



SAKARYA  
UNIVERSITY

2014 **INTE**

INTERNATIONAL  
CONFERENCE ON NEW HORIZONS  
IN EDUCATION

[www.int-e.net](http://www.int-e.net)

**June 25 - 27  
2014**

**Paris, FRANCE**



**Proceedings Book  
Volume 2/5**

**ISSN: 2146-7358**

Venue: Hotel Novotel Paris Est, PARIS, FRANCE



## Foreword

Dear Guests,

Welcome to the 5<sup>th</sup> International Conference of New Horizons in Education-2014 in Paris, France. "The International Conference of New Horizons in Education (INTE)" is an international educational activity for academics, teachers and educators. It promotes development and dissemination of theoretical knowledge, conceptual research, and professional knowledge through conference activities, workshops, discussions and conference proceeding book. The International Conference of New Horizons in Education-2014 aims to diffuse knowledge and research findings among academicians and lead to professional development and scholarly practices in educational sciences.

For this conference, we have gathered in Paris to share and construct knowledge, to promote dialogue across academic differences, to further and deepen connections within our scholarly community, and to be in fellowship with friends and colleagues old and new. This year, INTE-2014 has received about 1300 applications. The Conference Organizing Committee has accepted approximately 900 abstracts and the conference features over 750 presentations, including 620 oral, 86 poster, and 42 video presentations in 8 conference halls and with more than 165 sessions, representing the breadth and depth of education research today.

This year we have participants from more 60 different countries representing five continents, with different races, gender, ethnic backgrounds and cultures.

We would like to wish you a pleasant stay in Paris and a successful conference. We hope that we will meet again at the International Conference of New Horizons in Education, 2015 in Barcelona, Spain next year.

Thank you for your contribution for the success of International Conference on New Horizons in Education 2014.

Assoc. Prof. Dr. Ahmet ESKİCUMALI  
*Coordinator*

Prof. Dr. Aytekin İŞMAN  
*General Coordinator*



## **INTE 2014 Organizing Committee**

### **General Coordinator**

Prof. Dr. Aytekin İŞMAN, Sakarya University, Turkey

### **Coordinators**

Prof. Dr. Colleen SEXTON, Governor State University, USA

Prof. Dr. Teresa FRANKLIN, Ohio University, USA

Prof. Dr. Carlos De Sousa REIS, Instituto Politecnico da Guard, Portugal

Assoc. Prof. Dr. Ahmet ESKİCUMALI, Sakarya University, Turkey

### **Assistant Coordinator**

Assist. Prof. Dr. İrfan ŞİMŞEK, Istanbul University, Turkey

### **Conference Secretary**

Dr. Kerim KARABACAK, Sakarya University, Turkey

Dr. Burak ŞİŞMAN, Istanbul University, Turkey

## INTE 2014 Editorial Board

Aaron DAVENPORT, Grand View College, United States	Francine Shuchat SHAW, New York University, United States
Ahmet ESKİCUMALI, Sakarya University, Turkey	Gianni Viardo VERCELLI, University of Genova, Italy
Andreja Istenic STARCIC, University of Primorska, Slovenija	Gilbert Mbotho MASITSA, University of The Free State - South Africa
Antoinette MUNTJEWERFF, University of Amsterdam, Netherlands	Giovanni ADORNI, University of Genova, Italy
Antonis LIONARAKIS, Hellenic Open University, Greece	Gregory ALEXANDER, University of The Free State - South Africa
Arif ALTUN, Hacettepe University, Turkey	Gulriz IMER, Mersin University, Turkey
Arvind SINGHAL, University of Texas, United States	Heli RUOKAMO, University of Lapland, Finland
Asuman Seda SARACALOĞLU, Adnan Menderes University, Turkey	Hj. Mohd Arif Hj. ISMAIL, National University of Malaysia, Malaysia
Aytekin ISMAN, Sakarya University, Turkey	Hüseyin YARATAN, Eastern Mediterranean University, North Cyprus
Brent G. WILSON, University of Colorado at Denver, United States	Iman OSTA, Lebanese American University, Lebanon
Buket AKKOYUNLU, Hacettepe University, Turkey	Ina Joubert, University of Pretoria, South Africa
Carlos De Sousa REIS, Instituto Politecnico da Guarda, Portugal	Jagannath DANGE, Kuvempu University, India
Cem BİROL, Near East University, North Cyprus	James C. HOLSTE, Texas A&M University at Qatar, Qatar
Charlotte GUNAWARDENA, University of New Mexico, United States	Jerry WILLIS, Manhattanville College, United States
Colleen SEXTON, Governor State University, United States	Kakha SHENGELIA, Caucasus University, Georgia
Dale HAVILL, Dhofar University, Oman	Karel RYDL, Pardubice University, Czech Republic
Danguole RUTKAUSKIENE, Kauno Tech. University, Lithuania	Manoj Kumar SAXENA, Advanced Institute of Management, India
Douglas Franklin, Ohio University, United States	Mariam MANJGALADZE, Institute of Linguistics, Georgia
Don FLOURNOY, Ohio University, United States	Marina STOCK MCISAAC, Arizona State University, United States
Elnaz ZAHED, University of Waterloo, UAE	
Eric Zhi-Feng LIU, National Central University, Taiwan	

Martin STEIN, Westfälische Wilhelms University, Germany	Rozhan IDRUS, Sains Malaysia University, Malaysia
Miguel j. ESCALA, Ins. Tech. de Santa Domingo, Dominican Republic	Saedah SIRAJ, University of Malaya, Malaysia
Min JOU, National Taiwan Normal Uni., Taiwan	Seçil KAYA, Anadolu University, Turkey
Mohammad YAMIN, King Abdulaziz University, Saudi Arabia	Serap OZBAS, Near East University, North Cyprus
Monte CASSIM, Ritsumeikan Asi Pacific University, Japan	Stefan AUFENANGER, University of Mainz, Germany
Nabi Bux JUMANI, Allama Iqbal Open University, Pakistan	Tam Shu SIM, University of Malaya, Malaysia
Osman TİTREK, Sakarya University, Turkey	Teressa FRANKLIN, Ohio University, United States
Ozcan DEMIREL, Hacettepe University, Turkey	Tülen SANER, Near East University, North Cyprus
Pamela EWELL, Central College of IOWA, United States	Veysel SÖNMEZ, Cyprus International University
Paul KGOBE, Centre of Edu. Pol. Dev., South Africa	Vincent Ru-Chu SHIH, National Pingtung Univ. of Sci. & Tech., Taiwan
Paul Serban AGACHI, Babes-Bolyai University, Romania	Vu Thi Thanh HOA, Oxfam Great Britain, Vietnam
Paula FITZGIBBON, University of Victoria, Canada	Yavuz AKPINAR, Bogazici University, Turkey
Pedro TADEU, Instituto Politecnico da Guarda, Portugal	Prof. Dr. Paolo DISIA, Free University of Boucano, Italy
Psaltis IACOVOS, European University Cyprus, Cyprus	Dr. Hanna ONYI YUSUF, Bello University, NIGERIA
Raja Rizwan HUSSAIN, King Saud University, Saudi Arabia	



## INTE 2014 Keynotes



*Quality in Turkish Higher Education: Sakarya University Sample*

Prof. Dr. Muzaffer Elmas

The Rector of Sakarya University - TURKEY



*Turkish Higher Education System, New Developments and Trends*

Prof. Dr. Durmuş Günay

Council of Higher Education - TURKEY



*Are you ready today for tomorrow's technology?*

Prof. Dr. J. Ana Donaldson

AECT Former President - USA



*New Trends in Education: Tradition and Innovation*

Prof. Dr. Ozcan DEMIREL

Hacettepe University, TURKEY

## INTE 2014 Keynotes



How mobile technology effectively enhances language teaching and learning performance?

Prof. Dr. Vincent Ru - Chu SHIH

National Pingtung University of Science and Technology, TAIWAN



Leveraging Institutional Capacity Through Research Based Evaluation

Prof. Dr. Douglas Franklin

Ohio University, USA



Why We MOOC: "Philosophy and operations of HarvardX and EdX"

Dr. Robert Doyle

Harvard University, USA

## TABLE OF CONTENT

<b><i>Decision-making in seniors regarding residential social services</i></b>	<b>1</b>
<i>Soňa Vávrová</i>	
<b><i>Deepening the understanding of musical style through adaptation and alteration of constituent parameters</i></b>	<b>10</b>
<i>Franz Krieger</i>	
<b><i>Dependence of the results of entrance examinations on test variants</i></b>	<b>14</b>
<i>Jindrich Klufa</i>	
<b><i>Descriptive analysis of researches on curriculum development in education</i></b>	<b>21</b>
<i>Elif Akdemir, Esmâ Nur Karameşe, Ali Arslan</i>	
<b><i>Design and development of a digital life logging system for management of lifelong learning experiences</i></b>	<b>26</b>
<i>Mehmet Emin Mutlu</i>	
<b><i>Design and development of Arabic online games – a conceptual paper</i></b>	<b>43</b>
<i>Hamizul, M., Nik Mohd Rahimi</i>	
<b><i>Design and development performance-based into mobile learning for TVET</i></b>	<b>49</b>
<i>Irwan Mahazir, , Norazah, M.N, Rosseni, D, Azwin Arif, A.R, Ridzwan, C.R</i>	
<b><i>Design for experiencing: participatory design approach with multidisciplinary perspectives</i></b>	<b>56</b>
<i>Mihyun Kang, Phil Choo, Craig E. Watters</i>	
<b><i>Design of cooperative problem-based learning activities to enhance cooperation skill in online environment</i></b>	<b>59</b>
<i>Kawita Panlumlers', and Panita Wannapiroon</i>	
<b><i>Design of total quality management information system (TQMIS) for model school on best practice</i></b>	<b>67</b>
<i>Sudarat Srima, Panita Wannapiroon and Prachyanun Nilsook</i>	
<b><i>Determining of the prospective teachers' understadings of electrochemistry</i></b>	<b>73</b>
<i>Adem Yilmaz, Samih Bayrakçeken</i>	
<b><i>Determining of vocational school student's attitudes toward the puzzle method</i></b>	<b>81</b>
<i>Seyid Ahmet Sargin, Furkan Baltaci, Hakan Bicici, Ahmet Yumusak</i>	
<b><i>Determining the anxieties of accounting education students: A sample of Aksaray University</i></b>	<b>87</b>
<i>Haluk Duman, İbrahim Apak, Mehmet Yücenurşen, Ali Aykut Peker</i>	
<b><i>Developing the entrepreneurial competencies of sport management students</i></b>	<b>94</b>
<i>Jana Nová</i>	
<b><i>Development and evaluation of an e-portfolio for use in a dietetic internship program</i></b>	<b>104</b>
<i>Ann Gaba</i>	
<b><i>Development and implementation of metaphonological skills and reading assessment and intervention programs</i></b>	<b>112</b>
<i>Simone Aparecida Capellini, Fabio Henrique Pinheiro</i>	
<b><i>Development and validation of the information literacy assessment in connectivism learning environment for undergraduate students</i></b>	<b>120</b>
<i>Kulachai Kultawanich, Prakob Koraneekij, Jaitip Na-Songkhla</i>	
<b><i>Development of "educational faculty students' attitudes towards their departments" attitude scale study</i></b>	<b>125</b>



<i>Yucel Gelisli</i>	
<b><i>Development of a challenge based learning model via cloud technology and social media for enhancing information management skills</i></b>	<b>134</b>
<i>Sathaporn Yoosomboon , Panita Wannapiroon</i>	
<b><i>Development of a model of Thai literature hypermedia electronic books with social media based on the reader-response theory to enhance reading comprehension of elementary school students</i></b>	<b>140</b>
<i>Jitlada Kumnuansin, Jintavee Khlaisang</i>	
<b><i>Development of a two-tier diagnostic test to assess undergraduates' understanding of some chemistry concepts</i></b>	<b>147</b>
<i>Ayfer Mutlu , Burcin Acar Sesen</i>	
<b><i>Development of an Attitudes Scale toward Online Assessment</i></b>	<b>154</b>
<i>Emrah Gül, Ömay Çokluk, Çilem Doğan Gül</i>	
<b><i>Development of an instructional learning object design model for tablets using game-based learning with scaffolding to enhance mathematical concepts for mathematic learning disability students</i></b>	<b>162</b>
<i>Suwit Waiyakoon, Jintavee Khlaisang, Prakob Koraneekij</i>	
<b><i>Development Of Collaborative Learning Using Case-Based Learning Via Cloud Technology And Social Media For Enhancing Problem-Solving Skills And ICT Literacy Within Undergraduate Students</i></b>	<b>170</b>
<i>Jarumon Nookhong , Panita Wannapiroon</i>	
<b><i>Development Of Continuing Motivation Via Distance Learning Model In Unrest Southernmost Provinces, Thailand</i></b>	<b>176</b>
<i>Monton Pholboon, Wuttisak Pochanukul, Juta Tammachart, Kittisak Na Badalung</i>	
<b><i>Development Of E-Portfolio Management System Towards Thai Qualifications Framework For Higher Education</i></b>	<b>182</b>
<i>Prakob Koraneekij, Jintavee Khlaisang</i>	
<b><i>Development Of Learning Outcome Based E-Portfolio Model Emphasizing On Cognitive Skills In Pedagogical Blended E-Learning Environment For Undergraduate Students At Faculty Of Education, Chulalongkorn University</i></b>	<b>191</b>
<i>Prakob Koraneekij, Jintavee Khlaisang</i>	
<b><i>Development Of Non-Formal Adult Education In The Czech Republic</i></b>	<b>200</b>
<i>Jan Kalenda</i>	
<b><i>Development Of The Open Educational Rajabhat University Students Resources Using Service Learning To Enhance Public Consciousness And Creative Problem Solving</i></b>	<b>208</b>
<i>Poggade Chanayotha, Jaitip Na-Songkhla</i>	
<b><i>Dialogue Education In Turkey – France Relations</i></b>	<b>216</b>
<i>Bilgehan Gültekin, Tuba Gültekin</i>	
<b><i>Digital Spaces: Between Educational Tools And Student Uses</i></b>	<b>225</b>
<i>Cathia Papi</i>	
<b><i>Discourses Of Gender In Brazilian Songs: The Influence Of Music In Brazilian Education Under A Gender Analysis</i></b>	<b>233</b>
<i>Luciana Steffen, Daniéli Busanello Krob</i>	
<b><i>Discursivity And Creativity: Implementing Pigrum's Multi-Mode Transitional Practices In Upper Division Creative Production Courses</i></b>	<b>240</b>

<i>Michael Filimowicz, Veronika Tzankova</i>	
<b>Discussing The Importance Of Teaching Ethics In Education</b>	<b>248</b>
<i>Nur Yeliz Gülcan</i>	
<b>Distance Education For Health Professions' Students</b>	<b>252</b>
<i>Anna Siri, Marina Rui</i>	
<b>Do We Know What Is Important When Establishing New Business?</b>	<b>261</b>
<i>Hanák Róbert</i>	
<b>Does Intelligence Predict Academic Achievement? Two Case Studies</b>	<b>268</b>
<i>Vladimíra Čavojevová, Eva Ballová Mikušková</i>	
<b>Dyslexia: An Educational Project In The Sound And Music Scope</b>	<b>277</b>
<i>Anna Maria Ferrone, Stefano Olivi</i>	
<b>"Exploratory" And "Descriptive" Aspects Of Environmental Psychology Course Within The Interior Design Education</b>	<b>281</b>
<i>Meryem Yalçın</i>	
<b>8<sup>th</sup> Grade Students' Attitude Towards Technology</b>	<b>292</b>
<i>İsmail Yazar, Kerim Karabacak</i>	
<b>Early Identification Of Reading Problems: Preliminary Study With Students Of 1st Grade</b>	<b>303</b>
<i>Simone Aparecida Capellini, Alexandra Beatriz Portes De Cerqueira César, Giseli Donadon Germano</i>	
<b>East Meets West: The Reader Response Theory In Thriller Fictions</b>	<b>307</b>
<i>Mohd Nazri Latiff Azmi</i>	
<b>Educating Film Audience Through Social Cognitive Theory Reciprocal Model</b>	<b>313</b>
<i>Rosmawati Mohd. Rasit, Salasiah Hanin Hamjah, Siti Rugayah Tibek, Fariza Md. Sham, Muhamad Faisal Ashaari, Muhammad Adib Samsudin &amp; Adawiyah Ismail</i>	
<b>Education And Communication In Health As Strategies For Accomplishment Of The Universal Access To Health In Uberaba</b>	<b>321</b>
<i>Rosane A.S. Martins, Claudia H. Julião, Marta R. Farinelli, Aline F. Bessa, Aline C. P. Maríngolo, Brendda C.A Nolasco, Camila B. Ribeiro, Daniel S. Basilio, Nairana A. N. Gomes, Renata R. Severino, Tainara P. Costa</i>	
<b>Education For Structural Change And Innovativeness Of The Economy In Latvia</b>	<b>327</b>
<i>Viktorija Šipilova</i>	
<b>Education Issues In A Totalitarian State (Case Of Albania)</b>	<b>335</b>
<i>Anila Mullahi, Jostina Dhimitri</i>	
<b>Education Of Employees And Investment Climate Of The Region: The View Of The Heads Of Enterprises</b>	<b>340</b>
<i>Alina Ohotina, Olga Lavrinenko</i>	
<b>Education Of Students And Graduates Of Technical Schools For Contemporary Requirements Of Practice</b>	<b>345</b>
<i>Zuzana Chodasová, Zuzana Tekulová, Lýdia Hľušková, Stanislav Ľavinský</i>	
<b>Education policies during Atatürk period</b>	<b>353</b>
<i>Birsen Unal</i>	
<b>Education Policy of The State of Hatay (1938-1939)</b>	<b>358</b>
<i>Yusuf Kodaz</i>	
<b>Educational process in terms of teaching methods and organizational forms in small schools</b>	<b>359</b>

<i>Martin Skutil, Klára Havlíčková, Renata Matějíčková</i>	
<b>Educational technology in economics instruction</b>	<b>365</b>
<i>Ahmet Kara</i>	
<b>Educational Technology, potentials, expectations and challenges</b>	<b>374</b>
<i>Dr.Hala El Miniawi , AbdulHadi Brenjekjy</i>	
<b>Educational value of autobiographical writings for self-identity development and orienteering</b>	<b>381</b>
<i>Gabriella Aleandri, Alessia Checchi</i>	
<b>Effect of micro teaching technique on teacher candidates' beliefs regarding mathematics teaching</b>	<b>395</b>
<i>Kadir Bilen</i>	
<b>Effect(S) Of Teacher Evaluation On Collaborative Practices: Induction Or Inhibition?</b>	<b>403</b>
<i>Ana Marcos, Eusébio Machado, Marta Abelha</i>	
<b>Effectiveness Of Workshop To Improve Engineering Students' Awareness On Engineering Ethics</b>	<b>410</b>
<i>Pei Cheng Ooi, Michelle T. T. Tan</i>	
<b>Effects Of An Assisted Repeated Reading Program On Student Fluency In A Large Class In Burkina Faso</b>	<b>417</b>
<i>Élisabeth Boily, Chantal Ouellet and Catherine Turcotte</i>	
<b>Effects Of Creative Writing Activities On Students' Achievement In Writing, Writing Dispositions And Attitude To English.</b>	<b>424</b>
<i>Şükran Tok, Anıl Kandemir</i>	
<b>Effects Of English Spelling Learning Experience Through A Mobile Line App For College Students</b>	<b>432</b>
<i>Ru-Chu Shih, Chunyi Lee, &amp; Tsai-Feng Cheng</i>	
<b>Effects Of School Dropout For Transition To Adulthood</b>	<b>437</b>
<i>Carlos Reis</i>	
<b>Effects Of Teaching Strategies Supported By Information And Communication Technologies On Satisfaction And Learning Of College Students</b>	<b>448</b>
<i>Andreia Araujo Lima Torres, Gardênia Da Silva Abbad, Kelb Bousquet-Santos</i>	
<b>Effects Of The IQ Up Cognitive Development Method On The Cognitive Development Of 10- To 12-Year-Old Children</b>	<b>455</b>
<i>Hatice Kafadar, Zafer Akıncı , Belgin Çakır</i>	
<b>Effects Of The Media To Promote The Scratch Programming Capabilities Creativity Of Elementary School Students</b>	<b>466</b>
<i>Worarit Kobsiripat</i>	
<b>Efficient Education Of Ergonomics In Industrial Engineering Study Program</b>	<b>473</b>
<i>Marek Bures</i>	
<b>Eğitim ile Ücret İlişkisi: Türkiye Üzerine Bir Değerlendirme</b>	<b>479</b>
<i>Yrd. Doç. Dr. Seda Tekeli, Doç. Dr. Güler Günsoy</i>	
<b>Eğitim Ve Fen Fakültesi Matematik Öğretmen Adaylarının Geometrinin Temel Kavramları Hakkında Kavram Görüntüleri</b>	<b>497</b>
<i>Sare Şengül, Ayşe Altın' Pınar Güner</i>	
<b>E-Learning At The Polish University In The Opinion Of Students</b>	<b>504</b>
<i>Justyna Truskolaska, Magdalena Łuka, Nasturcja Toruj, Katarzyna Wrona, Patrycja Smagowska</i>	
<b>E-Learning In French Language Teaching In Higher Education In The Czech Republic</b>	<b>510</b>



<i>Radka Fridrichová</i>	
<b><i>E-Learning System In Blended Learning Environment To Enhance Cognitive Skills For Learners In Higher Education</i></b>	<b>515</b>
<i>Jintavee Khlaisang and Maneerat Likhitdamrongkiat</i>	
<b><i>E-Learning System In Virtual Learning Environment To Develop Creative Thinking For Learners In Higher Education</i></b>	<b>524</b>
<i>Noawanit Songkram</i>	
<b><i>E-Learning System In Virtual Learning Environment To Enhance Cognitive Skills For Learners In Higher Education</i></b>	<b>530</b>
<i>Noawanit Songkram, Bundit Puthaseranee</i>	
<b><i>E-Learning System To Enhance Cognitive Skills For Learners In Higher Education</i></b>	<b>537</b>
<i>Noawanit Songkram, Jintavee Khlaisang, Bundit Puthaseranee Maneerat Likhitdamrongkiat</i>	
<b><i>Elementary Students' Motivation Towards Informatics Course</i></b>	<b>544</b>
<i>Saša Mladenović, Žana Žanko, Monika Mladenović</i>	
<b><i>Elicited Learning Strategy Through Students' Mal-Intended Notes</i></b>	<b>553</b>
<i>Faranak Abbaszad Tehrani</i>	
<b><i>Embodied Processes Between Maths And Gross-Motor Skills</i></b>	<b>561</b>
<i>Rio Laura, Damiani Paola, Gomez Paloma Filippo</i>	
<b><i>Emotional Intelligence Factor In Creation Of The Polemics In Printed Media: An Analysis Over The Master And Doctorate Students</i></b>	<b>567</b>
<i>Ceyda Ilgaz Büyükbaykal Seda Çakar Mengü Murat Mengü</i>	
<b><i>Enhancing Students' Critical Thinking Skills Through Teaching And Learning By Inquiry-Based Learning Activities Using Social Network And Cloud Computing</i></b>	<b>573</b>
<i>Patamaporn Thaiposri, Panita Wannapiroon</i>	
<b><i>Environmental Views And Awareness Of Preschool Teacher Candidates</i></b>	<b>582</b>
<i>Elif Celebi Oncu, Esra Unluer</i>	
<b><i>E-Portfolio Model Development For The Professional Practice Bachelor Of Teaching (Pismp) In Malaysia</i></b>	<b>587</b>
<i>Tajul Ashikin, Hashim ; Ruhizan, Mohammad Yasin Rohani, Seman</i>	
<b><i>"Ethics and Ethic Codex in the Teaching Process."</i></b>	<b>595</b>
<i>Katarina Novakova</i>	
<b><i>Ethics Committees In Turkish Universities</i></b>	<b>599</b>
<i>Subhan Eksioglu, Hatice Beyza Mercan Sezer, Fatma Gozalan Cicek</i>	
<b><i>Evaluation Of The Candidate Teachers' Preparing Question Experience By Using Alternative Assessment Techniques</i></b>	<b>641</b>
<i>Assist. Prof. Dr. İrfan Şimşek</i>	
<b><i>Evaluation Levels In Education</i></b>	<b>609</b>
<i>Vít Dočekal, Miroslava Dvořáková</i>	
<b><i>Evaluation Of Current Applications On Legal Education</i></b>	<b>625</b>
<i>Huriye Kubilay</i>	
<b><i>Evaluation Of New Primary Education Curriculum Based On Constructivist Learning Approach Through The Viewpoints Of Teachers</i></b>	<b>628</b>
<i>Mehmet Arif Özerbaş</i>	

<b>Examination Of Anger Levels Of Prospective Teachers Of Physical Education And Sports</b> Elif Karagün	637
<b>Examination Of Teacher Candidates' Problem Solving Skills According To Several Variables</b> Kerim Karabacak Duygu Nalbant And Pınar Topçuoğlu	644
<b>Examining Technopedagogical Knowledge Competencies Of Teachers In Terms Of Some Variables</b> Barış Sezer	653
<b>Excel-Based Workbook For Quality Management (Ewqm)</b> Nieto-Marquez	661
<b>Exciting Technical Learning In Large Classes Through Personal Response Technology</b> Peter Knottenbelt, Amuli Bukanga	668
<b>Expectation Of Educators And Students Towards A Distance Learning Model In Southernmost Provinces Of Thailand</b> Charuwan Kritpracha, Ophat Kaosaiyaporn , Wasant Atisabda	674
<b>Expectation Of Students From Their Thesis Supervisor</b> Nuri Doğan, Özge Bıkmaz	680
<b>Explanation Of Instruments And Procedures Used By The Recipients Of Education In Order To Build Their Own Learning Network, Based On The Generic Model Cognitive Process</b> Milan Klement, Miroslav Chráska, Sylvie Klementová	687
<b>Exploring Technological Innovation Towards Inclusive Education: Building Digital Games - An Interdisciplinary Challenge</b> Adriana G. Alves, Ana Elisa F. Schmidt, Karla D. P. Carthca <sup>c</sup> , Regina C. L. Hostins	695
<b>Exploring The Effect Of Backwash In First Year Medical Students And Comparison With Their Academic Performances</b> Afshan Sumera, Ankur Barua, Amutha Navamoney	700
<b>Fabrication Of The Kinect Remote-Controlled Cars And Planning Of The Motion Interaction Courses</b> Ke-Yu Lee , Jhih-Sian Jheng , Shiang-Chih Chen , Shi-Jer Lou	705
<b>Factors Affecting Creative Problem Solving In The Blended Learning Environment: A Review Of The Literature</b> Samoekan Sophonhiranraka, Praweenya Suwannathachoteb, Sungworn Ngudgratokec	710
<b>Factors Impacting Academic Achievement In Colombian Working Children: A Gender Profile</b> Marla Maestre-Meyer, Óscar Oviedo-Trespalacios, Jorge Palacio	717
<b>Factors Influencing Function And Form Decisions Of Interior Architectural Design Studio Students</b> Umut Tuğlu Karşlı	723
<b>Factors Motivating Teachers Working At Elementary And Secondary Schools</b> Süleyman Can	732
<b>Fen Bilgisi Öğretmen Adaylarının Hazırlamış Oldukları Ders Materyalleri Hakkındaki Görüşleri Nasıldır?</b> Abdullah Koray, Gürkay Birinci, Özlem Koray	739
<b>Financial Strategies, The Professional Development Of Employers And Performance Of Sme's ( AGUASCALIENTES Case )</b>	746

<i>Jesús Salvador Vivanco Florido, Martha Gonzalez Adame, Miguel Angel Oropeza Tagle</i> <b>First Grade Teachers Teach Reading With Songs</b>	754
<i>Derya Arslan</i> <b>For A City's Pedagogy</b>	760
<i>Olivia Morais De Medeiros Neta</i> <b>Foreign Language Teaching : A Problem In Turkish Education</b>	766
<i>Aygül Oktay</i> <b>Free Problem Posing Cases Of Prospective Mathematics Teachers: Difficulties And Solutions</b>	775
<i>Sare Şengül, Yasemin Katranci</i> <b>From Vision To Action – A Strategic Planning Process Model For Open Educational Resources</b>	784
<i>Chen, Shu-Hsiang, Nasongkhla, Jaitip, Donaldson, J. Ana</i> <b>Fundamentals And Paradoxes Of Law Which Regulates The Religious Education In Public Schools Of Rio De Janeiro</b>	791
<i>Catharine Vanessa Peres , Luci Faria Pinheiro</i> <b>Game Programming For Complex System Development And Abet Accreditation Assessment</b>	797
<i>Cheer-Sun Yang</i> <b>Gamentship – An Innovative Project To Improve Entrepreneurship Competences.</b>	803
<i>Pedro Tadeu, Teresa Paiva</i> <b>Gamifying French Language Learning: A Case Study Examining A Quest-Based, Augmented Reality Mobile Learning-Tool</b>	807
<i>Bernadette Perry</i> <b>Gender- And Giftedness-Specific Differences In Mathematical Self-Concepts, Attributions And Interests</b>	815
<i>Ralf Benölken</i> <b>Globalization And Internationalization In ELT: Methodology, Technology And Language Policy At A Crossroad In Brazil</b>	825
<i>Maria Carolina Porcino, Kyria Rebeca Finardi</i> <b>Globalization, Nationalization And Rationalization</b>	832
<i>Gulnaz Zahid</i> <b>Gross-Motor Skills For Potential Intelligence Descriptive Study In A Kindergarten</b>	838
<i>Mariarosaria Galdi, Cristiana D'Anna, Nicolina Pastena, Filippo Gomez Paloma</i> <b>Grouping The Mega University Countries According To Their Similarities</b>	847
<i>Prof. Dr. Necat Berberoğlu - Assoc. Prof. Dr. Bahar Berberoğlu</i> <b>Health Education Survey Study With Parents Of Gifted Students</b>	855
<i>Fatma Çıldır Pelitoğlu, Sami Özgür</i> <b>Health Education: Strategy For Sexual And Reproductive Care For Women In Custody</b>	856
<i>Tatiane Gomes Guedes, Francisca Márcia Pereira Linhares , Sheila Coelho Ramalho Vasconcelos Morais , Izabelle De Freitas Ferreira, Tuanny Gomes Mendonça , Fernanda Vasconcelos Silva , Gabrielle Pessôa Da Silva , Jaciane De Almeida Costa , Lais Angela Da Silva Pessoa , Myllena Da Silva Santos</i> <b>Health Literacy</b>	861
<i>Gülnur İlgin, İlkay Sevinç Turaç, Sevilay Orak</i> <b>High School Students' Metaphoric Perceptions For The Concept Of Chemistry</b>	866
<i>Aysegül Derman</i>	



<b>High Scope Project In Taiwan Provides Students Both Career Exploration And Preparation For Further Study</b>	<b>868</b>
Ching-Ho Huang, Chin-Guo Kuo	
<b>Hiper Metinlerin (Hypertext) Yabancı Dil Dersleri İçin Önemi</b>	<b>873</b>
Selma Akol	
<b>How Big Is The World You Can Explore? A Study Of Chinese College Students' Search Behavior Via Search Engines</b>	<b>880</b>
Tao Fu, Kavita Karan	
<b>How Can I Do? The Representations Of Secondary School Student-Teachers About School Practices</b>	<b>890</b>
Laura Sara Agrati, Chiara Gemma	
<b>How Does A Taxi Driver Use Geometry?</b>	<b>896</b>
Aytaç Kurtuluş, Tuba Ada	
<b>How Effective Is Critical Reading In The Understanding Of Scientific Texts?</b>	<b>904</b>
Ferdi Akin, Özlem Koray, Koray Tavukçu	
<b>How To Effectively Integrate Technology In The Foreign Language Classroom For Learning And Collaboration</b>	<b>911</b>
Maria De Lurdes Martins	
<b>Identity issues among post-secondary nonnative students in an english speaking country</b>	<b>918</b>
Mehdi Rahimian	
<b>Il digital storytelling come filo d'Arianna tra le generazioni</b>	<b>925</b>
Barbara Bruschi, Alessia Rosa	
<b>Images of chemical scientists through Turkish primary students' eyes: implications for curriculum and instruction</b>	<b>932</b>
Hüncar Korkmaz, Nilgun Secken	
<b>Impact of self-esteem and gratitude disposition on happiness in pre-service early childhood teachers</b>	<b>939</b>
Haeik Hwang, Hyunmi Kang, Jeonghwa Tak, Sieun Lee	
<b>Implementation of hog edge detection algorithm on fpga's</b>	<b>945</b>
Berkant Başa	
<b>Implementation of the lifelong learning experiences management approach – Observations on the first experiences</b>	<b>953</b>
Mehmet Emin Mutlu, İlker Kayabaş, Buket Kip Kayabaş, Ayşe Peri Mutlu	
<b>Implementing Elt Innovations: Adopting Integrated Language Skills Through Ict</b>	<b>965</b>
Asst. Prof.Dr.Semin Kazazoglu	
<b>Implementing a digital model for smart space design:practical and pedagogic issues</b>	<b>966</b>
Do-Young Kim, Yoon Choe, Sung-Ah Kim	
<b>Improve student success through their realities</b>	<b>975</b>
Bani Saloua	
<b>In other words: Counterdiscourses in the classroom</b>	<b>981</b>
Nils Olov Fors	
<b>In the shade of performance</b>	<b>985</b>
Barbara Di Blasio	

<b><i>Inclusive Learning Environment At The University Of West Bohemia, Czech Republic</i></b>	<b>992</b>
<i>Pavla Hrabackova, Jana Hruskova</i>	
<b><i>Individual Potential Of Doctoral Students: Structure Of Research Competences And Self-Assessment</i></b>	<b>996</b>
<i>Eridiana Olehnovica, Ingrida Bolgzda, Mārīte Kravale-Pauliņa</i>	
<b><i>Influence Of Education On Unemployment Rate And Incomes Of Residents</i></b>	<b>1003</b>
<i>Ilga Lavrinovicha, Olga Lavrinenko, Janis Teivans-Treinovskis</i>	
<b><i>Influence Of Implementing Inquiry-Based Instruction On Science Learning Motivation And Interest: A Perspective Of Comparison</i></b>	<b>1009</b>
<i>Pi-Hsia Wang, Pai-Lu Wu, Ker-Wei Yu, Yi-Xian Lin</i>	
<b><i>Innovation Approaches For Better Self-Assertion Of The University Of Zilina, Faculty Of Special Engineering Graduates In Accordance With Actual Labour Market Needs</i></b>	<b>1016</b>
<i>Mária Hudáková, Mária Lusková</i>	
<b><i>Innovation In Ethical Education By Means Of Teachers' Action Research</i></b>	<b>1023</b>
<i>Miroslav Valica, Terezia Rohn</i>	
<b><i>Innovation Of Educational Content And Study Materials With Respect To Knowledge Society Needs And Labour Market At The University Of Zilina, Faculty Of Special Engineering</i></b>	<b>1029</b>
<i>Katarína Buganová, Mária Lusková</i>	
<b><i>Innovations In Ethical Education: Dilemmas In Theory And Practice</i></b>	<b>1036</b>
<i>Petra Fridrichova</i>	
<b><i>Innovative Educational Activities Using A Model To Improve Cultural Competency Among Graduate Students</i></b>	<b>1040</b>
<i>Kathleen Bauer, Yeon Bai</i>	

# Decision-making in seniors regarding residential social services

Soňa Vávrová\*

*Research Centre of FHS, Faculty of Humanities, Tomas Bata University in Zlín, Mostní 5139, 760 01 Zlín, Czech Republic*

---

## Abstract

We focused on the process of decision making in seniors regarding the initiation of using residential social services, i.e. possible moving into an institutional environment. A qualitative research strategy of depth interviews among 14 service users of homes for seniors was used. The grounded theory method was chosen as a method to analyse the data obtained among the users applied in accordance with Strauss and Corbin. The interviews were transcribed and processed using open, axial and selective coding. The results show that the users consider their moving into a home for seniors a necessity when having no other choice. The seniors believe that they did not have a choice in their decision making due to their social situation, their health condition or when in need of an intensive help and care of other persons, especially with no one available to provide them with the above in their natural social environment. The fact is that they had never imagined spending the end of their life in a home for the elderly, moreover they do not consider the facility their home. On the basis of the results obtained, we made recommendations for the practice – more precisely for education of helping profession students, who are to work with seniors.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* senior; social services; home for seniors; institutionalization; deinstitutionalization; non-institutionalization.

---

## Theoretical background

It is assumed that the state of elder care is a reflection of the development of the society. Attitudes of the Czech society towards social care for the elderly has transformed in the course of history in the context of the political and economic system of the country. After World War II, the social services for the elderly were primarily provided in the form of an institutional residential care for the elderly. Also Malíková (2011, p. 29) notes that a placement of seniors into a single form of institutional care, the state retirement homes, was customary and almost an exclusive way of solving a reduced self-sufficiency or a complete unself-sufficiency of seniors. It was often a way of addressing a housing deficit, which led to the fact that self-sufficient individuals and individuals capable of further independent life were placed in this kind of facility.

Human history is characterised by alternating paradigms which occurs whenever the existing paradigm is exhausted and ceases to be functional, which is the case of provision of social services for the elderly at the turn of the 20<sup>th</sup> and 21<sup>st</sup> century. People are no longer willing to spend the final stage of life path in an institutionalised environment of residential social services - homes for the elderly, quite the contrary. They wish to stay in their natural social environment with support of lay (family) and professional caregivers as long as possible. In case remaining in their natural social environment no longer possible for certain objective or subjective reasons, possible alternatives have to be considered. The decision to use residential social services of homes for the elderly is

---

\* Corresponding author.  
E-mail address: vavrova@fhs.utb.cz

according to Vágnerová (2008, p. 419) *an important milestone in the life of a senior* and it represents a fundamental change in one's lifestyle. Life in an institution is associated with a loss of personal background, privacy, autonomy and can be understood as a signal of the approaching end of life, which is reflected in one's perception and in the cognitive and behavioral areas (ibid., p. 149).

The fundamental transformation in provision of social services for the elderly occurred in the Czech settings at the beginning of the 21<sup>st</sup> century, coinciding with a legislative change. The Social Services Act No. 108/2006 Coll. (hereinafter the "Act"), which changed the main principles of providing social services, was approved by the Parliament of the Czech Republic on 14 March 2006. The effective date (1. 1. 2007) gave rise to a new paradigm in the provision of social services for the elderly. The Act anchored the conditions for *providing assistance and support to individuals in difficult social situations through social services and care allowance* (§ 1), while *the extent and form of assistance and support provided through social services is to preserve human dignity ... is to be based on individually identified needs of the individual, actively affect the individual, support the development of autonomy, encourage to engage in activities that do not lead to long-term persistence or worsening of an adverse social situation and strengthen social integration ... be provided in the interest of the individual and in the sufficient quality in order to always respect human rights and fundamental freedoms* (§ 2). As shown in the above quote of the Act, the existing legislation supports individualised care prior to social exclusion and institutionalisation of persons to whom the service is provided. The philosophy of non-institutionalisation of seniors gaining general support in the society.

#### *Residential social services for the elderly in the Czech Republic*

As mentioned above, residential care represented by homes for the elderly held, and still to some extent hold an important if not a dominant position in the field of social services for the target group. The development in the number of residential facilities whose services are aimed at seniors, since the effective date of the Act is illustrated below in Table 1.

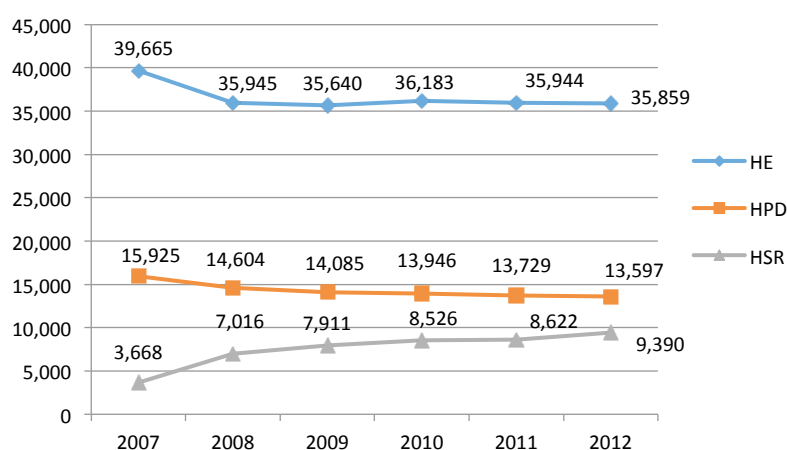
**Table 1.** Development in the number of residential social services since the effective date of the Act

Type of facility / Year	2007	2008	2009	2010	2011	2012
Homes for the elderly (HE)	463	452	453	466	471	480
Homes for people with disabilities (HPD)	205	225	218	219	211	212
Homes with special regime (HSR)	75	150	165	176	189	210
<b>Total</b>	<b>743</b>	<b>827</b>	<b>836</b>	<b>861</b>	<b>871</b>	<b>902</b>

Source of data: Statistical Yearbook of Labour and Social Affairs 2007-2012. [online].

The presented table demonstrates that the number of homes for the elderly has increased significantly since 2007 by 17 facilities, homes with special regime by 135 and homes for people with disabilities by 7. In order to obtain an objective view of the situation, we present Chart 1 Development in the number of residential social service user in the Czech Republic.

**Chart 1.** Development in the number of residential social service user since the effective date of the Act



Source of data: Statistical Yearbook of Labour and Social Affairs 2007-2012. [online].

The data published by the Ministry of Labour and Social Affairs show that while the number of users in homes for the elderly has decreased by 3,806 since the effective date of the Act, the number of users in homes with special regime has increased by 5, 722. Homes with special regime are designed not only for persons with a mental illness or a substance abuse problem, but also for people with senile, Alzheimer's and other types of dementia who display reduced self-sufficiency due to these conditions. It is therefore likely that reduction in the number of users in homes for the elderly was counterbalanced by the increasing number of senior users in specialised facilities.

## Research methodology

The research focused on the reflection of the decision-making process regarding initiation of residential social services by the users of homes for the elderly themselves. Our goal was to create a theory showing and explaining the phenomenon under review. We therefore decided to base our research on the grounded theory method. Grounded theory was developed in 1967 by sociologists Glaser and Strauss in their clinical research in medical sociology. Glaser and Strauss described the selected method in four following stages: 1. comparing and classification of incidents within each category, 2. integrating categories and their properties, 3. delimiting the theory, and 4. writing the theory (Rubin, Babbie, 2011, p. 477-478). When applying grounded theory, we shall proceed in accordance with the phases above, while taking the standpoint of the later concept of this method by Strauss and Corbin from 1990.

### Data collection technique

Using the technique of unstructured interviews, within field research conducted in large-scale residential social services for the elderly with 100 users or more, we interviewed seniors who moved into a home for the elderly no longer than 6 months ago about their decision making regarding initiation of use of residential care. *The field research is characterised by a lower level of structure, which usually manifests itself by rather general research questions* (Miovský, 2006, p. 103). The selected data collection technique - unstructured interview, was chosen due to its close resemblance to an ordinary conversation, which seemed most appropriate with regard to the target group of probands. *In an unstructured interview we do not have a plan created ahead in the form of a structure that we could follow ...we do not usually define sub-areas ... we rather follow the main theme* (Miovský, 2006, p. 157).

The initial formulation of the research questions were very broad as required by grounded theory, however during the research process, it became narrow and focused. According to Strauss and Corbin (1999, p. 24) a

research begins *openly and widely, but not so openly as to cover all possibilities, and at the same time not too narrowly as to prevent exclusion of the possibility of discovery, which is the primary purpose of using the grounded theory method.*

#### *Research sample selection*

The selection of the research sample was intentional (purposeful). We sought individuals that would meet the criteria. In the first phase, we chose a large-scale facility (with 100 users or more) of residential social services such as homes for the elderly on the territory of the Zlín Region (one of the 14 regions in the Czech Republic). These conditions were fulfilled by a total of 5 facilities whose capacity ranged from 108 to 196 users. One of these 5 institutions is directly in the regional town, 1 in one of the four district towns (note: the Zlín Region consists of 4 districts) and the remaining 3 facilities are located in smaller towns or municipalities.

Due to the above, we decided to carry out the research in a total of 3 institutions located in the regional, district and a small town (this facility was drawn).

The users to interview in each facility, were chosen in cooperation with social workers. The criteria for inclusion in the research sample were as follows:

1. Users were admitted into facility among the last ones, the latest date of their arrival was three months prior to the interview. The users were approached retrospectively.
2. Users are able to communicate verbally and there is a prerequisite that they can reflect on their decision about relocating into a home for the elderly.
3. Users tentatively agreed to their participation in the interview.

A consent to the visit of a researcher was obtained by the social workers from five service users in each facility and a date in which the researcher visited the facility was set. Table 2. captures the numbers of interviews conducted by the gender of the participants in individual homes for the elderly:

**Table 2.** Numbers of interviews in facilities according to probands' sex

Homes for the elderly located in:	Number of respondents	Probands' identification	Current number of facility users
regional town (76 thousand inhabitants)	4 women; 1 man*	P1, P2, P3, P4	108 (92 women; 16 men)
district town (26 thousand inhabitants)	2 women; 3 men	P5, P6, P7, P8, P9	153 (112 women; 41men)
small town (2.5 thousand inhabitants)	4 women; 1 man	P10, P11, P12, P13, P14	154 (105 women; 49men)

\* was hospitalised at the time of the research, the interview was not possible

Obtained recordings of the interviews were subsequently transcribed verbatim. To increase the degree of authenticity, we used annotated transcription, which also captures characteristic features of utterance, such as laughter, pauses, crying, etc. Semantic frameworks of the transcribed text of each interviews were numbered for clarity and each participant was labelled with a specific acronym.

The transcribed data were analyzed using the techniques of open, axial and selective coding. In the context of open coding, we consistently perused the texts and broke them into smaller semantic units (words, word sequences, sentences or paragraphs), which were assigned names (codes). We created a preliminary list of codes with localization of meaning units. During the analysis, we revisited the codes, revised and renamed them. Gradually we created a list of codes that were listed under the individual meaning units. The codes in different semantic blocks were then categorised, which formed categories with their suP10/tegories. During the open coding, 77 codes were

abstracted, and grouped into 12 categories. The presented categories were profiled by merging umbrella codes for individual data fragments recorded in the transcribed text. The category names more abstract compared to the code names and are of a certain conceptual range which determines their suP10/tegories. The first phase of the analysis was to uncover the thematic range of the corpus text. In the context of open coding, we divided the data and determined the categories / suP10/tegories, their properties and possible location on the dimensional scales.

During the open coding, 12 different categories emerged. Some of these belong to phenomena, others describe the conditions of ascertain relation to these phenomena. Other categories indicate strategies of action and strategies used to respond to the particular phenomenon. There are also categories referring to the consequences of actions in relation to the researched phenomenon.

Open coding was followed by axial coding, in which we looked for relationships between various categories (causes, consequences, conditions and interactions, strategies and processes). As part of axial coding, we then linked individual categories and thought of possible causes of various social phenomena, their wider context, applied strategies and ongoing processes. *Although open and axial coding are different analytical procedures, a researcher during an actual analysis constantly oscillates between the two types* (Strauss, Corbin, 1999, p. 71). Finally, we created a paradigmatic model (see Table 3), which allows to sort categories according to the circumstances of their creation and their relations, starting with the causes and ending with the consequences of their existence. Such a procedure contributes to a deeper knowledge and understanding of the links between the categories.

**Table 3.** Paradigmatic model created within axial coding

CAUSAL CONDITIONS	PHENOMENON	CONTEXT	INTERVENING CONDITIONS	ACTION AND INTERPRETATION STRATEGIES	CONSEQUENCES
Conditions / - life - family	DECISION MAKING REGARDING USE OF SOCIAL SERVICES IN HE*	Turning point  Services in natural environment	Feeling accompanying the decision  Family island*	Decision out of necessity  Selecting facility HE  Admission  Adapting to the new environment	Stay in HE / - feelings - needs - support / internal - support / external - evaluation of service - users  Memories  Visions of future

Via axial coding, we created the basis for selective coding and after a thorough analysis of the data, we proceeded to integrate the acquired categories in grounded theory. The basic building blocks of the newly emerging theory were the newly derived categories with their dimensions. Using a general coding paradigm, each category was compared with others on a dimensional level and also with the central category. The relations between the categories crystallized a chronological relational model depicting the process of decision making in seniors on the use of residential care.

\* A metaphor introduced into professional discourse by Rieger (2009).



Subsequently we followed the principles of selective coding. We were able to describe the framework and schema of the examined phenomenon in detail and the observed mechanisms which are involved in and which influence the decision-making process in seniors on the use of residential social services.

### **Analytical schema framework**

The survey results indicated that the decision regarding the use of residential care is determined by the life and family conditions in which the senior lives and it is initiated by a specific events that changes the current course of events, i.e. the turning point. The actual decision to get admitted into a home for the elderly is seen as a necessity, when there is no other solution to the situation. The decision is not perceived as an option, or a voluntary act, but as a fact the senior was "pushed" to accept by the circumstances that occurred and changed their existing life situation significantly. The events leading to admission into a home for the elderly may be personal, associated with deterioration of the health status of the elderly or with their increasing dependence on care of others, combined with dysfunctional relationships and ties within the family, or interpersonal, coming from persons who provided support to the elderly in their natural social environment, whose health status or family situation changed. The decision to use the services of a home for the elderly is often encouraged by the absence of a life partner who would be "keep" the senior in their natural social environment, and the partner's stay in the target home for the elderly.

A prior selection of a retirement facility is not of a significant role at the moment of making the decision to use residential care. However, the current offer of services is important - free capacity or the prospect of an early vacancy. Although the senior has filed for admission in the selected nursing home, they also contact another home, in case there was an opening at the time of the arising need. Availability of outreach and outpatient social services in the natural environment of a senior does not affect their decision to use the services in a home for the elderly, as it is a competitive alternative in their opinion. Only few seniors use outreach or outpatient social services, prior to their admission in residential care, with the exception of meal delivery and cleaning.

The admission of a senior in a residential care facility and their subsequent adaptation process is strongly influenced by the feelings accompanying the previous decision of moving to a new social environment, and by functioning of family support during one's transition to the institution. Seniors living in institutional care attribute an essential significance to family members, they appreciated their visits to the institution or the senior's visit in the family living outside the institution.

Stay in a home for the elderly is accompanied by memories of life in their natural social environment and visions of the future combined with the prospect of the approaching end of life. Frequently the desire to return "home" may be present, even though seniors themselves do not actually believe this alternative is possible. An important moment in the adaptation process in the institution is reconciliation with fate, in which the users of social services rationalise the circumstances of coming there, and coming to terms with the decision made. It is an internal process that is not determined by the evaluation (the quality) of social services. As a matter of fact, services as well as the staff of the facility, are appreciated by seniors. The adaptation process is negatively affected by feelings of longing and separation, and by the need for privacy, freedom and autonomy in decision making, which in their opinion the seniors are being deprived of. An emerging problem associated with staying in the institutional environment is the collective spirit of the facility generating conflicts among users, particularly in the case of seniors sharing a room. Most seniors would welcome the choice of a single room, regardless their financial situation. Conversely, the adaptation process is positively affected by the presence of a close person in the facility, e.g. a friend, a former co-worker, or a partner.

Prominent areas that emerged in the interviews are DECISION OUT OF NECESSITY, RECONCILIATION

WITH FATE and FAMILY ISLAND. Given the importance that seniors themselves attributed to these areas, below we provide typical statements creating an image of perceived reality and its interpretation based on the data in analysis. For clarity, the authentic statements are identified by the probands' number (from P1 to P14) and by the number of the thematic section within the transcribed interview.

#### DECISION OUT OF NECESSITY

*"... I did not make the decision, I just got ill (P1/18)"; "... well it was not hard because there was nothing else I could do (P3/22)"; "... I had to decide (P4/4) ... at that point it was impossible to do anything else about it (P4/26)"; "... it is basically a decision of necessity ... what else can you do ... it is always the circumstances (P5/8)"; "... one has no other, you know, no other way (P6/6)"; "... there was nothing else, I had no choice but to go where I have full service (P7/24)"; "... and then there was nothing but this (P8/6)"; "... so it was really the only solution (P10/86)"; "... I lost my legs and my home is not adjusted for my condition (P11/4)"; "... I was forced to (P13/45) ... it was not possible to do anything else and it still isn't (P13/59)"; "... I had to decide (P14/4) ... we can say that it was necessity (P14/78) ... there is no other solution (P14/80)".*

It is obvious from the statements above that seniors believe they could not have decided otherwise given their life situation. Admission into a home for the elderly was the only way to deal with their worsening life situation due to a sudden incident which changed their own health status or health status of their loved ones, who provided them with the necessary assistance and care. Users of social services are often aware that they cannot burden other family members with their care demands, as these members are mostly of working age, and in addition to helping the parents they must also care for their children, who are often still economically dependent on them. Seniors often try to help the children if possible and vice versa, children are of great support to seniors living in an institution. Upon their admission into a home for the elderly, seniors usually leave their apartment or house to the children or other relatives, unless they had done so earlier.

The decision to use residential social services for the elderly is often driven by altruistic motives (*"... I do not need to bother anyone (P5/ 131)"; "... children, my daughter lives in Brno, it is out of the question there, and son, twice as impossible to live there (P6/10)"; "... daughter built a house – she is in debt now and must work and son works out of town most of the time ( P8/6 ) ... I would not want to be a burden to children ( P8/55 ) ... and I would not bother anyone when they all need money ( P8/94 )"; "...I did not want to disturb their family life ( P10/78 ) ... they both work so I cannot ask this of them ( P8/ 84 )"*). Such altruistic thinking often influences seniors' behaviour, who act selflessly when considering other members of the family island in their decision making. The family is often very saddened by the current life situation which is causing the senior to be separated from the family island (*"... so we all cried (P1/54)"; "... I told my daughter that it will get over it and she told me that she will not (P13/97)".*

The perception of the impossibility of any other option makes the senior come to a gradual reconciliation with the fate – with staying in a home for the elderly.

#### RECONCILIATION WITH FATE

*"... it is ok, we have to endure (P2/47) ... oh God, my God, what can we do (P2/148)"; "...everything else is gone (P3/54) ... I must bear staying here for the time remaining (P3/59)"; "... we have to endure (P4/14) ... I will get used to it (P4/28)"; "... what else can we do (P5/85) ... what you can do (P5/99)"; "... I take it as it is (P6/34) ... I got used to it (P6/83)"; "...well, that's how it is (P7/ 68)"; "...what else can one do (P8/ 43)"; "...I must be reasonable enough to try and understand (P10/96)"; "... it will do no good if I sit here and I cry (P11/ 54)"; "...one must accept the necessity (P13/55) ... I either adjust to it or I fall (P13/57)"; "...I'm not alone (P14/32) ... so I accepted ... as the only*

solution (P14/66)".

We believe that the key area above emerged due to a pre-set criteria, namely admission into a home for the elderly. Due to the short residence time it is very likely that respondents only just began to cope with the major change of their life. At the time of transition from the natural social environment into a home for the elderly family members play a very important role mediating contact with the natural environment.

#### FAMILY ISLAND

"...I am a family guy, well, it is what it is (P1/112)"; "...I was lucky to have my sister (P3/36) ... when I need something, they still take care of it (P3/38)"; "... we are basically all together, but nevertheless no one can take care of me (P5/18)"; "... so I am trying to help her, she helps me in return and we are glad to have one another (P8/55); "... then I went here because my son knew this place is the best (P10/28)"; "...it is close for my men, I mean my son and my husband (P2/6)"; "...I feel very fortunate that I like my people ... we are not a big family, but we love each other (P13/113)"; "... the important thing is that you are not alone, that the family visits you (P14/94)".

Seniors highly appreciated if the members of the family island visit and even more so if they occasionally take them home. We talk about returning to the family island, though the following utterance shows that seniors are well aware that a home for the elderly is their "terminal station". Awareness of the approaching end of life is accompanied by thoughts of death and euthanasia, sometimes in a lighthearted spirit, but occurring in majority of interviews, either in a latent or manifest form ("... there is no better way than dying really soon (P2/35) ... I have nothing to plan ... I am just waiting to croak and be taken up that hill, soar through the chimney (laughs) and that's it (P2/150) "; "... my opinion is that I should be able to go to the pharmacy to buy a pill and when I cannot take it here in the world any more, should be able to take it, wash it down with glasses of slivovice, fall asleep and never wake up again (P5/99) ").

It can be rightly assumed that the family island creates a basic social net that helps senior citizens with their adaptation to the new institutionalised environment and boosts their will to live.

#### Summary

Based on the findings above it can be concluded that all current and future employees of residential social services for the elderly should pay increased attention to new coming service users and be their active support in the first months in the new institutionalised environment. The adaptation process is one of the most important stages in the provision of residential social services for the elderly. In turn it determines their perceived quality of life. In case a senior is unable to cope with the change of environment and remains in sorrow, their mental status may somatise over time. The decision to move to a home for the elderly is considered to be one of the toughest decisions in one's life and it is rarely reversible. This fact should be reflected on by students and staff of all helping professions.

#### References

- Malíková, E. (2011). *Péče o seniory v pobytových sociálních službách / Care for the elderly in residential social services*. Praha: GRADA, 2011.
- Miovský, M. (2006). *Kvalitativní přístup a metody v psychologickém výzkumu / Qualitative approach and methods in psychological research*. Praha: Grada, 2006.
- Rieger, Z. *Návrat k rodině a domů. Příprava klientů institucionální péče na návrat z odloučení. / Return to family and home. Institutional client preparation to return from separation*. Praha: Portál, 2009.
- Rubin, A. & Babbie, E. (2011) *Research Methods for Social Work*. Belmont: Brooks/Cole, 2011.
- Strauss, A. & Corbin, J. (1999). *Základy kvalitativního výzkumu / Basics of qualitative research*. Boskovice: Albert.

Vágnerová, M. (2008). *Vývojová psychologie II. Dospělost a stáří / Developmental psychology II. Adulthood and old age*. Praha: Karolinum, 2008.

*Statistical Yearbook of Labour and Social Affairs 2007* [online]. Prague: The Ministry of Labour and Social Affairs, 2008. Available on [http://www.mpsv.cz/files/clanky/5942/Statisticka\\_rocenka\\_2007\\_oprava.pdf](http://www.mpsv.cz/files/clanky/5942/Statisticka_rocenka_2007_oprava.pdf).

*Statistical Yearbook of Labour and Social Affairs 2008* [online]. Prague: The Ministry of Labour and Social Affairs, 2009. Available on [http://www.mpsv.cz/files/clanky/7870/rocenka\\_2008b.pdf](http://www.mpsv.cz/files/clanky/7870/rocenka_2008b.pdf).

*Statistical Yearbook of Labour and Social Affairs 2009* [online]. Prague: The Ministry of Labour and Social Affairs, 2010. Available on [http://www.mpsv.cz/files/clanky/9854/statisticka\\_rocenka\\_z\\_oblasti\\_prace\\_a\\_socialnich\\_veci\\_2009.pdf](http://www.mpsv.cz/files/clanky/9854/statisticka_rocenka_z_oblasti_prace_a_socialnich_veci_2009.pdf).

*Statistical Yearbook of Labour and Social Affairs 2010* [online]. Prague: The Ministry of Labour and Social Affairs, 2011. Available on [http://www.mpsv.cz/files/clanky/11544/rocenka\\_2010.pdf](http://www.mpsv.cz/files/clanky/11544/rocenka_2010.pdf).

*Statistical Yearbook of Labour and Social Affairs 2011* [online]. Prague: The Ministry of Labour and Social Affairs, 2012. Available on [http://www.mpsv.cz/files/clanky/13613/rocenka\\_2011.pdf](http://www.mpsv.cz/files/clanky/13613/rocenka_2011.pdf).

*Statistical Yearbook of Labour and Social Affairs 2012* [online]. Prague: The Ministry of Labour and Social Affairs, 2013. Available on [http://www.mpsv.cz/files/clanky/16366/rocenka\\_2012.pdf](http://www.mpsv.cz/files/clanky/16366/rocenka_2012.pdf)

Act No. 108/2006 Coll., on Social Services, as amended.

# Deepening the understanding of musical style through adaptation and alteration of constituent parameters

Franz Krieger\*

*University of Music and Performing Arts Graz, Institute for Jazz Research, Leonhardstraße 15, 8010 Graz, Austria*

---

## Abstract

Since the restructuring of the musicology course of studies in Graz (Austria), the number of students has increased by up to 132 percent. At the same time, however, serious deficiencies in students' academic preparatory education has become evident: the area of music-structural analysis is a particular problem, since significant course prerequisites – auditory imagination and differentiation – are often inadequate and can be only partially counteracted through normal curricular measures. The praxis-based teaching concept described in this paper represents an effective method of strengthening the understanding of musical style through the generation of stylistic copies, transcriptions and aberrational exercises. As it allows a measure of creative freedom, the approach is also likely to appeal to students.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* musical style; efficient learning; stylistic copy; transcription; aberration

---

## 1. Initial situation

In the early 2000s, as university budget cutbacks threatened the more than 60-year-old Graz Institute of Musicology with relocation or closure, a cooperation between the Karl-Franzens University – the home of musicology in Graz – and the University of Music and Performing Arts was initiated. Though the latter had been promoted to university status only a few years ago, it had possessed for decades exactly what was needed to add new luster to the course offerings: a number of musicological institutes, incorporating a far wider range of disciplines than the handful of old-guard musicology instructors had previously been able to cover.

The Institute of Musicology's course content had up to that point been based on academic principles formulated by Guido Adler in 1885 and was thus comprised of an internationally familiar triumvirate: (a) historical musicology, (b) systematic musicology and (c) comparative musicology. Although these contentual categories were entirely capable of integrating new societal, economic, media and musical developments (cf. Adler, 1885), the variety of institutes joining the collaboration – with concentrations in early music and performance practice, electronic music, ethnomusicology, jazz research, and aesthetics of music – now distinguished the musicology program in Graz from similar institutions and, in the end, led to its survival.

This bundling of musicological resources coincided with the curricular restructuring required by the Bologna Accord (1999), which ultimately led, beginning with the winter semester 2006, to the replacement of the former diploma course with bachelor's and master's degree programs. The concentrations now included (a) Ethnomusicology, (b) Jazz and Popular Music, (c) Music in History, (d) Aesthetics of Music, (e) Music Psychology and Acoustics and (f) Pop, Music and Media Culture (the latter only available in the master's program). The course title was changed from *Musikwissenschaft* to *Musikologie* – not simply to modernize the nomenclature, but to bypass an outdated requirement for incoming students to have a command of Latin.

---

\* Corresponding author. Tel.: +43-316-389-3400; fax: +43-316-389-3161.

E-mail address: franz.krieger@kug.ac.at

The new course offerings, along with free university access, led to a steady increase in the number of students; 2010/11 marked a high point in this trend, with a gain of 132 percent. At the same time, however, serious deficiencies in the students' preparatory education were becoming evident. To the extent that these concerned theoretical knowledge they could be cushioned with additional entrance examinations, but the absence of certain mental abilities – particularly auditory imagination and differentiation – were proving difficult to make up for. These abilities have always been a requirement for historical and comparative musicology but now, particularly in the analysis of jazz and popular music, they presented a *sine qua non*. A good auditory imagination is essential, for instance, when one is required to work with written music but has no external means of rendering it audible, such as a recording or musical instrument. A good capacity for auditory differentiation is crucial for both the transcription of audio material and the music-structural analysis of recordings without written music.

Using the understanding of musical style as an example, the following model describes a means of combating these deficiencies in an effective and motivational manner, combining current musicological methods in a novel way and adapting them to didactical purposes. The model's starting point is the standard, source-dependent situation in the area of jazz and popular music, where the music to be studied exists only as a sound recording; it is designed for a bachelor's degree student, beginning in about the second year of the program, and is divided into four progressive sections:

- Identification of constituent parameters
- Transcription of recordings
- Stylistic imitation
- Stylistic aberration

## **2. The model**

### *2.1 Identification of constituent parameters*

Musical style, as the sum of all that is perceptible to the ear (Krieger, 1995:13; cf. Pascall, 2014), is comprised of a multitude of parameters bearing differing levels of stylistic relevance. The differentiation between constituent and redundant parameters can be accomplished by the instructor or by students, as an exercise, chiefly using the following methods:

- Consulting appropriate literature (examples: Kuch and Tedjasukmana, 2013; Gridley, 2012; Everett, 2008 and Krieger, 2001)
- Orientation on prototypical examples (examples: Krieger, 2008; Dobbins, 1988, and the Band-in-a-Box software)
- Attempting on one's own (using a musical instrument or software such as Magix Music Maker, Steinberg's Sequel or Apple's GarageBand) in combination with appropriate feedback and discussion
- Musical transcription and analysis on one's own

The identification of style-relevant parameters in a piece of music (personal style, genre, etc.) can, depending on the student's level of understanding, be based on recordings (analysis by ear) or accomplished with the help of written music (visual analysis) generated by transcription. Even the attempt to analyze music by ear deepens the understanding of style; however, a transcription is generally required to conduct a well-founded visual analysis – the proper prerequisite for stylistic imitation and aberration.

### *2.2 Transcription of recordings*

Musical transcriptions – specifically, the notation of played or recorded music – have existed for centuries (cf. Fritz, 2002), if not millennia (cf. Riethmüller, 1989). In addition to their conservational, illustrational and evidential functions, transcriptions serve as a means of developing sources, rendering complex musical events visible and thus

opening them to investigation. Furthermore, transcription is a highly effective means of ear training (cf. Kupfer, 2001 and Rautiainen, 2014). The most important technical transcription tool is a means of slowing down recordings (for instance the software programs Transcribe! or Audacity), which reduces the complexity of the material that must be grasped mentally.

Since the production of high-quality transcriptions is generally a major hurdle for most students, the notation of music should also be comprehensively implemented outside of this model. It has also proved helpful to provide students with examples of thematically similar transcription examples as reference material.

### 2.3 Stylistic imitation

Stylistic imitation in the form of student compositions differs from a copy in that the latter is a simple duplicate and the former a stylistically similar – but new – original work (cf. N. N., 2014). This kind of original work calls for an in-depth consideration of the relevant material (use of constituent parameters, orientation on transcriptions) and also allows the student creative latitude.

The most important technical assistant for the creation of stylistic imitations – assuming the goal is a written piece of music – is notation software with a playback function. If, on the other hand, the composition is to be realized through performance without previous notation, an audio recording of the piece serves the purpose as well.

### 2.4 Stylistic aberration

Transcriptions – or indeed pieces generated in a stylistic imitation exercise – can serve as source material for stylistic aberration exercises. In this process, the source material generally undergoes differing degrees of variation (and thus stylistic modification), depending on the modified parameter. Variation can – and should – lead to disassociation (cf. Vlachos, 2002 as an example), which has a highly positive effect on the understanding and mastery of style.

As with imitation, stylistic aberration can be realized as notated music (with an audio component) or performance (as a recording); the multiple options involved in this process also provide space for considerable creativity.

## 3. Prospects

Experience to date has shown that the contentual, didactic approach described here is received exceptionally well by students, who have the impression of having profited more from these processes than from the usual strategies. Students respond particularly well to the creative aspect of the learning process; this may well be a reaction to the otherwise strict academic attitude and regimentation that prevail in the bachelor's and master's courses (cf. N. N., 2008, and Gail, 2013).

The method described here, as yet only intermittently applied, will form the basis of a seminar on musical analysis to be held by the author in the winter semester 2014/15; the seminar will also include a comprehensive qualitative evaluation. Additionally, with the support of the Austrian Science Fund, a transcription-based dictionary of musical styles is planned to serve in the future as a reference for student transcriptions.

## References

- Adler, G. (1885). Umfang, Methode und Ziel der Musikwissenschaft. *Vierteljahresschrift für Musikwissenschaft*, 1, 5 - 20.
- Dobbins, B. [1984]. *The contemporary jazz pianist. A comprehensive approach to keyboard improvisation* (4 vols.). New York: Colin.
- Ellingson, T. (2014). Transcription (i). *Grove Music Online. Oxford Music Online*. Oxford University Press.  
<http://www.oxfordmusiconline.com/subscriber/article/grove/music/28268> (accessed May 24, 2014).
- Everett, W. (2008). *The foundations of rock*. Oxford: Oxford University Press.
- Fritz, H. (2002). Einführung in die Musiktranskription [Lecture notes from an identically named course held during the winter semester 2002 at the University of Vienna]. [www.unet.univie.ac.at/~a7425519/Skripten/Transkription2002.doc](http://www.unet.univie.ac.at/~a7425519/Skripten/Transkription2002.doc) (accessed May 12, 2014).

- Gall, I. (2013). Zu starr, zu eng, zu verschult: Bachelor-Reform in Sicht. *Hamburger Abendblatt* (April 4, 2013).  
<http://www.abendblatt.de/hamburg/article115255958/Zu-starr-zu-eng-zu-verschult-Bachelor-Reform-in-Sicht.html> (accessed May 28, 2014).
- Gridley, M. C. (2012). *Jazz styles. History and analysis* (11th ed.). Boston: Pearson.
- Kuch, A., and Tedjasukmana, I. (2013). *Beatbox complete. Sounds, patterns, styles. Das Lehrbuch für Unterrichtspraxis und Selbststudium*. Rum bei Innsbruck: Helbling.
- Krieger, F. (1995). Jazz-Solopiano. Zum Stilwandel am Beispiel ausgewählter "Body And Soul"-Aufnahmen von 1938–1992. *Jazzforschung / Jazz Research*, 27. Graz: Akademische Druck- und Verlagsanstalt.
- Krieger, F. (2001). One more Grammy for Whitney Houston: annotations to musical roots and musical identity in the era of globalization. *Bulgarian Musicology*, 2, 46 - 54.
- Krieger, F. (2008). Original und Coverversion. [Unpublished notes from a lecture at the University of Music and Performing Arts Graz].
- Kupfer, D. (2001). Pete Seeger interviewed by David Kupfer.  
<http://www.wholeearth.com/issue/2104/article/116/pete.seeger.interviewed.by.david.kupfer> (accessed May 23, 2014).
- N. N. (2008). Viel Kritik an Verschulung des Studiums. Podiumsdiskussion mit Minister Goppel über die Situation von Uni und Studenten. *Main Post* (June 25, 2008). <http://www.mainpost.de/regional/wuerzburg/Viel-Kritik-an-Verschulung-des-Studiums;art735,4562838> (accessed May 28, 2014).
- N. N. (2014). Stilkopie (Musik). *Wikipedia*. [http://de.wikipedia.org/w/index.php?title=Stilkopie\\_\(Musik\)&oldid=116410351](http://de.wikipedia.org/w/index.php?title=Stilkopie_(Musik)&oldid=116410351) (accesses May 5, 2014).
- Pascall, R. (2014). Style. *Grove Music Online. Oxford Music Online*. Oxford University Press.  
<http://www.oxfordmusiconline.com/subscriber/article/grove/music/27041> (accessed May 23, 2014).
- Rautiainen, H. (Ed.) (2014). Branford on the importance of transcribing. *Sax on the Web*. <http://forum.saxontheweb.net/showthread.php?140840-Branford-on-the-importance-of-transcribing-Interesting-and-funny&s=e18f5d5e6f8b4c4cc2cb36245c694f0> (accessed May 27, 2014).
- Riethmüller, A. (Ed.) (1989). *Neues Handbuch der Musikwissenschaft. Bd. 1. Die Musik des Altertums*. Laaber: Laaber-Verlag.
- Vlachos, St. (2012). *Deformation und Verfremdung. Eine Stiltendenz in der deutschen Kunst um 1500*. Kiel: Ludwig.

## Cited software

- Apple GarageBand*. <http://www.apple.com/mac/garageband/> (accessed May 30, 2014).
- Audacity*. <http://audacity.sourceforge.net> (accessed May 30, 2014).
- Band-in-a-Box*. <http://www.bandinabox.com/> (accessed May 30, 2014).
- Magix Music Maker*. <http://www.magix.com/us/music-maker/> (accessed May 30, 2014).
- Steinberg Sequel*. <http://www.steinberg.net/en/products/sequel.html> (accessed May 30, 2014).
- Transcribe!* <http://www.seventhstring.com/> (accessed May 30, 2014).



# Dependence of the results of entrance examinations on test variants

Jindrich Klufa\*

*University of Economics, W. Churchill Sq.4, 13067 Prague, Czech Republic*

---

## Abstract

The paper reports and discusses the results of the entrance examinations in mathematics at the Faculty of Informatics and Statistics at University of Economics in Prague. There was a significant change in test variants in mathematics in 2013. We shall study dependence of the results of entrance examinations on test variants. In addition, we shall compare the distributions of the number of points in the test in mathematics in 2013 and in the previous year. The obtained results will be used to design further changes in the test variants in mathematics in the coming years.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* Entrance examinations; test variants; mathematics; statistical methods

---

## Introduction

Most students of the Prague University of Economics have been accepted to study on the basis of tests in mathematics and language tests. The math tests are prepared by the Department of Mathematics of the Faculty of Informatics and Statistics. These tests are the multiple choice question tests – see e.g. Klufa (2012), Zhao (2006), Klufa (2013), Premadasa (1993), Klufa and Kaspříková (2012). The tests in mathematics have 10 questions for 5 points and 5 questions for 10 points (100 points total). Questions are independent. Each question has 5 answers (one answer is correct), wrong answer is not penalized. The number of points in the test in mathematics can be 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, . . . , 90, 95, 100.

These tests are used to the three faculties of the Prague University of Economics (Faculty of Informatics and Statistics, Faculty of Finance and Accounting, Faculty of Business Administration ). Analysis of the entrance examinations in mathematics in 2013 at the Faculty of Informatics and Statistics at University of Economics in Prague is provided in this paper.

The aim of this paper is to analyze the the entrance examinations in mathematics in 2013 (similar problems are solved in Brozova and Rydval (2013), Hruby (2013), Kaspříková (2012), Mosna (2013), Brozova, Rydval and Horakova (2014), Otavova and Sykorova (2014)). We shall compare probability distributions of number of points in the test in mathematics in 2013 and in previous year. We shall study dependence of number of points in the test in mathematics on test variants. These results will be used to further improve of the preparation of test variants in the coming years.

---

\* Corresponding author. Tel.: +420224094244; fax: +420224094244.  
E-mail address: klufa@vse.cz

## Methods

The analysed data are the results of 849 students in mathematics. Four test variants (denoted A6, A7, B2, B3) were used for the entrance examinations in mathematics at the Faculty of Informatics and Statistics in 2013. The analysed data sorted according to test variants are in Table 1 (contingency table).

For study dependence of number of points in the test in mathematics on test variants we shall use  $\chi^2$  test of independence in contingency table. Statistic  $\chi^2$  is

$$\chi^2 = \sum_{i=1}^r \sum_{j=1}^s \frac{(n_{ij} - n_{ij}^o)^2}{n_{ij}^o} \quad (1)$$

where  $r$  is number of rows,  $s$  is the number of columns in contingency table and  $n_{ij}^o$  is the expected frequency in case of independence – see e.g. Anděl (1978). When

$$\chi^2 > \chi_\alpha^2((r-1)(s-1)), \quad (2)$$

where  $\chi_\alpha^2((r-1)(s-1))$  is critical value of  $\chi^2$  distribution, hypothesis of independence is rejected at significance level, which is asymptotically equal to  $\alpha$ .

For comparison of test variants we shall use ANOVA and Scheffé's method. We shall verify the validity of the null hypothesis: mean number of points in test variants A6, A7, B2, B3 is the same. When (the test statistic  $F$  see e.g. Rao (1973))

$$F > F_\alpha(s-1, n-s) \quad (3)$$

where  $F_\alpha(s-1, n-s)$  is critical value of Fischer-Snedecor distribution with  $(s-1)$  and  $(n-s)$  degrees of freedom ( $s = 4$ , number of variants), hypothesis is rejected at significance level  $\alpha$ .

## Results and Discussion

### *Dependence on the test variants*

Results of the entrance examinations in mathematics in 2013 are in Table 1 (for example 6 students with variant A6 obtained 10 points in test in mathematics, i.e. 6 is frequency  $n_{31}$  in 3rd row and 1st column of the contingency table).

Now we shall study dependence of number of points in the test in mathematics on test variants. We shall test null hypothesis

$H_0$ : number of points in the test is not dependent on the test variant.

We shall use  $\chi^2$  test of independence in contingency table – see e.g. Anděl (1978). In the first step we calculate according to (1) statistic  $\chi^2$  (for example  $n_{11}=2$  (see Tab.1) and expected frequency  $n_{11}^o = 4 \times 224/849 = 1.055$ ). Because of the small expected frequencies, we combine first 3 rows of the contingency table. We have

$$\chi^2 = 63.89$$

Tab. 1: Distribution of number of points in test in mathematics (contingency table)

Points in test	Variants				Sum
	A6	A7	B2	B3	
0	2	1	0	1	4
5	2	0	0	2	4
10	6	3	1	6	16
15	4	4	2	8	18
20	9	7	7	7	30
25	12	10	8	6	36
30	18	10	8	11	47
35	15	9	16	16	56
40	22	17	21	10	70
45	19	18	21	15	73
50	17	13	22	19	71
55	15	14	17	15	61
60	17	14	12	15	58
65	26	12	19	9	66
70	9	9	11	13	42
75	11	10	17	11	49
80	7	12	13	10	42
85	3	13	11	7	34
90	5	7	10	5	27
95	0	5	4	7	16
100	5	11	7	6	29
Sum	224	199	227	199	849

Critical value of  $\chi^2$  distribution for 54 degrees of freedom and significance level  $\alpha = 0.05$  is  $\chi^2_{0.05}(54) = 72.15$ .  
Since

$$\chi^2 = 63.89 < 72.15$$

null hypothesis  $H_0$  is not rejected at approximately 5% significance level. Moreover  $p$  value is 0.168 (null hypothesis  $H_0$  is not rejected also at 16% significance level). For calculation we used MS Excel – see Marek (2013). We can say that the number of points in the test does not depend on the test variant.

### Differences between the test variants

Now we shall compare distributions of number of points in the test in mathematics in test variants A6, A7, B2 and B3 (graphical comparison see Fig.1).

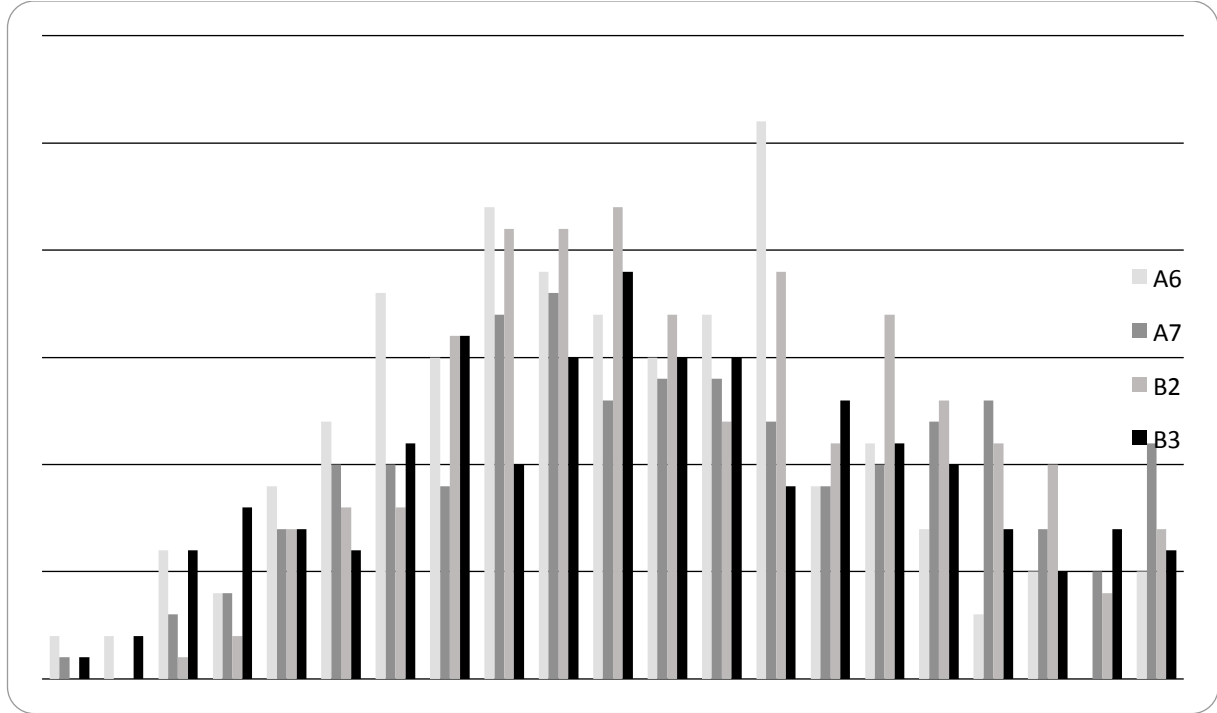


Fig. 1: Distribution of number of points in test in mathematics in 2013 – test variants A6, A7, B2, B3 (histogram)

We shall test null hypothesis

$$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4, \quad (4)$$

where  $\mu_1, \mu_2, \mu_3, \mu_4$  is mean number of points in test variants A6, A7, B2, B3, i.e. mean number of points in test variants A6, A7, B2, B3 is the same.

To verify the validity of the hypothesis we use ANOVA. In the first step we verify assumption (the same variance of number of points in test variants A6, A7, B2, B3) of this method by Bartlett's test. Test statistic  $B$  (see e.g. Anděl (1978)) is  $B = 6.41$ . Critical value of  $\chi^2$  distribution for 3 degrees of freedom and significance level  $\alpha = 0.05$  is  $\chi^2_{0.05}(3) = 7.81$ . Since  $B < 7.81$ , assumption of ANOVA can be considered to have been met.

Results of ANOVA we got with MS Excel – see Tab. 2 and Tab. 3. Since

$$F = 5.858 > 2.615,$$

null hypothesis (4) is rejected at 5% significance level. There are some differences between the test variants (the differences between average number of points in test variants A6, A7, B2, B3 (see Tab. 3) are statistically significant).

Tab. 2: Results of ANOVA

Source of variability	Sum of Squares	Degrees of freedom	Fraction	F	P value	F crit
Test variants	8953,136	3	2984,379	5,857937449	0,000583659	2,615439
Rezidual	430492,8	845	509,4589			
Sum	439445,9	848				

Tab. 3: Distribution of number of points in test – test variants A6, A7, B2, B3

	Frequency ni	Sum	Average number of points	Variance
A6	224	11015	49,17411	453,4628243
A7	199	11275	56,65829	575,5190092
B2	227	12955	57,07048	447,4640365
B3	199	10550	53,01508	577,2270443

Finally we shall study which pairs of averages differ significantly. We use Scheffé's method – see e.g. Anděl (1978). Pairs of averages differ significantly if absolute value of difference in averages exceeds critical value (see Tab. 2 and Tab. 3)

$$\sqrt{\left(\frac{1}{n_i} + \frac{1}{n_j}\right) \times 3 \times 509,4589 \times 2,615439} \quad (5)$$

Tab. 4: Scheffé's method

Pair of test variants	Absolute value of difference in averages	Critical value (5)
A6, A7	7.484*	6.159
A6, B2	7.896*	5.954
A6, B3	3.841	6.159
A7, B2	0.412	6.140
A7, B3	3.643	6.338
B2, B3	4.055	6.140

\* Significant difference for  $\alpha=0.05$

From Tab. 4 it is seen that a significant difference is at 5% significant level only between A6, A7 and A6, B2. All other pairs of averages are not significantly different.

## Conclusion

The change in test variants in mathematics in 2013 at the Faculty of Informatics and Statistics at University of Economics in Prague has a positive effect on the distribution of number of points in test (e.g. the mode in 2012 is

100 points, the mode in 2013 is 45 points) – see Fig. 2.

From  $\chi^2$  test of independence in contingency table it follows that the number of points in the test in mathematics does not depend on the new test variant. There are some small differences between the test variants but from the results of this paper we can say that significant changes in test variants in mathematics in the coming years are not needed.

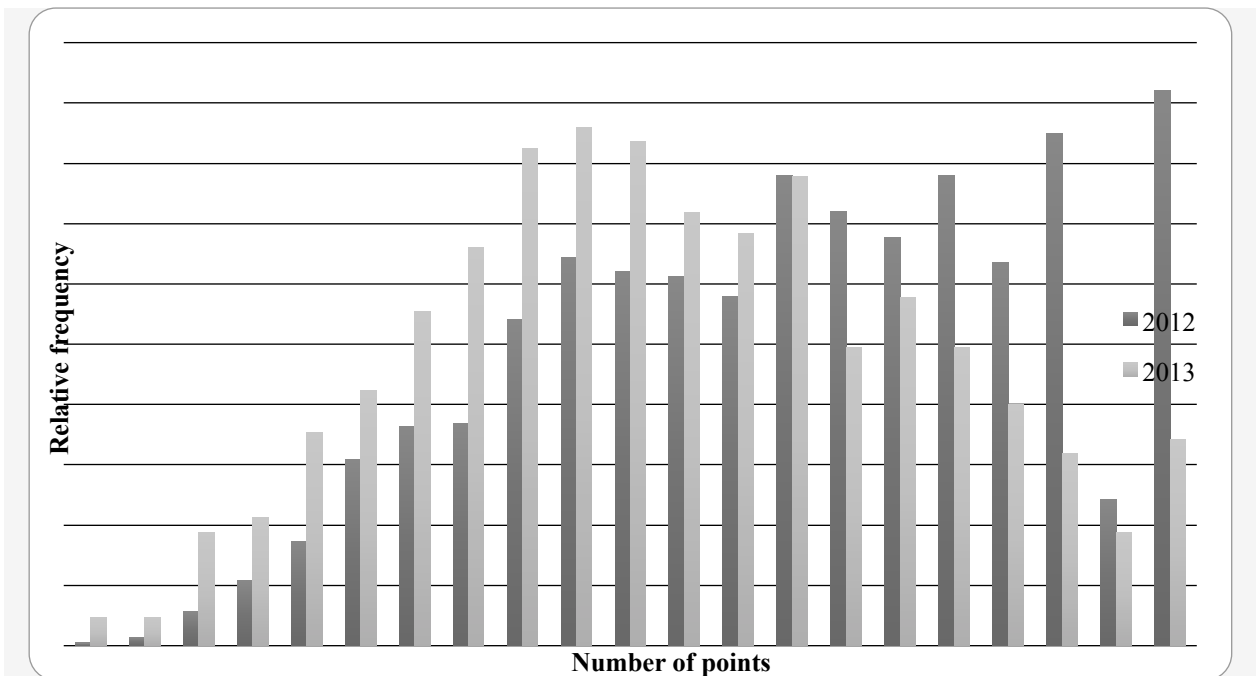


Fig. 2: Distribution of number of points in test in mathematics in 2012 and 2013 at the Faculty of Informatics and Statistics (histogram)

## References

- Anděl, J. (1978). *Mathematical statistics*. Prague: SNTL/ALFA.
- Brozova, H., & Rydval, J. (2013). Analysis of the exam test quality. In *Efficiency and Responsibility in Education, Proceedings of the 10th International Conference* (pp. 47–54), Prague.
- Brozova, H., Rydval, J., & Horakova, T. (2014). Self-test and exam test results in the subject applied mathematics for IT. In *Efficiency and Responsibility in Education, Proceedings of the 11th International Conference* (pp. 40–46), Prague.
- Hruby, M. (2013). Extended elements of the question objects. In *Efficiency and Responsibility in Education, Proceedings of the 10th International Conference* (pp. 204–209), Prague.
- Kaspříková, N. (2012). Data analysis of students' performance. In *Efficiency and Responsibility in Education, Proceedings of the 9th International Conference* (pp. 213–218), Prague.
- Klufa, J. (2012). Tests from probability point of view. In *Efficiency and Responsibility in Education, Proceedings of the 9th International Conference* (pp. 229–233), Prague.
- Klufa, J., & Kaspříková, N. (2012). Multiple Choice Question Tests for Entrance Examinations – A Probabilistic Approach. *Journal on Efficiency and Responsibility in Education and Science*, 5, 195–202.
- Klufa, J. (2013). Random Effects in the Entrance Examinations. *Procedia – Social and Behavioral Sciences*, 106, 2197–2204.

Klufa, J. (2013). Comparison of entrance examinations in mathematics. In *Efficiency and Responsibility in Education, Proceedings of the 10th International Conference* (pp. 270–275), Prague.

Marek, L. (2013). *Statistics in exams*. Prague: Professional Publishing.

Mosna, F. (2013). E-learning and interactive dynamical figures for teaching of mathematics. In *Efficiency and Responsibility in Education, Proceedings of the 10th International Conference* (pp. 449–454), Prague.

Otavova, M., & Sykorova, I. (2014). Analysis of scores from mid-term and final test by a contingency table. In *Efficiency and Responsibility in Education, Proceedings of the 11th International Conference* (pp. 527–533), Prague.

Premadasa, I. (1993). A reappraisal of the use of multiple-choice questions. *Medical Teacher*, 15, 237-242.

Rao, C.R. (1973). *Linear Statistical Inference and Its Applications*. New York: John Wiley.

Zhao, Y. (2006). How to design and interpret a multiple-choice-question test: A probabilistic approach. *International Journal of Engineering Education*, 22, 1281-1286.

# Descriptive analysis of researches on curriculum development in education

Elif Akdemir\*, Esma Nur Karameşe, Ali Arslan

*Bülent Ecevit University, Ereğli Education Faculty, Kdz.Ereğli Zonguldak Turkey*

---

## Abstract

Descriptive analysis of the studies using the curriculum as a descriptive and published at the Curriculum Inquiry journal is conducted in this study. Results revealed that literature review is the preferred method, document analysis is the preferred data collection tool, purposeful sampling is the preferred sampling method, qualitative research is the most used research, and elementary education is the most investigated level in the studies. Future research should concentrate on other respective journals to reach the broad understanding of the studies conducted in the Curriculum and Instruction.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* curriculum development studies; educational sciences; descriptive analysis

---

---

\* Corresponding author. Tel.: +903723233870; fax: +903723238693.  
E-mail address: elif.akdemir@beun.edu.tr



## Introduction

In our time, as a result of significant expansion of scientific knowledge, the most crucial requirement of information era becomes not to have knowledge but to know how to reach correct ones that are beneficial for us. In these days, the most important sources that lead us to reach scientific knowledge are doctorate theses, master theses and journals that contain scientific publications. According to Balcı (1997), educational researches are interdisciplinary researches that test scientific hypotheses, detect empirical and analytic relations and show importance of educational applications. As in all branches of science, there are numerous studies in educational sciences (Tavşancıl and others, 2010) that try to produce valid and reliable knowledge. There are researches that try to describe researches in educational sciences (Arık and Türkmen, 2009; Bıkmaz and others, 2010; Ozan and Köse, 2014; Saracaloğlu and Dursun, 2010). There are also scientific journals that concentrate on the areas of curriculum and instruction specifically. Studying the articles of the journals that publish in the areas of curriculum and instruction leads researchers about the target people with whom the researches are realized and about the preferred research method. Because of that reason, in this research, the descriptive analysis of the publishing in the Curriculum Inquiry that precedes in the area of curriculum development is realized.

Curriculum Inquiry journal is one of the publications that contain studies about curriculum. In this research, the descriptive analysis of the articles that uses curriculum description in the years from 2005 to 2013 in Curriculum Inquiry that included in the Web of Science with prestigious publications.

## Method

In this study, descriptive analysis method is used (Balcı, 2005). Descriptive analysis of 66 articles about the curricula of the years from 2005 to 2013 that are published in Curriculum Inquiry journal and included in the Web of Science are realized and the answers of the questions below are replied.

- 1-What is the dispersion of the researchers' genders?
- 2-What is the numerical dispersion of articles according to the years?
- 3-What type of research patterns are used in articles?
- 4-What are the data collecting instruments that are used in articles?
- 5-What types of sampling are used in articles?
- 6-What is the research method that has been used?
- 7-What is the target people of the articles?

### *Data Collecting and Analysis*

In 2005 to 2013, there are 66 articles about curriculum published in Curriculum Inquiry journal and the document analysis is realized by accessing the ones in Web of Science. 66 publications are included in analyzing the research. Genders of researchers, patterns that used in articles sampling types and the educational level that the research is realized are dealt in document analyzing. The descriptive analysis of the collected data is realized and percentage distributions are defined.

### *Data and Interpretation*

In the years between 2005 to 2013, what is the distribution of gender of the researchers of the articles that are published in Curriculum Inquiry journal and included in Web of Science? These data in Table-1 are collected by analyzing that question.

Table 1: Distribution of Genders of the Researchers

Gender	f	%
--------	---	---

Female	34	52
Male	32	48
Total	66	100

As a result of that the gender analysis of the researches is done, it is detected that the 52 percent of researchers are female and 48 percent of them is male who published those researches. With respect to that result, it is understood that the proportion is nearly same in both genders.

In 2005 to 2013, there are 66 articles about curriculum published in Curriculum Inquiry journal and what is the distribution of the articles in Web of Science from the point of their publication dates? These data in Table-2 are collected by analyzing that question.

Table 2: Distribution of the Publications according to the years

Publication date	f	%
2005	7	11
2006	5	8
2007	7	11
2008	8	12
2009	10	14
2010	6	9
2011	5	8
2012	11	16
2013	7	11
Total	66	100

With respect to analyzing the researches' distribution of the years, it is understood that 16 percent of them are in 2012 and 14 percent of them are in 2009. It is seen as the numbers of studies are increased until 2009 and decreased after that year and the top number of the publications is realized in 2012. Publications of 2014 are not included in Web of Science yet.

In 2005 to 2013, there are 66 articles about curriculum published in Curriculum Inquiry journal and the question of that which types of research patterns are used in the articles in Web of Science results in the data in Table-3.

Table 3: Research Patterns that used in Researches

Research Pattern	f	%
Literature Review	34	54
Modelling	0	0
Content Analysis	11	16
Descriptive Research	16	22
Experimental Research	1	2
Grounded Theory	0	0
Case Study	4	6
Total	66	100

As a result of analyzing numerical distribution of research patterns of published studies, it is understood that 54 percent as literature review, 22 percent as descriptive research, 16 percent as content analysis, 6 percent as case study and 2 percent as experimental research used. With those results, it is said that in curriculum studies, literature search and descriptive research are used more.

In 2005 to 2013, there are 66 articles about curriculum published in Curriculum Inquiry journal and the question of that what type of data collecting instrument is used in articles in Web of Science. By answering that question, that information is formed.

Table 4: Data Collecting Instruments

Data Collecting Instruments	f	%
Document Analysis	47	55
Interview	22	25
Observation	14	16
Testing	1	1
Survey	3	3

By looking the distribution of data collecting instruments in published works, it is understood that 55 percent as document analysis, 25 percent as interviewing, 16 percent as observation and 4 percent as testing and surveying are used. Also, it is reached that there is not only one data collecting instrument used, but more than one. The most used data collecting instrument is documents while the least used ones are testing and surveying.

In 2005 to 2013, there are 66 articles about curriculum published in Curriculum Inquiry journal and the question of that what type of sampling is used in the articles in Web of Science establishes the observations in the Table-5.

Table 5: Sampling Types

Sampling Types	f	%
Purposive Sampling	14	56
Convenience Sampling	6	24
Proportionate Stratified Sampling	3	12
Disproportionate Stratified Sampling	1	4
Maximum variance Sampling	1	4
Total	25	100

By analyzing the sampling types used in researches, it is realized that 56 percent as purposive sampling, 24 percent as convenience sampling, 12 percent as proportionate stratified sampling and 4 percent as disproportionate stratified sampling and maximum variance sampling are used. As a conclusion, purposive sampling is preferred mostly.

In 2005 to 2013, there are 66 articles about curriculum published in Curriculum Inquiry journal and the question of that which type of research method is used in the articles in Web of Science establishes the observations in the Table-6.

Table 6: Research Method

Research Method	f	%
Qualitative	62	91
Quantitative	1	3
Mixed	3	9
Total	66	100

By analyzing the distribution of research methods used in researches, it is realized that 91 percent as qualitative, 9 percent as mixed method and 3 percent as quantitative research method are used.

In 2005 to 2013, there are 66 articles about curriculum published in Curriculum Inquiry journal and the question of that what is the target population of the articles in Web of Science forms the observations in the Table-7.

Table 7: Target Population

Target Population	f	%
Primary School	5	21
Secondary School	11	47
University	2	8
Teachers	6	24
Total	24	100

By analyzing the target population of the published studies, it is understood that 47 percent with secondary school, 24 percent with teachers, 21 percent with primary school and 8 percent with university students are realized. As a result, it is argued that those researches are maintained mostly in secondary education.

### Conclusion and Recommendations

In that research, the descriptive analysis of 66 published researches from different criteria is realized by searching the years from 2005 to 2013 of Curriculum Inquiry journal that uses definition of curriculum in itself by the digital library of Web of Science. As a result, it is seen as both genders have nearly same proportions in those publications. Also, the numbers of researches are increased until 2009 and decreased coming years. However, in 2012, it is increased again and reached the maximum publication number. Again, it is understood that literature and descriptive researches are included most, the most used data collecting instrument is documents and the least one is tests and surveys. Also, it is observed that the purposive sampling is used mostly and quantitative research method is not included in those published researches. That observation does not fit to the results of Ozan and Köse (2014). It is concluded as Curriculum Inquiry journal pays more attention on qualitative works. Other than that, the results from that study shows that the researches are realized mostly in secondary school levels.

In that research, the descriptive analysis of Curriculum Inquiry journal that precedes in the subject of curriculum development is realized. Further researches' concentration on same works in that subject in other journals leads to define the way to be followed by curriculum researches.

### References

- Arık, R. S. ve Türkmen, M. (2009). Eğitim Bilimleri Alanında Yayınlanan Bilimsel Dergilerde Yer Alan Makalelerin İncelenmesi. I. Uluslararası Türkiye Eğitim Araştırmaları Kongresi, Çanakkale Onsekiz Mart Üniversitesi, Antalya.
- Balcı, Ali. (1997), Sosyal Bilimlerde Araştırma, Ankara.
- Bıkmaz, F., Aksoy, E., Tatar, Ö. ve Atak-Altınyüzük, C. (2010). Türkiye’de Program Geliştirme Alanında Yapılan Doktora Tezlerinin Çeşitli Değişkenler Açısından Analizi. 1. Ulusal Eğitim Programları ve Öğretim Kongresi, Balıkesir Üniversitesi, Ayvalık.
- Ozan, C. & Köse, E. (2014). Eğitim Programları ve Öğretim Alanındaki Araştırma Eğilimleri. Sakarya University Journal of Education, 4/1 (Nisan /April 2014) ss. 116-136.
- Saracaloğlu, A. S. ve Dursun, F. (2010). Türkiye’de Eğitim Programları ve Öğretim Alanındaki Lisansüstü Tezlerinin İncelenmesi. 1. Ulusal Eğitim Programları ve Öğretim Kongresi, Balıkesir Üniversitesi, Ayvalık.
- Tavşancıl, E., Çokluk, Ö., Çıtak, G. G., Kezer, F., Yıldırım, Ö. Y., Bilican, S. vd. (2010). Eğitim Bilimleri Enstitülerinde Tamamlanmış Lisansüstü Tezlerin İncelenmesi (2000-2008). Ankara Üniversitesi, Bilimsel Araştırma Projesi Kesin Raporu. <http://acikarsiv.ankara.edu.tr/browse/6199/>. Access date: 07 Nisan 2014.

# Design and development of a digital life logging system for management of lifelong learning experiences

Mehmet Emin Mutlu\*

Open Education Faculty, Anadolu University, Eskisehir, 26470, Turkey

---

## Abstract

In this study, a life logging system is designed, developed and tested for management of the lifelong learning experiences. In the first stage, theoretical foundations of lifelong learning experiences have been searched and then an applicable and expanded approach is acquired by putting together major informal learning theories. After that, a life logging system that captures webcam images and screenshots from individual's desktop, laptop and tablets spontaneously is developed in order to save these learning experiences. System is expanded to architecture which enables the user can interpret his/her personal experiences, develop personal knowledge base, signification and management of learning experiences. Design based research approach is used in study and results of sixteen month old development-trial period are discussed.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** Life logging; lifelong learning; recording of learning experiences; management of learning experiences

---

## Introduction

Lifelong learning is a process which starts at individual's birth and continues until his/her death. When lifelong learning is considered, we encounter with very long time periods. Infinite number of variability and contents are placed in individuals' lifelong learning history such as lecture notes which belong to his/her college days thirty years ago, ability he/she gained twenty years ago during in service training, the museum he/she visited ten years ago during a foreign holiday and the book he/she reads right now. This variability will continue increasingly both in present and future learning. Individuals usually do not realize the importance of management of personal learning processes spread through all of the life experiences. In formal education environments, this function is mainly left to the institutions and instructors and learners are expected to fit in these processes. On the other hand, when lifelong learning and especially informal learning is considered it is clear that an individual, who is not under the supervision of an institution or instructor, needs efficient methods and tools to manage his/her learning processes. Based on this idea, a research project coordinated by the author of this article and supported by Anadolu University has started in order to design and develop a technological infrastructure, which enables individuals to manage their lifelong learning experiences. Formation of learning experiences has been examined at the first stage of the research project and an approach for *recognition and description of learning experiences*, which includes steps such as realization, recording, interpretation of these experiences, definition of the contexts formed by them and creation of a personal knowledge base by using these contexts, is obtained (Mutlu, 2013a). After that, informal learning theories in literature have been examined and by developing a synthesis of these theories *expanded informal learning model* is

---

\* Corresponding author. Tel.: +90-505-7330725.  
E-mail address: memutlu@anadolu.edu.tr

obtained. A useful classification for explaining the meaning of informal learning experiences is offered with the help of this model. Then, by using “recognition and definition of the learning experiences approach”, “expanded informal learning model” and basic management concepts to manage these learning experiences, is offered (Mutlu, 2013b). The method which includes steps such as (a) *recording*, (b) *interpreting*, (c) *forming a personal knowledge base*, (d) *signification*, (e) *planning, controlling and evaluation* provides individuals opportunity to manage their lifelong learning experiences. On the other hand, technological designs to apply these approaches and methods are made too. At first, a multiple device based life logging system is developed (Mutlu, 2013c). And then, a system for *management of the life experiences* is developed in order to enable interpreting the experiences captured (Mutlu, 2013d). Another study, made towards this aim, is a personal knowledge base design which enables users to define contexts among the life experiences recorded and helps them to form a personal knowledge base from these contexts (Mutlu 2013e). Finally, a holistic approach which is based on management of the experiences belonging to personal knowledge work in a study that examines the close relationship between learning and personal knowledge management, is obtained (Mutlu, 2014).

In this study, a system is designed and developed to manage the lifelong learning experiences by using the theoretical and technological studies within the scope of this research. With this aim, the problem of the research is defined and a design based research method is scrutinized. In the following sections, the theoretical framework used for management of lifelong learning to solve the problem are discussed together with the expectations towards this framework. Then, a system for management of the lifelong learning experiences is designed and trial cycle is activated until an applicable system is obtained. The obtained findings are discussed by evaluating the individual tests of the system developed. As a result, findings of the system developed and the expectations of the theoretical model are compared, possible the future research and development activities and other possible fields of application of this system is reviewed.

## **Method**

### *Problem*

In this study, design and development of a life logging system is aimed to manage the lifelong learning experiences. This study is focused on design and development; application of the system by lifelong learners and evaluation of the system is not included.

### *Design based research*

Because of the fact that the problem undertaken is about design and development of a system used in learning area, design based research method which is widely used for this kind of problems is used. Design based research is defined by Wang and Hannafin (2005) as a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings, and leading to contextually-sensitive design principles and theories. Fundamental steps of the design based research method are applied to the problem of the study as mentioned below:

- *Analysis of the current problem by researchers and applicants:* In this step, the conceptual framework is defined by analyzing the fundamental concepts of management of the lifelong learning experiences such as learning, lifelong learning, life-wide learning, life-deep learning and learning experiences.
- *Development of solutions by using technological innovations and existing design principles:* By considering the developments in life logging systems and personal knowledge base tools, an applicable method is developed for management of the learning experiences.
- *Cyclical development and trial process to find the solutions:* Towards the design principles defined in previous step, the software to capture and manage learning experiences has been developed and tested.

- *Reflection to produce design principles and enhance solution implementations:* In order to help determination of the startup design principles of more complex problems related to this field, design and development processes of this study, reports related to the development, test and re-evaluation cycles, products obtained and supportive materials are documented and published.

Details of these steps are discussed in following sections.

## **Analysis of problem**

Learning is the act of acquiring new, or modifying and reinforcing, existing knowledge, behaviors, skills, values, or preferences and may involve synthesizing different types of information. It does not happen all at once, but builds upon and is shaped by what we already know. To that end, learning may be viewed as a process, rather than a collection of factual and procedural knowledge (Schacter et al., 2011:264). Learning is a process which starts at birth continues until death (time scale axis) and occurs every place during day consciously or unconsciously (space axis). This educational fact that covers entire life is named as *lifelong learning*. Learning can occur in an education institution in a planned way or via communication with the individual's environment on his/her own. This space which contains all the learning types from *formal learning*, *non-formal learning* and to *informal learning* is named as *life-wide learning*. The distinction between formal and non-formal learning environments is about where learning takes place. Formal learning occurs within institutions established primarily to deliver education and training, often leads to recognized outcomes and qualifications. Non-formal learning has intended education and training outcomes; however, the setting is out of the dedicated learning institutions, most often in places where learning is not the primary business. Informal learning is distinguishable by an absence of primary intent. It can occur almost anywhere, but as a by-product of other activities. It is often unplanned and without explicit emphasis on learning, yet may still lead to the acquisition of valuable skills, knowledge and attitudes (Clark, 2005). *Life-deep learning*, which leads people what to believe, how to behave, how to judge himself/herself and others, embraces all the religious, spiritual, ethical and social values (Banks et al, 2007). Formation of all these values are closely related to other experiences a person has and roles a person takes. An individual's objective perception of self with an integrated approach happens by a detailed examination of his/her past and inner world. This kind of examination can be achieved with the help of evaluation of different unstructured private information such as memories, journals, diaries, comments, personal notes etc. In formal learning environments, learning activities, which are determined at the instructional design, underlies the learning process. Learner can repeat these learning activities in order to correct his/her deficiencies in his/her learning process retrospectively. In informal learning environments there are not any similar pre-designed learning activities, at most cases, individuals do not realize they are having learning process at that point. Because of this, to use a more common concept such as *learning experience* instead of "learning activity" is more suitable. Learning experience is defined by Mutlu (2013a) as physical, mental, emotional, spiritual, religious, social or virtual events or activities we attend or exposure and make us acquiring new, or modifying and reinforcing, existing knowledge, behaviors, skills, values, or preferences. Because of the fact that learning experience states an attitude which is both active and passive, it can be matched with events and activities that occur at the three dimensions of learning such as lifelong, life-wide and life-deep, and it should be handled together with the other contexts such as place, time, other people, the emotions he/she had, which are related to the life experiences. So it must be handled with the other environments bounded with the other life experiences.

## **Design a solution for problem**

The analysis, made in previous sections for lifelong learning experiences, shows us that learning experiences are a subset of the life experiences and it is hard to isolate them from life experiences. In order to overcome this difficulty an approach which enables individuals to arrange their life experiences is developed.

## *An approach to realize and define learning experiences*

In order to realize and define the learning experiences an approach which consists steps such as *recording of life experiences*, *interpreting life experiences* and *constructing a personal knowledge base* by using these records is suggested (Mutlu, 2013a).

### *Record of life experiences*

The traditional method to record life experiences is to keep a diary. Today, technologies named as *life log* or *life logging* are being designed to make this transaction spontaneously. Origins of life logging researches are based on Vannevar Bush's recommendation of a device which is called as *Memex* and records everything an individual sees, hears, in 1940 (Bush, 1945). This vision started to get real in 1980s via wearable computer researches of Steve Mann. In 1990s the studies of a number of researchers, Mann was also among them, caused improvements in augmented reality (Mann, 2004). Today one of the members of this group, Thad E. Starner is the manager of Google Glass Project (Kress and Starner, 2013). In 2000s Aizawa was able to record all communication information, location information and biological information such as heart beats besides sound, photographs and videos via a wearable computer (Aizawa et al., 2004). At the same time Microsoft developed a wearable camera named as SenseCam, which capture images continuously. With the contribution of this camera and other Microsoft researchers, researcher Gordon Bell developed a system which records wide range and variability of data such as the things he hears, reads, watches and self-tested it (Gemmell et al., 2002). Microsoft SenseCam has been used in numerous life logging researches during 2000s in Oxford, England and positive results obtained especially on patients with Alzheimer's (Hodges et al., 2011). In 2013 Autographer which is based on SenseCam architecture and a kick start project called as Narrative (Memoto) started to popularize wearable cameras. Today, field of wearable sensors has been expanded gradually and both companies and the researchers working on this field are merged under the concept of "quantified self" movement.

### *Interpreting life experiences*

According to Teraoka (2012) there are three layers for recording and management of personal experiences such as *logs*, *activities* and *episodes*. So, the records belonging to life experiences can be interpreted as activities and episodes after their review. In addition to Teraoka, Mutlu (2013a) defined another layer named as *story* above the episode layer and used it for interpretation process of life experiences.

*Activities*: According to theory of activity, human activities are consisted of actions, actions are consisted of operations. Actions are behaviors which are done for achieving a goal. Operations are routine processes done for making actions. People usually do not realize the operations they made (Kaptelinin, 2013). Spontaneous life logs are usually evidential for either operation or the action. After long time, it might be hard to remember an activity by looking at a single log. Because of that, life logs should be scanned in every few days to recognize the life experiences. A daily activity list should be made to interpret the perceived experiences. Within this period, it should be considered that intercepted experiences may occur simultaneously such as reading a book during a journey (Mutlu, 2013a).

*Episodes*: According to Tulving (1983), episodes include information such the location of an event, who was present, and what occurred before, during, and the after the event. When they are discussed in scope of life logging, episodes are written by interpreting contexts of intercepted activities take place, time, other people and feelings which happen during a certain month or months. Matching episodes with a certain month or months will enable us to use these months as contexts. Evaluating daily activities in this way, after a month is important to review an individual's life and enable him/her to direct it. Several episodes usually happen in a month (Mutlu, 2013a).

*Stories*: Stories are meaningful summaries of life logs (Byrne et al., 2011). Stories usually contain intercepted episodes during longer time periods. There is an episode which determines the beginning and ending of each one of these stories. Matching stories with a certain year or years will enable us to use these years as contexts. Several stories usually happen in a year (Mutlu, 2013a).



*Episodic memory* is the memory of autobiographical events (times, places, associated emotions, and other contextual who, what, when, where, why knowledge) that can be explicitly stated. It is the collection of past personal experiences that occurred at a particular time and place (Schacter et al., 2011:240-241). Episodic memory can be supported by recording life experiences continuously on life log basis (Lee and Dey, 2008). *Autobiographical memory* is a memory system consisting of episodes recollected from an individual's life, based on a combination of episodic (personal experiences and specific objects, people and events experienced at particular time and place) and semantic (general knowledge and facts about the world) memory (Williams et al., 2008). The individual can strengthen his/her autobiographical memory by interpreting data occurred during his/her life experiences which are recorded via life logging (Doherty et al., 2012).

#### *Constructing of personal knowledge base*

The most fundamental summarization to process raw life experiences in order to obtain information that can be used for other purposes is to list them under various categories. The architecture named as *life experiences management framework* and suggested by Mutlu (2012a), shows us that the information gathered via life experiences can be listed under seven common lists and their sub-lists such as *places, events, people, behaviors, emotions, features* and *assets*. Personal knowledge bases are defined as is an electronic tool used to express, capture, and later retrieve the personal knowledge of an individual (Davies, 2011). By using his/her life experiences, an individual can obtain the inventory of his/her life by using these seven groups of lists. This inventory help individual to balance his/her life, do his/her own life coaching, manage his/her personal development and lifelong learning processes.

Even though formal learning is usually young individuals' field of interest, with the help of lifelong learning, learning process gains became important for every age group. Studies show that as age grows, episodic memory weakens and its place is taken by semantic memory. This shifting happens as removing the specific temporal and spatial contexts from memories in episodic memory and causing these memories to become semantic memories (Piolino et al., 2002). To record and interpret life experiences and create a personal knowledge base approach can ease the management of lifelong learning processes of elderly people by supporting both their episodic and autobiographic memories.

#### *Expanded informal learning model*

It enables us to capture and define all the life experiences which also include learning experiences that contain suggested steps which are "recording of life experiences", "interpreting life experiences" and "creating personal knowledge base by using these records". While individuals can recognize their planned and deliberate learning experiences, they may not realize learning experiences happened unconsciously and unplanned.

In his study, which is published in 2000 and updated in 2004, Eraut suggested a typology for informal learning. In this typology which is divided into three categories such as "implicit learning", "reactive learning" and "deliberative learning" by considering the level of intention of learner. Implicit learning happens without any intent and awareness for learning. At one extreme there is implicit learning, at the other there is deliberative learning in time specifically set aside for that purpose. Reactive learning is near-spontaneous and unplanned, the learner is aware of it but the level of intentionality will vary and often be debatable. Other dimension of the informal learning is about timing of the episodes on which the learning focused. Episodes related to learning might have happened in past, happening now or will happen in future. Here the difference is about an episode and its temporal differences. Even though context of learning is always present; focus of the learning might be past, present or future. In other words, the experience which caused learning might have happened in past, is happening now or will happen in future (Eraut, 2000; 2004)

Schugurensky (2000) defined three status of informal learning by using the taxonomy of intention and cognition of which he named as "self-directed learning", "incidental learning" and "socialization". Self-directed learning refers to 'learning projects' undertaken by individuals (alone or as part of a group) without the assistance of an 'educator' (teacher, instructor, facilitator), but it can include the presence of a 'resource person' who does not regard

herself or himself as an educator. It is both intentional and conscious. It is intentional because the individual has the purpose of learning something even before the learning process begins, and it is conscious, in the sense that the individual is aware that she or he has learned something. Incidental learning refers to learning experiences that occur when the learner did not have any previous intention of learning something out of that experience, but after the experience she or he becomes aware that some learning has taken place. Thus, it is unintentional but conscious. Socialization (also referred to as tacit learning) refers to the internalization of values, attitudes, behaviors, skills, etc. that occur during everyday life. Not only we have no a priori intention of acquiring them, but we are not aware that we learned something (Schugurensky, 2000). Schugurensky realized that the fourth type of learning can be suggested as conscious but unintended learning according to the typology he offered. But he also said that conceptualization of this type of learning is hard and any example of intentional learning can also be conscious too (Schugurensky, 2000).

Bennett (2012) extended Schugurensky's (2000) conceptualization of informal by recommending “four part model of informal learning”: a) self-directed learning, which is conscious and intentional, b) incidental learning, which is conscious and unintentional, c) tacit learning, which replaces socialization and is both nonconscious and unintentional, and d) integrative learning, which is non-conscious and intentional. According to this model, self-directed and incidental learning are conscious activities, which can be observed easily and clearly. Bennet re-named “socialization” item in Schugurensky’s model as “tacit learning”. In this type of learning, individual learns something in social environments without intention before he/she knows it. Bennett added the fourth type of which Schugurensky avoided as “integrative learning” to his model. Integrative learning is defined as a learning process that combines intentional nonconscious processing of tacit knowledge with conscious access to learning products and mental images. For Integrative learning Bennet’s examples are finding solutions to the problems via tacit knowledge, creative processes, self-driven solutions like intuition and finding the solution of the problem during a break after working on it. For integrative learning Bennett defines two sub categories as “information shifting” and “sublimation” (Bennett, 2012).

By applying Bennet’s four part model of informal learning to Eraut model Mutlu obtained *expanded informal learning model*. With this aim he added Eraut’s matrix which contains “implicit”, “reactive” and “deliberative” learning types and three time levels “integrative learning” column which is borrowed from Bennett. Reactive learning is re-named as *incidental (reactive) learning* and while Eraut claims that there can be different levels of intention in this model, in expanded model it is assumed that this type of learning is totally intended. Eraut’s deliberative learning type is re-named as *self-directed learning* as same as Bennett and Schugurensky. On the other hand, instead of intention, *planning situation* is used to consider if the individuals planned informal learning beforehand or not. While forming his typology Eraut does not reference level of consciousness directly instead he uses being aware of or not. In the suggested model, taxonomy is formed between *level of consciousness* and *planning situation* by taking level of consciousness into account as it is used by Schugurensky and Bennet (Table 1). So, learning types such as *implicit (tacit) learning*, *integrative learning*, *reactive (incidental) learning* and *self-directed learning* is determined from informal learning experiences of individual’s lifelong learning process and a framework which will help individual to gain awareness towards his/her previous, present and future learning experiences (Mutlu, 2013b).

1. Table1. Expanded informal learning model

Learning Types	Implicit (tacit) learning	Integrative learning	Reactive (incidental) learning	Self-directed learning
----------------	---------------------------	----------------------	--------------------------------	------------------------

Level of consciousness	Unconscious	Unconscious	Conscious	Conscious
Planning situation	Unplanned	Planned	Unplanned	Planned
	<p><i>In implicit learning</i> there is no intention to learn and no awareness of learning at the time it takes place (Eraut, 2000).</p> <p><i>In tacit learning</i>, learning takes place in social environments unconsciously (Bennett, 2012).</p> <p><i>Socialization</i> refers to the internalization of values, attitudes, behaviors, skills, etc. that occur during everyday life. Not only we have no a priori intention of acquiring them, but we are not aware that we learned something. (Schugurensky, 2000)</p>	<p><i>Integrative learning</i> is a learning process that combines intentional nonconscious processing of tacit knowledge with conscious access to learning products and mental images (Bennett, 2012).</p>	<p><i>Reactive learning</i> is near-spontaneous and unplanned, the learner is aware of it (Eraut, 2000).</p> <p><i>Incidental learning</i> refers to learning experiences that occur when the learner did not have any previous intention of learning something out of that experience, but after the experience she or he becomes aware that some learning has taken place (Schugurensky, 2000).</p>	<p><i>In deliberately learning</i>, there is a definite learning goal and time is set aside for acquiring new knowledge (Eraut, 2000).</p> <p><i>Self-directed learning</i> refers to intentional and conscious 'learning projects' undertaken by individuals (alone or as part of a group) without the assistance of an 'educator' (Schugurensky, 2000)</p>
Time of focus				
Past episode(s)	Implicit linkage of past memories with current experience (Eraut, 2000).	Change of point of view towards a previous problem.	Brief near spontaneous reflection on past episodes, events, incidents, experiences (Eraut, 2004).	Discussion and review of past actions, communications, events, experiences (Eraut, 2004).
Current experiences	A selection from experience enters episodic memory (Eraut, 2004).	Intuiting solution of a current problem	Noting facts, ideas, opinions, impressions, asking questions; observing effects of actions (Eraut, 2004).	Engagement in decision making, problem solving, planned informal learning (Eraut, 2000).
Future behaviour	Unconscious expectations (Eraut, 2004)	Realizing a problem which will gain importance in future	Recognition of possible future learning opportunities (Eraut, 2004).	Planning learning opportunities, rehearsing future events (Eraut, 2004).

#### *A Method for management of learning experiences*

For management of learning experiences a five stepped method which is formed by three sections is suggested (Mutlu, 2013b). First section of the method is taken from “an approach for realization and description of learning experiences” developed by Mutlu (2013a), for the second section of the approach “expanded informal learning model” is used. Third section of the method contains functions belong to the management theory. Steps of the suggested approach for management of learning experiences are given below:

- Record, interpretation and creation a personal knowledge base (Stage 1-2-3)
- Signification (Stage 4)
- Planning, monitoring and evaluation (Stage 5)

In “an approach for realization and interpretation of learning experiences” Mutlu (2013a) suggests that foreseen learning experiences are a part of life experiences, if we record life experiences precisely, learning experiences can also be capture. By interpreting life experiences, which have caught via portable life logging cameras, with

different time layers such as “activities”, “episodes”, and “stories” it is possible to realize most of the learning experiences and interpret them. By using obtained raw data and information gathered via interpretation and also with the help of personal knowledge base lists such as “environments”, “events”, “persons”, “behaviors”, “emotions”, “features” and “assets”; learning experiences will be exposed via cross-references and recorded. In final step, a mechanism which can define future, current and previous situations of learning experiences is used.

- Stage 1: User records images belong to his/her experiences via life logging applications that work on multiple devices.
- Stage 2: On life logs “activities”, “episodes” and “stories” are created as soon as possible.
- Stage 3: Personal knowledge base lists are created and updated during certain time intervals by using this information.
- Stage 4: At certain intervals learning experiences are scanned with the help of life logs, activities, episodes, stories and personal knowledge base lists. Determined learning experiences are tagged as “formal learning”, “non-formal learning” and “informal learning”. By scrutinizing “informal learning” experiences we try to interpret them while tagging them as “implicit (tacit) learning”, “integrative learning” “reactive (incidental) learning” and “self-directed learning”.
- Stage 5: Actions such as monitoring the current, evaluating previous and planning the future is carried out by scanning records belong to previous, current and future learning experiences. Users can use headlines such as “goals”, “road maps”, “design ideas”, “drafts”, and “things left for upcoming projects/versions” for “lists towards future”. For “lists towards current situations” headlines such as “things have done”, “version diary”, “problems/mistakes”, “completed”, “canceled” can be used. For “lists towards past” names such as “achievements”, “failures”, “abilities/qualifications” will be enough.

### **Development and test phase**

“Learning experience management method” which is suggested in previous sections, can be applied by using a pencil and a paper by individuals during their daily lives. But this isn’t practical and sustainable. In this section, an information system which consists of four parts and designed for application of management of learning experiences will be examined. Even though, first three items of the information system is developed during previous studies by the author of this study, last item is developed and tested in during this study.

#### *Life logging layer*

In order to remember the details of an experience lived, every moment of this experience must be recorded. It might be considered that, this problem can be solved by simultaneous video and audio recording of whole life of the individual. But this time we face with the timing problem caused by scanning all the records. In order to overcome this problem, it is suggested to record photo of life experiences every thirty seconds (Hodges et al., 2006). If an individual records his/her photos every thirty seconds via his/her wearable camera every thirty seconds, he/she will have approximately 2000 photos each day. Scanning these photos can be done quicker than scanning a video with the same length.

Studies towards using life logging systems in education mostly focus on recording physical learning experiences via life logging cameras (Ogata et al., 2011). Subjects such as distance learning experiences carried out by individuals in virtual environments, educational activities they do on their own, experiences in social learning environments and capturing informal learning experiences are genuine subjects which are not researched much. When it is considered that most of the learning takes place at virtual environments today, it is required to take regularly and automatically screenshots of the computers used in addition to camera images. With the help of a system which records key images for later retrieval of learning experiences and contextual data contains date, hour and minute of the image obtained, individual can realize his/her learning experiences and remember information which enables him/her to access to the educational content belongs to the time of this experience.

By using this approach Mutlu (2013c) developed a life logging system to record learning experiences of individuals' learning processes. With this aim, physical and virtual environments are taken into account and a life logging system is designed to record the learning activities take place in these environments simultaneously and autonomously. With the help of this system, it is possible to put together all the images capture every thirty seconds by the screenshot and camera capture software that works on multiple devices such as desktop computers, laptops, tablets, smart phones and wearable cameras and stored on cloud infrastructure (Figure 1).

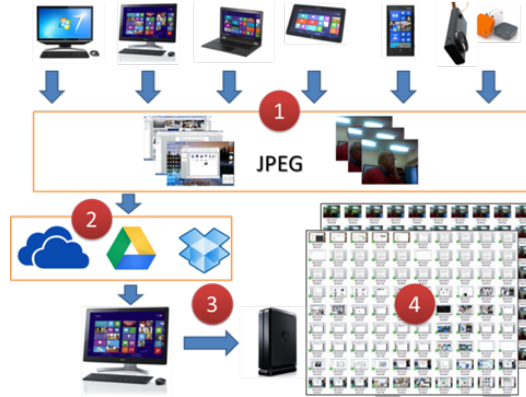


Fig.1. A multi-device based life logging system.

In life logging system, screenshot and camera capture software which can work on desktops, laptops, tablets and wearable life logging cameras captures camera and screen images in jpeg format at every thirty seconds (1). They record the images in the folder of the cloud storage services such as OneDrive, Google Drive or Drop Box (2). Images on cloud environment are downloaded to working computer via software developed for this purpose in a folder named with time stamp and capture device tag (3). Images can be browsed by Windows Explorer as sorted according to year, month, day and name of the capture device.

#### *Experience processing layer*

In another study carried out by Mutlu (2013d) a system suggestion is made for the users who can benefit to manage their life experiences. For this aim, a life logging layer which records life experiences in virtual and physical environments via screenshots and camera captures and experience processing layer which enables users to manually interpreting their experiences on different time spaces (Figure 2).

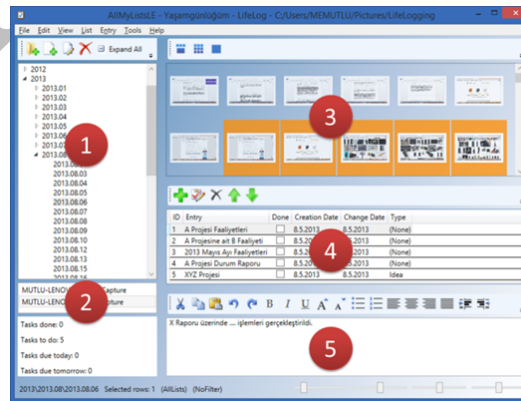


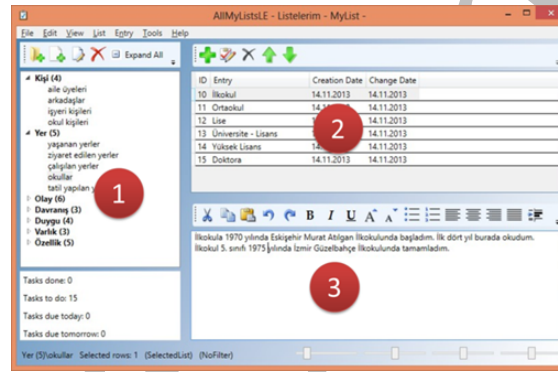
Fig. 2. Screenshot of experience processing software (AllMyListsLE).

In experience processing layer, when AllMyListsLE software is executing, it reaches the images obtained via life logging layer automatically and lists these images to the user as a calendar three which contains year-month-day nodes (1). User picks up a device from list of devices for a specific date (2). Chosen screen or camera shots are browsed as full day view or hour view and list view or tile view (3). User can create one or more comment item/items for a chosen day or one or more images in it (4) and rich text format contents can be entered this item (5). User also have facilities such as find, search, list, entering multiple contexts and filing operations via menus.

#### *Personal knowledge base layer*

In another study carried out by Mutlu (2013e), a personal knowledge base system integrated with a life logging system which enables individual to record all of his/her information, study experiences via screenshot or camera shots and software belonging to the system designed is developed. In this design, a knowledge base layer is added to the life logging layers and experience processing layer two of which are previously developed.

In order to create the knowledge base layer, a new version of AllMyListsLE software is developed which enables it to manage MyList lists besides MyLog lists. In this structure, MyLog lists are the lists which are used for record and management of the images and comments related life experiences. MyList lists are the lists which are used for



create entries of personal knowledge base (Figure 3).

Fig. 3. Personal knowledge base layer.

When AllMyListsLE software is executing for MyList lists, interface of the software changes and a three that contains nodes and sub-nodes created by the user is loaded (1). User can create one or multiple comment entries for each of nodes/sub-nodes chosen (2); changes such as add, delete and change can be done on these nodes and rich text format entries can be enter to these items (3). User can enter additional information such as finishing time, reminder, priority, type and prepare managerial lists towards planning, control and evaluation with the help of these.

The most important feature of the personal knowledge base items is to enable users to create hierarchical lists related to recorded life experiences such as person, place, etc. While a user is commenting on his/her life experiences on MyLog lists, he/she can create a personal knowledge base derived from all of his/her life experiences via MyList lists. Mutlu (2012a; 2012b) suggested the lists and their sub-lists given below for main contextual lists.

- Lists of people (family members, friends, colleagues, school friends, etc.)
- Lists of places (the places we have lived, visited, worked, studied, etc.)
- Lists of events (educational events, healthcare events, family events, business life events, etc.)
- Lists of behaviors (habits, routines, cultural behaviors, etc.)
- Lists of emotions (happiness, regrets, doubts, etc.)

- Lists of assets (objects, properties, cultural assets, etc.)
- Lists of features (hobbies, achievements, abilities, issues, priorities, etc.)

#### *Learning experiences management facility*

In order to apply 4th and 5th stages of *the management of learning experiences method*, two enhancements are made to the three layered system which is developed during previous and contains “life logging”, “experience processing”, and “personal knowledge base” layers. First of these is the feature of entering comments related with the learning types. This transaction is done in “Type” field of the entry. So users can scan their life experiences and tag the comments belong to their learning experiences as “formal learning”, “non-formal learning” and “informal learning”. Also, they can make a more detailed tagging for informal learning types such as “implicit (tacit) learning” or “integrative learning”, “reactive (incidental) learning” or “self-directed learning”. This feature enables us to list a lot of learning experience entries spread around a long period. So, individual can find the existence of learning experiences he/she missed more easily and add these entries to his/her list.

Second enhancement enabled user to add blank year-month-day nodes related to past and future. These nodes without images can be used for planning, monitoring and evaluation. So user can transfer stories from memories of certain episodes of previous years or out sources. Similarly system can be updated by logging plans related to upcoming months/years.

Similarly in order to monitor the present term they can add entries such as “stories of the year”, “plans of the year”, “months of the year” to the year node; “episodes of the month”, “plans of the month” and “weeks of the month” to the month nodes. User can plan future without leaving MyLog environment with the help of these entries, monitor his/her current situation and evaluate his/her past.

#### *Development and test cycles*

During the development and test cycle of the digital life logging system, which consists of four elements and designed in previous section, the development and test cycles given below is applied in order to get a useful version (Table 2).

2. Table 2. Development and Test Cycles (December 2012 – March 2014)

Components of the System	Period
Life Log Software	Development and Tests: December 2012 – September 2013 on 125.000 images
Life Experiences Management Software	Development January 2013 – May 2013; Tests May 2013 - September 2013 on 125.000 images
Personal Knowledge Base Facility	Development May 2013; Tests June 2013 – October 2013 on 158.000 images
Learning Experiences Management Facility	Development: May 2013; Tests June 2013 – March 2014 on 480.000 images

The experiences belong to first three steps are covered enough in previous publications. The experiences belong to the final step will be only covered here. Personal experiences had as a whole system since March 2014 can be summarized below:

*Logs:* Screenshots and camera shots from seven different devices such as two workstations and a laptop in the office, a desktop computer and a workstation at home, one more laptop, a tablet and a smart phone are derived between December 2012 and March 2014. On March 2014, half million images are obtained and they take more 25 GB space of the working computer.

*Comments:* Since May 2013 activities, episodes and stories are entered to the logs which have been captured previously. This transaction is also applied to the previous logs between December 2012 and May 2013. So more than 1.000 activities, 100 episodes and 10 stories have been defined and traced during 16 months.

*Personal knowledge base:* During this term, 843 nodes and 1117 entries have been collected on personal knowledge base in form of MyLists structure which is obtained from contexts related to experiences. These entries not only consist data limited with these 16 months but also cover all the contexts related to life as long as they are remembered.

*Learning experiences:* Among current experiences significant learning experiences belong to that day have been tried to be determined so more than 400 learning experience is tagged in 16 months.

*Planning-controlling-evaluation:* Future planning and evaluation activities are carried out by opening the MyLog nodes which belongs to 2014 , previous and following three years and months of these years and entries created such as episodes of the year, plan of the year, months of the year, episodes of the month, weeks of the months.

## **Evaluation and findings**

Last step of the design based research approach is defined as reflection to produce design principles and enhance solution implementations. With this aim, while development and trial cycles of the system have been implementing, components of the system are used individually during personal life and observations belong to this usage has been noted. Moreover, design, development and test reports of the research is published in various papers and articles and Project documents are offered on blog and wiki pages of the project manager. In following sections, evaluations obtained for each of the components during the 16 months long research are formed together.

### *Life Log Software*

*Benefits and Problems:* Since the first day, it has been tested, life logging software started to produce benefits and it is commonly used for retrieving and evaluating learning experiences and projects worked on a specific date in past. Especially carrying out the design, development and trial processes of multiple software projects developed on multiple computers smooth existence of life logging systems is effective. Different users on different computers can use life logging software by logging into their accounts and the images belong to them are saved on their own OneDrive accounts during their usage. So images belong to different users won't be mixed. On the other hand, sometimes it is observed that OneDrive cloud storage service is not sufficient for data synchronization at this intensity (Mutlu, 2013c).

Existence of different usage patterns is realized during first trials with life logging software (Mutlu, 2013c).

- *First usage pattern:* Long term archive support for users who use limited number of devices. In this usage type, for example a student can evaluate all the educational activities on his/her laptop belong to whole semester.
- *Second usage pattern:* It is organizational support which is provided for people who use multiple devices at the same time. In this usage pattern, for example a software developer can coordinate his/her activities by scanning his/her life logs on five computers every day.
- *Third usage pattern:* It is usage of the system as urgent memory support. This usage type is used only when it is needed (for example when the correspondence between two people is needed or a new document is found etc.).

### *Life Experiences Management Software*

The findings given below are determined as a result of the use of AllMyListsLE experience processing software (Mutlu, 2013d).

- *Instant use:* Instant use is effective for retrieving the details of a previous experience.
- *Life archive:* a complete inventory of life experiences had in physical and virtual environments can be prepared and a useful life archive is obtained.
- *Permanent remembrance:* Because of the fact that visual evidence of daily activities provide more permanent remembrance, it is possible to comment on these experiences even after for a long time.



- *Usage on multiple devices*: It is seen that the system is efficient especially for coordination of activities which require working on multiple computers.
- *Personal performance*: Existence of daily activity lists provides opportunity for evaluating personal performance.
- *Take advantage of previous experiences*: Reviewing similar experiences by using images and activity logs of the previous experiences prevent waste of time and energy.
- *Stories belong to the life*: It is realized that life is composed of either sequential or parallel stories. The relationships between different roles and stories become less complex. The uncertainty and blur between future, present and past are decreased.

#### *Personal knowledge base facility*

The results mentioned below are obtained as a result of use of personal knowledge base layer (Mutlu, 2013e):

- A safe and practical knowledge base is developed which doesn't put any restrictions on personal information sources even though it records all the information experienced in this study, focuses on contexts rather than content so it can provide the required flexibility for filtering personal information.
- The prepared personal knowledge base enables people to log their comments on activity, episode and story levels by using visual evidence belong to internalization, externalization, combination and socialization steps of knowledge creation process.
- By using time dependent logs, activities, episodes and stories, personal knowledge base items which are independent from time, are formed. The personal knowledge base obtained provides suitable infrastructure for management of software development projects.

In order to conversion the tacit knowledge to explicit knowledge, the strategies given below are applied during personal use (Mutlu, 2013e).

- *Direct recall*: Via records and comments belong to experiences (activities, episodes and stories) retrieval and record of tacit knowledge, ability, behavior, value and preferences are enabled.
- *Indirect recall*: Unnoticed relations are revealed via cross-references between MyLog and MyList lists that belong to the experiences.
- *To see the bigger picture composed of all the information*: By determining personal road map and personal digital stories, the opportunity of defining future for a long time via previous periods is obtained.

These are also among the opportunities provided by personal knowledge base (Mutlu, 2013e):

- If an individual is working on more than one project and research at the same time, the burn out sense and alienation brought by his/her busy schedule can be overcome by evaluating his/her position objectively with the help personal knowledge base based on life logs.
- Another acquisition realized during trials are that the approach enables person to have the information belongs to him/her via an integrated approach. With the help of the system, the individual can determine the fields he/she underestimated or lied heavily on so he/she can balance the areas which forms his/her life.

#### *Learning experiences management facility*

With the help of the suggested architecture, almost all of the life experiences of an individual can be captured, recorded, recognized and interpreted. Also formation of personal knowledge base and management of this information among these experiences can be enabled. While traditional personal learning management studies focus on deliberate and conscious activities, this study enables us to evaluate all of learning experiences of an individual with classifying them as planned, unplanned, conscious, unconscious.

Learning requires focusing on. On the other hand administrative activities require focusing too. These two processes are required not to collide with each other. The architecture suggests an opportunity to overcome this problem by focusing on learning activities and management of these activities on different levels. The applied management approach is focused more passively on recording experiences lived and management of personal learning experiences by using these experiences.

Awareness towards the learning experiences a user had can be increased by applying learning experience management process. So he/she can see how many implicit learning experiences he/she had, he/she can get new results by integrating different learning experiences, he/she can place unplanned learning activities more easily to his/her road map, he/she can support his/her planned and deliberate learning experiences together with his/her unplanned and unconscious learning experiences (Mutlu, 2014).

### *Weaknesses*

The observed weaknesses of the system developed for management of learning experiences can be summarized below:

- *Restrictions of the operating system:* Because of the fact that sub system of life logging of the system is developed only for Windows 8 and Windows Phone 8, it is not possible to get any screen or camera shots from iOS, MacOS and Android.
- *Memory restrictions:* AllMyListsLE software may slow down when browsing more than 120 pictures on computer screen. It is not possible to browse images belong to multiple devices simultaneously. Developments can be done to overcome these restrictions of the system.
- *Usage restrictions:* Dependence on working computer (for Mylog lists), low level resolution of the images recorded, synchronization problems of cloud computing system, difficulty of integrating the images recorded previously to the system, lack of graph structure of personal knowledge base facility, differences of usage environments of MyLog and MyList lists.
- *Privacy problems:* The system should be discussed according to safety of the personal information recorded, problems caused by making record in public places and privacy of the records which shouldn't have been recorded.

### *Costs*

- *Duration of the learning and adaptation period:* It is not easy for a participant to use each of the five stages of management of the learning experience method at the same time. Instead, if he/she starts using the system gradually in one-two months gradually, it would be easier to get used to, adopt and sustain the system.
- *Period of time required for keeping up the system:* There is not any significant amount of time for an experienced user with reflexes for starting and stopping the record of camera and screen shots. Controlling the transporting of the images from cloud to computer, interpreting the daily activities, updating activities, episodes and stories one hour will be enough for each week. On the other hand, the time spent on using the system to support daily life will be increased in accordance with the benefits user get from the system. Lastly, an additional can be spared to plan, control and evaluate the yearly, monthly and weekly activities. Maximum amount of time to sustain the system every week is three hours.
- *Hardware costs:* Because of the fact that the system designed will be working on computers with existing Windows 8 or higher versions and smartphones, there is not seen any costs for recording devices. If extensive recordings are made with four devices at the same time, 200 GB will be enough to store 10.00 images daily and 4 million images yearly. When it is considered that the cost of a portable storage device with 1 TB (100 GB) capacity is 100 USD average, there is not any significant costs for using this system.

## Conclusion

The system designed has been developed incrementally for 16 months and each step of it evaluated individually. At this point, the system has not been fully tested with all of its features together with sufficient number of users during sufficient amount of time yet. During individual trials, it is seen that workflow of the model suggested during design phase can be carried out smoothly via software obtained during development phase and it is enough for recording personal experiences and working on them. Application oriented research should be done for observation and evaluation of the effects of personal knowledge base formed as a result of the usage of this system on interpretation-trial-evaluation process.

- Enhancing of the usability of the system: It is required to design and carry out studies based on case studies and action researches which monitors and evaluates applicants in detail in order to enhance the usability of the system. As a result of these studies modifications can be done for enhancing the process and updating the software towards this.
- In order to test how much of the user expectations satisfied with this model and determine the contributions made to management of lifelong learning experiences of individuals, applications should be performed on large user groups with different roles and these user should be surveyed. So, the existence of different usage patterns can be found.
- Researches related to adaptation and usage of the system developed on different fields such as management of personal projects, support of biological memory, goal management and personal development management, personal information management, self-supervision, self-monitoring, recording of user experiences, personal healthcare management can be done.

It is possible to develop the system in the areas mentioned below:

- Textual search can be done on past experiences by scanning the screenshots caught via optical character recognition software and indexing them.
- By applying face recognition and image recognition feature on the camera capture images, it is possible to tag past experiences automatically.
- By using tree and graph approaches together, a semantic hypertext space which enables us to visualize the relationship between all of the experiences recorded and their relationship with the contexts they are within.
- A portable version of the system which works on USB stick can be developed in order to mobilize the system.
- The R&D activities can be done for transforming personal knowledge base systems based on life logging to life long memory support systems and then transforming them into personal AI systems gradually.
- Life logging system can be enhanced with different types of sensors such as audio, video, GPS, environment and biological etc.

## Acknowledgements

This study was supported by Anadolu University Scientific Research Projects Commission under the grant no: 1301E014.

## References

- Aizawa, K., Tanchaoen, D., Kawasaki, S., Yamasaki, T. (2004). Efficient Retrieval of Life Log Based on Context and Content, In the *Proceeding of 1st ACM Workshop on Continuous Archival Retrieval of Personal Experiences*, 22-31.
- Banks, J., Au, K., Ball, A., Bell, P., Gordon, E., Gutierrez, K., et al. (2007). *Learning in and out of school in diverse environments: Life-long, life-wide, life-deep*. The LIFE Center (The Learning in Informal and Formal Environments Center), Seattle, University of Washington, Stanford University, and SRI International. Retrieved from [http://life-slc.org/docs/Banks\\_etal-LIFE-Diversity-Report.pdf](http://life-slc.org/docs/Banks_etal-LIFE-Diversity-Report.pdf)

- Bennett, Elisabeth E. (2012). A Four-Part Model of Informal Learning: Extending Schugurensky's Conceptual Model. In the *Proceedings of the Adult Education Research Conference*. Saratoga Springs, NY: AERC.  
Retrieved from <http://www.adulterc.org/Proceedings/2012/papers/bennett.pdf>
- Bush, V. (1945). As We May Think, *Atlantic Monthly*, July 1945.
- Byrne, D., Kelliher, A., Jones, G. J. (2011). Life Editing: Third-Party Perspectives on Lifelog Content, In the *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 1501-1510.
- Clark, T. (2005). Lifelong, life-wide or life sentence? *Australian Journal of Adult Learning*, 45(1), 47-62.
- Davies, S. (2011). Still Building the Memex. *Communications of the ACM*, vol. 53, issue 2, pp.80-88, Feb. 2011.
- Doherty, A.R.; Pauly-Takacs, K.; Caprani, N.; Gurrin, C.; Moulin, C.J.A.; O'Connor, N.E. and Smeaton, A.F. (2012). Experiences of Aiding Autobiographical Memory Using the SenseCam, *Human-Computer Interaction*, 27:1-2, 151-174.
- Eraut, M. (2000). Non-formal learning and tacit knowledge in professional work. *The British journal of educational psychology*, 70 (Pt 1), 113-36.
- Eraut, M. (2004). Informal learning in the workplace. *Studies in Continuing Education* 26(2), 247-273.
- Gemmell, J. Bell, G. Lueder, R. Drucker, S. Wong, C. (2002). MyLifeBits: Fulfilling the Memex Vision, *Proceeding of the tenth ACM International Conference on Multimedia*, 235-238.
- Hodges, S., Berry, E., Wood, K. (2011). SenseCam: A Wearable Camera That Stimulates and Rehabilitates Autobiographical Memory, *Memory*, 19(7), 685-696.
- Hodges, S., Williams, L., Berry, E., Izadi, S., Srinivasan, J., Butler, A., et al. (2006). SenseCam: A Retrospective Memory Aid, In *UbiComp 2006: Ubiquitous Computing*, Springer Berlin Heidelberg, 177-193.
- Kaptelinin, V. (2013). Activity Theory. In: Soegaard, Mads ve Dam, Rikke Friis (eds.). *The Encyclopedia of Human-Computer Interaction*, 2nd Ed. Aarhus, Denmark: The Interaction Design Foundation. Retrieved from [http://www.interaction-design.org/encyclopedia/activity\\_theory.html](http://www.interaction-design.org/encyclopedia/activity_theory.html)
- Kress, B., Starner, T. (2013). A Review of Head-Mounted Displays (HMD) Technologies and Applications for Consumer Electronics, In *SPIE Defense, Security, and Sensing, International Society for Optics and Photonics*, 87200A-87200A.
- Lee, M. L. ve Dey, A. K. (2008). Wearable experience capture for episodic memory support. *12th IEEE International Symposium on Wearable Computers*, 107-108.
- Mann, S. (2004). Continuous lifelong capture of personal experience with EyeTap. In *Proceedings of the the 1st ACM workshop on Continuous archival and retrieval of personal experiences* (pp. 1-21). ACM.
- Mutlu, M. E. (2012a), Yaşam Günlüğü (CARPE) Uygulamaları ve Yaşam Deneyimleri Yönetimi İçin Bir Bilgi Mimarisi, *XVII. Türkiye'de İnternet Konferansı*, 7-9 November 2012, Eskişehir. Retrieved from <http://inet-tr.org.tr/inetconf17/bildiri/7.pdf>, (In Turkish)
- Mutlu, M.E. (2012b). A Mobile Information Management Framework Proposal for Development of Personal Learning Environments, *Proceedings of Future Learning IV*, 3-32.
- Mutlu, M.E. (2013a). Üç Boyutlu Öğrenme Modeli ve Öğrenme Deneyimlerinin Oluşması, 22. *Ulusal Eğitim Bilimleri Kurultayı*, Eskişehir Osmangazi Üniversitesi, 5-7 September 2013. (In Turkish)
- Mutlu, M.E. (2013b). Genişletilmiş İnförmel Öğrenme Modeli ve Öğrenme Deneyimlerinin Yönetimi için Bir Yöntem, 22. *Ulusal Eğitim Bilimleri Kurultayı*, Eskişehir Osmangazi Üniversitesi, 5-7 September 2013. (In Turkish)
- Mutlu, M.E. (2013c), Öğrenme Deneyimlerinin Kaydedilmesi İçin Çoklu Cihaz Tabanlı Bir Yaşam Günlüğü Sisteminin Geliştirilmesi, *Eğitim ve Öğretim Araştırmaları Dergisi (JRET)*, Cilt 2, Sayı 4, Makale No:28, 256-269 pp., November 2013. (In Turkish)
- Mutlu, M.E. (2013d), Yaşam Deneyimlerinin Yönetimi İçin Bir Sistem Önerisi, 30. *Ulusal Bilişim Kurultayı*, 28-29 November 2013, Ankara
- Mutlu, M.E. (2013e), Yaşam Günlüğüne Dayalı Bir Kişisel Bilgi Tabanı Sistemi Tasarımı, *İnet-Tr 2013 – XVIII. Türkiye'de İnternet Konferansı*, İstanbul Üniversitesi, 9-11 December, 2013. Retrieved from <http://inet-tr.org.tr/inetconf18/bildiri/35.pdf>, (In Turkish)
- Mutlu, M.E. (2014). Kişisel Bilgi Yönetimi İçin Bütüncül Bir Yaklaşım – Kişisel Bilgi Çalışması Ortamlarındaki Deneyimlerin Yönetimi. *AB'14 - XVI. Akademik Bilişim Konferansı*, Mersin Üniversitesi, 5-7 February 2014.  
Retrieved from <http://ab.org.tr/ab14/bildiri/176.pdf>, (In Turkish)
- Ogata, H., Li, M., Hou, B., Uosaki, N., Yano, Y. (2011). Learning by Logging: Supporting Ubiquitous Learning Using a Lifelogging Tool, *2011 International Conference on Internet of Things and 4th International Conference on Cyber, Physical and Social Computing*, 552-557.
- Piolino, P., Desgranges, B., Benali, K., & Eustache, F. (2002). Episodic and semantic remote autobiographical memory in aging. *Memory*, 10, 239-257.
- Schacter, Daniel L., Gilbert, Daniel T., and Wegner, Daniel M. (2011). *Psychology*; Second Edition. New York: Worth Publishers.
- Schugurensky, D. (2000). *The forms of informal learning: Towards a conceptualization of the field*. NALL Working Paper #19-2000. Retrieved from <http://www.nall.ca/res/19formsofinformal.htm>
- Teraoka, T. (2012). Toward personal experience management in a socially networked World. *PIM WorkShop 2012, affiliated with CSCW 2012, the Conference on Computer-Supported Collaborative Work*, held in Seattle in February 2012. Retrieved from [http://pimworkshop.org/2012/pdf/teraoka\\_2012\\_toward.pdf](http://pimworkshop.org/2012/pdf/teraoka_2012_toward.pdf)
- Tulving, E. (1983). *Elements of Episodic Memory*. New York: Oxford University Press.
- Wang, F. and Hannafin, M.J. (2005). Design-based research and technology-enhanced learning environments. *Educational Technology Research and Development*, 53(4), 5-23.

Williams, H. L., Conway, M. A., & Cohen, G. (2008). Autobiographical memory. In G. Cohen & M. A. Conway (Eds.), *Memory in the Real World* (3rd ed., pp. 21-90). Hove, UK: Psychology Press.

INTE 2014

# Design and development of Arabic online games - a conceptual paper

Hamizul, M. <sup>a\*</sup>, Nik Mohd Rahimi <sup>b</sup>

<sup>a</sup> The National University of Malaysia, 43600, Bangi, Selangor, MALAYSIA.

<sup>b</sup> The National University of Malaysia, 43600, Bangi, Selangor, MALAYSIA.

---

## Abstract

Online games approach is recommended as a tool that can enhance students' ability to master the Arabic language. Appropriate models need to be produced as effective learning materials especially in the design and development of online Arabic language games. This concept paper explores elements of development and digital game-based learning model in the process of building Arabic language online games at school. This study describes the design elements as the results of the Arabic language online games development. The implications of this study can serve as a guideline for the development and effectiveness of future learning of Arabic language through online games at school.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* Online Games, Vocabulary, Arabic, design and development, game-based learning.

---

## 1.0 Introduction

The issue of the performance of students in the Arabic language in schools continues until now. According to Hassan Basri and Zamri (2012), after years of Arabic language subjects being taught and going through several phases of development and changes, the effectiveness of this subject is still questionable. Although several approaches have been used, there are many more reports being issued stating dissatisfaction with the students' language.

One of the problems faced by the students is weaknesses in mastering vocabulary. According to Zawawi et al. (2005), the level of Arabic vocabulary among students has not reached a satisfactory level and has become one of the factors that led to the declination of academic achievement in Arabic secondary schools. At the university level, the weakness in the usage of Arabic vocabulary and negative attitude among the students become major causes of failure for Arabic language courses at the UIA (Muhammad Sabri, 2011). It is said that the trend of mastering the vocabulary by the students is via memorization, which leads to this problem. To spark the interest and motivation in learning the Arabic language, in particular the vocabulary, online gaming is proposed as a game-based learning approach.

In the context of education, online game is a game-based learning approach that could potentially help students to master the learning process. Usage of the integrated online gaming in education has a positive impact on students' learning. However, there are also findings from previous studies that there are different effects; being mixtures between positive and negative, when online gaming was integrated into learning as teaching aids and support materials for teaching students in the classroom. To ensure that online games are effectively integrated into the education system, certain elements should be incorporated while designing and developing the game. This concept paper highlighted the elements that should be incorporated in the development of an Arabic online game based on the literature review as suggested by scholars.

## **2.0 Online Games and Digital Game-Based Learning**

Online games and digital game-based learning are terms that are quite similar with each other. An online game is defined as any computer-based game played over the internet; games are stored and played directly from the server (Roslina & Azizah, 2008). While digital game-based learning is an approach by using electronic games for learning intention (Thang, Hanneghan, & Rhalibi, 2009). For this article, the term online games is referred to learning by using games via internet. Games-based learning has been a part of education for decades. However, with new technological advances, digital games have recently emerged as a new teaching tool.

## **3.0 Previous Research Of Digital Game-Based Learning (DGBL)**

Many researchers have demonstrated the potential of using computer games in education to help students to improve their learning performance (Brom et al. 2011; Huang et al. 2010; Money & Chen, 2010). For example, several studies have shown that digital games are an important part of the development of children's cognition and social processes (Kim et al. 2009; Yien et al. 2011). There are also studies that reported that educational computer games can improve students' learning interest (Ebner & Holzinger 2007; Malone 1980) and thus increase their motivation (Burguillo 2010; Dickey 2010; Harris & Reid 2005; Miller et al. 2011).

To ensure that computer games help in student learning, there are several elements that must be incorporated into a computer game. According to Grice and Strianese (2000), there are some important features of learning environment through the game, which is to provide interaction and response levels, motivation, goals that are specific, systematic procedures, providing appropriate equipment and an environment that is not boring. According to Overmars (2004), effective games are games that have fair and complete rules, require little calculation and logical reasoning. Tüzün et al. (2009) in his research also associated them with fun features.

The use of computer games in education generally produces a positive impact on students. Various studies had been conducted (Sadiq, I. 2010; Çankaya & Karamete, 2009; de Freitas & Jarvis, 2007) and concluded that learning through computer games is more effective. According to Zakirah and Fadhilah (2007), learning-oriented games are easier to use and easy to understand. This study also reflects the values of the psychological aspects of students as they become more responsive and motivated.

## **4.0 Current Research of Digital Game-based Learning (DGBL) in Malaysia**

There are many studies related to online games being integrated in the education system in the context of Malaysia. However, DGBL scenarios-related study that explores the language learning through online gaming is still in its infancy stage (Sahrir, 2012). Most studies conducted have positive effects on the students' learning process, all in terms of interest, motivation and achievement. According to Mat Zin, Jaafar and Yue (2009), a digital game-based learning has been used in education during the process of learning and teaching for some subjects, such as math, science, history and language. On the subject of history, a game-based learning model has been presented to overcome the difficulty of memorizing the history facts and the boring learning environment of history itself (Mat Zin, Jaafar and Yue, 2009). The researchers believe that this game-based learning approach is an alternative method for the study of history. In science, the learning game discusses the principles of digital games and learning strategies and the potential of merging is presented (Nazirah Mat Sin, Othman Talib, Tengku Puteri Norishah, 2013).

In language learning, Sahrir, MS, & Elias, NA (2011) reported a positive perception of university students in learning Arabic online. Rosman, F. et al. (2013), used meta-analysis study to analyze several current articles published by selected journals that focused on studies related to the potential of using video games to learn Bahasa Melayu vocabulary by international students. Findings showed that video games have the potency as an effective

teaching aid and are capable of motivating the students in language learning. Previous and current studies showed proves of potential of digital games based learning in education. However, to ensure the effectiveness of using digital games in education, there are three main components that should be considered: 1.) Pedagogy, 2.) DGBL elements, and 3.) ARCS model.

## 5.0 Integrating Pedagogy and DGBL

To ensure that the design and development of online games are effectively integrated into the education system, integration of the two main components, which are pedagogy based on learning theory and DGBL elements, are required. According to Prensky (2001), there is no standard procedure in combining the two components (Pedagogy and DGBL) and there is still no agreement on the issue of merging these components. In this study, three main components are proposed in the form of a model for Arabic online games using DGBL approach. The main components are identified as Pedagogy, DGBL elements and ARCS model.

### 5.1 Pedagogy

For the pedagogy component, three elements are elaborated as the following:

- (a) Learning objective – A clear learning objective is important to ensure learning accomplishment can be achieved.
- (b) Curriculum needs – Every country has their own curriculum. In Malaysia, the Integrated Curriculum for Secondary School (KBSM) is used in the secondary school. Any approach should be appropriate this curriculum.
- (c) Learning theory – Choosing the suitable learning theories is important to foster the learning process effectively.

### 5.2 DGBL elements

For the DGBL elements, researchers stated various elements to be considered. According to Prensky (2001), there are 12 vital elements, which are 1.) Fun, 2.) Play, 3.) Rules, 4.) Goals, 5.) Interactive, 6.) Adaptive, 7.) Outcomes & Feedback, 8.) Win States, 9.) Conflict/Competition/Challenge/Opposition, 10.) Problem-solving, 11.) Interaction, and 12.) Representation & Story. Meanwhile, Clark and Mayer (2011) listed six principles of games: 1.) Match game type to learning goals, 2.) Make learning essential to game progress, 3.) Build in proven instructional strategies, 4.) Build in guidance and structure, 5.) Manage complexity, and 6.) Make relevance salient. For this study, game elements from Bober (2010) being used. Table 1 describe the game elements and their descriptions.

Fig. 1: Game elements from Bober (2010)

Game elements	Description
<b>Challenge</b>	A test of the learner's skills, set at a level to stretch his/her abilities.
<b>Fantasy/Narrative</b>	Imaginary environment, characters or story which can stand as a metaphor for the real world.
<b>Feedback</b>	Response to the learner's actions or progress within the game



<b>Goals</b>	Clear aims that are meaningful and achievable but stretch the learner's abilities
<b>Sensory stimuli</b>	Engaging visual and sound effects. Social aspects/community playing with or against other people and social interaction inside and outside the game. Additional learning elements that can be found in digital games.

### 5.3 ARCS model

The ARCS model is a problem solving approach in designing the motivational aspects of learning environments to stimulate and sustain students' motivation to learn (Keller, 1983). There are two major parts of the model. The first is a set of categories representing the components of motivation. The second part of the model is a systematic design process that assists in creating motivational enhancements, which are appropriate for a given set of learners. To accurately measure the changes in learner motivation, Karoulis and Demetriadis (2005) indicated that the ARCS model (Keller, 1987) can be the standard on how much the learning motivation is increased by the game. The four dimensions of ARCS are described in following figure:

Fig. 2: ARCS model (Keller, 1987)

ARCS	Description
<b>Attention - strategies for arousing and sustaining curiosity and interest.</b>	Learners are more motivated when the instructional design generates curiosity and interest about the content or learning context.
<b>Relevance - strategies that link to learners' needs, interests, and motives.</b>	Learners are more motivated when goals are clearly defined and align with learners' interests.
<b>Confidence - strategies that help students develop a positive expectation for successful achievement.</b>	Learners are more motivated when challenge is balanced in such a way that the learning process is neither too easy as to bore the learner, or too difficult such that success seems impossible.
<b>Satisfaction - strategies that provide extrinsic and intrinsic reinforcement for effort.</b>	Learners are more motivated when there are rewards for correctly executed actions.

Based on the three components stated above – pedagogy, game elements and ARCS model, Figure 3 below describes the proposed components in Arabic online games with DGBL elements.

Fig. 3: Proposed components in Arabic online games with DGBL elements

ARABIC ONLINE GAMES WITH DGBL ELEMENTS		
<b>PEDAGOGY</b> 1. Learning objective 2. Curriculum needs 3. Learning theories	<b>GAME ELEMENTS</b> 1. Challenge 2. Fantasy/Narrative 3. Feedback 4. Goal 5. Sensori Stimuli	<b>ARCS MODEL</b> 1. Attention 2. Relevance 3. Confidence 4. Satisfaction

## 7.0 Conclusions

This concept paper had described an effort to design and develop an online game for learning Arabic language in Malaysian secondary school. In addition, this study had identified the potential of merging games elements, pedagogy components and ARCS model to suit Arabic online games model. The proposed components could be used to implement the DGBL approach in Arabic language learning for Malaysian secondary school setting. However, further studies are needed to complete the effectiveness of the model by evaluating the usability and practicality of the prototype for the model.

## References

- Bober, M. (2010). Games Based Experiences for Learning. *Bristol: Futurelab*.
- Brom, C., Preuss, M. & Klement, D. 2011. Are Educational Computer Micro-Games Engaging and Effective for Knowledge Acquisition at High-Schools? A Quasi-Experimental Study. *Computers & Education* 57(3): 1971-1988.
- Burguillo, J. C. 2010. Using Game Theory and Competition-Based Learning to Stimulate Student Motivation and Performance. *Computers & Education* 55(2): 566-575.
- Çankaya, S., & Karamete, A. 2009. The Effects of Educational Computer Games on Students' Attitudes Towards. *Procedia Social and Behavioral Sciences*. 1: 145–149.
- Clark, R. C., & Mayer, R. E. 2011. *E-Learning and the Science of Instruction*. San Fransisco: Pfeiffer
- Dickey, M. D. 2010. Murder on Grimm Isle: The Impact of Game Narrative Design in an Educational Game-Based Learning Environment. *British Journal of Educational Technology* 42(3): 456-469.
- Ebner, M. & Holzinger, A. 2007. Successful Implementation of User-Centered Game Based Learning in Higher Education: An Example from Civil Engineering. *Computers & Education* 49(3): 873-890.
- Grice, R. & Strianese, L. 2000. Learning and Building Strategies with Computer Games. *Professional Communication Conference, 2000. Proceedings of 2000 Joint IEEE International and 18th Annual Conference on Computer Documentation (IPCC/SIGDOC 2000)*, p.

- Harris, K. & Reid, D. 2005. The Influence of Virtual Reality Play on Children's Motivation. *Canadian Journal of Occupational Therapy* 72(1): 21-30.
- Hassan Basri, A. M. D. & Zamri, A. R. 2012. Memartabat Pendidikan Islam Dan Bahasa Arab Di Malaysia: Satu Usaha Berterusan Yang Tidak Kesudahan *PROSIDING WACANA PENDIDIKAN ISLAM SIRI KE-9 PERINGKAT SERANTAU* hlm. 1-22.
- Huang, W.-H., Huang, W.-Y. & Tschopp, J. 2010. Sustaining Iterative Game Playing Processes in Dgbl: The Relationship between Motivational Processing and Outcome Processing. *Computers & Education* 55(2): 789-797.
- Karoulis, A., & Demetriadis, S. (2005). The motivational factor in educational games. *D21*, 2.
- Kim, B., Park, H. & Baek, Y. 2009. Not Just Fun, but Serious Strategies: Using Meta-Cognitive Strategies in Game-Based Learning. *Computers & Education* 52(4): 800-810.
- Keller, J. M. (1987). Development and use of the ARCS model of instructional design. *Journal of instructional development*, 10(3), 2-10.
- Malone, T. W. 1980. *What Makes Things Fun to Learn?: A Study of Intrinsically Motivating Computer Games*. Xerox, Palo Alto Research Center.
- Marc Prensky. (2001). *Digital Game-Based Learning*. McGraw-Hill
- Mat Sin, N., Talib, O., & Norishah, T. P. (2013). Merging of Game Principles and Learning Strategy using Apps for Science Subjects to Enhance Student Interest and Understanding. *Jurnal Teknologi*, 63(2).
- Osman, K., & Bakar, N. A. (2012). Educational Computer Games for Malaysian Classrooms: Issues and Challenges. *Asian Social Science*, 8(11).
- Rosman, F., Alias, N., Siraj, S., Kenayathullah, H. B., Zakaria, A. R., & Darusalam, G. (2013). Potential of video games in learning Bahasa Melayu vocabulary among international university students in Malaysia: a meta-analysis of selected journals. *Turkish Online Journal of Educational Technology*, 12(4).
- Miller, L. M., Chang, C.-I., Wang, S., Beier, M. E. & Klisch, Y. 2011. Learning and Motivational Impacts of a Multimedia Science Game. *Computers & Education* 57(1): 1425-1433.
- Overmars, M. 2004. Teaching Computer Science through Game Design. *Computer* 37(4): 81-83.
- Roslina Ismail & Azizah Jaafar (2008). Web-based educational games as a learning tool: Issues and challenges on design and development perspective in Malaysia. Proceeding in the 4th International Conference on University Learning and Teaching, 421-432, on 20-21 October 2008 organised by UiTM Shah Alam, Malaysia in collaboration with University of Hertfordshire, UK
- Sadiq, I. (2010). Effects of Online Games On Student Performance In Undergraduate Physics. Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications. 3685-3691
- Sahrir, M. S. 2011. Analysis, Design and Development of an Online Vocabulary Game for Arabic Elementary Learners Tesis PhD, UITM.
- Sahrir, M. S., & Alias, N. A. (2011). A Study On Malaysian Language Learners' Perception Towards Learning Arabic Via Online Games. *GEMA Online Journal of Language Studies*, 11(3).
- Sahrir, M. S., & Yusri, G. (2012). Online Vocabulary Games For Teaching And Learning Arabic. *GEMA Online Journal of Language Studies*, 12(3).
- Squire, K. (2011) Video games and learning: Teaching and participatory culture in the digital age. New York: Teachers College Press
- Tang, S., Hanneghan, M., & El Rhalibi, A. (2009). Introduction to games based learning. *Games Based Learning Advancements for Multi-Sensory Human Computer Interfaces*. New York: IGI Global.
- Tüzün, H., Yılmaz-Soylu, M., Karakuş, T., İnal, Y. & Kızılkaya, G. 2009. The Effects of Computer Games on Primary School Students' Achievement and Motivation in Geography Learning. *Computers & Education* 52(1): 68-77.
- Vandergruyse, S., Vandewaetere, M. and Clarebout, G. (2012) Game-Based Learning: A Review on the Effectiveness of Educational Games. In: Cruz-Cunha, M. M. (ed.), *Handbook of Research on Serious Games as Educational, Business, and Research Tools*. Hershey, PA: IGI Global, 628-647
- Wang, L. C. & Chen, M. P. 2010. The Effects of Game Strategy and Preference-Matching on Flow Experience and Programming Performance in Game-Based Learning. *Innovations in Education and Teaching International* 47(1): 39-52.
- Yien, J.-M., Hung, C.-M., Hwang, G.-J. & Lin, Y.-C. 2011. A Game-Based Learning Approach to Improving Students' learning Achievements in a Nutrition Course. *TOJET* 10(2):
- Zakirah, O. & Fadhilah, M. Y. 2007. Tinjauan Permainan Berkomputer Sebagai Alat Pembelajaran.
- Zawawi, I., Mohd Sukki, O. & Abd. Raof, H. A. 2005. Masalah Pengajaran Dan Pembelajaran Bahasa Arab Di Malaysia. Dlm. Zawawi, I. & Mohd Sukki, O. (Ed.). *Pendidikan Bahasa Arab Di Malaysia: Cabaran Dan Inovasi*, p. 96-113. Bangi: Minda Imtiyaz Publications.
- Zin, N. A. M., Yue, W. S., & Jaafar, A. (2009). Digital game-based learning (DGBL) model and development methodology for teaching history. *WSEAS transactions on computers*, 8(2), 322-333.

## Acknowledgement

- We would like to extend our sincere gratitude to the Ministry of Education, Malaysia for providing the scholarship to one of the author (**Hamizul Mahmud**) for his PhD study.

# Design and development performance-based into mobile learning for TVET

Irwan Mahazir, I<sup>a</sup>, Norazah, M.N<sup>b</sup>, Rosseni, D<sup>c</sup>, Azwin Arif, A.R<sup>d</sup>, Ridzwan, C.R<sup>e</sup>,

<sup>a,b,c,d,e</sup> Faculty of Education, Universiti Kebangsaan Malaysia, Bangi, 43600 Selangor, MALAYSIA

---

## Abstract

In incorporating mobile learning into daily teaching and learning, technologist educators must initially consider a workable framework to gauge the teaching and learning process. Therefore, performance-based mobile learning is rather crucial to be implemented to ensure the quality of teaching and learning will benefit the students and at the same time diversifying alternative methods to improve student performance in TVET. The design of this research is based on readings and literature review undertaken by evaluating and re-arranging the facts from the previous studies and thus will propose a design and development phase into mobile learning for TVET. To ensure that mobile learning materials developed with high and reliable quality, a detailed and systematic planning should be focused on design and development process. Findings of this study proposed a design and development process requires planning and essentially meets the needs and potential use of these learning materials and platform. The implication of this research is that it is capable to define and assist in developing learning materials that suit mobile learning activity for TVET.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords: Mobile learning; design and development; performance-based; TVET;*

---

## Introduction

The notion of incorporating technology and education is in line with one of the Ministry of Higher Educations' goal for internationalization of higher education (Sirat & Omar, 2008). To ensure a certain standard and quality of education, teaching and learning at the tertiary level, all higher education **curriculums are monitored and to** follow the regulation set by Malaysian Qualification Agency (MQA). To add, all curriculums are based on Malaysian Qualifications Framework (MQF) in which all institute of higher education curriculum must practice MQAs' Outcome Based Education (OBE). On January 2010, MoHE has instructed that all Polytechnics' current curriculum to be restructure to adhere to OBE (Aspalilla & Nin Hayati, 2010; Joan, Pang, & Vitales, 2011). However, the challenge of implementing OBE is not only to the curriculum, but across the organization, systems, processes, beliefs and philosophy to the principles of OBE (Joan et al., 2011)

Besides implementing OBE, it also affected the development teaching and learning tool. Mobile learning is fairly a new technology that has emerged from the rapid development of information technology; that is possible to help improve the quality of education in Malaysia. Mobile learning is triggered by a combination of E-learning and mobile computers provide application support for learning that can be done in 'anytime' and 'anywhere' (Tatar, Roschelle, Vahey, & Penuel, 2003). The use of mobile learning in the field of TVE in particular courses of Computer Aided Design (CAD) to support new methods of delivery and teaching and help students in

terms of problem solving. The study will be carried out focusing on performance-based prototype mobile learning (MobiCAD) developed and evaluated at the end of the study. MobiCAD site will be developed using a content management system (CMS) as students access the information online. In addition, the activities developed are based on student learning styles and student readiness are hoped to increase the capacity of students to solve problems thereby improving student performance. Thus, the researchers hope that this study will examine the effectiveness of this MobiCAD for polytechnic students to solve problems in CAD.

## **2. Mobile Learning**

Mobile learning is expected to increase the capacity for applied learning, especially for the purpose of delivering learning. Mobile learning can improve the quality of learning activities (Roschelle, Rafanan, Estrella, Nussbaum, & Claro, 2010; Zurita & Nussbaum, 2007). In addition, mobile learning is also capable of assisting the process of note taking and presentation support materials (Anderson, Simon, Wolfman, VanDeGrift, & Yasuhara, 2004; Kam et al., 2005), formative assessment materials (Cortez, Nussbaum, Woywood, & Aravena, 2009; Valdivia & Nussbaum, 2009), games (Spikol & Milrad, 2008), simulation (Yin, Ogata, & Yano, 2007) and the problem solving process (Looi & Chen, 2010; Nussbaum et al., 2009). Therefore, mobile learning is very effective and has very significant impact on the development of education in Malaysia.

TVE has also applied non-formal training on top of formal session as it is known that effective teaching and learning requires a variety of methods and approaches to prepare trained employees (Tessaring & Wannan, 2010). But learning that takes place lies deep in the policy and does not concerned with the understanding of students and later generate students who are not mastering the skills that they have learned. Therefore, the mobile learning tool must be user friendly and capable to enhance student problem solving skill.

Design and development are important process to ensure the tool will give an impact to the student. In addition, the methodology must be practical to provide the learning and problem-solving during the design process. Every weakness must be identified and amended on an existing design to create a better design. Furthermore, few studies have been conducted to evaluate the changes and differences between mobile learning and e-learning (Evans & Taylor, 2005), evaluation (Luckin, 2003; Taylor, 2004) and learning to use learning ethics must also be considered for produce effective learning (Traxler, 2005; Twigg, 2003). Therefore, by injecting performance based learning, it will enhance the mobile learning tool for TVET students.

### **Performance Based**

Richard Meyer at Trinity University has proposed a performance-based model for the use of electronic information. Performance based will ensure instructors not only focus on how to convey information but focus on student performance (J. Pfeffer & R. I. Sutton, 1999). Furthermore, Performance Based which consists of at 3C; Cost, Competent, Cause and Effect (Gery, 1991) will add value and ensure meaningful learning take place. Besides, by adapting and incorporating various learning theories while designing the prototype, it will improve significantly on the learning materials, purpose and plan of activities. Learning theories will ensure all activities designed achieve the learning purpose. To know whether the prototype really effective and give significant impact to the user, researcher must plan and decide suitable research design.

Performance-based learning is also a model that is very meaningful to the education sector. (J. Pfeffer & R. Sutton, 1999) states that learning is not just to convey information or knowledge but is the process of ensuring good student performance. Performance-based learning is learning that provides advice, information teaching, training and room space for the provision of teaching materials (Kicken & Stoyanov; Stoyanov et al., 2010). Based on the specified element of this performance-based learning is able to provide the information required by a student while helping students improve performance. Therefore the performance based must suit for education purposed and aligned with

education needs. Figure 1.0 is performance based diagram from electronic use to education purpose for the education purpose. But to make sure the performance based will give the necessary impact for student in enhancing student problem solving skill, it is necessary to use suitable problem solving model.

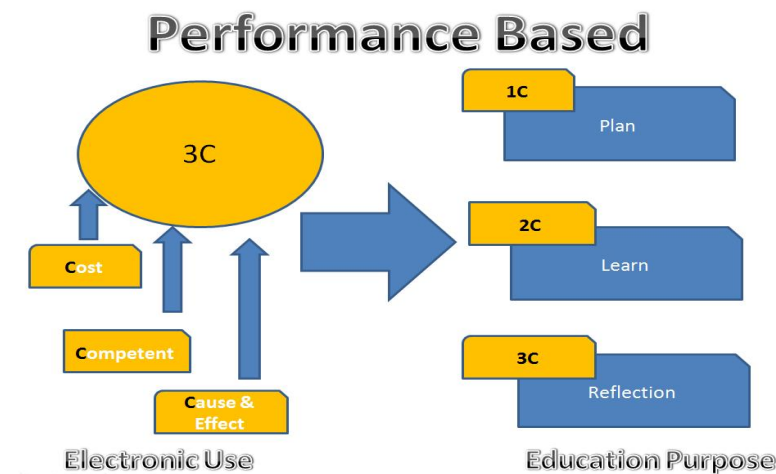


Fig 1.0: Performance based Diagram

## 5. Rudric & Krulik Problem Solving Model

Problem solving model is deemed important to make sure the learning process running well. Therefore, Rudric & Krulik Problem Solving model is an establish model which has five stage for problem-solving process (Krulik & Rudnick, 1999). A person engaged in the problem-solving process moves back and forth, sometimes unconsciously with a goal for each stage. Contrary to the linear model for solving problem, Polya's problem-solving stages are dynamic and cyclic in nature that promotes his goal of teaching students to think (Choi & Hannafin, 1995). The five stages include Read and Think, Explore and Plan, Select a Strategy, Find an Answer, and Reflect and Extend (Evenson & Gollin, 2003; Krulik & Rudnick, 1999).

In the Read and Think stage, problem is analyzed and critical thinking begins. Facts are examined and evaluated, physical setting is visualized, described and understood. Furthermore, problem is translated into students' language, relationships between problem parts are identified and the question asked is identified. In the Explore and Plan stage, given information are analyzed for completeness while irrelevant information are identified and eliminated. Data are organized in tabular or graphical form (drawings, models, graphs and the like), and a plan for finding the answer is developed. The Select a Strategy stage is considered by many as the most difficult part of the problem-solving process. Since there are many established heuristics (strategies and techniques), a good problem solver should be able to select appropriately one or a combination of available heuristics. The Find an Answer stage makes use of students' drawing skills. The use of mobile learning is made applicable at this stage.

In Reflect and Extend stage, answers are checked for accuracy to determine if the question has been answered correctly. Creative thinking is maximized in this stage wherein variations to the original conditions can be applied to create new yet related problem situations (Krulik & Rudnick, 1999). However, if students are taught these processes, they are in a good position to resolve problems successfully (Krulik & Rudnick, 1999). The common heuristics available include guess and check, make a systematic list, act it out, simplify the problem, look for pattern, working backwards, use of diagram or model. Combination of Rudric & Krulik Problem Solving Model into Performanced ased will make sure the tool effectiveness for TVET student. Figure 2.0 is diagram for Rudric & Krulik Problem Solving Model.

# Problem Solving



Fig 2.0: Rudric & Krulik Problem Solving Model.

## 6. Statement Of The Problem

In order to produce skilled manpower, flexible and easy to be trained, trainees or students must be able to adapt to technological change (Ahmad, 2005). The notion remarked not only to students but also to trainers and teachers as they should vary and not practicing traditional method of instruction only. A survey conducted by the researchers, found that a certain polytechnic students will accept any inputs from instructors and carry out all the exercises and assignments given. Evidently, in this case, teachers in the polytechnics are still using teacher-centered learning methods that use demonstrations or demonstration method in teaching Computer Aided Design (CAD).

AutoCAD is a course that is rather difficult and requires some time to enable students to master it, other than that, it would cause a sense of curiosity, a sense to test the ability to solve problems, make decisions and critical and as well as creative thinking (Sidek & Mohd Ariffin, 2011). Technology only can improve motivation (Holzinger, 1997) but the important aspect are the delivery of learning, whilst delivery methods must be effective to improve the problem solving process as needed (M. Sharples, 2000; M. Sharples, Corlett, & Westmancott, 2002). The failure of students in AutoCAD is because most of them fail to understand and grasp the right concept (Sidek & Anoar, 2010). In addition, the students of Computer-Aided Design (CAD) testified that they have the highest difficulty in a course in learning because they are less common with software functions rather than not for being absent from class. The most difficult thing is to understand the information, and produce three-dimensional objects from two-dimensional objects from paper. (James, Diane, & Claude, 2007) (Perez Carrion & Serrano, 1998)

Engineering education must shift from traditional learning (learning-centered teaching) on student centered learning (student-centered learning) (Duffy & Bowe, 2010). ICT now is the medium that can help to improve the process of interaction within and between students. To add, it has revolutionized the learning environment throughout the world (Saadiah, 2003). Therefore, performance-based mobile learning is rather crucial to be implemented to ensure the quality of teaching and learning will benefit the students and at the same time diversifying alternative methods to improve student performance in TVE in Malaysia.

## 7. Purpose Of The Study

In order to design and develop a proper mobile learning tool, the researcher must need to understand the elements in mobile learning. Therefore, the framework can be a guideline for design and development phase. Based on instructional design, every development phase have their own model and theory that must be considered to make sure the learning material achieve their goal. For this study, will focus on design and development performance-based prototype mobile learning (MobiCAD).

## 8. Methodology

The study is focus on the design and development process. The researcher will illustrate the elements that must be incorporated according to the selected model. The development model will work as track or sequence that must be followed by researcher while design the learning material. In this phase also, the researcher will make sure the learning theories adapted in design process. By adapting the learning theories the researcher can plan the activity for learning. Furthermore, adding performance based will give a significant impact to the respondents

In designing and developing the mobile learning prototype, some of the emphases for the development are as follows

- Designing navigation is the process of determining how to connect the elements in mobile learning prototype
- Designing the process of determining how the menu on the menu form mobile learning prototype
- To design appropriate activities based on the needs students at mobile learning prototype
- Designing appropriate learning objects based on the needs of students at mobile learning prototype.

By applying the Rudric & Krulik Problem Solving Model into Performance based, it will make sure the mobile learning prototype more reliable and able to enhance student problem solving skill, beside it will make sure it will give positive impact for TVET student. Figure 3.0 is a performance based framework for mobile learning.

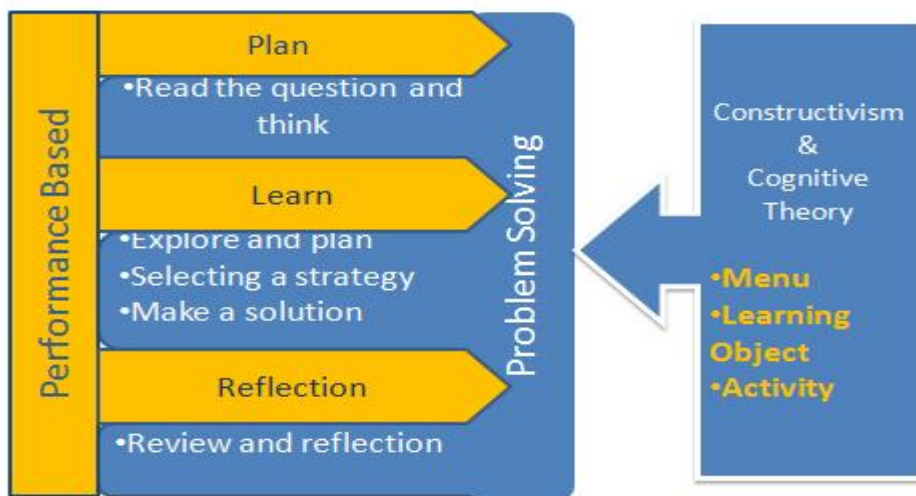


Fig 3.0: Performance based framework for mobile learning.

## 9. Discussion And Conclusions

The framework of this study in general will propose the element of mobile learning tool. By distinguishing the elements of the desired framework will help the researcher to prepare for design and develop the mobile learning



tool (MobiCAD) for TVET environment. To add, the elements will make sure the prototype reliable and meets the TVET environment needs. On the framework, performance based elements will be reflected at the Menu Plan for the mobile learning prototype (MobiCAD). Every Menu Plan in the prototype will contain problem solving skills.

Based on framework, Menu plan will make sure student can read the question and think the problem. Menu Pelan also will make sure student can plan the learning period and select the suitable learning process based on problems given.

Learn Menu will make sure student can competent and able to master the learning. On Learn Menu students will explore, select the learning and try to solve the problem given. This stage will maximized the original conditions that can be applied to create new yet related problem situations (Krulik & Rudnick, 1999). The last menu is Reflection Menu, the menu will help student to do the reflection from what they have go through by using mobile learning prototype (MobiCAD). (Krulik & Rudnick, 1999), believe that this is a good position to resolve problems successfully and enhances student problem solving skill

Overall the performance based element will be a menu and guideline for learning orientation. Meanwhile Rudric & Krulik Problem Solving Model will inject into the performace element. TVET student will be able to enhance their problem skill by go through the tool. The framework also will make sure TVET students have proper instructional design to learn and able to achieve good performance. This tool also will give TVET student an option to learn anywhere and anytime. Therefore, mobile learning is very effective and has very significant impact on the development of education in Malaysia.

## References

- Ahmad, E. (2005). Penerapan Kemahiran Kepimpinan Menerusi Kokurikulum Di Politeknik. (Doktor Falsafah), UTHM, Batu Pahat.
- Anderson, R., Simon, B., Wolfman, S.A., VanDeGrift, T., & Yasuhara, K. (2004). Experiences with a tablet PC based lecture presentation system in computer science courses.
- Aspalilla, M., & Nin Hayati, M. (2010). Pendekatan Learning Outcome (L.O) Bagi Pembelajaran Amali Kursus Komunikasi Data Dalam Pelaksanaan Outcome Based Education (Obe) Di Politeknik Kementerian Pengajian Tinggi Malaysia. Paper presented at the Seminar Kebangsaan Transformasi Pendidikan Teknikal 2010 (MyTEDT10').
- Choi, Jeong-Im, & Hannafin, Michael. (1995). Situated cognition and learning environments: Roles, structures, and implications for design. *Educational Technology Research and Development*, 43(2), 53-69.
- Cortez, C., Nussbaum, M., Woywood, G., & Aravena, R. (2009). Learning to collaborate by collaborating: a face-to-face collaborative activity for measuring and learning basics about teamwork1. *Journal of Computer Assisted Learning*, 25(2), 126-142.
- Duffy, G., & Bowe, B. (2010). A Framework to Develop Lifelong Learning and Transferable Skills in an Engineering Programme. Paper presented at the 3rd International Symposium for Engineering Education, 2010., University College Cork, Ireland
- Evans, Diane, & Taylor, Josie. (2005). The role of user scenarios as the central piece of the development jigsaw puzzle. *Mobilelearning anytimeeverywhere*, 63.
- Evenson, Robert E., & Gollin, Douglas. (2003). Assessing the impact of the Green Revolution, 1960 to 2000. *Science*, 300(5620), 758-762.
- Gery, G.J. (1991). *Electronic performance support systems: How and why to remake the workplace through the strategic application of technology*: Weingarten Publications, Inc.
- Holzinger, A. (1997). Development of the Problem Solving Behavior in Physics Education. A sectional and longitudinal study in Thermodynamics (Entwicklung des Problemlöseverhaltens im Physikunterricht. Eine Querund Längsschnittuntersuchung aus dem Bereich der Wärmelehre). Graz: Karl Franzens Universität.
- James, S., Diane, B., & Claude, V. (2007). *Boutique Engineering: Student Learning in a Multidisciplinary Engineering Concepts and Methods Course* American Society for Engineering Education.
- Joan, W. Y. J., Pang, V., & Vitales, J. W. . (2011). Obe Curriculum Implementation Process in Politeknik Kota Kinabalu: Apossible Evaluation Framework. Paper presented at the Seminar Kebangsaan Transformasi Pendidikan Teknikal 2010 (MyTEDT10').
- Kam, M., Wang, J., Iles, A., Tse, E., Chiu, J., Glaser, D., . . . Canny, J. (2005). Livenotes: a system for cooperative and augmented note-taking in lectures.
- Kicken, Wendy, & Stoyanov, Slavi. Effects Of Mobile Performance Support System On Students'learning Outcomes And Perceived Effectiveness. *Mobile Learning Performance Support System For Vocational Education And Training*, 159.
- Krulik, Stephen, & Rudnick, Jesse A. (1999). Innovative tasks to improve critical and creative thinking skills. *Developing mathematical reasoning in grades K-12*, 61, 138.
- Looi, C.K., & Chen, W. (2010). Community-based individual knowledge construction in the classroom: a process-oriented account. *Journal of Computer Assisted Learning*, 26(3), 202-213.

- Luckin, Rosemary. (2003). Between the lines: documenting the multiple dimensions of computer-supported collaborations. *Computers & Education*, 41(4), 379-396.
- Nussbaum, M., Alvarez, C., McFarlane, A., Gomez, F., Claro, S., & Radovic, D. (2009). Technology as small group face-to-face Collaborative Scaffolding. *Computers & Education*, 52(1), 147-153.
- Perez Carrion, T., & Serrano, M. (1998). Ejercicios para el desarrollo de la perception especial. : Espania.
- Pfeffer, J., & Sutton, R.I. (1999). *The knowing-doing gap: How smart companies turn knowledge into action*: Harvard Business Press.
- Pfeffer, Jeffrey, & Sutton, Robert. (1999). *The knowing-doing gap: How smart companies turn knowledge into action*: Harvard Business Press.
- Roschelle, J., Rafanan, K., Estrella, G., Nussbaum, M., & Claro, S. (2010). From handheld collaborative tool to effective classroom module: Embedding CSCL in a broader design framework. *Computers & Education*, 55(3), 1018-1026.
- Saadiah, B. (2003). Enhancing self-regulatory motivational strategies through e-Portfolios. Malaysia: Sultan Idris Education University.
- Sharples, M. . (2000). The design of personal mobile technologies for lifelong learning. Paper presented at the Computers & Education.
- Sharples, M., Corlett, D., & Westmancott, O. (2002). The Design and Implementation of a Mobile Learning Resource. Paper presented at the Personal and Ubiquitous Computing.
- Sidek, R.Z.S., & Anoar, A. (2010). Pembinaan Perisian Pembelajaran Berbantu Komputer (PBK) Basic Autocad 2007 (2D) Bagi Mata Pelajaran Lukisan Kejuruteraan Berbantu Komputer. Pembinaan Perisian Pembelajaran Berbantu Komputer (PBK) Basic Autocad 2007 (2D) Bagi Mata Pelajaran Lukisan Kejuruteraan Berbantu Komputer, 1-7.
- Sidek, R.Z.S., & Mohd Ariffin, S. (2011). Modul pembelajaran sendiri mata pelajaran reka bentuk berbantu komputer Autocad 3D. UNSPECIFIED, 1-9.
- Sirat, M., & Omar, I.C.H.E. (2008). HIGHER EDUCATION RESEARCH MONOGRAPH.
- Spikol, D., & Milrad, M. (2008). Physical activities and playful learning using mobile games. *Research and Practice in Technology Enhanced Learning*, 3(3), 275-295.
- Stoyanov, Veselin, Cardie, Claire, Gilbert, Nathan, Riloff, Ellen, Buttlar, David, & Hysom, David. (2010). Coreference resolution with reconcile. Paper presented at the Proceedings of the ACL 2010 Conference Short Papers.
- Tatar, D., Roschelle, J., Vahey, P., & Penuel, W. R. (2003). Handhelds Go to School: Lessons Learned. Paper presented at the Computer.
- Taylor, Josie. (2004). A task-centred approach to evaluating a mobile learning environment for pedagogical soundness.
- Tessaring, M., & Wannan, J. (2010). Vocational education and training: Key to the future. Lisbon-Copenhagen-Maastricht: mobilising for.
- Traxler, J. . (2005). Using Mobile Technologies to Support Learning in Sub-Saharan Africa. . In H. v. d. M. T. Brown (Ed.), *mLearn 2005: Book of Abstracts* (pp. 66): Cape Town: mLearn 2005.
- Twigg, Carol A. (2003). Improving quality and reducing cost: Designs for effective learning. *Change: The Magazine of Higher Learning*, 35(4), 22-29.
- Valdivia, R., & Nussbaum, M. (2009). Using multiple choice questions as a pedagogic model for face-to-face CSCL. *Computer Applications in Engineering Education*, 17(1), 89-99.
- Yin, C., Ogata, H., & Yano, Y. (2007). Participatory simulation framework to support learning computer science. *International Journal of Mobile Learning and Organisation*, 1(3), 288-304.
- Zurita, G., & Nussbaum, M. (2007). A conceptual framework based on Activity Theory for mobile CSCL. *British Journal of Educational Technology*, 38(2), 211-235.

# Design for experiencing: participatory design approach with multidisciplinary perspectives

Mihyun Kang<sup>a\*</sup>, Phil Choo<sup>b</sup>, Craig E. Watters<sup>c</sup>

<sup>a</sup>*Department of Design, Housing and Merchandising, Oklahoma State University, Stillwater, Oklahoma, 74074, USA*

<sup>b</sup>*Department of Art, Graphic Design and Art History, Oklahoma State University, Stillwater, Oklahoma, 74074, USA*

<sup>c</sup>*School of Entrepreneurship, Oklahoma State University, Stillwater, Oklahoma, 74074, USA*

---

## Abstract

The purpose of this study was to allow undergraduate graphic design students and interior design students to conduct participatory design projects with entrepreneurship students as collaborative efforts. In one instance, entrepreneurship students developed the business plans and participated as users who were recognized as partners. Graphic design students teamed with these entrepreneurship students to develop app interface designs. In the other instance, interior design students sought collaboration with entrepreneurship students to propose and design a retail space in an existing commercial area. The aspects of the participatory designs were the goal of improving the quality of life, a collaborative orientation, and an iterative process. With an entrepreneurial perspective in the context of community, this project allowed graphic design students and interior design students to experience participatory design within two different forms of design, comprehensive app interface design and an interior retail environment.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords: Participatory Design; Multidiscipline; Graphic Design; Interior Design; Entrepreneurship*

---

## Introduction

Emerging design practice is experiencing a shift from being product-oriented to being purpose-driven and from being user-centered design to co-designing for collective creativity (Sanders & Stappers, 2008). This co-designing approach is found in the Northern European concept of participatory design. Participatory design is a design approach that actively involves all stakeholders, such as employees, partners, customers, citizens, and end users, in the design process to ensure that the end result meets the needs of all and is usable. Participatory design, therefore, can be a collaborative process of multiple disciplines. The purpose of this study was to allow undergraduate graphic design students and interior design students to conduct participatory design projects with entrepreneurship students as collaborative efforts.

## Participatory Design

Participatory design was originally created to guide the advancement of technological development, especially regarding the computerization of work places. Since then, participatory design has evolved into a wider approach to apply to design in general (Merritt & Stolterman, 2012). The goal of participatory design is to include all stakeholders in each step of the design process. Such stakeholders include designers, clients, users, the community, and others. Users are especially valuable stakeholders when it comes to designing for the public.

Participatory design is a beneficial and appropriate means of researching and developing new designs because it

---

\* Corresponding author. Tel.: +1-450-744-5628; fax: +1-450-744-6910.  
E-mail address: mihyun.kang@okstate.edu

focuses on the verbal exchange of design ideas, which is extremely important in the initial concept stages of design. Both knowledge and understanding emerge as a result of verbal exchange (Luck, 2003). The intentions of participatory design are “clarifying goals and needs, designing coherent visions for change, combining business-oriented and socially sensitive perspectives, initiating participation and partnerships with different stakeholders, using ethnographic analyses in the design process...and providing a large toolbox of different practical techniques” (Simonsen & Hertzum, 2012, p. 10). Additionally, participatory design allows users to have a sense of ownership, acceptance, and ultimately the best outcome.

Participatory design can be implemented in many ways, including workshops, ethnography, cooperative prototyping, mock-ups, card sorting, and user design. In a workshop, stakeholders and designers collaborate to create vision, designs, or even a simple understanding of the current problems in search of a solution. Ethnography is an in-depth observational study of stakeholders to attain a first-hand understanding of the public’s circumstances. Cooperative prototyping involves stakeholders getting hands-on experience with a prototype of a potential product or service in order to improve it. Mock-ups are used to stimulate stakeholders into thinking about new ideas and to let them experience the future. Mock-ups are encouraged early in design exploration because card sorting is the process in which stakeholders write down relevant information that is sorted into groups to be used for the designers’ benefit. Finally, user design gives the public direct access to creating designs themselves (Yamauchi, 2012). Other methods include questionnaires, interviews, and establishing long-term working relations with worksite participants. These are implemented in order to understand the relationship between technology and work across organizations (Kensing & Blomberg, 1998). The result of these methods produces designs that can be used to the full benefit of every stakeholder.

Participatory design intends to build value in design based on the shared understanding of stakeholders. Iversen, Halskov, and Leong (2012) stated that participatory design when implemented without acknowledging values is no longer real participatory design. Participatory design must have a foundation in values in order to truly make an impact. They proposed viewing methods and participation as means for achieving a core engagement with values.

## Procedure

In one instance, entrepreneurship students developed the business plans and participated as users who were recognized as partners. Graphic design students teamed with these entrepreneurship students to develop app interface designs (see Figure 1). App design is one of the fastest growing design industries and develops applications for small hand-held devices such as tablets and mobile phones. In the other instance, interior design students sought collaboration with entrepreneurship students to propose and design a retail space in an existing commercial area.

Participatory design was implemented in the format of workshops, although the terminology of workshop was not employed. A collective understanding, development, and reflection of mutual learning were required. This mutual learning consisted of graphic and interior design students studying the practices and contexts of entrepreneurship and the entrepreneurship students learning about the different options of design that can impact



Fig. 1. Student Presentations

them in the future. This process was intended to provide all participants with increased knowledge and understanding.

Graphic design students and interior design students explored ideas together at the beginning of the design process to define problems. However, they came up with independent solutions for app design and the interior environment. Entrepreneurship students collaborated with graphic design and interior design students, respectively, throughout the design process. The final solutions were presented to all students and discussed for further improvement.

## Findings and Discussion

With an entrepreneurial perspective in the context of community, this project allowed graphic design students and interior design students to experience participatory design within two different forms of design: comprehensive app interface design and an interior retail environment. The app interface design project yielded creative and responsive design solutions for app users' needs. The interior retail environment focused on the creation of an aesthetically pleasing and functional design solution that was integrated into the overall environment of the neighborhood. The final solutions connected the product and the community simultaneously.

A collaborative orientation and an iterative process were the observed aspects of this participatory design process. It required a collective understanding, development, and reflection of mutual learning. This mutual learning included graphic and interior design students studying the practices and contexts of entrepreneurship and the entrepreneurship students learning about the different options of design that will impact them in the future. In this way, all participants gained increased knowledge and understanding. Also, this project supported "when different voices are heard, understood and heeded in a design process, the results are more likely to be flexible and robust in use, accessible to more people, more easily appropriated into changing situations, and more adaptable to these situations over time" (Simonsen & Hertzum, 2012, p. 87-88).

The collaborative orientation and an iterative process of participatory design became a challenge for students. Different working styles and levels of understanding held up progress and required students to invest more time in the process. It was found that the awareness and recognition of contrasting perspectives and the re-examination of the parts that are taken for granted are important aspects to be shared.

## Acknowledgements

The authors greatly appreciate the Riata Entrepreneurship Faculty Fellowship, which allowed this study to be conducted in the Riata Center for Entrepreneurship in the Spears School of Business at Oklahoma State University.

## References

- Iversen, O. S., Halskov, K., & Leong, T. W. (2012). Values-led participatory design. *CoDesign*, 8(2-3), 87–103.
- Kensing, F., & Blomberg, J. (1998). Participatory design: Issues and concerns. *Computer Supported Cooperative Work (CSCW)*, 7(3-4), 167–185.
- Luck, R. (2003). Dialogue in participatory design. *Design Studies*, 24(6), 523-535.
- Merritt, S., & Stolterman, E. (2012). Cultural hybridity in participatory design. *Proceedings of the 12<sup>th</sup> Participatory Design Conference: Volume 2 Exploratory Papers, Workshop Descriptions, Industry Cases*, 73–76.
- Sanders, E., & Stappers, P. (2008). Co-creation and the new landscapes of design. *CoDesign: International Journal of CoCreation in Design and the Arts*, 4(1), 5–18.
- Simonsen, J., & Hertzum, M. (2012). Sustained participatory design: Extending the iterative approach. *Design Issues*, 28(3), 10–21.
- Yamauchi, Y. (2012). Participatory design. In T. Ishida (Ed.), *Field informatics* (pp. 123–138). Heidelberg, Germany: Springer.

# Design of cooperative problem-based learning activities to enhance cooperation skill in online environment

Kawita Panlumlers<sup>a,\*</sup>, and Panita Wannapiroon<sup>b</sup>

<sup>a</sup>Lecturer, Program of Business Computer, Faculty of Management Science at Suan Dusit Rajabhat University, Bangkok, 10300, Thailand

<sup>b</sup>Assistant Professor, Information and Communication Technology for Education Division,  
Faculty of Technical Education, King Mongkut's University of Technology North Bangkok, Bangkok, 10800, Thailand

---

## Abstract

These objectives of the study are 1) to design cooperative problem-based learning activities to enhance cooperation skill in online environment, and 2) to evaluate the designed cooperative problem-based learning activities to enhance cooperation skill in online environment. The research procedures are divided into two phases. The first phase is to design cooperative problem-based learning activities to enhance cooperation skill in online environment, and the second phase is to evaluate the cooperative problem-based learning activities to enhance cooperation skill in online environment. The sample group of this study consists of five experts selected by purposive sampling method. Data were analyzed by arithmetic mean and standard deviation. The research findings are as follows: 1. The cooperative problem-based learning activities to enhance cooperation skill in online environment consist of three steps are 1) the introduction to the lesson 2) the activities are subdivided in to three sub steps are 2.1 to introduced into a group activities 2.2 the cooperative problem-based learning activities to enhance cooperation skill in online environment, and 2.3 evaluation and testing, and 3) The conclusion of lesson. 2. The experts agree that cooperative problem-based learning activities to enhance cooperation skill in online environment are the highest level of appropriateness.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

**Keywords:** Learning Activity; Cooperative Learning; Problem-Based Learning; Online Environment; Cooperative Skill

---

## Introduction

National ICT Policy Framework 2011-2020 (ICT 2020) is Thailand's ICT Policy Framework. According to the Thailand education is moving into "Smart Learning", which requires the adoption of ICT as a tool for improved learning performance. This policy supports both of supports the application and the development of ICT learning media. Later, it becomes a part of lifelong learning society (Ministry of Information and Communication Technology of Thailand, 2012).

Cooperative learning seems to keep a lot of attention from educators. Concerning the cooperative learning activities in view of instructors on specific subject area, curriculum, learners, and learning environment. The instructors can stimulate learners to acquire the knowledge as well as interpersonal and team skills. Besides it can help improve their interaction by working in small groups in order to maximize their learning and to reach their shared goal (Wichadee & Orawiwatnakul, 2012). Cooperative learning is a teaching strategy which is applied to teach small teams. Each student has their own abilities at different levels. The instructors use various learning activities to improve their understanding. Every member of a team has their responsibilities for learning and also help teammates learn, which creates an atmosphere of achievement. Students work through the assignment until all group members successfully understand and complete it (Johnson, 1991). Cooperative learning is characterized by

---

\* Corresponding author. Tel.: +66-086-756-9489.

E-mail address: Kawita\_pan@dusit.ac.th

five common elements, including 1) positive interdependence that each member's contribution is important to the group's success, 2) face-to-face group interactions, each member encouraged to participate, help others succeed, and learn from each other, 3) individual and group accountability members dividing the work and being individually responsible for specific tasks, 4) development of small group social skills involving negotiating and use of group interaction skills, and 5) group processing to involves students reflecting on the group's experience (Johnson et al, 1995).

The Problem-based learning is learning techniques that attracted world-wide attention (Yusof et al, 2012). Problem-based learning is actually a philosophy that aims to develop a holistic, student-centered environment (Alwi et al, 2012). The problem is importing into the beginning of the learning process without knowledge expected of students. Problems to stimulate learning leads to questions no answers, which is directed learners keep finding the solution (Majumdar, 2011). Problem-based learning has been used in a variety of disciplines and educational levels (Yusof et al, 2012). Polya presents a problem-solving procedure that consists of 4 steps: understanding the problem, devising a plan, carrying out the plan, and looking back (Polya, 1957).

Information and communication technology (ICT) in the sense of the Internet and its applications such as the website, e-mail, teleconferencing, groupware for computer supported collaborative learning (CSCL), learning management system (LMS) , social network and social media for education are growing rapidly in Thailand. We can call all of these terms "Online Environment", that the learners are of distance from the instructors and computers to reach learning resources, to interact with the lessons and the instructors (Wannapiroon, 2008).

Cooperative problem-based learning is combined both cooperative learning and problem-based learning. The cooperative problem-based learning to guide students through the problem-based learning cycle according to cooperative learning principles and to develop the whole class into a learning community (Yusof et al, 2012) (Alwi et al, 2012) (Yusof et al, 2012).

Therefore, the researchers have had an idea to design cooperative problem-based learning activities to enhance cooperation skill in online environment.

### **Purpose of the study**

The purposes of this research study were;

*To design a cooperative problem-based learning activities to enhance cooperation skill in online environment.*

*To evaluate the designed cooperative problem-based learning activities to enhance cooperation skill in online environment.*

### **Scope of the study**

#### *Population*

In this research study, the population consisted of experts in the fields of the instructional design, cooperative learning, problem-based learning, online environment and cooperative skill.

#### *Sample Groups*

The sample groups are five experts in the fields of the instructional design, cooperative learning, problem-based learning, online environment and cooperative skill, selected by purposive sampling method.

### *Variables of the research*

The independence variable was cooperative problem-based learning activities to enhance cooperation skill in online environment and the dependent variable was evaluation of the learning activities.

### **Conceptual Framework**

The research framework of this research is to integrate the instructional design, cooperative learning, problem-based learning and online environment, as shown in Figure 1.

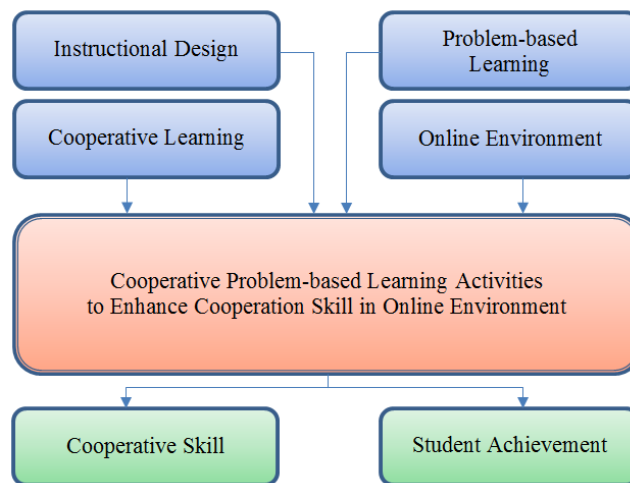


Fig. 1. Research framework.



## Research Methodology

*The first phase was to design of cooperative problem-based learning activities to enhance cooperation skill in online environment as the following steps:*

To study, analyze and synthesize documents and former's research relevant to cooperative problem-based learning activities to enhance cooperation skill in online environment.

To design cooperative problem-based learning activities to enhance cooperation skill in online environment.

To create the evaluation tools for evaluating the learning activities.

*The second phase was to evaluating the cooperative problem-based learning activities to enhance cooperation skill in online environment as follow:*

To present the designed learning activities to the five experts from the fields of the instructional design, cooperative learning, problem-based learning, online environment and cooperative skill.

To improve the cooperative problem-based learning activities to enhance cooperation skill in online environment as to the suggestions of the expert.

To analyze the results of evaluation of the learning activities by arithmetic mean ( $\bar{x}$ ) and standard deviation (S.D.) consisting of 5 criteria for evaluation according to Likert scale.

To summarize and discuss the result of this study.

## Result

The cooperative problem-based learning activities to enhance cooperation skill in online environment is illustrated in Fig. 2.

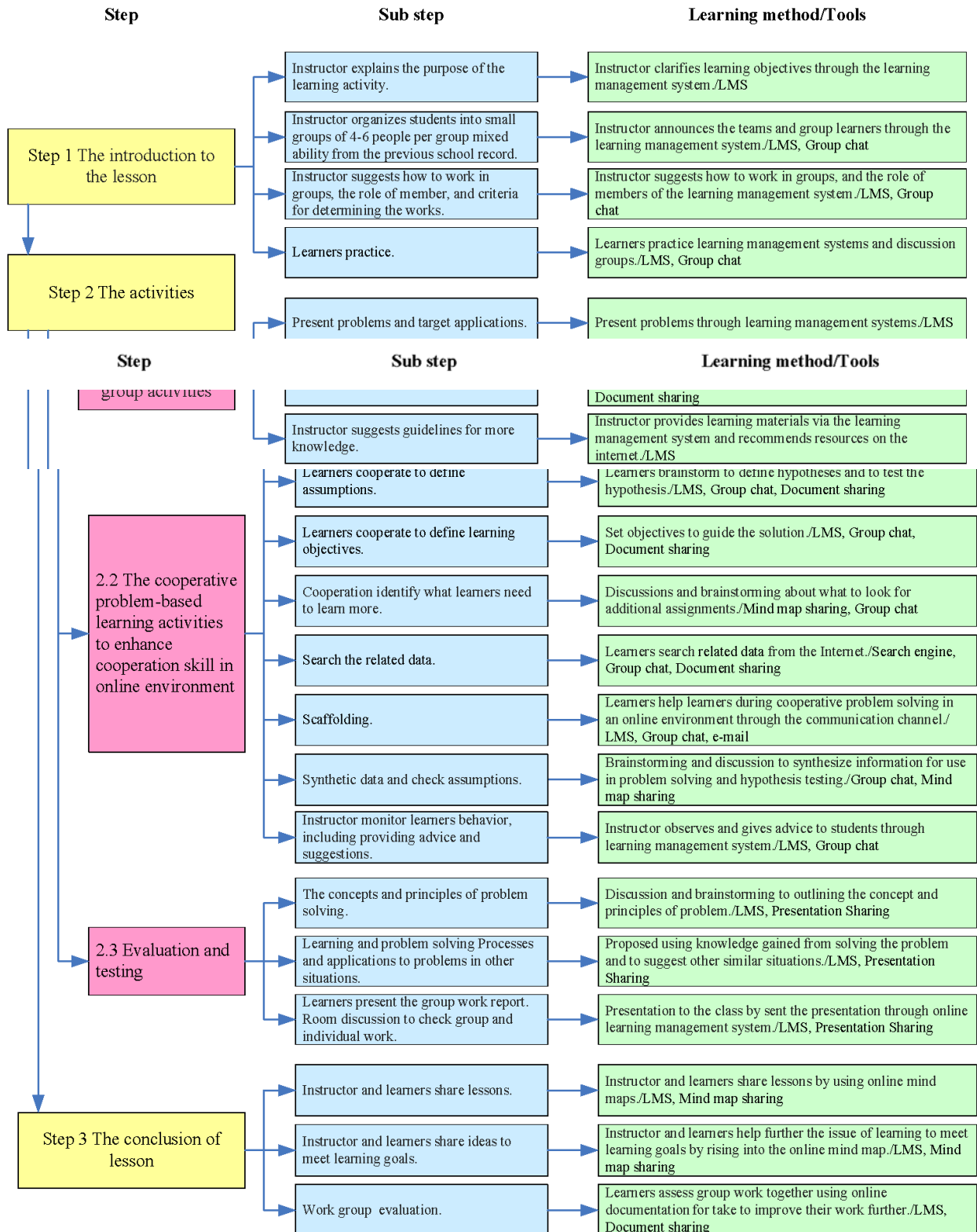


Fig. 2. The cooperative problem-based learning activities to enhance cooperation skill in online environment.

The cooperative problem-based learning activities to enhance cooperation skill in online environment include three steps; the details thereof were as follow:

*1) The introduction to the lesson*

- 1.1) The instructor explains the purpose of the learning activity.
- 1.2) The instructor organizes students into small groups of 4-6 persons per group mixed ability considered from the previous school record.
- 1.3) The instructor suggests how to work in group, assign the member role and criteria works.
- 1.4) The learners practice according to the above steps.

*2) The activities*

This step can be divided into three phases:

- 2.1) To introduce the activities which are enclosed three components:
  - 2.1.1) Groups present problems and target applications.
  - 2.1.2) Groups understand the problems together.
  - 2.1.3) Instructor suggest guidelines to the group.
- 2.2) According to the cooperative problem-based learning activities to enhance cooperation skill in online environment is consisted of eight components:
  - 2.2.1) Learners participate group discussion to define the problem.
  - 2.2.2) Learners assign assumptions together.
  - 2.2.3) Learners cooperate to define learning objectives.
  - 2.2.4) Learners cooperate identify what topics to be studied.
  - 2.2.5) Learners searched the related data.
  - 2.2.6) There are scaffolding by leaners help learners.
  - 2.2.7) Learners synthesize data and assumptions are checked.
  - 2.2.8) Instructor monitored learners behavior, including providing advised and suggestions.
- 2.3) To evaluate and test are divided to three components:
  - 2.3.1) Learners summarize concepts and principles of problem solving.
  - 2.3.2) Learners conclude problem solved learning processes and applied to problems in other situations.
  - 2.3.3) Learners present the group work report with room discussion to checked group and individual work.

*3) The conclusion of lesson*

- 3.1) The lessons are shared by instructor and learners.
- 3.2) Instructor and learners share ideas to meet learning goals.
- 3.3) Learners evaluate work group.

*The evaluation appropriateness results of the cooperative problem-based learning activities to enhance cooperation skill in online environment*

Table 1 shows that the experts agree as to cooperative problem-based learning activities to enhance cooperation skill in online environment was appropriateness in highest level. ( $\bar{x} = 4.71$ , S.D. = 0.48).

Table 1. The evaluation appropriateness results of the cooperative problem-based learning activities to enhance cooperation skill in online environment

Evaluation Lists	Results		Level of appropriateness
	$\bar{x}$	S.D.	
1. The introduction to the lesson	4.75	0.47	Highest
2. The activities	4.72	0.47	Highest
2.1 Introduce into a group activity	4.67	0.48	Highest
2.2 The cooperative problem-based learning activities to enhance cooperation skill in online environment	4.70	0.47	Highest
2.3 Evaluation and testing	4.80	0.45	Highest
3. The lesson conclusion	4.67	0.51	Highest
Summary	4.71	0.48	Highest

Table 2 shows the experts agree as to cooperative problem-based learning activities to enhance cooperation skill in online environment for using was appropriateness in highest level. ( $\bar{x} = 4.70$ , S.D. = 0.50).

Table 2. The evaluation appropriateness results of the cooperative problem-based learning activities to enhance cooperation skill in online environment for using

Evaluation Lists	Results		Level of appropriateness
	$\bar{x}$	S.D.	
1. Cooperative problem-based learning activities in online environment is appropriate to enhance cooperation skill	4.80	0.45	Highest
2. Cooperative problem-based learning activities to enhance cooperation skill in online environment is possible for using	4.60	0.55	Highest
Summary	4.70	0.50	Highest

## Conclusion

The research findings show that 1) the cooperative problem-based learning activities to enhance cooperation skill in online environment include three steps; the details thereof were as follow: the introduction to the lesson, the activities, and the conclusion of lesson and 2) the experts agree as to cooperative problem-based learning activities to enhance cooperation skill in online environment for using was appropriateness in highest level.

To use the cooperative problem-based learning activities to enhance cooperation skill in online environment, any education institutes that desire to apply these learning activities should be well prepared in term of learning environment, instructors and learners.

## Discussion

According to the assessment by experts, it was found that cooperative problem-based learning activities to enhance cooperation skill in online environment for using were highest level of appropriateness. The results were in accordance with research of Yusof et. al. (2012) who found that cooperative problem-based learning (CPBL) framework in engineering education. A sample case study included affirms the need for supporting students to learn

in their teams, and the outcome of positive development and experiences in team working while undergoing cooperative problem-based learning.

## References

- Alwi, S. R. W., Yusof, K. M., Hashim H. & Zainon Z. (2012). Sustainability Education for First Year Engineering Students using Cooperative Problem Based Learning. *Procedia Social and Behavioral Sciences*. pp. 52-58.
- Johnson, D. (1991). Cooperative learning: Increasing college faculty instructional productivity. *ASHE-ERIC Higher Education Report*.
- Johnson, D. W., Johnson, R. T., & Holubec, E. J. (1995). *Circles of learning*. Edina, MI. Interaction Book Company. 4th ed.
- Majumdar, B. & Boonyanurak, P. (2011). *Problem-based Learning*. Burapa university.
- Ministry of Information and Communication Technology of Thailand. (2012). *National ICT Policy Framework 2011-2020: ICT 2020*. Ministry of Information and Communication Technology of Thailand.
- Polya, G. (1957). *How to solve It*. New York. Doubleday & Company, Inc. 1957.
- Wannapiroon, P. (2008). [Online]. Development of problem-based blended learning model in developing undergraduate students' critical thinking. *Thaicyber University Ejournals*. Available: <http://ejournals.swu.ac.th/index.php/ictl/article/view/367/362>
- Wichadee, S. & Orawiatnakul, W. (2012). Cooperative Language Learning: Increasing Opportunities For Learning In Teams. *Journal of College Teaching & Learning*. pp. 93-100.
- Yusof, K. M., Hassan, S. A. H. S. & Phang, F. A. (2012). Creating a Constructively Aligned Learning Environment using Cooperative Problem Based Learning (CPBL) for a Typical Course. *Procedia Social and Behavioral Science*. pp. 747-757.
- Yusof, K. M., Hassan, S. A. H. S., Jamaludin, M. Z. & Harun, N. F. (2012). Cooperative Problem-based Learning (CPBL): Framework for Integrating Cooperative Learning and Problem-based Learning. *Procedia Social and Behavioral Sciences*. pp. 223-232.

# Design of total quality management information system (TQMIS) for model school on best practice

Sudarat Srirama<sup>a</sup>, Panita Wannapiroon<sup>b</sup> and Prachyanun Nilsook<sup>c</sup>

<sup>a</sup> PhD. Candidate, Information and Communication Technology for Education, Faculty of Technical Education at King Mongkut's University of Technology North Bangkok, 10800, Thailand.

<sup>b</sup> Assistant Professor, Information and Communication Technology for Education Division, Faculty of Technical Education, King Mongkut's University of Technology North Bangkok, Bangkok, 10800, Thailand.

<sup>c</sup> Associate Professor, Information and Communication Technology for Education Division, Faculty of Technical Education, King Mongkut's University of Technology North Bangkok, Bangkok, 10800, Thailand.

---

## Abstract

This research aims to 1) design the Total Quality Management Information System (TQMIS) for model school on practice, and 2) assess the Total Quality Management Information System (TQMIS) for model school on practice. The research process is divided into 3 stages: 1) study the related documents and researches as well as set up a sub-group meeting for the executives of the model schools on practice, 2) design the information system, 3) assess the appropriateness of the information system. The samples are 5 experts selected by purposive sampling. The data is analyzed by means and standardized deviations statistically. The research result shows that 1) the model of Total Quality Management Information System (TQMIS) for model school on best practice is consisted of 4 key components which are 1.1) the principle of the information system development model, 1.2) the development of the information system based on System Development Life Cycle (SDLC)'s principles, 1.3) the information report based on Total Quality Management Information System (TQMIS) for model school on practice, and 1.4) the assessment of information system using Black-Box technique, and 2) the result of the assessment of Total Quality Management Information System (TQMIS) for model school on practice is rated as absolutely appropriate in overall ( $\bar{X}=4.78$ ).

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

**Keywords:** Executive information system; Total quality management; Model school on best practice

## Introduction

According to Education Management section in National Education Act of B.E.2542 and its amendment (second edition) in B.E. 2545, one of the main specifications is the quality of education which is the ultimate goal of educational reforms at all levels. If basic education and tertiary education are not adequately qualified, Thailand will never catch up other countries' development (Office of the National Education Commission, 2545). It states in the article 48 of National Education Act of B.E.2542 amended in B.E. 2545 (second edition) that "original affiliation authorities and educational institutions must have a quality assurance system within the educational institutions and acknowledge quality assurance as a part of education management process that must be constantly continued." While in the article 49 of the same act mentions the external quality assurance in "...there must be an authority who reassures the standard and assess the quality of education. This public organization must develop standards and methodologies of external quality assurance, and assess education management's result in order to examine the quality of education" (Office for National Education Standards and Quality Assessment, 2555).

There are 6 standards for basic education standard for quality assurance within educational institutions. There are 6 standards for learners which the first to the sixth standards while the seventh to fifteenth standards are the standards for basic educational institution management. The standard for general educational institution management assigns the teachers to conduct the teaching in relevance to seventh standard. Therefore, teachers must conduct the classes of the years and subjects they are responsible according to nine indicators. (Lucas, et.al, 1988)

TQM is an organizational management system that aims to ultimately satisfy the customers by studying the "voice of customers" and apply it to the design of production and service process in order to create a product or

service that best suits to the customers' need. This can be assessed by customer satisfaction. To develop educational institutions at secondary level to be model school on best practice for Total Quality Management Information System (TQMIS), there are notion, principle, and methodology and other approaches for developing quality of the whole model schools. 1. TQM notion is to ultimately satisfy the customers and the stakeholders such as students, teachers, parents, institutions, and communities. 2) TQM has 3 principles which are "customer-oriented", "continuous improvement", and "employee involvement". 3) TQM's establishment in an organization methodologies are: 3.1) leadership-development-based management, 3.2) information and analysis management, 3.3) strategic quality planning management, 3.4) human resource development and management, 3.5) management of process quality, and 3.6) Customer Relation Management. 4) There are several stages that make the TQM practical which are: 4.1) selection and appointment personnel who are responsible for organization's quality development, 4.2) objective planning, 4.3) actual operation, 4.4) follow-up, examination, revision, and 4.5) reinforcement (Pitsamai Kawcharoenphon, 2002). Moreover, there is an application of SIPPO educational management model for excellent quality process for all model schools. Stakeholder (S) refers to customers and stakeholders of the educational institutions. Input (I) refers to supporting factors for education. Process (P) refers to knowledge management and education management processes. Product (P) refers to educational outcomes such as academic results, expertise, competency of educational institution's executives, including new existing knowledge and academic services. Outcome (O) refers to satisfaction of customers and stakeholders. (Suansunandha Rajabhat University, 2554).

In terms of educational institution management, executives are responsible for management in various fields in order to operate the organization effectively and maximize the profits. (Onwalan Klongsungsrn, 2007) The executives need to decide and plan the utilization of limited resources. Therefore, the executives need related data and information about the issues that must be determined adequately. Executive information system (EIS) is used as an instrument for supporting the executives' determination. The information must include both internal and external components that are related to the targets, strategies, policies, challenges, and control for the educational institution's executives in order to make them coherent to the internal quality assurance. (Weeraporn Panurag, 2007).

Thus, the researcher had an idea to develop the Total Quality Management Information System (TQMIS) for Model School on Best Practice as a tool to support the management process so that the administrators could set up plans and make any decisions more efficiently.

## **Purpose**

2.1 To design the Total Quality Management Information System (TQMIS) for model school on best practice.

2.2 To assess the appropriateness of the Total Quality Management Information System (TQMIS) for model school on best practice.

## **Scope of the study**

### *3.1 Population:*

Population is the experts in the field of total quality management, executive information system, and quality assurance

### *3.2. Samples Groups:*

Samples are 5 experts in the field of total quality management, executive information system, and quality assurance chosen by purposive sampling. They are highly-experienced experts in these fields for at least 5 years.

### *3.3. Variables of the study:*

3.3.1 Independent variable is the Total Quality Management Information System (TQMIS) for model school on best practice.

3.3.2 Dependent variable is the appropriateness of the Total Quality Management Information System (TQMIS) for model school on best practice.

## **Methodology**

### *4.1 Phase 1 Content Analysis*

4.1.1 Study and analyze the relevant documents and researches on models of total quality management for education, executive information system, and quality assurance.

4.1.2 Conduct a sub-group meeting for the executives of the model schools on best practice in order to identify the needs of the Total Quality Management Information System (TQMIS) for model school on best practice

### *4.2 Phase 2 System Design*

4.2.1 Design the Total Quality Management Information System (TQMIS) for model school on best practice.

4.2.2 Propose the Total Quality Management Information System (TQMIS) for model school on best practice to the advisor for further examination and revision

4.2.3 Create an instrument for assessing the appropriateness of the Total Quality Management Information System (TQMIS) for model school on best practice

### *4.3 Phase 3 Assessment of the appropriateness of the Total Quality Management Information System (TQMIS) for model school on best practice as the following:-*

4.3.1 Propose the designed Total Quality Management Information System (TQMIS) for model school on best practice to the 5 experts for assessing the appropriateness

4.3.2 Analyze the output data by using appropriateness measurement scale based on 5-point Likert Scale as well as means ( $\bar{X}$ ) statistics

1.00-1.49 means the assessment topic is absolutely inappropriate

1.50-2.49 means the assessment topic is inappropriate

2.50-3.49 means the assessment topic is neutral

3.50-4.49 means the assessment topic is appropriate

4.50-5.00 means the assessment topic is absolutely appropriate.

## **Result**

*Stage 1 The model of Total Quality Management Information System (TQMIS) for model school on best practice is composed of 4 key components which are:*

5.1 the principle of the information system development model



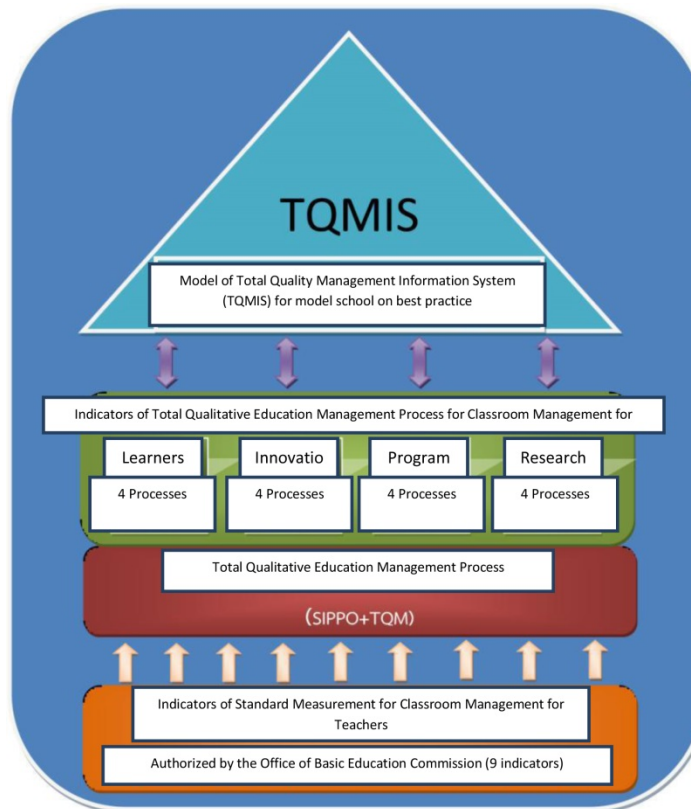


Fig. 1. The model of Total Quality Management Information System (TQMIS) for Model School on Best Practice

5.1.1. Indicators of Standard Measurement for Classroom Management for Teachers are 1.1) teachers identify the goals for learners' quality in terms of knowledge, skills, competency, and desirable qualifications, 1.2) teachers analyze students each by each and use the data to plan the educational management for developing the learners' competency, 1.3) teachers design and manage the education in regard to the differences between individuals and differences in intellectual development levels, 1.4) teachers integrate suitable media and technology suitable to the concept and indigenous knowledge, 1.5) teachers measure and assess with various methods in order to maximize the educational development of the learners, 1.6) teachers advise and solve learners' problems both in terms of academics and quality of life with fairness, 1.7) teachers study, research, and develop knowledge management for their responsible subjects and apply them to teaching, 1.8) teachers behave as good role models and good members of educational institutions, and 1.9) teachers manage their assigned classes full-time to the best of their ability.

5.1.2 The total qualitative education management process is consisted of 2.1) quality process management that uses SIPPO educational management model composed of Stakeholder (S) which refers to customers and stakeholders of the educational institutions, Input (I) which refers to supporting factors for education, Process (P) which refers to knowledge management and education management processes, Product (P) which refers to educational outcomes such as academic results, expertise, competency of educational institution's executives, including new existing knowledge and academic services, and Outcome (O) which refers to satisfaction of customers and stakeholders, and 2.2) 3 Total Quality Management (TQM) principles which are "customer-oriented", "continuous improvement", and "employee involvement".

5.1.3 The process design that will bring about the model schools on best practice consists of 1) learners' quality discovery process, 2) innovation management in classrooms process, 3) learners' quality management process, and 4) research management in classrooms process.

5.2 the development of executive information system based on Total Quality Management Information System (TQMIS) for model school on best practice uses System Development Life Cycle (SDLC) model for designing. The cycle includes 1) problem recognition, 2) feasibility study, 3) analysis, 4) design, 5) construction of the system, 6) conversion, and 7) maintenance.

5.3 the information report based on Total Quality Management Information System (TQMIS) for model school on best practice supports the indicators of education management in terms of learners, innovation, program, and research. Each section is made of 4 processes and 12 indicators; therefore, there are 48 indicators in total.

5.4 the assessment of the designed information system uses Black-Box technique for assessing. The questions are categorized as below:-

5.4.1 Functional Requirement Test

5.4.2 Functional Test

5.4.3 Usability Test

5.4.4 Performance Test

5.4.5 Security Test

**Stage 2** *The result of appropriateness measurement of the model of Total Quality Management Information System (TQMIS) for model school on best practice*

Following Table 1, the Total Quality Management Information System (TQMIS) for model school on best practice is rated as absolutely appropriate in overall ( $\bar{X}=4.78$ ). When considering each component, it found out that the development of the information system based on System Development Life Cycle: SDLC is rated as the most absolutely appropriate ( $\bar{X}=4.89$ ), followed by 1) the principle of the information system development model which is consisted of 3 component (1.1 the indicators of standard measurement for classroom management for teachers, 1.2 the total qualitative education management process, and 1.3 the indicators of total qualitative education management process for classroom management for teachers), and 2) the assessment of the designed information system uses Black-Box technique which is consisted of functional requirement test, functional test, usability test, performance test, and security test. These are rated as absolutely appropriate ( $\bar{X}=4.78$ ). These are followed by the information report based on Total Quality Management Information System (TQMIS) for model school on best practice which is also rated as absolutely appropriate ( $\bar{X}=4.67$ ).

Table 1 the Assessment Result of Total Quality Management Information System (TQMIS) for Model School on Best Practice

Assessment Topics	$\bar{X}$	S.D.	Assessment Result
-------------------	-----------	------	-------------------

1. Principles and Rationale as a basis of Model of Total Quality Management Information System (TQMIS) for model school on best practice	4.67	.53	Highest
2. Model's Objectives	4.32	.58	High
3. Information System Development Model	4.24	.52	High
-SIPPO Management's Development System	4.30	.53	High
-Total Quality Management's Development System	4.32	.50	High
-Executive Information's Development Systems that use System Management Life Cycle	4.10	.53	High
-Data Processing using TQMIS System	4.11	.58	High
4. Measurement and Assessment includes	4.36	.57	High
-Model Assessment using TQMIS System	4.42	.55	High
-Effectiveness Measurement using TQMIS System	4.35	.58	High
-Satisfaction Measurement using TQMIS System	4.30	.58	High
Total	4.33	.55	High

The examination by the experts shows that the design of executive information management based on the Model of Total Quality Management Information System (TQMIS) for model school on best practice is rated as absolutely appropriate. This is consistent to the findings of Pongsak Pakamas in which the development of ICT system for management in North-Eastern regional universities facilitates and simplifies the executives' management, and also consistent to the findings of Pisamai Kaewjareonpol in which the management based on total quality management in primary schools was rated as absolutely appropriate.

## Conclusion and discussion

According to evaluation by the experts, it is found that the development of model of Total Quality Management Information System (TQMIS) for Model School on Best Practice has suitability in a good level. This is in complaint with (Onwalan Klongsungsrn, 2007) who found that the development of information system for the administration in universities around the northeast of Thailand enabled the executives to work more easily and conveniently. Also, the results are in accordance to those of (Pitsamai Kawcharoenphon, 2002) who found that the management by means of Total Quality Management in primary schools was in good level.

The schools that employ the model of Total Quality Management Information System (TQMIS) for Model School on Best Practice should be well prepared in terms of fundamental technology, network system, and basic equipment needed for internet connection.

## Recommendations

Schools that apply the Model of Total Quality Management Information System (TQMIS) for model school on best practice as an instrument for leveling up themselves to excellence should be ready and adequate in terms of basic technology, networking system, and basic tools necessary for internet connection.

## References

- Office of the National Education Commission, "Reforming process for learning quality development", 2545.
- Office for National Education Standards and Quality Assessment, "Guide to external assessment", 2555.
- Lucas, H.C., E.J. Walton, and M.J. Ginzberg. (1988). "Implementing Packaged Software", *MIS Quarterly*, 13.4, December 1988, pp.537-549.
- Pitsamai Kawcharoenphon, "A Study of total Quality Management (TQM) of Primary Schools under The Office of Kamphaeng Phet Provincial Provincial Primary Education," *Kamphaengphet University*, 2002.
- Suansunandha Rajabhat University, "Design of Classroom Research Management Process for OBE Schools, Samutsongkram Province", 2554.
- Onwalan Klongsungsrn, "The Reform of Executive Information System For The Thai Customs Department," *Ramkhamhaeng University*, 2007.
- Weeraporn Panurag, "The Development of an Executive Information System : A Case Study of Rajabhat Maha Sarakham University," *Khon Kaen University*, 2007.

# Determining of the prospective teachers' understandings of electrochemistry

Adem YILMAZ<sup>a</sup>, Samih BAYRAKÇEKEN<sup>b\*</sup>

<sup>a</sup>Kastamonu University, Education Faculty, Kastamonu, Turkey

<sup>b</sup>Atatürk University, Education Faculty of Kazım Karabekir, Erzurum 25240, Turkey

---

## Abstract

The aim of this study was to determine of prospective teachers' understandings related to electrochemistry. Qualitative and quantitative research techniques were used together in the study. A concept test consisted of 20 items for electrochemistry; interviews and focus group discussion were used as data collecting tools. Data were collected after the subject of electrochemistry was taught in the scope of general chemistry lesson. Sample of the study consisted of 95 prospective teachers studying in the first grade of elementary science teaching department in an education faculty in 2011-2012 semester. The electrochemistry concept test was given to the sample at the end of electrochemistry unit. The interviews and the focus group discussion were made with the prospective teachers chosen according to the results of concept test. Findings of the study showed that the prospective teachers' understandings of electrochemistry were inadequate and there were many misconceptions. Many misconceptions were found different from previously detected misconceptions in literature.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** Electrochemistry, Misconception, Concept Test, Interview, Focus Group Discussion.

---

## 1. Introduction

Of our time, which has become an indispensable part of education; progressive, practical, and has an ongoing feature. Both social and natural sciences developed on the basis of technology and innovation, in every area of the country is a major contributor to growth. In this context, the importance of science education and training to the same extent against the increase. Science education, development, renewal and on the world as a reason to look confidently to the future has become both a consequence (Akdeniz, Yıldız and Yigit, 2000).

The purpose of science classes, students do not memorize the concepts of science, learning, teaching them to ensure the development of thinking skills, to train researchers and inquisitive individuals are indicated as (Karaçöp, 2010). In science, scientific concepts and principles to be too much, and this concept is not foreign to the students, it is difficult to science teaching. Teaching of science courses as well as courses that have to be learned is one of the chemistry course. Chemistry courses, there are a lot of abstract concepts and issues in the expression for the lack of suitable laboratory conditions at all times, because often a preferred method of straight narrative technique that is expressed. This case does not result in adequate conceptual learning. Chemistry occurring in education in order to eliminate these deficiencies in appropriate educational strategies and methods must be used. (Capel, Leask and Turner, 2001).

Only recognize the concept or definition of the concept of education is not to make. One of the most important points in the teaching of the concept of the relationship between concepts is determined correctly.

---

\* Corresponding author. Tel.: +90 533 653 89 17  
E-mail address: samih@atauni.edu.tr

Featured in the mind of each student to create a housing concept that is different from the picture. In recent years, studies focused on by the front information detecting seen. Because of the concept and the subsequent learning that occurs in the form of a chain Given that affects the student's prior knowledge of the misconceptions that exist in the detection, in terms of education has a vital importance. Science teaching when students' prior knowledge of what constitutes this preliminary knowledge of scientific thought in terms of the extent that they are consistent, if the preliminary information inconsistencies between them if what level that decision is made, science teaching is attempted, if teachers teaching strategies very well known, even if the desired level of a It is very difficult to ensure conceptual change (Demir, 2008).

How important is the identification of misconceptions, the removal and proper restructuring of the concepts in students' minds in terms of the training is so important. Correction of the false notion that exists in the minds of students and to create a more accurate concepts and learning before the student's willingness to be sensitive to this issue is required. In which students are now confronted with a new situation, and the creation of a favorable environment for conceptual change is required. In this environment, the course will prepare students to participate in an active way, using their own ideas should be able to generate new ideas (Bodner, 1986). Students corrected the false notion that already exists in the right place with the modification that is called conceptual change. Conceptual change in order to become students in himself of existing data is missing should notice, presented to him new knowledge, mental processes passing sense must find (Posner, Strike, Hewson, Gertzog, 1982).

### **1.1 Problem Statement**

In the 2011-2012 academic year, Atatürk University Faculty of Kazim Karabekir Science Teacher Education program studying in 1st year of teacher candidates in electrochemistry what kind of issues are misconceptions?

### **1.2 Research Objectives**

In this study, using different data collection techniques relevant to teacher candidates' understanding of electrochemistry is intended to detect.

### **1.3 Importance of Research**

Electrochemistry, chemical understanding is seen as one of the most difficult issues, as well as teachers of teachers needed is a unit that forced (Cobern, 2003). Therefore electrochemistry unit and misconceptions often not understood is composed. Electrochemistry teachers about misconceptions that may occur in existing or conceptual knowledge of the subject with a more effective and efficient way of teaching will be possible. These misconceptions, program developers and educational material will serve as a guide for. In addition, misconceptions about the subject can also be used in the testing and evaluation process. In this study, the relevant literature (Sanger and Greenbowe, 1997a, 1997b, 1999; Morgil, Erdem Yılmaz, 2003; Yılmaz, Erdem and Morgil, 2002). Unlike the error in determining individual interviews in addition to the focus group discussions were also conducted. In this study, predominantly interviews, more reliable and valid way of misconceptions is thought to be determined.

### **1.4. Techniques that can be used in determining Misconceptions**

In order to identify the misconceptions; description, posters, drawings, written comments, word association, interviews, question and answer techniques, concepts, techniques include puzzles that can be used. These include interview method, is one of the most commonly used and effective method (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz and Demirel, 2009).

## **2. Methods**

In this research, qualitative and quantitative research approach method was together used. The case study, a case on the facts, is a type of a study conducted in-depth review. Special case of the method distinguishes from many research methods, researchers investigated cases, about events and situations to allow for in-depth research is the opportunity to do research and a rich (Ekiz, 2009).

### **2.1. Population and Sample**

The universe of this study, colleges of education as a science teacher in the 1st year of the program consisted of the teacher candidates studying. Examples of non-random sampling method for the determination of the appropriate sampling method was used. Appropriate sampling method, the researcher can access and save data in an environment rich in order to obtain the sample by selecting a sampling method that is used (Büyüköztürk et al., 2009). For this purpose, the study population, Kazim Karabekir School Science Teacher Education program who are studying in 1st year teachers constitute 95.

### **2.2. Data Collection Tools**

Electrochemistry as a means of testing the concept of data collection, interviews and focus group discussions were used vehicle.

### **2.3 Electrochemistry of Concept Test Process Improvement**

Electrochemistry in the concept development phase of testing was conducted pilot studies. For this purpose, initially open-ended, true false, one-and two-stage multiple-choice questions to determine students' understanding of electrochemistry has been studied. During the pilot study were asked open-ended questions and received answers to 12 scale developed (Abd-El-Khalick, Lederman, Bell and Schwartz, 2001) was analyzed. In addition to this, student teachers should indicate why 16 false and 20 multiple-choice questions correctly directed and answers were analyzed. Pilot applications often during the tests again discussed with reference to expert opinion and research that will be used in a test consisting of 20 multiple-choice questions were created. These tests for reliability analysis, electrochemistry previously trained in the context of general chemistry chemistry education in 5th grade and 25 in the name of science teacher education candidates were administered to 30 teachers located in the 2nd year. Cronbach's alpha reliability coefficient of the test was calculated as 0.62. To determine the validity of the test has also consulted experts. For this purpose, test, three experts in the field of analytical chemistry, chemistry education and 1 to 4 were examined by the faculty member.

### **2.4. Development of Interview Process**

Qualitative research methods as one of the most widely used techniques is also interviewing techniques. Interviews with a group of two people or can be made mutually. Interviews structured, semi-structured and unstructured to be designed for a certain purpose and based on mutual exchange of information is a data collection techniques. Interview technique gives students the opportunity to express their opinions, and student-centered approach is used. In an interview to be ready to follow the answers and questions that can be used at the appropriate time to ensure the preparation and experience depends on a good run. Interviews conversation rather than an interrogation should be made in the form of air carrying a conversation. Otherwise, students may have problems in confidence and comfort can not comment. Reasons set forth above is determined by considering the type of multiple-choice tests of the misconceptions in order to examine more in-depth focus group interviews with students and interviews were conducted. Data electrochemistry lesson students were collected after processing. Interview data prior written consent of the students by the researcher himself is collected. Research of reliability above-mentioned tests utilizing interviews and used in interviews ensure the credibility purposes, as far as possible with as many people were interviewed, interview before the researchers interviews a detailed researched and trained for talks enough time and suitable environment provided, interviews permission audio and video recorded and the data obtained repeatedly examined, interviewed students the topic of discussion regarding previously trained individuals, selected from the students made earlier multiple-choice test results by the successful, middle and fail levels equal number of people taking one by a person and expert opinion presented in the negotiating process has been restructured. Through this meeting the specified criteria review process can be made to be reliable.

### **2.5. Data Analysis**

Electrochemistry of concept test and interview data obtained were analyzed separately. Students, electrochemistry concepts to test their answers were analyzed using the SPSS program and the frequency and percentage tables have been created. Multiple choice test questions and pilot studies considering the application, the prepared semi-structured interviews were collected and analyzed under specific headings. In the first stage of the

analysis of interview data, video recording device as voice and video data recorded by a written transcript was made. This data has been cleared of speech and are not associated with the research questions has been made significantly simplified. Within the framework of the interview questions used in the study, data will be collected and will be presented under the headings which have been identified. In this way, students have uncovered some misconceptions and listed.

### 3. Results

Electrochemistry test results obtained by reference to the concept, they fall into the misconceptions of students determined which questions and misconceptions found together under specific headings in the table below are given with percentages.

Table 3.1. Misconceptions About the Galvanic Batteries

Galvanic Batteries	%
An unknown half-cell potential to determine the potential of half the battery will need to connect the voltmeter.	58.9
Electrolysis and galvanic batteries in the battery anode and cathode signals are the same.	37.9
Zinc-copper couple in a standard battery of oxidation events that are not immersed in the solution at the zinc electrode occurs.	27.4
Zinc-copper couple in a standard battery of copper electrode oxidation phenomenon occurs in the part not immersed in the solution.	25.3
Galvanic battery cells in the battery voltage in half does not depend on the concentration of the solution used.	17.9
A standard zinc-copper battery is located in the copper electrode oxidation event takes place in solution.	14.7
Batteries, while oxidation event occurred in half the number of electrons in the cells do not change.	14.7
During the oxidation half-cell battery incident ions from the solution will be given.	13.7
If the operation of electrolysis cells, and the galvanic cell must be energized from the outside.	13.7
Electrolysis and galvanic cell reactions occurring in the reaction are voluntary.	11.6
In a galvanic cell, oxidation-reduction reactions in the battery flatbed work again.	11.5
An unknown half-cell potential to determine the potential need to connect to half the battery ammeter.	10.5
The anode electrode in a galvanic battery completely runs out of battery works.	9.5

Table 3.2. Misconceptions About Electron Transfer and Electron Exchange

Electron Transfer and Electron Exchange	%
The electrodes used in batteries may be present in solid and liquid phase only.	48.4
In a galvanic cell, the transfer of electrons from one electrode to the other half-cell inducing factor of ions in solution at each other is a push or pull.	38.9
The electrodes used in the battery may be present only in the solid phase.	31.6
In a galvanic cell, allowing the transfer of electrons from one electrode to the other factor is that the	21.1

movement of anions from solutions.

In a galvanic cell, allowing the transfer of electrons from one electrode to the other factor is that the concentration of the salt solution used. 10.5

The electrodes used in the batteries only in liquid and gas phases may be present. 9.5

Table 3.3. Misconceptions About Salt Bridge and Features

Salt Bridge and Features	%
Salt solution must be able to ensure the passage of electrons through.	61
The purpose of using the salt bridge galvanic cell is to provide passage of electrons.	24.2
The cause of the electrolysis cell used in the salt bridge is that energy needs are met from the outside.	15.8
The cause of electrolysis cell used in the salt bridge of the resulting reaction is carried out intentionally.	10,8

Table 3.4. Misconceptions About Electrodes and Electrode Surface Area Phases

Electrodes and Electrode Surface Area Phases	%
Surface area of the electrodes used in the battery increases, the current intensity and the cell potential increases.	58.9
Batteries used in cell potential of the electrodes increases, the surface area increases.	12.6

Table 3.5. Misconceptions About Corrosion (Rust)

Corrosion (Rust)	%
Only the presence of oxygen in the corrosion process is sufficient for the environment.	40
Saltwater corrosion in environments where events occur faster resolution of the reason is the increase of metals.	32.6
Saltwater corrosion in environments where events occur faster than the speed of the reason is to provide charge balance.	23.2

Table 3.6. Misconceptions About Conducting Wire

Conducting Wire	%
The task of the battery used in the conducting wires is to provide passage of anions and cations.	51.6
Voltmeter used in batteries do not bind onto the wire does not pass current through the conductive wire.	10.5

Table 3.7. Misconceptions About Concentration Cells

Concentration Cells	%
---------------------	---



Effect of allowing you to work in a concentration cell battery, externally supplied energy.	25.3
Effect of allowing you to work in a concentration cell battery, type of solution used is different.	25.2
In a concentration cell, the same concentrations of the stock solution in half-cell battery to ensure operation of the external circuit is necessary to increase the cross section of the conductor wire.	13.7
In a concentration cell, the same concentrations of the stock solution in half-cell of the battery to ensure operation in the salt bridge is necessary to increase the concentration of the solution.	12.6
Half of the solution contained in the cells of a concentration cell is the same concentrations at the anode to permit operation of the battery to increase the mass of the electrode is required.	11.6

\* These statements prevalence levels among students who participated in the study over 10% of which were included in error.

Table 3.8. *Electrochemistry Concept Test Specific Obtained With This Study Misconceptions*

<b>Obtained by Electrochemistry Concept Test Misconceptions</b>	
Increased surface area of the electrodes used in the battery when the battery potential is increased.	
In a galvanic cell, the transfer of electrons from one electrode to the other half-cell inducing factor of ions in solution at each other is a push or pull.	
In an environment of saltwater corrosion events happen faster resolution of the reason is the increase of metals.	
The electrodes used in the battery may be present only in the solid phase.	
Concentration effect of allowing you to work outside of the battery in the battery is energized.	
Concentrations with the same battery to run a concentration needs to be done is to increase the cross-section of the conductors.	
Increasing the salt concentration in the salt bridge solution is also increased if the battery potential. To the concentration of the salt solution is a direct correlation between cell potential.	
The end result is a galvanic battery in the battery after using the substances consumed and disappear.	
Battery potential to the concentration of the solutions used in half-cell, not depends on the type of solution.	
The electrodes used in the battery may be present only in the solid phase. Because for measuring the battery potential electrodes are required to connect the conductors.	
Concentration of battery operation mode of diffusion which is great as the concentration of the right hand side with a low concentration would be with the passage of electrons.	
Solution may be used in all kinds of salt bridges. For the operation of the battery is sufficient that the aqueous solution of the salt bridge.	
Thanks to the half-cells of the salt bridge solution miscible with the solution contained in the other half cell.	
Of the surface area of the electrodes used in the battery cell potential does not affect the change. Because the cell potential of the electrode type, but depends on the concentration of the solution used.	

Analyzing the concept of Electrochemistry test; teachers galvanic batteries, salt bridges, electron transfer, corrosion, conductive wires and electrodes misconceptions regarding phase they have seen. Teacher candidates to explore in depth the misconceptions found in the interviews and focus group discussions were also conducted. Understanding concepts in electrochemistry test of teacher candidates identified and misconceptions on which concepts have been identified along with where rates. In-depth interviews conducted on electrochemical concepts in the literature during interrogations is not unique to this study identified as misconceptions were presented with frequency values in Table 3.9.

Table 3.9. Results of Interviews and Focus Group Discussions and Frequency Values Obtained Misconceptions

Interviews and Focus Group Discussions with Obtained Misconceptions	f
Increasing the salt concentration in the salt bridge solution is also increased if the battery potential. to the concentration of the salt solution is a direct correlation between cell potential.	9
The end result is a galvanic battery in the battery after using the substances consumed and disappear.	6
Battery potential to the concentration of the solutions used in half-cell, not depends on the type of solution.	5
The electrodes used in the battery may be present only in the solid phase. Because for measuring the battery potential electrodes are required to connect the conductors.	5
Concentration of battery operation mode of diffusion which is great as the concentration of the right hand side with a low concentration would be with the passage of electrons.	4
Solution may be used in all kinds of salt bridges. For the operation of the battery is sufficient that the aqueous solution of the salt bridge.	4
Thanks to the half-cells of the salt bridge solution miscible with the solution contained in the other half cell.	3
Of the surface area of the electrodes used in the battery cell potential does not affect the change. Because the cell potential of the electrode surface area, but depends on the concentration of the solution used.	3

Teacher candidates electrochemistry understanding of determining used, interviews and focus group interview techniques have shown that the teacher candidates in the negotiations, their thoughts more comfortable in expressing and preservice teachers' understandings in the process in depth are investigated. Interview and focus group discussion technique that allows researchers the benefits of the concept, how it is perceived by the teachers to ensure detection and to identify misconceptions is quite helpful.

#### 4. Results

This research program studying in science teacher preservice teachers' misconceptions in electrochemistry multiple-choice test, interview and focus group interviews was conducted in order to identify the techniques. The findings of this study on preservice teachers' conceptual understanding of electrochemistry at the desired level, and many have misconceptions that they reveal. Errors detected before a significant number of studies were also determined.

In addition to the misconceptions in the results section of this study have been identified in some specific misconceptions. Some of these misconceptions in electrochemistry concept test in the interviews and focus group discussions with others in the results are set forth in the detailed considerations. These misconceptions are presented in Table 3.8 and Table 3.9 in the list.

In these studies found in the literature as distinct from data collection tools, focus group discussions conducted and their understanding of electrochemistry to teachers basing on certain principles are given the opportunity to express. In this study from interviews and focus group interviews, the reasons for the formation of misconceptions, some data were obtained. Teacher candidates in the laboratory many more courses have not committed the student teachers' lessons taught in those limited and different resources need be, electrochemistry on the subject of in-depth research have the electrochemistry of the concepts of abstraction levels to be more misconceptions occur reasons among others.

## 5. Suggestion

- Determination of misconceptions, multiple choice tests in addition to the use of interview techniques, the causes of errors are seen as important in terms of uncovering.
- Misconceptions found in the studies of teacher candidates to be reliable and give you the answers in the test substance is stable in the discovery that seems important in terms of the use of the interview.
- Acts shy of interviews, focus group discussions many teachers are more than willing to express their opinions was observed. Therefore, the data collection techniques as misconceptions research also included focus group interviews can be said to be beneficial.
- If one focus group considered classes of prospective teachers, in-depth understanding of sniffer is spoken by qualified teachers with questions reveal misconceptions terms would be helpful.
- Teachers' misconceptions about the possibilities to reach the work done in terms of improving the effectiveness of the teaching process is considered beneficial.
- Uncovering the causes of misconceptions prevent the occurrence of this error in teaching and / or will be useful for the removal.

## References

- Abd-El-Khalick, F., Lederman, N.G., Bell, R.L. and Schwartz, R.S. (2001). View of Nature of Science Questionnaire (VNOS): Toward Valid and Meaningful Assessment of Learners' Conceptions of Nature of Science. *In Proceedings of The Annual Meeting of The Association For The Education of Teachers In Science*. January 18-21. Costa Mesa, CA.
- Akdeniz, A. R., Yıldız, İ. ve Yiğit, N. (2000). *İlköğretim 6. Sınıf Öğrencilerinin Işık Ünitesindeki Kavram Yanılgıları*. Hacettepe Üniversitesi Eğitim Fakültesi Dergisi. 19(1), 5-14.
- Bodner, G. M. (1986). Constructivism: A Theory of Knowledge. *Journal of Chemical Education*, 63(10), 873-878.
- Büyükoztürk, Ş., Kılıç Çakmak, E., Akgün, Ö.E., Karadeniz, Ş. ve Demirel, F. (2009). *Bilimsel araştırma yöntemleri*. Ankara: Pegem Akademi.
- Capel, S., Leask, M. and Turner, T. (2001). *Learning To Teach In The Secondary School*. New York, Routledge.
- Coburn, W.W. (Ed). (2003). *Chemical education: Towards Research-Based Practice*. Kluwer Academic Publishers.
- Demir, Y. (2008). *Kavram Yanılgılarının Belirlenmesinde Kavram Karikatürlerinin Kullanılması*. Yüksek Lisans Tezi, Atatürk Üniversitesi Fen Bilimleri Enstitüsü.
- Ekiz, D. (2009). *Bilimsel araştırma yöntemleri*. Ankara: Anı Yayıncılık.
- Karaçöp, A. (2010). *Öğrencilerin Elektrokimya ve Kimyasal Bağlar Ünitelerindeki Konuları Anlamalarına Animasyon ve Jigsaw Tekniklerinin Etkileri*. Doktora Tezi, Atatürk Üniversitesi, Fen Bilimleri Enstitüsü.
- Morgil, İ., Erdem, E ve Yılmaz, A. (2003). Kimya Eğitiminde Kavram Yanılgıları. *Hacettepe Üniversitesi Eğiti Fakültesi Dergisi*, (25), 246-255.
- Posner, G., Strike, K., Hewson, D. and Gertzog, W. (1982). Accommodation of a Scientific Conception: Toward a Theory of Conceptual Change. *Science Education*, 66 (2), 211-227.
- Sanger, M. J. and Greenbowe, T. J. (1997a). Students' Misconceptions In Electrochemistry: Current Flow In Electrolytic Solutions And The Salt Bridge. *Journal Of Chemical Education*, 7(74), 819-823.
- Sanger, M.J. and Greenbowe, T.J. (1997b). Common Student Misconceptions in Electrochemistry: Galvanic, Electrolytic, and Concentration Cells. *Journal Of Research In Science Teaching*, 34(4), 377-398.
- Sanger, M.J. and Greenbowe, T.J. (1999). An Analysis Of College Chemistry Textbooks As Sources Of Misconceptions And Errors In Electrochemistry. *Journal of Chemical Education*, 76(6), 853-860.
- Yılmaz, A., Erdem, E ve Morgil, İ. (2002). Öğrencilerin Elektrokimya Konusundaki Kavram Yanılgıları. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, (23), 234-242.

# Determining of vocational school student's attitudes toward the puzzle method

Seyid Ahmet Sargin<sup>a\*</sup>, Furkan Baltacı<sup>b</sup>, Hakan Bicici<sup>c</sup>, Ahmet Yumusak<sup>d</sup>

<sup>a</sup>Akdeniz University, Alanya Faculty of Education, Primary Education Division, Dept. of Science Education, 07400 Alanya, Antalya, Turkey

<sup>b</sup>Akdeniz University, Alanya Faculty of Business, Turizm Management Division, Dept. of Turizm & Hospitality, 07400, Alanya, Antalya, Turkey

<sup>c</sup>Akdeniz University, Gazipaşa MRB Vocational School, Catering services program, Gazipaşa, 07400 Antalya, Turkey

<sup>d</sup>Celal Bayar Üniversitesi, Demirci Education Faculty, Primary Education Division, Dept. Elementary Education, 45900 Manisa, Turkey

---

## Abstract

The purpose of this study is to determine the vocational school students' attitudes toward "Puzzle Method" implemented to increase their interest, motivation and attendance for the lectures, and better understanding for the theoretical parts of their courses. In this study, the survey application was performed to 92 students who are studying in the Accounting & Tax Applications Program and the Banks & Insurance Program at Alanya Chamber of Commerce and Industry Vocational School (ALTSO) of Akdeniz University. Thus, the students' thoughts on "Puzzle Method" have been identified, and the statistical analyses regarding the results have been demonstrated. As a result of the study, it is detected that students were satisfied with Puzzle Method in general terms. In addition to this, students stated that this method provides the interest & their continuity in the course, the increase their self-confidence & the success on the courses, and the ease for theoretical knowledge into practice. Owing to the method, the increase of communication with socializing rate between student-student & student-teacher, and the decrease their concerns for the future of finding a job, are the study's other key findings. The achievement of this success in higher education institutions, such as Vocational High Schools, which mission to train qualified intermediate staff for sectors, will contribute to individuals and educational institutions in the short term, as for the industry & the national economy in the long term.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** Alanya, code, matching, puzzle method, vocational schools.

---

## Introduction

The conventional approaches used in training process are no longer sufficient to raise & develop individuals. Therefore, in education, it is needed to be used of the opportunities and, especially the computers provided by instructional technology [5, 8]. Play, especially during early childhood, positively influences important psychological, sociological, and intellectual developments that might be a universally accepted mode of learning [1, 2]. Puzzles can be used to support a variety of different types of learning depending on the type of puzzle, including logic, spatial awareness, verbal skills, numeracy skills, and spelling [7]. Puzzle based (both high and low level forms are available, low level puzzles promote recall, recognition, location and linking, which level versions stimulate analysis, synthesis and evaluation [4]. With help of interesting, motivating, nice problems they analyze the main principles and problem types. Puzzles that are easy to remember increase the chance that the solution method will also be remembered. A Eureka moment is reached when the correct path to solving the puzzle is recognized. Hence,

---

\* Corresponding author. Tel.: +90-506-401-6820; fax: +90-242-518-1199.  
E-mail address: sasargin@akdeniz.edu.tr

the puzzles should have elementary solutions that are not obvious [6]. The methods to be preferred by students to recite out, thinking, and to direct research will ensure transformation the targets in the training program into behavior more efficiently [3]. Puzzle method is a technique of measuring information used in the science olympics such as biology. In this technique, it is expected to be correctly matched at a single answer column with using some code letters / numerals, among various items of information given in two columns. The method has been named by me as "Puzzle method" in terms of reminders "learning by amusing" to students.

## Methodology and Findings

The purpose of the study is to determine Vocational School students' attitudes towards the Puzzle Method applied to increase on behalf of their persistence, motivation, interest for the courses, and better understanding the theoretical part of the courses they have studied. The universe of study is composed of students continuing their education in the accounting & tax treatment program and, the banking & insurance program at Alanya Chamber of Commerce and Vocational High School (ALTSO) during the spring semester of 2013-2014 school year. In this context, the application of the survey was conducted with 92 students in total. The proposals placed on the questionnaire were created by the researchers. The data obtained under survey application has subjected to the reliability analysis as a priority, and it has been identified as  $\alpha = 0.937$ . The factor analysis was performed to test the construct validity of the scale, and in order to resize propositions found in the scale. During the analysis, varimax method was used as the method of rotation axis, and the load factor is limited to 0.50. However, the analysis of any proposition not appears to be out of the analysis. KMO = 0.892 has revealed that the data is to be suitable for the factor analysis (see Table 4).

The demographic profiles of the participants are presented in Table 1. 47.8% of respondents were male, while 52.2% were females. 20-year-old participants are the first with 32.6% rates among the total participants according to the age. According to the school they graduated, with a maximum of 67.4%, most participants, are tourism vocational high school graduates. The majority of students' the grade point average is between 2.00 and 2.99 (46.7%). Finally, the majority of participants is first-class formal education students (96.7%).

All tables should be numbered with Arabic numerals. Every table should have a caption. Headings should be placed above tables, left justified. Only horizontal lines should be used within a table, to distinguish the column headings from the body of the table, and immediately above and below the table. Tables must be embedded into the text and not supplied separately. Below is an example which the authors may find useful.

Table 1. Demographic Profile of Participants

Gender	N	%	Graduated high school	N	%
Male	44	47,8	High Schools	21	22,8
Female	48	52,2	Anatolian High Schools	6	6,5
Age	N	%	Tourism Vocational School	3	3,3
18	11	12,0	Other	62	67,4
19	18	19,6	GPA	N	%
20	30	32,6	0-1,99	30	32,6

21	23	25,0	2,00-2,99	43	46,7
22 ≤	10	10,9	3,00-4,00	19	20,7
Program	N	%	Grade	N	%
Accounting & tax applications	24	26,1	1st Grade Formal Education	89	96,7
Banking & Insurance	68	73,9	1st Grade Secondary Education	3	3,3
Total	92	100	Total	92	100

Table 2. Multiple Response Table (More than one marking is made)

Responses	N	Responses Percent	Percent of Cases
Because nowadays, it is a viable profession.	44	32,1%	48,4%
Because I like that I have trained for the profession	33	24,1%	36,3%
Because I have preferred for based on my exam score.	23	16,8%	25,3%
Because of my collateral kin's advises	19	13,9%	20,9%
other	10	7,3%	11,0%
Because there is no other choice	8	5,8%	8,8%
Total	137	100,0%	150,5%

The six propositions were placed at the questionnaire, in order to determine the reasons which caused students to choose the divisions they attended. By 92 participants, a total of 137 marking was made. So, participants 50.5% has marked more than one option. Accordingly, the most important factor in the preference of the major that they attending is they are seeing their profession of which training they receive as a valid profession even today. To make a choice unconsciously and according to their score in the exam is the second factor, while to be getting the education for profession they love is the third. In fourth place, "to make choices on the advice of the relatives" is found, "other reasons" is at fifth, where as "having no choice" is placed in the sixth (see Table 2).

Table 3. Students' Attitudes to the Puzzle Method

Propositions	Disagree	No idea	Agree	
1. In this course and exams, I would have been less successful if the conventional methods were applied instead of the Puzzle method.	22	16	54	N
	23,90	17,40	58,70	%
2. In no way, I couldn't have concentrated on the courses. Puzzle method, has increased my interest in the courses.	15	15	62	N
	16,30	16,30	67,40	%

3. Puzzle method has increased my interest & continuance in my school.	23	14	55	N
	25	15,20	59,80	%
4. If the same method is applied in even other lessons, I believe I can learn by amusing.	14	17	61	N
	15,20	18,50	66,30	%
5. If the same method is applied even in dislike courses, I believe I can be successful in these lessons, too.	10	17	55	N
	10,80	18,50	70,70	%
6. With the puzzle method, I fondly came / prepared to the class.	13	14	65	N
	14,20	15,20	70,60	%
7. With the puzzle method, I came to exams by preparing easier.	8	10	74	N
	8,70	10,90	80,40	%
8. Thanks to the puzzle method, I can hold more information in my memory in use position.	7	7	78	N
	7,60	7,60	84,80	%
9. Thanks to the puzzle method, my confidence in myself is increased.	17	18	57	N
	18,40	19,60	62,00	%
10. I think that the puzzle method is not entirely a memorization method; in fact it is the method of preparation to select and use the accurate information from heaps of other information.	8	14	70	N
	8,60	15,20	75,20	%
11. Because the puzzle method is reproducible method, more information may become longer lasting.	9	11	72	N
	9,80	12,00	78,20	%
12. I believe that I will be successful after graduation & even in my professional life by remembering more easily the information I learned by the puzzle method.	10	15	67	N
	10,90	16,30	72,90	%
13. After graduation, to be unable find a job prospect frightens me. I saw that the information I have learned through this method is permanent, and I believe that I will be successful to find a job in my profession.	19	23	50	N
	20,60	25,00	54,40	%
14. The assignments within the scope of the puzzle method and the applications in question-answer have enabled us to communicate easily with the lecturer and my classmates.	14	6	72	N
	15,20	6,50	78,20	%
15. Sometimes I got a feeling as if I was living in a vain, and was fed up with everything; my self confidence has increased after using this method that I am successful by studying, and even these bad feelings diminished.	27	15	50	N
	29,30	16,30	54,40	%
The reliability of the scale	0,937			

In the table 3, the averages and percentages of the responses to questions were presented. "Completely disagree" and "disagree" options were merged, and renamed as "Disagree" than added to the table. "I agree" and "strongly agree" options was re-combined, and named as "Agree" than, added to the table. More than half of the participants, in all propositions ticked "I agree" option. This situation reveals that the students are pleased with the puzzle method.

Table 4. The Factor Analysis Results

Propositions	Factor Loadings	Eigen Value	Mean	Reliability ( $\alpha$ )
Factor 1: Knowledge Level		8,429	4,07	
KNL.11 Because the puzzle method is reproducible method,	,874		4,06	,927

more information may become longer lasting.			
KNL.8 Thanks to the puzzle method, I can hold more information in my memory in use position.	,797	4,13	
KNL.12 I believe that I will be successful after graduation & even in my professional life by remembering more easily the information I learned by the puzzle method.	,790	3,95	
KNL.10 I think that the puzzle method is not entirely a memorization method; in fact it is the method of preparation to select and use the accurate information from heaps of other information.	,781	4,08	
KNL.7 With the puzzle method, I came to exams by preparing easier.	,616	4,15	
Factor 2: Self-Confidence	1,191	3,69	
SLC15 Sometimes I got a feeling as if I was living in a vain, and was fed up with everything; my self confidence has increased after using this method that I am successful by studying, and even these bad feelings diminished.	,801	3,40	
SLC9 Thanks to the puzzle method, my confidence in myself is increased.	,733	3,73	
SLC13 After graduation, to be unable find a job prospect frightens me. I saw that the information I have learned through this method is permanent, and I believe that I will be successful to find a job in my profession.	,693	3,58	,880
SLC6 With the puzzle method, I fondly came / prepared to the class.	,652	3,79	
SLC14 The assignments within the scope of the puzzle method and the applications in question-answer have enabled us to communicate easily with the lecturer and my classmates.	,645	3,96	
Factor 3. Interest to the Courses	1,090	3,70	
INC.5 If the same method is applied even in dislike courses, I believe I can be successful in these lessons, too.	,705	3,89	
INC.4 If the same method is applied in even other lessons, I believe I can learn by amusing.	,691	3,80	
INC.2 In no way, I couldn't have concentrated on the courses. Puzzle method, has increased my interest in the courses.	,688	3,77	,826
INC.3 Puzzle method has increased my interest & continuance in my school.	,671	3,52	
INC.1 In this course and exams, I would have been less successful if the conventional methods were applied instead of the Puzzle method.	,581	3,50	
Overall Reliability of the Scale ( $\alpha$ )			,937
KMO			,892
Total Variance Explained Rate		71,404	
Bartlett's Test of Sphericity	Chi-square: 1058,417	df: 105	Sig.: ,000

In the table 4, the results of factor analysis is showed. As a result of analysis, was obtained mainly three dimensions. These dimensions have been named as "Knowledge Level", "Self-Confidence" and "Interest to the



Course", by considering factors forming the propositions. The ratio explaining total variance of the obtaining factors is 71%. The overall mean of "Knowledge Level" factor is  $\bar{X}=4.07$ , the mean of "Self-Confidence" factor is  $\bar{X}=3.69$ , while the mean of "Interested in the course" factor is  $\bar{X}=3.69$ .

## Results

Lecture techniques have a key role for students to be successful in the courses. Because there is a linear relationship between the methods used in lectures and the achievement levels of students. As a result, it has been identified that students are satisfied with the "Puzzle Method" in the general sense. Students stated that this method increases the interest in the course, their continuity, their self-confidence and the success of the course, and provides convenience for the conversion of theoretical knowledge into practice. Owing to the method, it has been identified that student-student & student-teacher communication and the proportion of socializing are increased, whereas their future concerns in finding a job decreased.

Another important finding obtained from the study is, approximately 4/3 of the students preferred their department deliberately, and have a liking their profession of education they receive. With the right teaching techniques, to be able to motivate such a student profile to the lessons is an important cornerstone, on behalf of a necessary increasing success in the system of education. As evidenced by the results of the study, the puzzle method has helped students achieving their success. The method increases the rate of success with endearing courses to students. The achievement of this success in higher education institutions, such as Vocational High Schools, which mission to train qualified intermediate staff for sectors, will contribute to individuals and educational institutions in the short term, as for the industry & the national economy in the long term. In this context, particularly in higher education institutions, such useful lecture methods which will contribute to the success of students in courses should be provided to develop.

## References

1. Amory, A. (2007). Game object model version II: a theoretical framework for educational game development. *Education Tech Research Dev.* 55, 51-77.
2. Blanchard, J. S., & Cheska, A. (1985). The anthropology of sport: An introduction. Massachusetts: Bergin and Garvey Publishers Inc.
3. Çilenti ve Özçelik, 1991; YÖK/Dünya Bankası, 1997.
4. Falchikov, N. (2005). Practical solutions for aiding learning in higher and further education. Taylor & Francis e-Library.
5. Hırça, N., Şimşek, H. (2013). Enhancing and Evaluating Prospective Teachers' Technopedagogical Knowledge Integration Towards Science Subject. *Necatibey Faculty of Education Electronic Journal of Science and Mathematics Education.* 7 (1), 57-82.
6. Michalewicz, Z., Michalewicz, M. (2008). Puzzle Based Learning. *Teaching Mathematics and Computer Science.* 6 (2), 415-420.
7. Whitton, N. (2010). Learning with digital games: A practical guide to engaging students in higher education. Taylor & Francis e-Library.
8. Yigit, N. & Akdeniz, A. R. (2003). Fizik Öğretiminde Bilgisayar Destekli Etkinliklerin Öğrenci Kazanımları Üzerine Etkisi: Elektrik Devreleri Örneği, *Gazi Eğitim Fakültesi Dergisi*, 23(3), 99-113.

# Determining the anxieties of accounting education students: A sample of Aksaray University

Haluk Duman<sup>a</sup>, İbrahim Apak<sup>b</sup>, Mehmet Yücenurşen<sup>c</sup>, Ali Aykut Peker<sup>d</sup>

<sup>a</sup>Aksaray University, Faculty of Economics and Administrative Sciences, Aksaray – 68100, Turkey

<sup>b</sup>Aksaray University, Institute of Social Sciences, Dept. of Business Administration, Aksaray – 68100, Turkey

<sup>c</sup>Aksaray University, Ortaokul Vocational High School, Aksaray – 68400, Turkey

<sup>d</sup>Aksaray University, Ortaokul Vocational High School, Aksaray – 68400, Turkey

---

## Abstract

The quality of accounting education is under the factors such as insructive facts, physical facilities, interest and ability of students, implementation of different learning techniques transferring the theory to the practice and etc. In accounting courses, the personal factors such as the student's ability and interest, individual and collective work in or off classroom, using different materials written-visual, etc. and internships and so on are also important for both the success of the student and increasing the quality of the education. In the study, basically, it is aimed to determine the factors that affect the success of students in accounting education and thereby measure the effects of anxiety that reveal in low, medium and high levels. In this context, the study makes recommendations about specifying and moderating the major causes of anxiety. In the study we implement a survey of five-point Likert-type scale on the students who take the accounting lessons. The findings are analyzed by SPSS package program.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** Muhasebe Eğitimi, Kaygı.

---

## Introduction

The concept of “anxiety” which is the popular research issues in psychology and psychiatry can be confused with diverse and multi-faceted emotions (fear, phobias, stress). However, it is a subjective emotional condition in which physical conditions such as tremors, muscle tension, heart palpitations, dizziness can occur. From this point, the anxiety can be defined as “universal feelings and experiences appeared in the particular period of a person's lifetime” (Deveci, Çalmaz, & Açı, 2012). The concept of anxiety is explained in two ways: the permanent anxiety depends on personal characteristics and described as individual differences in the perception of threat, and the circumstantial anxiety which is temporary and varies in intensity over time (Can, Dereboy, & Eskin, 2012). Individual's anxiety level is shaped by the environmental factors such as parents, friends, teachers which can affect the individual's behavior and feelings of anxiety (Ehtiyar & Üngüren, 2008).

Considering that the anxiety is a negative reaction (Malgwi, 2004), it will be a positive step for reducing it by determining the causes of anxiety. The anxiety factors such as attitude, motivation, personal characteristics etc. can affect the learning concept. The low level of anxiety can affect negatively a person's learning process as well as high levels (Na, 2007).

Because of entering into a new and different learning term after the high school process, it is inevitable that the university students meet the anxiety. In this process, the students often encounter some conditions like excessive excitability, flushing, casting cold sweats, being unable to answer the questions that they actually know etc. and it can cause the students experience anxiety. For they can be unable to deal with the situation, the students faced

sometimes with the failures (Çağlar, Dinçyürek, & Arsan, 2012). On the other hand, the desire to succeed can be show as an example of triggering factors for anxiety beside the fear of failure (Özan & Yüksel, 2003). So it creates problems in the learning quality, individual and professional development. And also the perception of accounting language is numeric and complex can increase the level of anxiety.

### **1. Literature Review**

In the study of Warren, Reeve and Duchoc (2007), they state the most important factor causes anxiety is the boredom of accounting education. This anxiety can be extremely negative effect for the learning efficiency.

Borja (2003) determine that learning accounting process is similar to learning a foreign language for students and so it affects them in this way. And also it is determined that preparing before lessons and giving homework may reduce the anxiety for educators and students. Because they found the duration of the lessons is not enough for learning accounting.

Ameen et al. (2002), carried out a work about the anxiety of accounting educators. The findings of the study show that the more than 78% of participants experience anxiety and %38,5 of this percent encounter with the physical discomfort like heart palpitations, acceleration of the heartbeat etc., and in the %80 of this percent there are general physical reactions like concern, sadness and so on. The most important issue of the study is the anxiety level of the accounting educators is related to the age, gender, race and academic title. With being unable to deal with the anxiety, the educators may reflect it to the students. And on the other hand, a negative reaction of the general success level can increase the anxiety level.

In his study, Bearden (2004) developed some methods for realizing learning more efficiently and decreasing the anxiety in learning accounting. These methods are:

- In the first seance of the lessons, Bearden preferred putting on casual clothes instead of formal clothes.
- He turned the tables and desks to him which were arranged as standard.
- He played games about accounting and did not make the course for the first day, before explaining the rules and forms about the course.
- And in the second lesson, he noticed that the students did not remember the titles exactly, and he remind each of the titles about accounting.

Applying these new methods on students, Bearden considered that the anxiety level for learning accounting was decreasing and even their learning speed is increasing as comparing with the other classes. The findings show that the new methods used in learning accounting have significantly positive effects. With this, the classical education approach was left behind and getting increasing the motivation, dodging the prejudices and facilitating the learning. In addition, it can understand that repeating the subject has affect learning in the positive way.

In the study of Malgwi (2004), it was determined that the anxiety level of accounting could not be explored and defined for business administration students. Malgwi examined the reasons and levels of anxiety that business administration students experience on learning accounting by a survey of 1112 participants in an business faculty in England. The findings of the study show that the reasons for anxiety are caused by different academic titles, ranks and work experiences and in addition there is a factor of gender. This situation change the anxiety level with different culture, environment, gender and so on.

Chen et al. (2012), implemented a survey for determining the relationship with learning attitudes and anxiety for the students who took accounting. The survey was implemented on the hospital management students from different universities of Taiwan. The findings indicate there is a strong relationship with the learning attitude and the learning anxiety.

Consequently, there are several factors such as person's physical and psychological status, gender, place where he lives and university is, family, culture, work performance, educators and educations methods etc. affect the anxiety for learning accounting.

### **2.Research**

### 2.1.Scope and Methodology

The research includes the students of Aksaray University (ASU) FEAS. Public administration, economics, and management information systems department students are excluded from the research for they don't take sufficient accounting education.

The questions of the survey are taken from Malgwi's "Anxiety Scale in Accounting Education". "Beck Anxiety Scale (BAS)" is used for measuring the anxiety levels of the participants. BAS, consisting of 21 items and describing the anxiety levels, was tested for reliability by Hisli (1989). The data was collected from the questionnaires applied to the business administration students of ASU. The reliability of the questionnaire in itself was tested by Cronbach Alpha Method and the results are shown in the table 1:

Table 1. Reliability Coefficient	
Number of Polls	359
Number of Questions	41
Alpha	0.847

The reliability coefficient of all questionnaires is determined as 0.847 which means that the questionnaire is reliable.

### 2.2.Purpose

In the research, we tried to determine the anxiety level in the first stage, and then fix the relationship between the anxiety level and learning accounting in the second stage. In the third stage, we will try to put forth the factors which affect the students learning anxiety in accounting education and providing advices for decreasing the anxiety level.

Table 2. Demographic Research Findings of the Universe					
	Frequency	Percent(%)		Frequency	Percent(%)
Gender			Age		
Male	129	35,9	17-21	184	51,3
Female	230	64,1	22-26	171	47,6
			27 and over	4	1,1
District Inhabited By Family			Planned Career Field		
Marmara	23	6,4	Banking and Finance	84	23,4
Ic Anadolu	175	48,7	Self-Employed	24	6,7
Akdeniz	88	24,5	Public-Employed	162	45,1
Dogu Anadolu	13	3,6	Marketing	15	4,2
Guney Dogu Anadolu	22	6,1	Entrepreneur	37	10,3
Karadeniz	9	2,5	Financial Advisors	24	6,7
Ege	29	8,1	Others	13	3,6
Description By Students About Cultivation			Anxiety Level by BAS		
Village or Borough	71	19,8	Low	-	-
County Town	110	30,6	Medium	82	23
City Centre (Medium Size)	54	15,0	High	277	77
Metropolitan	124	34,5	Career Anxiety After Graduating		
			Yes	192	53,5
			Partly	45	12,5
			No	122	34

### 2.3.Findings and Analysis

359 students were participated in the study and the frequency values concerning the demographic data of the research sample are in Table 2. Table 2 demonstrates that the participants of %64,1 are women and of %35,9 are male. It is seen that the most of (%48,7) the students' families are from Ic Anadolu District. %45,1 of the students are planning career in the public fields. By the Beck Anxiety Scale, %77 of the participants have high-level anxiety and %23 of them have medium-level anxiety. And also it is found that %53,5 of the students have career anxiety after graduating, %12,5 of them have partly, and the remains (%34) do not have the career anxiety after college.

In the basis of having low, medium or high level of anxiety, there are several reasons from career anxiety after graduating. This shows the students plan their career firstly on the public sector which is the biggest employer of Turkey, and secondly on banking and finance sector. Whereas the public sector symbolizes a low-level risk and stress-free working area, the banking and finance sector means risky and stressful working life though it is easy to get a job in this sector.

Table-3 Frequency, Percentage and Standard Deviation Values of Anxiety Factors in Accounting Education

Anxiety At Accounting Education	I strongly agree- I agree		I am not certain		I strongly disagree- I disagree		n:359 s
	f	%	f	%	f	%	
The challenge of learning accounting is exciting	151	42	71	19.8	137	38.2	1.278
I feel that accounting is a necessary tool in both educational and work settings	275	76.6	36	9.7	48	13.7	1.067
I have avoided accounting courses because they are unfamiliar and somewhat intimidating to me	78	21.7	93	25.9	188	52.4	1.110
I have difficulty in understanding how accounting systems work.	164	45.7	65	18.1	130	36.2	1.271
I feel that understanding accounting will make me a more productive individual.	231	64.4	75	20.9	53	14.7	1.040
I feel insecure about my ability to prepare, analyze and interpret financial statements.	135	37.6	109	30.4	115	32.1	1.138
I feel that I will be able to keep up with the advances happening in the accounting profession.	197	54.9	108	30.1	54	15.1	.950
I think I would be able to learn the accounting information systems.	252	70.2	67	18.7	40	11.1	.942
I am confident I can learn the accounting skills.	250	69.6	72	20.1	37	10.3	.948
Anyone can learn to apply the accounting information systems if they are motivated and practice.	268	74.6	48	13.4	43	12	.986
Learning accounting is a new skill, the more you practice the better you become.	272	75.7	44	12.3	43	12	.055
I am afraid that if I begin to use accounting software I will become dependent on them and lose some of my reasoning skills.	45	12.5	74	20.6	240	56.8	1.064
I am sure that with time and practice I will be as comfortable working with the accounting software as I am working with basic word processing software.	251	69.9	65	18.1	43	11.9	1.046
I look forward to preparing, analyzing and interpreting financial statements.	172	47.9	96	26.7	91	25.4	1.106
I feel apprehensive about having to pass the CPA examinations in order to practice or do well in the profession.	246	68.6	58	16.2	55	15.3	1.130
I feel apprehensive about using accounting systems.	138	38.4	101	28.1	120	33.4	1.097
It scares me to think that I could cause all the financial statements to be wrong by committing an error of principle.	172	47.9	116	32.3	71	19.8	1.051
I hesitate to use accounting software for fear of making mistakes that I cannot correct	146	40.6	100	27.9	112	31.5	1.129
One has to be a genius to understand all the accounting transactions and adjusting entries that go into preparing an accounting cycle.	78	21.8	56	15.6	225	62.7	1.204
If given the opportunity I would like to learn about and use accounting software.	280	78	45	12.5	34	9.5	1.049

Table 3 shows that the students of %76,6 (275 students) consider that the accounting is a essential tool for their professional career and %78 of them (280 students) are eager to learn the accounting softwares if given the opportunity. This means that the students are conscious about that accounting course has influence over career planning. The students indicate that they (%64,4 – 231 students) believe learning accounting get them more productive people and they (%68,6 – 246) consider that they have to have a tough theoretical and practical background about accounting so that being successful in the financial advisor and so on exams. The students state 70,2% of them have the ability to learn the accounting information system, 69,6% of them have self-confidence for learning, 69,9% of them have the required motivation and ability to use the programs, 74,6% of them believe that the learning depends on working and professional skills can be developed.

As we see in the Table 3, %70 of the students think that they are able to learn the accounting and information system, and %69,6 of them have self-confidence, and %74,6 of them believe they can be successful if they study and be motivated. As the Table 3, most of the students consider that they are able to learn well accounting and information system with studying and motivation and they have self-confidence about it. And also a high level of the students (%62,7) do not agree with the statement of “One has to be a genius to understand all the accounting transactions and adjusting entires that go into preparing an accounting cycle” .

Examining the data collected from the participants, we compared the mean of the groups so that determining whether the anxiety of students has influence on the accounting anxiety. In this context, the hypotheses are formulated as following:

**H<sub>0</sub>:** There is no relationship between anxiety and accounting concerns.

**H<sub>1</sub>:** There is a relationship between anxiety and accounting concerns.

Table 4. Correlation According to the Relationship Between The Anxiety and Accounting Anxiety

	Anxiety	Accounting Anxiety	Compute
Anxiety	Pearson Correlation	1	,041
	Sig. (2-tailed)		,444
	N	359	359
Accounting Anxiety Compute	Pearson Correlation	,041	1
	Sig. (2-tailed)	,444	
	N	359	359

#### 2.4. Analysis Results

Analyzing Table 4, it can be seen that the value of Sig. is bigger than 0.05 and so H<sub>0</sub> is accepted and H<sub>1</sub> is rejected. There is no relationship between the anxiety level and accounting anxiety. In this point, for determining the factors that cause accounting anxiety, “Anxiety Survey in Accounting Education” is tested whether it is suit for factor analysis.

Table 5. KMO and Barlett Test Results

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,840
	Approx. Chi-Square	1953,742
Bartlett's Test of Sphericity	df	190
	Sig.	,000

Being KMO bigger than 0.5 and Sig. value of Barlett Test smaller than 0.05 means that the data is suit for factor analysis. Some 5 factor whose eigenvalues are bigger than 1 append into the analysis. The rotated matrix components in where the load factors are shown in the Table 6:

Table 6. Distribution of Factors in Accounting Anxiety

Self - Confidence	I feel that I will be able to keep up with the advances happening in the accounting profession.
	I think I would be able to learn the accounting information systems.
	I am confident I can learn the accounting skills.
	Anyone can learn to apply the accounting information systems if they are motivated and practice.
	Learning accounting is a new skill, the more you practice the better you become.
Desire	The challenge of learning accounting is exciting
	I feel that accounting is a necessary tool in both educational and work settings
	I feel that understanding accounting will make me a more productive individual.
	I look forward to preparing, analyzing and interpreting financial statements.
Anxiety	If given the opportunity I would like to learn about and use accounting software.
	I am sure that with time and practice I will be as comfortable working with the accounting software as I am working with basic word processing software.
	I feel apprehensive about having to pass the CPA examinations in order to practice or do well in the profession.
	I feel apprehensive about using accounting systems.
	It scares me to think that I could cause all the financial statements to be wrong by committing an error of principle.
	I hesitate to use accounting software for fear of making mistakes that I cannot correct
Incapability	One has to be a genius to understand all the accounting transactions and adjusting entries that go into preparing an accounting cycle.
	I have difficulty in understanding how accounting systems work.
Fear	I feel insecure about my ability to prepare, analyze and interpret financial statements.
	I have avoided accounting courses because they are unfamiliar and somewhat intimidating to me
	I am afraid that if I begin to use accounting software I will become dependent on them and lose some of my reasoning skills.

Examining Table 6, it is obvious that there are 5 factors whose eigenvalues are bigger than 1 at accounting anxiety scala. In all factors, 24,1522% of total variance is the self-confidence factor and 13,438% of total variance is desire factor. These figures are shown at Table 7:

Tablo 7. Variance of Factors

Total Variance Explained					
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %	Total	% of Variance
1	4,830	24,152	24,152	4,830	24,152
2	2,688	13,438	37,591	2,688	13,438
3	1,327	6,634	44,225	1,327	6,634
4	1,217	6,085	50,310	1,217	6,085
5	1,081	5,403	55,713	1,081	5,403

Examining the relationship of the anxiety with the factors, it is understood that the anxiety has a relation with self-confidence, anxiety and fear. As the variables level of anxiety and fear factor increase, the anxiety increases also. However there is a negative relation between self-confidence and the anxiety. Correlation analysis for the relationship level between the anxiety and the factors are shown at Table 8:

Table 8. Anxiety and Factors

		Anxiety	Self-confidence	Desire	Anxiety	Incapability	Fear
Anxiety	Pearson Correlation	1	-,142**	-,050	,173**	,149**	,039
	Sig. (2-tailed)		,007	,349	,001	,005	,458
	N	359	359	359	359	359	359

According to the results of the correlation analysis, the anxiety decreases as self-confidence increases. student's anxiety level imcreases, as the level of ineptitude decreases.

### 3. Conclusions and Recommendations

359 questionnaires are made to determine the reasons for anxiety of ASU, FEAS, Business Administration students at learning accounting and the results are:

- 50,4% of the students participated in the survey explain their cultivations as "The village, borough or country town". Most of the students have never used any accounting softwares in that the village, borough or country towns' the technological infrastructure are insufficient. By results, it support the this finding with 78% of the highest judicial level of participation "If given the opportunity I would like to learn about and use accounting software." which is one of the reasons for accounting anxiety.
- According to BAS, it is very engrossing that the students have high-level anxiety with 77% and middle-level anxiety with 23%. However there is no relationship with the anxiety levels and the anxiety at learning accounting by the analysis results.
- Most of the students, as 62,7%, consider that for comprehending general process of accounting doesn't involve a great intelligence. It is so important for supporting this idea that the students consider the skill level at accounting is related to the studying hardly.
- There is a negative relationship between the anxiety and self-confidence as examining the factors which explain the anxiety at learning accounting. It is recommended that the students may decrease the level of anxiety at learning accounting by the applications which support the self-confidence.
- It can be seen that 66% of the students strongly or partly have the anxiety for their career after graduate. And it is support this finding that the students plan their career at public sector with a rate of 45,1%, which is the biggest rate.

As a result, this study is closely associated with accounting tutorials, researchers, university education planners. The importance of the accounting department for the companies and the financial data generated by the accounting department are well-known. The quality of the undergraduate education taken by the personnel who generates the data affects negatively the utility and quality of financial data. In this context, the determination of the anxiety at learning accounting and workings to decrease the causes for anxiety will affect positively the learning efficiency and effectiveness. The value added by the students who educated the accounting efficiently and effectively will extremely positive to the companies.

It is obvious that the students have the anxiety with high or medium level, but that anxiety isn't based on the accounting education. In the survey of accounting anxiety, it is understood that the accounting anxiety is comprised

of five sub-factors such self-confidence, desire, concern, ineptitude and fear. There is a relationship between accounting education anxiety with self-confidence, concern and ineptitude, however the relation is negatively with self-confidence, and positively with concern and ineptitude.

## References

- Ameen, E. C., Guffey, D. M., & Jackson, C. (2002). Evidence of Teaching Anxiety. *Journal of Education for Business*, 16-22.
- Bearden, C. (2004). Old professor + new tricks = great results. *Business Education Forum*, 59(1), 20-22.
- Borja, P. M. (2003). So you've been asked to teach principles of accounting. *Business Education Forum*, 58(2), 30-32.
- Buckhaults, J., & Fisher, D. (2011). Trends in Accounting Education: Decreasing. *Journal Of Education For Business*, 86, 31-35.
- Can, P. B., Dereboy, Ç., & Eskin, M. (2012). Yüksek Riskli Sınav Kaygısının Azaltılmasında Sistemik Duyarsızlaştırma ile Bilişsel Yeniden Yapılandırmanın Etkililiğinin Karşılaştırılması. *Türk Psikiyatri Dergisi*, 23(1), 9-17.
- Chen, B. H., Hsu, M.-S., & Chen, M.-H. (2012). The relationship between learning attitude and anxiety in accounting classes: the case of hospitality management university students in Taiwan. *Springer Science*, 2815-2827.
- Çağlar, M., Dinçyürek, S., & Arsan, N. (2012). Üniversite Öğrencilerinin Sosyal Kaygılarının Analizi. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi* (43), 106-116.
- Deveci, S. E., Çalmaz, A., & Açık, Y. (2012). Doğu Anadolu'da yeni açılan bir üniversitenin öğrencilerinde kaygı düzeylerinin sağlık, sosyal ve demografik faktörler ile ilişkisi. *Dicle Tıp Dergisi*, 39(2), 189-196.
- Ehtiyar, R., & Üngüren, E. (2008). Turizm Eğitimi Alan Öğrencilerin Umutsuzluk ve Kaygı Seviyeleri ile Eğitime Yönelik Tutumları Arasındaki İlişkinin Belirlenmesine Yönelik Bir Araştırma. *Uluslararası Sosyal Araştırmalar Dergisi*, 1(4), 159-181.
- Malgwi, C. A. (2004). Determinants Of Accounting Anxiety In Business Students. *Journal Of College Teaching And Learning*, 1(2), 81-94.
- Na, Z. (2007). A Study of High School Students' English Learning Anxiety. *Asian EFL Journal*, 9(3), 22-34.
- Özan, M. B., & Yüksel, Y. (2003). Öğrencilerin Sınav Kaygılarının Öğrenmeleri Üzerindeki Etkileri. *Doğu Anadolu Bölgesi Araştırmaları*, 3, 64-70.



# Developing the entrepreneurial competencies of sport management students

Jana Nová\*

*Masaryk University Faculty of Sport Studies Brno, 62500, Czech Republic*

---

## Abstract

The aim of this paper is to provide a conceptual basis for addressing need of the development of the entrepreneurial competencies in sports management study programs. On the base of the specific features of sport and specific characteristics of the entrepreneurship in sport, the conceptual framework of the development of entrepreneurial competencies in sport management is presented. The teaching methods which could be appropriate for the development of the entrepreneurial spirit in the sports management study are discussed. Particular attention is paid to the development of the case studies considering the nature of the generation Y (Millennials).

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* entrepreneurship in sport; specific features of sport; entrepreneurial competencies in sport; case studies; generation Y

---

## Introduction

European Commission in its report from 2008 entitled ' Entrepreneurship in higher education, especially within non- business studies ' states that "Entrepreneurship refers to an individual's ability to turn ideas into action. It includes creativity, innovation and risk taking, as well as the ability to plan and manage projects in order to achieve objectives. This supports everyone in day –to day life at home and in society, makes employees more aware of the context of their work and better able to seize opportunities and provides a foundation for entrepreneurs establishing a social or commercial activity". In sport these entrepreneurial characteristics come up to different dimensions as far as sport is considered as a growing social and economic phenomenon and beyond aiming to improve health, sport has an educational dimension, fulfilling a social, cultural and recreational function (European Commission, 2007). As such sport provides a variety of opportunities for the constant innovation which is believed to be a paramount of the successful entrepreneurship since Schumpeter (1947) era.

In terms of the entrepreneurial competencies many authors discussed them and the most comprehensive source list is provided by Mitchelmore and Rowley (2010). Beside their entrepreneurial competency framework which represents the academic view regarding the entrepreneurial competencies , for the purpose of this paper, it is strongly recommended to take into consideration desirable entrepreneurial competencies and skills defined by the entrepreneurs and scholar's and available professional standards. To supply the market needs for educated entrepreneurs the public and private universities all over the world developed and provide a various entrepreneurship education programmes pursuing the overarching goals – to educate the individuals who would possess and able to apply the entrepreneurial attitudes and skills. The sport management programmes are not the exception. Although the single entrepreneurship sport programmes are rare, the majority of the educators in this field, especially when the study programme is delivered at business schools, feel the enormous pressure from sport sector to produce the

---

\* Corresponding author. Tel.: +421 725827788; fax: +0-000-000-0000 .  
E-mail address: nova@fsps.muni.cz

graduates equipped with the desirable entrepreneurial competencies. In this sense the author of the paper offers the conceptual framework for developing the entrepreneurial spirit in sport management programmes. The conceptual framework is based on the sports' specific features (Smith and Steward, 2010) and sport – based entrepreneurship concept as developed by Ratten (2011, 2012). Moreover the relevant standards in terms of entrepreneurship education (EE) and profession are taken into account. The need for the utilization of the appropriate teaching and learning (T and L) methods and education activities that would be in tune with the Generation Y (Millennials) traits are presented. This approach is central for the development of the appropriate teaching and learning methods in sport management programs in order to encourage the entrepreneurial thinking which could lead to the development, but more importantly to the proper application of the entrepreneurial skills in the sport specific context.

### Specific features of sport and their influence on the entrepreneurship in sport

Sport – based entrepreneurship is to the great extent influenced by the specific features of sport as defined by the Smith and Steward (2010). They provided a list of unique features of sport, which require the application of the specific management techniques. Chadwick (2011) also stated that the distinctive features of the sport have an implication on business in sport. The nature of the entrepreneurship in sport has been discussed by the Ratten (2012) as the intersection between entrepreneurship and sports management. As such sport entrepreneurship impacts a number of management areas (Ratten, 2011) and it is any innovative activity that has a sport objective. Specific features of sport as described in the Table 1 have a crucial impact on the way how the sport entrepreneurship is understood and performed and subsequently influence the special set of the skills which the sport- based entrepreneurs should possess.

Table 1. Specific features of sport and their influence on entrepreneurship in sport

Specific features of sport Smith and Steward ( 2010); Chadwick (2011)	Influence on the sport entrepreneurship
Irrational passion for sporting teams, competition or athletes; high degree of optimism and brand loyalty	Risk taking can be higher than in usual business
Different perception of the performance in sport; uncertainty of the outcome	High creativity in the development of the variety of economic, social and environmental indicators for evaluation of the institutional performance
Competitive balance, the principle of „collaborating to compete”	The need to accept and balance the principles of “accepting the competitor”
Limited organizational control over product - limits the scope to attain competitive advantage	Necessity of inventing the unique non – sport product 's competitive advantage
Variable quality of sport product, Fans (customers) are producers and consumers	Inclusion of the fans and consumers of sport activities in the creation of the quality of sport product
Symbiotic relationship with media	Sports oriented innovation are bound to the media sector
Limited availability	The need to maintain the financially balanced and mixed ( sporty and business – like ) portfolio of the products

Source: Own elaboration based on Smith and Steward (2010) and Chadwick (2011)

Moreover the logic of the entrepreneurship in the sport is influenced by the fact that sport and recreation opportunities are delivered by a mixed economy of providers across the public, non-for –profit and commercial sectors (Hoye, 2012). Therefore it cannot always pursue the “pure business like” approach and it is highly dependent on the context. This was reflected in sport – based entrepreneurship categorization as suggested by Raten (2011, 2012). On the base of this categorization entrepreneurship activities in sport span from venture creation to any innovative activity in sport context depending on the sector where the activities take place.

Table 2. Categories of the sport – based entrepreneurship and the respective sports entrepreneurship activity

Sport – based entrepreneurship categories	Sports entrepreneurship activity
Community based, Social, Immigrant	Sport related exploration and exploitation
Corporate, Institutional, International	Sport venture creation
Technological	Sports oriented innovation

Source: Own elaboration based on Ratten (2011, 2012).

### Conceptual Framework for developing the Entrepreneurial Skills in Sport Management programs

Entrepreneurship education should not be confused with general business and economic studies; its goal is to promote creativity, innovation and self-employment, and may include the following elements: Developing personal attributes and skills that form the basis of an entrepreneurial mindset and behaviour (creativity, sense of initiative, risk – taking, autonomy, self- confidence, leadership, team spirit, etc.);Rising the awareness of students about self – employment and entrepreneurship as possible career options; Working on concrete enterprise projects and activities;

Providing specific business skills and knowledge of how to start a company and run it successfully” (European Commission Report entitled ' Entrepreneurship in higher education, especially within non- business studies, 2008). Entrepreneurship education in sport should provide students with the opportunity to identify opportunities and developing sport ventures or developing of an existing sport organizations. It should focus on encouraging students to apply entrepreneurial skills and attributes to a range of different context in sport including new or existing business, charities, non- governmental organizations, in the public sector, and social enterprises.

In 2012 with support from the Quality Assurance Agency for Higher Education (QAA) the new guidance for UK higher education providers called Enterprise and entrepreneurship education was launched. It is meant to assist to foster the teaching and learning strategies in the entrepreneurship education. This guide distinguish the enterprise education and entrepreneurship education. Whereas the first one provides students with the opportunity to learn how to generate original ideas and skills to make them happen the latter is the education which equips students with additional knowledge, attributes and capabilities required to apply these abilities in the context of setting up a new venture or business. The guide also defines the entrepreneurial effectiveness as the ability to function effectively as an entrepreneur or in an entrepreneurial capacity and offers a framework for the development and assessment of enterprise and entrepreneurship behaviours, attributes and skills which, taken together, contribute towards the development of an entrepreneurial mindset and entrepreneurial effectiveness.

In sport management programs the entrepreneurship education should be ideally addressed at a programme level, but this not always the case. Therefore the second option seems more realistic i.e. to embed enterprise and entrepreneurship within the subject areas in sport management programs. For the development of entrepreneurship spirit in sport management education the culture of enterprise in each particular country play the crucial role as well. Conceptual framework for entrepreneurship education in sports management curricula as presented in the Table 3. The concept is based on the assumptions that the appropriate teaching and learning methods for developing the entrepreneurial skills in sport management students can be identified only when the content, goal and audience of the study are taken into consideration. Firstly content of the study should respect the standards set for entrepreneurship education by respective authorities, sports ' specific features and their impact on the nature of the entrepreneurship in sport as well as on the innovations of the products, services and processes in sport. Secondly to set and measure the attainment of the goal in the entrepreneurship studies in sport, the professional as well as academic opinions regarding the desirable competences and skills for entrepreneurship should be considered. Thirdly the audience we deliver the entrepreneurship education in sport management programs is generation Y (Millennials) and their specific traits are influencing the mode of teaching and learning to the great extent.

Table 3. Conceptual framework for entrepreneurship education in sports management curricula

EE dimension in sport management	Educational Variables	Context Variables
Content of the EE study in sport	Standards for EE	Sports' specific features
Goal of the EE study in sport	Development of desirable E skill	Professional standards
T and L strategies	Student – centred learning	Traits of Gen Y

Source: Own elaboration

### Standards for Entrepreneurship Education

The standards for EE issued by the respected authorities could help the educators in sport management to incorporate the subjects or educational activities which would be in tune with these standards, and would facilitate the entrepreneurial spirit of the sport management programmes. For this and for the purpose of this paper the national standards for EE education have been selected and their content is compared in the Table 4.

Table 4. Examples of National Content Standards for Entrepreneurship Education

EEE Guide, Ireland, 2012 ( eight major areas of EE outcomes)	UK QAA Standards for EE 2012	National Content Standards Consortium for Entrepreneurship Education , 2004, USA
A: Entrepreneurial behavior, attitude and skills development	A: Developing entrepreneurial effectiveness ( Enterprise awareness; Entrepreneurial mind sets; Entrepreneurial capability )	A: Entrepreneurial Skills The processes and traits/ behaviors associated with entrepreneurial success
B: Creating empathy with the entrepreneurial life world	B: Graduate outcomes	B: Ready Skills The basic business knowledge and skills that are prerequisites for becoming a successful entrepreneur ( Business Foundation; Communications and Interpersonal Skills ; Economics; Financial Literacy; Professional Development ; Career Planning)
C: Key entrepreneurial values	<i>Enterprising behaviors, attributes and skills</i>	C: Business Functions The business activities performed by entrepreneurs in managing the business ( Financial and Human Resources Management; Information management; Marketing Management; Operations and Risk Management; Strategic Management )
D: Motivation to Entrepreneurship career	<i>Thematic approaches:</i> Creativity and innovation; opportunity recognition; decision making supported by critical analysis and judgment; implementation of ideas through leadership and management; reflection and action; interpersonal skills; communication and strategy skills	
E: Understanding of processes of business and tasks		
F: Generic entrepreneurship competencies		
G: Key minimum how – to		

Source: Own elaboration based on National Entrepreneurship Education standards from Ireland, UK and USA

### Professional standards for Entrepreneurs Enterprising Skills - professional standards vs academic opinions

Competences are the characteristics of a person that are related to superior performance in a job and can be common across situations (Spencer & Spencer, 1993). There are many definition of the competence and this term is often used interchangeably in the literature. As Mitchelmore and Rowley (2010) state, there are at least two meanings or uses of the term competency and for the purpose of this paper who follow the second one that propose that the competency is a minimum standards of performance. According to the UK approach and their national occupational standards the competence is seen as a description of something which a person who works in a given occupational area should be able to achieve, it is a description of an action, behaviour or outcome which person should be able to demonstrate. Skills CFA and SFEDI (Small Firms Enterprise Development Initiative) work to ensure Enterprise skills are well developed within the UK. The Enterprise standards are aimed at those starting, running or managing a business and they cover many key areas, including: how to win new business; how to keep and develop your business; people skills and the essentials of enterprise.

According to the QAA UK guide of Enterprise and entrepreneurship education (2012) entrepreneurial skills include taking the initiative, intuitive decision making, making things happen, networking, identifying opportunities, creative problem solving, innovating, strategic thinking , and personal effectiveness. Enterprise education extends beyond knowledge acquisition to a wide range of emotional, intellectual, social and practical skills. To set up the appropriate goals (attainments) from the EE means to specify the competencies and skills that should be possessed and demonstrated by EE graduates. In this sense the knowledge based on the comparison of the academic and professional opinions could be beneficial so to focus appropriately in the EE. The selected set of the desirable

entrepreneurial competencies defined by the entrepreneurs and scholar's and also by professional standards is presented in the Table 5.

Table 5. Desirable entrepreneurial competencies and skills defined by the entrepreneurs and scholar's and professional standards

Izquierdo, E., Desschoolmeester, D., Salazar, D. ( 2005) A View from Entrepreneurs and Scholar 's Perspective	Model developed by Consortium for Entrepreneurship Education ( 2004)	National Occupational Standards UK ( 2012)
Identifying business opportunities	Personal Effectiveness Competencies	Scan the business environment for enterprise opportunities
Evaluating business opportunities	( Interpersonal Skills; Initiative; Ambition; Adaptability and Flexibility; Willingness to take risks and learn)	Make sense of enterprise opportunities and their compatibility with organizational priorities
Decision Making	Academic Competencies	Identify stakeholders for an enterprise venture and evaluate their needs
Networking	Workplace Competences	Develop a vision and goals for an enterprise venture
Identifying and solving problems	Industry – Sector Technical Competencies	Demonstrate the difference created by an enterprise venture
Oral communication abilities		Monitor and evaluate the difference created by an enterprise venture
Innovative thinking		Plan to deal with uncertainties, ambiguities and contingencies relating to an enterprise venture
		Identify customers and how to engage them in an enterprise venture
		Manage an enterprise venture
		Review and sustain networks to support enterprise venture

Source: Own elaboration based on academic literature and national occupational standards in UK and USA

### Entrepreneurship competencies and skills for entrepreneurship in sport

The specific features of sport and the sport –based entrepreneurship peculiarities have great impact on the skills which the entrepreneur in sport should possess or develop. The question is, whether or not the entrepreneurs in sport should possess the different or additional entrepreneurial skills from those that have been defined already by scholars and professionals for performing the entrepreneurial job in any business. Considering the nature of the sport as described earlier it seems that generic entrepreneurial skills for sport – based entrepreneurs are the same as in any other sector but a few should be developed deeper. These 'sport special entrepreneurial skills ' are bound to the fact, that

- innovations in sport are complex and require skills for discovering the synergies across the sport sectors and sport disciplines;
- proactiveness must be combined with environmental and social responsibility;
- risk in sport takes different forms, which mainly relate to people i.e. social risk (Ratten, 2012);

- business and social goals must be very often balanced for the sake of public good (development of new venture with a high growth potential is not always the ultimate goal of entrepreneurship activity in sport );
- the entrepreneurship in sport is supposed to be developed as entrepreneurship but also as an intrapreneurship;
- the sports products which include participation, entertainment, equipment and apparel, promotional items, sport facilities, marketing research, management services (West Virginia University) exhibit a specific nature by comparison with the other business products
- different entrepreneurial competencies and skills are suitable a required for different sports environment and context ( public, professional, non – governmental).

All the above mentioned should be considered when designing the entrepreneurial education in sport management.

### Developing the entrepreneurial skills in sport management - Teaching Millennials

There are numerous articles related to the EE teaching and learning methods (Fiet, 2000 a,b,; Tan and Frank, 2006;;McCarthy et.al. 2006 ; Strydom, 2008; Adeyemo, 2009; Rushworth, 2013). To achieve the goal of the EE i.e. development of the desirable entrepreneurial competences and skills the authors recommend strongly to apply the student – centred approach and cooperative learning strategies and use the teaching methods such as team – based learning, experiential learning, case studies, problem – based learning, active learning and many other unconventional teaching approaches. Generally in EE it is accepted that teacher's role has to change as far as the effective theory – based EE requires the active attitude of the students to the great extent.

Another challenge in EE is the fact, that the audience of EE is generation Y (so called Millennials') which special traits have been firstly introduced by Howe and Strauss (2000). The Y generation bears internally complex set of traits consisting of ambition, confidence, optimism and capacity for high level cooperative reliance on parents and as it is stressed by Wilson and Gerber (2008) teaching Millennials requires the application of different teaching strategies. The recommendations for overcoming teaching challenges the Millennial generation were discussed by numerous authors (Partridge and Hallam, 2006; Elam et.al. 2007; Nicoletti and Merriman, 2007; McAlister, 2009; Bracy et.al, 2010; Werth and Werth, 2011).

On the base of from the analysis of the teaching and learning strategies that are appropriate for the development of the entrepreneurial skills and the analysis of the teaching and learning strategies that are appropriate for Millenials we could conclude, that the teaching and learning strategies that are recommended for Millenials are very much in tune with those recommended for entrepreneurship education (see Table 6).

Table 6. Teaching methods in EE for Millennials

Teaching methods recommended for EE	Exploitation of the Millennials' specific traits related to:
Visual stimulation- teaching in real situation ; increasing the effectiveness	Natural inclination and usage of IT gauges in their learning
Student driven models of teaching	Preference of doing things and gathering knowledge their own way
Active – learning model	Confidence; goal orientation; desire for empowerment
Community related learning	Desire for being a part of the wider society
Group projects, collaborative learning	Preference for teamwork
Structured learning environment – case study ; group works	Achievement orientation
Authentic learning in real world, experiential learning	Impatient – need for fast and handy info resources ; eager for realistic solution

### Case studies as a valuable teaching method in EE in sport management programmes

The effects of the project method of teaching entrepreneurship were investigated by McMullan and Boberg (1991) and further compared to case study. Results indicated that, while the case study is valuable teaching method, the project method is more effective in achieving most levels of learning defined by Bloom's Taxonomy of Learning Objectives in increasing the interest of start a new venture. Based on our previous work and personal experience in teaching the cases studies in sport management we still strongly advocate the usage of the case studies (Nova, 2013) in EE in sport management. The logic of the usage of the case studies in EE is based on the fact, that entrepreneurial skills which are expected to be achieved after the graduation of the study programs in sport management can be combined with the personal traits of the current students' population – as their natural predispositions in learning process. Case studies could than contribute to the development and enhancement of the desired skills bearing in mind the traits of the Y generation. It is recommend taking into consideration this logic when preparing the case studies for the EE education of the future sports managers.

Table 7. Case study method contribution to the development of the E skills using Y traits

Y - traits the generational theory	Case study method contribution to the development of the entrepreneurial skills	Desirable EE skills as defined by the Izquierdo, E., Desschoolmeester, D., Salazar, D.( 2005) A View from Entrepreneurs and Scholar 's Perspective
Team oriented; Pressured	Workgroup; Time management	Decision Making; Networking
Confident/ accepting the values	Critical evaluation/judge the value of material for a given purposes, Establish relationships and identify issues;	Identifying business opportunities Identifying and solving problems
Seeks out creative challenges	Evaluation of alternative polices or strategies; resource investigation	Evaluating business opportunities
Confident, Achievement oriented	Presentation skills in a variety of format	Oral communication abilities
Achievement oriented; Structured	Break down complex information, Ability to break down materials into component parts so that the structure can be understood; Information gathering and analysis	Evaluating business opportunities
	Development of the individual study skills, carrying out independent research	
Purposeful; Creative; Multi taskers		Innovative thinking



## Conclusion

Importance of the entrepreneurship education was lastly highlighted by the European Directorate for Enterprise and Industry's in its report on Effects and Impact of Entrepreneurship Programs in Higher Education (2012). According to the report the entrepreneurship education can make a difference as it impacts greatly the intention for and competence of enterprise and also the employability of the future higher education graduates. It also underlines the importance of developing the educational capacity in this sense across all disciplines. For sport management studies this could be translated as an urgent need to introduce new teaching and learning strategies for the enhancement of the entrepreneurial skills of the students during their studies. Therefore it is recommended to use all facets of enterprise and entrepreneurship education: curriculum based, extracurricular activity for students, and university – based business start –up support for students and graduates. In sport management programmes the generic features of and recommendations for EE are challenged in terms of the various contexts which can be encountered in sport. But above all the specific features of sport have to be considered when designing the courses which would facilitate the entrepreneurial skills of the sport management students. By constructing the conceptual framework for the EE in sport management the author emphasized also the importance of these educational challenges in the light of the Millennials' students.

## References

- Adeyemo, S., A. (2009). Understanding and Acquisition of Entrepreneurial Skills: A Pedagogical RE – Orientation for Classroom Teacher in Science Education. *Journal of TURKISH SCIENCE EDUCATION*. Volume 6, Issue 3, December 2009, pp. 57- 65.
- Bracy, C. & Bevill, S. and Roach, T. D. (2010). The Millennial Generation: Recommendations for Overcoming Teaching Challenges. *Proceedings of the Academy of educational Leadership*, Volume 15, Number 2, pp. 21- 25.
- Elam, C. & Stratton, T. and Gibson, D. (2007). Welcoming a New Generation to College: The Millennial Students. *Journal of College Admission*; Spring 2007; 195; ProQuest Central, pp. 20- 25.
- Enterprise and Entrepreneurship Education (EEE) Guide, Ireland, 2012. Retrieved from: <http://ieeponline.com/wp-content/uploads/2013/11/EEE-Draft-guidelines-B-W-for-issue-prior-to-conference.pdf>.
- Enterprise and entrepreneurship education: Guidance for UK higher education providers. September 2012.QAA (The Quality Assurance Agency for Higher Education, 2012). Retrieved from: <http://www.qaa.ac.uk/publications>.
- Enterprise: National Occupational Standards UK (2012). Retrieved from: <http://www.skillsfca.org/standards-qualifications/enterprise.html>.
- European Commission (2007). White paper on Sport. Retrieved from: [http://ec.europa.eu/sport/documents/wp\\_on\\_sport\\_en.pdf](http://ec.europa.eu/sport/documents/wp_on_sport_en.pdf)
- European Commission Report (2008). Entrepreneurship in higher education, especially within non- business studies. 2008. Retrieved from: [http://ec.europa.eu/enterprise/newsroom/ef/itemdetail.cfm?item\\_id=3366](http://ec.europa.eu/enterprise/newsroom/ef/itemdetail.cfm?item_id=3366).
- European Directorate for Enterprise and Industry (2012). Effects and Impact of Entrepreneurship Programs in Higher Education. Retrieved from: <http://ec.europa.eu/enterprise/newsroom/ef/>.
- Hoye, R. at al. 2012. Sport Management - principles and applications. Third edition. Routledge NY
- McCarthy, P. R. and McCarthy, H., M. (2006). When Case Studies Are Not Enough: Integrating Experiential Learning Into Business Curricula. *Journal of Education for Business*: Mar/Apr 2006; 81, 4; ProQuest Central, pp. 201- 204.
- McAlister, A. (2009). Teaching the Millennial Generation. *American Music Teacher*. Aug/Sept. 2009, pp. 13- 15.
- Mitchelmore, S. and Rowley, J. (2010). Entrepreneurial competencies: a literature review and development agenda. *International Journal of Entrepreneurial Behaviour & Research*. Vol.16 No.2, 2010 pp. 92- 111.
- Fiet, J. O. (2000a). The theoretical side of teaching entrepreneurship. *Journal of Business Venturing* 16, pp.1-24.
- Fiet, J.O. (2000b). The pedagogical side of entrepreneurship theory. *Journal of Business Venturing* 16, pp.101-117.
- Howe, N. and Strauss, W. (2000). Millennials Rising: The Next Great Generation. Vintage Books, New York, NY.
- National Content Standards Consortium for Entrepreneurship Education, 2004, USA. Retrieved from: [http://www.entred-ed.org/Standards\\_Toolkit/standards\\_summary.htm](http://www.entred-ed.org/Standards_Toolkit/standards_summary.htm).
- Nicoletti, A. and Merriman, W. (2007). Teaching Millennial Generation Students. *Momentum*; Apr/May 2007; 38, 2; ProQuest Central, pp. 28- 31.
- Nová, J. (2013). The role of the teaching case studies in the sport management education. In *Sport and Quality of Life 2013*. Brno: Masarykova univerzita, 2013, pp. 319-328.
- Man, T. W., Lau, T., & Chan, K. F. (2002).The competitiveness of small and medium enterprises. A conceptualization with focus on entrepreneurial competences. *Journal of Business Venturing*, 17(2), pp. 123-142
- McMullan, C. A., & Boberg, A. L. (1991). The Relative Effectiveness of Projects in Teaching Entrepreneurship. *Journal of Small Business & Entrepreneurship*, 9(1), pp. 14-24.
- Partridge, H. and Hallam, G. (2006). Educating the Millennial Generation for evidence based information practice. *Library Hi Tech*, vol. 24, No. 3, pp. 400- 419.

- Ratten, V. (2011). Sport-based entrepreneurship: towards a new theory of entrepreneurship and sport management. *International Entrepreneurship Management Journal*, 7(1), pp. 57-69.
- Ratten, V. (2012). Sport entrepreneurship: challenges and directions for future research. *International Journal of Entrepreneurial Venturing*, 4(1), pp. 65-76
- Rushworth, S. (2013). Entrepreneurship Education: The Case for Adopting the Team – based Learning Approach. *Journal of Asia Entrepreneurship and Sustainability*. Vol. IX Iss1 May 2013, pp. 14 – 38.
- Schumpeter, J.A. (1947). *The Journal of Economic History*, Vol. 7, No. 2 (Nov., 1947), pp. 149-159.
- Smith, A. C., & Stewart, B. (2010). The special features of sport: A critical revisit. *Sport Management Review*, 10(1), pp. 1-11
- Spencer, L. & Spencer, S. (1993). *Competence at Work: A Model for Superior Performance*. New York: Wiley
- Strydom, R. (2008). Evaluating the Learning Experience of Entrepreneurship Students Exposed to an Unconventional Teaching Approach. *International Council for Small Business World Conference*. June 2008. Halifax, Nova Scotia, Canada.
- Tan, S. S., and Frank Ng, C.K. (2006). A problem – based learning approach to entrepreneurship education. *Education + Training*. Vol. 48 No. 6, pp. 416- 428.
- The Sport Business Industry - Chapter 1. (West Virginia University learning resources) Retrieved from: <http://www.bellerophonproductions.com/FOSM.pdf>.
- Werth, E. P. and Werth, L. (2011). Effective Training for Millennial Students. *Adult Learning*. Summer 2011; 22, 3; ProQuest, pp. 12 – 19.
- Wilson, M. and Gerber, L. E. (2008). How Generational Theory Can Improve Teaching: Strategies for Working with the “Millennials”. *Currents in Teaching and Learning*. 1(1), pp. 29-44.

# Development and evaluation of an e-portfolio for use in a dietetic internship program

Ann Gaba EdD RD CDN CDE\*

*City University of New York School of Public Health, Hunter College 2180 Third Avenue New York, NY 10035 USA*

---

## Abstract

A template for e-portfolios was developed, and the resultant portfolios utilized, as a tool for formative and summative assessment of students' progress in a dietetic internship program. Required assignments were posted to each student's portfolio pages, along with a daily log/journal which encouraged the students to identify learning objectives met and to reflect upon their experiences in practice. One year and three year evaluations showed that interns were able to successfully complete e-portfolios utilizing this format. Feedback from the interns indicated that overall the e-portfolios were viewed favorably.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* e-portfolio; dietetic; internship; nutrition, documentation; reflection

---

## 1. Introduction

Educational researchers suggest that the evaluation of competence is best attained through the use of assessment that is performance-based, realistic, and set within contexts that students will encounter beyond the educational setting. (Gadbury-Amyot et al., 2012). Competency based education is predicated on what individuals need to know and be able to do in didactic and professional situations. Evaluation of progress towards and attainment of competencies requires an appropriate means of collecting and documenting material for both formative and summative assessment. For many, the portfolio model meets this need precisely. McDuffie et al. (2010) state that portfolios are critical “to assure quality experiences for our students, to allow demonstration of provision of care, and to meet established educational outcomes.” The “bottom line” in using any method of assessment is whether it allows discrimination between students who should pass and those who should fail. In case studies by Webb et al. (2003), the formative aspects of portfolios were used to identify students who were “struggling” in various ways so that appropriate assistance could be given. When it came to the summative evaluation point, the problems had been overcome.

The choice of approach to the portfolio will result in the development of entirely different portfolio activities. The positivist approach places a premium on the selection of items that reflect external standards and interests, whereas the constructivist approach emphasizes the selection of items that the student believes reflect her/his individual learning (Skrabal, 2012). Many favor the constructivist theories, which advocate that learning has to be constructed by the learners themselves rather than being imparted to them by evidence to show that learning relevant to the course objectives has taken place (Tiwari & Tang, 2003).

Student and professional portfolios have been developed, used, and evaluated for a variety of professions practicing in settings around the world. Examples include: teachers in Germany (Imhof & Picard, 2009) and Norway (Hegerholm, 2011); nurses in the UK (Dolan, Fairbairn & Harris, 2004; McMullan, 2008; Timmins &

---

\* Corresponding author. Tel.: 1-212-396-7773; fax: 1-212-396-7638.  
E-mail address: agaba@hunter.cuny.edu

Dunne, 2009; Sowter, Coats & Clarke, 2011 and Head & Johnson, 2012); nursing students in the UK (Scholes et al., 2004), in Hong Kong (Twinimi & Timmins, 2003 and in Canada (Hill, 2012; Garnnett & MacPhee, 2013); graduate nursing students in the US (Ryan, 2011; Wassef et al., 2012); midwifery students in Iran (Kariman & Moafi, 2011); midwives in Australia (Pincombe et al., 2010); pharmacy students in the US (McDuffie et al., 2010; Bricelend & Hamlin, 2010; Skrabal et al., 2012); physical therapy graduate students in the US (Hayward et al., 2008); Dental students in the UK (Vernazza et al., 2011), and in the US (Gadbury et al., 2012); medical students in South Africa (Burch & Seggie, 2008), in Canada (Duque et al., 2006; Hall et al., 2012), in Sweden (Haffling et al., 2010), the UK (Vance et al., 2013), the US (Nowacki, 2013), Brazil (Forte et al., 2013), and the Netherlands (Driessen et al., 2006); emergency medicine residents (O'Sullivan & Greene, 2002), surgical residents (Webb & Merkley, 2012), and medical residents in the US (Rao et al., 2012); family medicine residents in South Africa (Jenkins et al., 2013); Registered Dietitians in the US (Keim et al., 2001; Weddle et al., 2002) and dietetic students in the UK (Brennan & Lennie, 2010). This last study was the only reference to portfolio use in pre-professional dietetics practice found in a search of PubMed.

### 1.1 *Portfolios as assessment tools*

A portfolio is a collection of work that, when put together, demonstrates that achievement or learning has taken place. This collection of information and examples describe or give a profile of development as a professional (Neades, 2003). A portfolio includes and describes evidence of experiences and achievements during a course of work or study. Materials included in the portfolio exhibit the efforts, progress, achievements, and reflections in a specific area of practice. These may include projects, reports, presentations, assessments, and other samples of work. Tracking progress as a portfolio develops can provide opportunities for formative evaluation and any needed corrections. Evaluation of a completed portfolio provides an evaluative summative assessment of the student's attainment of skills.

The portfolio, as a formative assessment, is considered to be a good method of engaging the student in the process of learning through evaluation and assessment. Through decisive selection and collection of evidence, the portfolio helps the student identify his or her growth and development. In this type of formative assessment, the portfolio is a well-suited evaluation tool. However, evaluating the portfolio using the traditional quantitative and qualitative assessment methods is extremely difficult. Specific competencies need to match the skill being assessed, and evidence needs to realistically match the progression of the student. Unambiguous tools that incorporate clear marking guidelines can provide the guidance necessary to reduce any uncertainty or possible bias the assessor may have when reviewing the portfolio (Hill, 2012).

Driessen et al. (2007) indicate that important factors for success in implementing portfolios are: clearly communicated goals and procedures, integration with curriculum and assessment, flexible structure, support through mentoring, and measures to heighten feasibility and reduce required time. McMullan's (2008) students pointed out that for portfolios to be successful it is important that students receive feedback, clear guidelines, and support with the portfolio's use. Portfolios should be designed to be clear and user-friendly and should focus equally on students' practice skills as well as on their academic skills. Buckley et al. (2009) note that while portfolios encourage students to engage in reflection, the quality of those reflections cannot be assumed and the time-commitment required for portfolio completion may detract from other learning or deter students from engaging with the process unless required to do so by the demands of the assessment.

There can be issues with validity, and particularly honesty of written accounts within the portfolio, especially when summative assessment requires assignment of a grade (Timmons & Dunne, 2009). A conflict can exist between the use of portfolios for personal development and their use for assessment purposes. This dual use can cause problems because when they are used well, portfolios are likely to be very personal in nature, especially if they include a diary component. Students may be reluctant to share personal information with their peers, instructors or preceptors (Harris, Dolan & Fairbairn, 2001). McMullan's (2008) students reported that they felt they could not be totally honest and critical in their writing if their reflective writing was seen by anyone in authority or power.

Timmons & Dunne (2009) also mention that there are other inherent challenges with regard to student portfolio use; such as storage and safety of the documents, the time taken to complete the portfolio and the anxiety that their

preparation and evaluation may cause to students.

In the UK, Webb et al. (2003) conceptualized the quality of fieldwork portfolios into four models: the “shopping trolley”, the “toast rack”, the “spinal column”, and the “cake mix”. These provide an evocative framework for analyzing the effectiveness of portfolios in assessing learning and competence. Endicott et al. (2004) concisely described these models as follows:

- The shopping trolley is a portfolio that acts as a repository for artifacts collected during the course. There is little cohesion evident in the portfolio, and the little attempt to link the evidence to learning outcomes or competencies.
- The toast rack portfolio is made up of discrete elements (the toast) that assessed different aspects of the practice and/or theory. They remained separate when collected into a binder, with the binder (the rack) simply acting as a convenient device for keeping the elements in one place (like slices of toast in a toaster). There is no overarching narrative to connect the various sections.
- The spinal column portfolio is structured around practice competencies or learning outcomes (the ‘vertebrae’ making up the central column), and evidence is slotted in, to demonstrate how each competency has been met. Within this model there may be reflective accounts that consider more than one competency and overarching competencies that require multiple pieces of evidence as proof of achievement.
- The cake mix portfolio integrates evidence from theory and practice and the whole “cake” can be assessed. It includes an overarching narrative which combines elements, and the narrative can be evaluated rather than discrete components. The “cake” is more than the sum of its parts. Reflectivity, practice, and professional development are the most likely to be features with this model.

The kinds of inter-linking connections between pieces of evidence seen in the latter two models are much easier to illustrate in an on-line format.

### *1.2 Advantages of an e-portfolio*

The e-portfolio shows great promise as a system for the portfolio learning experience and may address many of the issues that students currently face when using paper-based portfolios, such as limited number of views possible, or storage of the portfolios (Pincombe et al., 2010). Tosun & Baris (2011) enumerate several of the advantages of using e-portfolios. Firstly, paper based portfolios are not efficient environments to show the various abilities of students at the same time. Secondly, developments in information and communication technologies, the increase of the number of users of these technologies, and early adaptation of these technologies especially by the younger generation, are likely to facilitate the use of e-portfolios. The dynamic nature of internet pages and easy sharing via electronic media enable the student’s studies to be shared with a wide audience in a meaningful way. These files have a very flexible structure. Students can create and store their own oral and written work, image files, artistic work, and animations. This expands the possible expressions of the student’s point of view as a learner and makes learning more exciting. Furthermore, they can be accessed from all over the world and can be shared readily with communities of interest. These authors foresee e-portfolios becoming an indispensable part of education as both an education tool and evaluation method in many countries.

## **2. Application of an e-portfolio in a dietetic internship**

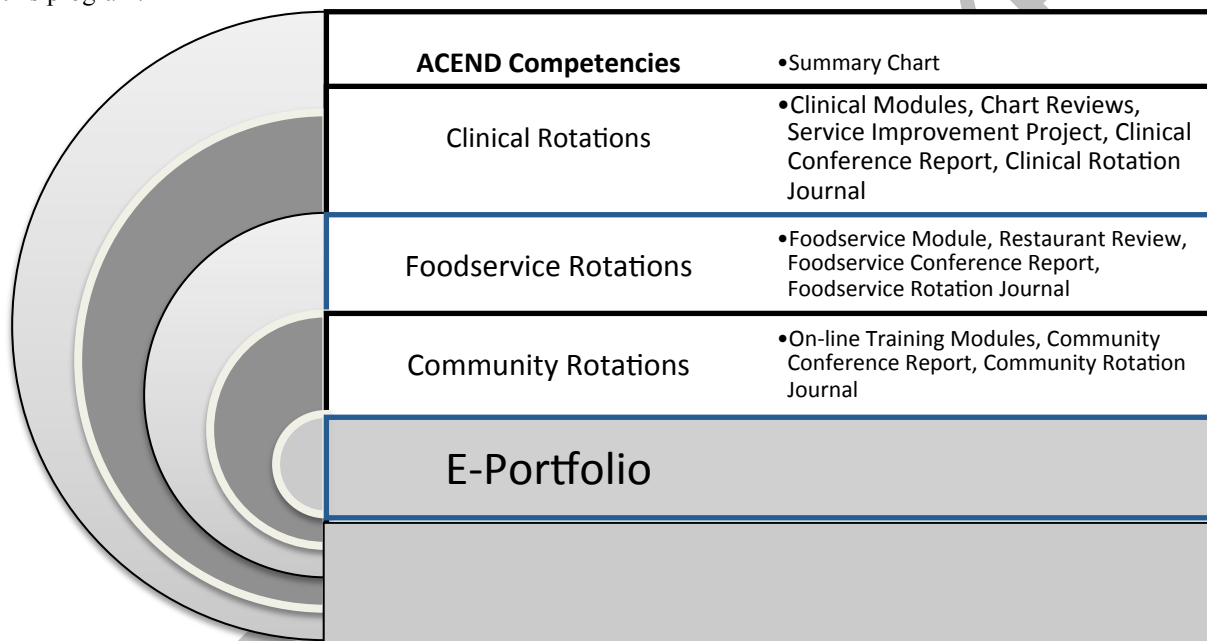
The Accreditation Council for Education in Nutrition and Dietetics (ACEND) is the program accreditation body of the Academy of Nutrition and Dietetics (AND). ACEND requires that students demonstrate having attained specific professional competencies in nutrition and dietetics before they can sit for the national Registered Dietitian exam. Evidence of this must be available when the program is assessed for periodic review and re-accreditation.

E-portfolios present an ideal platform for the collection, evaluation, and display of this material. E-portfolios provide interns with a convenient place to maintain their activity journals, and to store the materials generated at their various field sites, as well as the results of on-line assignments. These also provide valuable practice and opportunities for coaching in how to maintain a professional web presence. This can then flow into their own use of

websites and other social media avenues as they go forward in their careers. For these many foregoing reasons, it was determined that e-portfolios would be the means by which the dietetic interns at Hunter College of the City University of New York would document their progress towards, and completion of, the competencies needed to sit for the Registered Dietitian exam.

The author was a participant in a grant-funded summer workshop program for faculty creating on-line assessment tools for various didactic programs. It was decided that the goal would be to develop a template to provide a basic structure for the interns to use as a framework upon which to attach their pieces of evidence corresponding to competencies met. As Endacott (2004) has pointed out, “it is evident that some degree of structure is required for the portfolio to redress the fault line created by the problem of not knowing what you don’t know.”

The various projects and assignments in the internship are designed to meet the learning objectives set forth by ACEND (2013). These were used as a basis for development of a template for the interns’ e-portfolios. The e-portfolio template was designed to provide structure and guidance in documenting the interns’ work. (See figure 1.) Digication software (Digication, Inc, Providence, Rhode Island) was utilized for creation of the e-portfolios used in this program.



**Figure 1.** Structure of the e-Portfolio template

Each year, the internship e-portfolio was introduced during intern orientation. A half-day workshop with an internet technology (IT) staff member familiar with the software enabled interns to start their e-portfolios immediately and ask any questions they had about getting started. Ongoing technical support was provided as needed throughout the year by the program director and/or IT staff. The completed e-portfolio represented 20% of the final internship grade. This was sufficient to serve as a motivator, but not so much as to cause a fear of failing the internship because of the portfolio.

### 2.1 Initial evaluation of the e-portfolio

Evaluation of learning outcomes for the first year of implementation was included in the internship program’s re-accreditation Self Study (Gaba, unpublished 2012). All interns successfully created portfolios, and documented meeting the learning objectives. An overview table listing all required learning objectives was included in each

portfolio. This table was cross-referenced to the interns' activity logs and assignments. Having documentation of how each intern met each objective, located in an easily accessible site, also allowed for greater flexibility as to exactly how each intern carried out each assignment and met each learning objective. Having greater flexibility permitted interns to tailor activities to their individual interests, and to take advantage of unique opportunities as they arose. The finished portfolios most resembled the "spinal column" in the series of models presented by Webb et al. (2003), in that all activities and documentation were aligned with specified learning objectives. Upon completion of the internship, the e-portfolios were electronically archived to maintain a permanent record of each intern's work.

## 2.2 Results of evaluation after 3 years of implementation

Since the original cohort (n=16), two additional intern classes have utilized the e-portfolio template to document their work. All (n=48) completed a portfolio, with most (n=40) doing so by the end of the internship term. (The remaining interns had requested brief extensions to complete this work.) Upon completion of the internship, each intern was given an opportunity to evaluate various elements of the program. Experience in creating the e-portfolio was rated on a 5-point Likert-type scale, with 1 being a rating of "poor" and 5 being a rating of "excellent." Results are shown in Table 1 below.

**Table 1.** Comparison of Interns' Rating of E-Portfolios over 3 years

Class Year (n)	Average Rating	% rating "poor"(n)	% rating "fair" (n)	% rating "average"(n)	% rating "good" (n)	% rating "excellent"(n)
2012 (15) <sup>a</sup>	3.6	13% (2)	7% (1)	20% (3)	27% (4)	33% (5)
2013 (15) <sup>b</sup>	3.7	0% (0)	13% (2)	13% (2)	27% (4)	40% (6)
2014 (14) <sup>c</sup>	4.4	0% (0)	0% (0)	14% (2)	28% (4)	57% (8)
3 year averages	3.9	4.5% (2)	6.8% (3)	15.9% (7)	43.2% (19)	43.2% (19)

a,b,c Some interns in each class did not rate the e-portfolio on this scale. Thus they were not included in the data reported. % scores are rounded.

## 3. Discussion

Creation of the e-portfolio was generally rated favorably by the interns. Overall ratings improved as the program had more experience in utilizing e-portfolios, especially in anticipation and prevention of potential problems. Open-ended comments from these interns were similar to those of students noted in previous studies. (Neades, 2003; Tiwari & Tang, 2003; McMullan, 2008; Head & Johnston, 2012). The use of an on-line format for the e-portfolio was both time-consuming in its initial creation and convenient to access from a variety of locations once it was in place. The degree of familiarity and comfort a student had with internet technology was usually indicative of how easily he/she would adopt the e-portfolio structure. Striking the right balance between documenting experiences that met competencies versus describing personal experiences and opinions was another challenge. This was particularly evident in the interns' rotation journals, where documentation of hours spent and projects completed competed with more personal observations and reflections.

## 4. Conclusions

A template to guide creation of e-portfolios to document attainment of learning objectives was created for a dietetic internship. This template clarified and facilitated interns' documentation of their work to meet specific learning objectives. Having easily accessible documentation and examples of interns' work facilitated demonstration of these for program accreditation by a national accrediting body.

Ongoing assessment indicated improved experiences reported by interns as the e-portfolio was better integrated into the program assignments, and as the program director became more proficient at anticipating and addressing any difficulties.

E-portfolios are an effective way to document and catalog activities done by students, interns, and participants in continuing professional education. Creation of an e-portfolio template can provide structure and guidance in creation of an e-portfolio to fulfill a specific purpose.

## Acknowledgements

This project was funded in part by a Faculty Initiatives in Teaching Technology (FITT) grant from Hunter College, City University of New York.

## References

- Accreditation Council for Education in Nutrition and Dietetics (2013). *Accreditation Standards for Internship Programs in Nutrition and Dietetics Leading to the RD Credential.*, Chicago: Academy of Nutrition and Dietetics.
- Brennan, K.M., & Lennie S.C. (2010). Students' experiences and perceptions of the use of portfolios in UK preregistration dietetic placements: a questionnaire-based study. *Journal of Human Nutrition and Dietetics*, 23(2):133-43.
- Briceland, L.L., & Hamilton, R.A. (2010). Electronic Reflective Student Portfolios to Demonstrate Achievement of Ability-based Outcomes During Advanced Pharmacy Practice Experiences. *American Journal of Pharmaceutical Education*, 74 (5), 79.
- Buckley, S., Coleman, J., Davison, I., Khan, K.S., Zamora, J., Malick, S., Morley, D., Pollard, D., Ashcroft, T., Popovic, C., & Sayers, J. (2009). The educational effects of portfolios on undergraduate student learning: a Best Evidence Medical Education (BEME) systemic review. BEME Guide No. 11. *Medical Teacher*, 31(4), 282-298.
- Burch, V.C., & Seggie, J.L. (2008). Use of a structured interview to assess portfolio-based learning. *Medical Education*, 42, 894-900.
- Dolan, G., Fairbairn, G., & Harris, S. (2004). Is our student portfolio valued? *Nurse Education Today*, 24, 4-13.
- Driessen, E.W., Overeem, K., Van Tartwijk, J., Van Der Vleuten, C.P.M., & Muijtjens, A.M.M. (2006). Validity of portfolio assessment: which qualities determine ratings? *Medical Education*, 40, 862-866.
- Driessen, E., Van Tartwijk, J., Van Der Vleuten, C.P.M., & Wass, V., (2007). Portfolios in medical education: why do they meet with mixed success? A systematic review. *Medical Education*, 41, 1224-1233.
- Endacott, R., Gray, M.A., Jasper, M.A., McMullan, M., Miller, C., Scholes, J., & Webb, C. (2004). Using portfolios in the assessment of learning and competence: the impact of four models. *Nurse Education in Practice*, 4, 250-257.
- Forte, M., de Souza, W.L., da Silva, R.F., do Prado, A.F., & Rodrigues, J.F. (2013). A Ubiquitous Reflective E-Portfolio Architecture. *International Journal of Medical Informatics*, 82, 1111-1122.
- Gadbury-Amyot, C.C., McCracken, M.S., Woldt, J.L., & Brennan, R. (2012). Implementation of Portfolio Assessment of Student Competence in Two Dental School Populations. *Journal of Dental Education*, 76 (12),1559-1571.
- Garrett, B.M., MacPhee, M., & Jackson, C. (2013). Evaluation of an eportfolio for the assessment of clinical competence in a baccalaureate nursing program. *Nurse Education Today*, 33, 1207-1213.
- Haffling, A.C., Beckman, A., Pahlmblad, A., & Edgren, G. (2010). Students' reflections in a portfolio pilot: Highlighting professional issues. *Medical Teacher*, 32(12):e532-40.
- Hall, P., Byszewski A., Sutherland, S., & Stodel E.J. (2012). Developing a Sustainable Electronic Portfolio (ePortfolio) Program That Fosters Reflective Practice and Incorporates CanMEDS Competencies into the Undergraduate Medical Curriculum. *Academic Medicine*, 87, 744-751.
- Harris, S., Dolan, G., & Fairbairn, G. (2001). Reflecting on the use of student portfolios. *Nurse Education Today*, 21, 278-286.
- Hayward, L.M., Blackmer, B., Canali, A., DiMarco, R., Russell, A., Aman, A., Rossi, J., & Sloane, L. (2008). Reflective Electronic Portfolios: A Design Process for Integrating Liberal and Professional Studies and Experiential Education. *Journal of Allied Health*, 37(3), e140-e159.
- Head, K.S. & Johnston, J.H. (2012). Evaluation of the personal development portfolio in higher education: An explorative study. *Nurse Education Today*, 32, 857-861.
- Hegerholm, H. (2011). Digital portfolio as tool in distributed education. *The Online Journal of New Horizons in Education*, 1(4):26-34.



- Hill, T.L. (2012). The portfolio as a summative assessment for the nursing student. *Teaching and Learning in Nursing*, 7, 140-145.
- Imhof, M., & Picard, C. (2009). Views on using portfolio in teacher education. *Teaching and Teacher Education*, 25, 149-154.
- Jenkins, L, Mash, B., & Derese A. (2013). The national portfolio for postgraduate family medicine training in South Africa: a descriptive study of acceptability, educational impact, and usefulness for assessment. *BMC Medical Education*, 13, 101.
- Kariman, N., & Moafi, F., (2011). Effect of portfolio assessment on student learning in prenatal training for midwives. *Journal of Educational Evaluation for Health Professions*, 8, 2.
- Keim, K.S., Johnson, C.A., & Gates, G.E. (2001). Learning needs and continuing professional education activities of Professional Development Portfolio participants, *Journal of the American Dietetic Association*, 101(6), 697-702.
- McDuffie, C.H., Sheffield, M.C., Miller, M.S., Duke, L.J., & Rogers, S.P. (2010). Web-based Portfolios for Pharmaceutical Care Plans During Advanced Pharmacy Practice Experiences. *American Journal of Pharmaceutical Education*, 74(4), 59.
- McMullan, M. (2008). Using portfolios for clinical practice learning and assessment: The pre-registration nursing student's perspective. *Nurse Education Today*, 28, 873-879.
- Neades, B.L. (2003). Professional portfolios: all you need to know and were afraid to ask. *Accident and Emergency Nursing*, 11, 49-55.
- Nowacki, A.S. (2013). Making the grade in a portfolio-based system: student performance and the student perspective. *Frontiers in Psychology*, 4, 155.
- O'Sullivan, P. & Greene, C. (2002). Portfolios: Possibilities for Addressing Emergency Medicine Resident Competencies. *Academic Emergency Medicine*, 9(11), 1305-1309.
- Pincombe, J., McKellar, L., Weise, M., Grinter, E., & Beresford, G. (2010). ePortfolio in Midwifery Practice: "The Way of the Future". *Women and Birth*, 23, 94-102.
- Rao, S., Swartz, A., Obeid, L., Rao, S., Joyce, B., Whitehouse, S., Horst, M., Butler, J., Kimnen, R., Shepard, A., & Rubinfeld, I. (2012). e-Portfolio Competency Metadata: Pilot Study for a Call to Action. *Journal of Medical Systems*, 36, 457-462.
- Ryan, M. (2011). Evaluating Portfolio Use as a Tool for Assessment and Professional Development in Graduate Nursing Education. *Journal of Professional Nursing*, 27, 84-91.
- Scholes, J., Webb, C., Gray, M., Endacott, R., Miller, C., Jasper, M., & McMullan, M., (2004). Making portfolios work in practice. *Journal of Advanced Nursing*, 46(6), 595-603.
- Skrabal, M.Z., Turner, P.D., Jones, R.M., Tilleman, J.A. & Coover, K.L. (2012). Portfolio Use and Practices in US Colleges and Schools of Pharmacy. *American Journal of Pharmaceutical Education*, 76(3), 46.
- Sowter, J., Cortis, J., & Clarke, D.J. (2011). The development of evidence based guidelines for clinical practice portfolios. *Nurse Education Today*, 31, 872-876.
- Timmins, F., & Dunne, P.D. (2009). An exploration of the current use and benefit of nursing student portfolios. *Nurse Education Today*, 29, 330-341.
- Tiwari, A., & Tang, C. (2003). From process to outcome: the effect of portfolio assessment on student learning. *Nurse Education Today*, 23, 269-277.
- Tosun, N., & Baris, M.F. (2011). E-portfolio Applications in Education. *The Online Journal of New Horizons in Education*, 1(4), 42052.
- Vance, G., Williamson, A., Frearson, R., O'Connor, N., & Davison, J., (2013). Evaluation of an established learning portfolio. *The Clinical Teacher*, 10, 21-26.
- Vernazza, C., Durham, J., Ellis, J., Teasdale, D., Cotterill, L., Scott, L., Thomason, M., Drummond, P., & Moss, J. (2011). Introduction of an e-portfolio in clinical dentistry: staff and student views. *European Journal of Dental Education*, 15, 36-41.
- Wassef, M.E., Riza, L., Maciag, T., Worden, C., & Delaney, A. (2012). Implementing a Competency-Based Electronic Portfolio in a Graduate Nursing Program. *Computers, Informatics, Nursing*, 30(5), 242-248.
- Webb, C., Endacott, R., Gray, M.A., Jasper, M.A., McMullan, M., & Scholes, J. (2003). Evaluating portfolio assessment systems: what are the appropriate criteria? *Nurse Education Today*, 23, 600-609.
- Webb, T.P., & Merkley, T.R. (2012). An Evaluation of the Success of a Surgical Resident Learning Portfolio. *Journal of Surgical Education*, 69, 1-7.
- Weddle, D.O., Himburg, S.P., Collins, N., & Lewis, R. (2002). The professional development portfolio process: Setting goals for credentialing. *Journal of the American Dietetic Association*, 102,(10), 1439-1444.

INTE 2014

# Development and implementation of metaphonological skills and reading assessment and intervention programs

Simone Aparecida Capellini<sup>a</sup>; Fabio Henrique Pinheiro<sup>a</sup>

<sup>a</sup>*Investigation of Learning Disabilities Laboratory of Speech and Hearing Sciences Department of São Paulo State University "Júlio de Mesquita Filho" - UNESP - Marília - São Paulo - Brasil. Avenue Hygino Muzzi Filho, 737, Postal Code: 17.525-000, Marília-Sao Paulo-Brazil.*

---

## Abstract

This study aimed to develop two programs, one for assessment and another for intervention with metaphonological skills and reading, divided into Study 1: development an assessment and intervention programs and Study 2: application of the programs for students with and without learning difficulties. A total of 32 students participated, from 2nd to 5th grade of elementary school with and without learning difficulties, both groups submitted the assessment in pre and post-testing program. The results showed that intervention groups were benefited from the intervention program, demonstrating its effectiveness, and also, the assessment program as a tool for surveying and reassessing the altered skills

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* Learning Difficulties. Computadorized Intervention. Assessment.

---

## 1 . Introduction

### 1.1 The context of educational computing in Brazil

The Educational Computing is characterized by the use of information technology as a support to the teacher, being an additional aid in the classroom. At this level, the computer is operated by specialist teachers, according to their capacities, making it possible to simulate, practice or experience situations and may even suggest abstract conjectures, fundamental to the comprehension of knowledge or knowledge model that is being built (Borges-Neto, 1999).

According to Valente (1993), four basic requirements for the deployment of effective resources in education are necessary: the computer, the educational software, a specialist teacher, capable of using the computer as an educational means, and the student, considering that no one will excels the other, so that the computer may become, not only the instrument that teaches the learner, but the tool in which the student develops something, and so learning takes place by the fact of running a task via computer .

A growing number of schools have introduced in their curriculum the teaching of computer science in modern times, investing in computer rooms, in which the students usually attend once a week , accompanied by a monitor or, at best by a trainee linked to the area, proficient in specialized computing education. Thus, instead of learning to use this new technological apparatus in favor of meaningful learning and universal access to knowledge, students are "trained" to use the latest computer technology for lessons which are not in accordance to the scholastic texts, without any links to other disciplines and without any pedagogical concept (Valente & Freire, 2001).

Thus, according to the conjecture presented, which does not yet have a clear goal on the use of this tool, there are proposals for computer programs (Ecalfe, Kleinz & Magnan, 2013) which, as described by Oliveira (1996), may offer to the students, both normal and those with learning difficulties, a new atmosphere and a different kind of

student - teacher relationship than the traditional school. Thus, in a context in which the instrument used to promote learning is a computer (with one software to assist in the activities), the interest for learning can be reinforced.

According to Shih and Alessi (2004), the use of multimedia resource, ie , programs or information environments that use computers to integrate text, graphics, images, videos and audios, represent a strong tendency on the digital world in which they are immersed in our schools, as well as an excellent resource for keeping students motivated .

Motivation, according to studies by Ellis (2008) and Griffith (2008), is a very important factor in learning, and teachers must do everything to keep their students motivated. These considerations are countersigned by such studies from Kamberi (2013), which showed that the incorporation of technologies such as the use of computers in the learning process, can act as a highly motivational factor for the development of academic skills in the classroom.

## **1.2 Learning difficulties in the assessment context**

The assessment of learning disabilities should be an extensive process of data collection, including a quantitative and qualitative analysis, aiming to verify the level of implementation of school tasks, the previous child development, behavior in the classroom, opinion of the teacher, family and social environment, skills, learning methods, assessment methods of learning and other aspects related to the environment and the student (Romero, 1995).

Evaluating the performance or school performance is a difficult task, both for teachers and for professionals who face lack of measurement tools appropriate to our culture, plus the complexity of the processes involved (Cunha, 2000). In Brazil, the experience with assessment tools on school performance or cognitive- linguistic skills involved in the learning process is very scarce.

For the occurrence of a proper analysis of metaphonological abilities, it becomes necessary a careful choice towards the evaluation procedure. Several aspects related to the procedures should be considered ( complexity of the terms used , quality of stimuli (auditory, visual) , number of items , linguistic aspects (handling different sizes of units, such as words, syllables, phonemes, segments of rhyme or alliteration ) and specific cognitive operations required by different types of tests ( Casalis & Colé, 2009; Silva, 2013; Pinheiro, 2014) .

## **1.3 The difficulties of learning in the intervention context.**

Coping with school failure, poor scholastic performance and with multiple implications for self - evaluation of the child, family, teachers and the community, constitutes a complex and challenging task for which there is not yet a prompt solution, demonstrating the need to seek alternatives that can minimize this situation.

At the beginning of the literacy process, the child needs to discover the graph - phonological writing relationship, and this occurs through reflection on speech sounds and their relationship with the graphemes of writing; this reflection which requires access to phonological awareness and development of metalinguistic skills (Germano, Pinheiro & Capellini, 2009; Vaessen & Blomert, 2010) .

The direct instruction of phonological awareness, combined to the grapheme-phoneme instruction, assists the acquisition of the alphabetic principle and the proper development of the metaphonological abilities, favoring the acquisition of reading (Piasta & Wagner, 2010; Pinheiro, 2014).

In other words, students who have difficulty in reading in the early grades and remain without learning the alphabetic principles, will have the same difficulties persisting throughout his/her academic life, and over the years it will be observed an increase in performance difference between students with reading difficulties and his/her class group (Ziolkowska & Goldstein, 2008).

Thus, the employment of intervention programs with the metalinguistic skills to develop reading abilities, have typically used the phonological, syllabic and metaphonological skills for their development. These programs are generally based on phonemic, syllabic and supra - phonemic activities (rhyme and alliteration), which aim to develop skills related to phonological processing related to reading and text comprehension (lexical access speed, naming and phonological awareness). The activities which are present in the phonological training programs include the following scheme: syllabic structure of the word (analysis and synthesis); identification of syllables;

identification of phonemes; comparison of syllables; comparison of phonemes; syllabic recombination ( segmentation and manipulation ); phonemic recombination ( segmentation and manipulation ) and identification of sounds and syllables for rhyme and alliteration. This combination of strategies is described by several authors, such as: Broom and Doctor (1995), Capellini (2001), Silva (2013) and Pinheiro (2014).

This study aimed to develop and apply computer programs for assessment and intervention of metaphonological and reading skills in students with and without learning disabilities in order to supply this demand in the academic and therapeutic environment.

## **2. Research Methods**

This study was approved by the Ethics Committee in Research of the Faculty of Philosophy and Sciences, São Paulo State University "Júlio de Mesquita Filho " FFC / UNESP - Marília - SP, and approved under protocol nº 0405/2010. The survey was conducted through two studies: Study 1 consisted of the preparation of computer programs for assessment and intervention of metaphonological and reading skills. Study 2 consisted of the application of assessment and intervention of metaphonological and reading skills programs, and the study was divided into: Phase 1: implementation of the evaluation procedure and Phase 2: implementation of the intervention procedure.

The study included 32 schoolchildren, from 7-12 years, both genders, from 2<sup>nd</sup> to 5<sup>th</sup> grades of elementary school, divided into:

Group I (GI): group composed of 8 students with learning difficulties, who underwent metaphonological and reading intervention computerized program

Group II (GII) group composed of 8 students with learning disabilities, not subjected to the metaphonological and reading intervention computerized program

Group III (GIII) : 8 group composed of students without learning difficulties, who underwent metaphonological and reading intervention computerized program

Group IV (GIV): 8 group composed of students without learning disabilities, not subjected to the metaphonological and reading intervention computerized program.

These students were selected according to the inclusion and exclusion criteria proposed in this study. The composition of the groups was based on the suggestion of teachers of students from the 2<sup>nd</sup> to 5<sup>th</sup> grades of a public school from Marília - SP , who presented a poor performance in relation to reading and writing activities in two consecutive marking periods (average below 5) and students who did not present learning difficulties, according to the assessment criteria. All students were submitted to the Colored Progressive Matrices Test - RAVEN (Raven, 1938), to exclude the possibility of cognitive impairment; this procedure is applied and corrected by a neuropsychologist from the Research Laboratory of Learning Difficulties (LIDA) .

The subjects should have auditory level above normal limits 20 dB HL (Northern & Downs, 1986) and school records should report that students are able to read the Snellen scale from 0.1 to 0.7 (Combos, 1979), considering that it is a program of auditory and visual basis. The four groups presented, were assessed by the computerized evaluation program of metaphonological and reading skills, which consisted on the evaluation instrument used in the pre-and post-testing of the intervention program, developed in Study 1.

The evaluation program consisted of the analysis of correct answers in the following subtests: Rapid naming; Identification of the name and sounds of letters; Reading real words ; Reading nonwords; Proof of Discrimination of Sounds; Proof of Rhyme; Proof of alliteration; Proof of Syllable Segmentation; Proof of Syllable manipulation and phonemic segmentation.

The intervention program consisted of: Identification of Names of Letters of the Alphabet ; Identification of the Sounds of Letters of the Alphabet; Presentation of the sequence of letters, syllables, colors, numbers and objects for rapid naming; Oral reading of words and nonwords; Identification of the syllable in the initial , medial and final position; Identification of the phoneme in the initial, medial and thin position; Syllabic manipulation (initial, medial and final position); Proof of Phonemic Manipulation (initial, medial and final position ); Rhyme; Alliteration and accuracy of reading (words / nonwords) .

Six individual sessions were held in the same sequence of presentation, with two weekly sessions, with the intervention program completed by the students within one month. Its employment consisted of five sessions, performing the stimuli designed for the program, and the sixth session consisted of review tasks of different graphic and phonological, presented during the performance of the computer program of metaphonological and reading intervention. Each session lasted approximately 1 hour.

The students were exposed to the screens of the program sequentially, and they could interact with the information displayed (picture and sound) through the use of the mouse.

As for the review, the researcher was allowed to use the computer room of the school, in a different period of time, so that the study could be performed. The annotation of the responses of the students, was done in their own answer sheet, specially made for recording their responses. Their performances were measured based on correct answers during the intervention session, so, at the end of the sixth sessions, their overall performance were analyzed in separate sessions.

### 2.1 Data Analysis

Statistical analysis was performed using SPSS (Statistical Package for Social Sciences), version 21.0, based on the number of correct answers submitted by GI and GIII, to obtain the results. The tests used were Mann-Whitney test in order to evaluate possible differences in assessment between both groups (GI, GII, GIII and GIV), and the Wilcoxon Signed Posts Test, for possible differences between the two observation periods (pre-and post-testing). The Friedman test found possible differences between the variables of metaphonological intervention program for GI and GIII groups. The level of significance was set at 5 % (0.05) for the statistical tests.

## 3.0 Results and Discussions

Table 1 shows the performance distribution of group GI, on the intervention with metaphonological skills and reading program. It becomes possible to verify a statistically significant difference when comparing pre-and post-testing, on the identification of sounds subtests, reading words, reading nonwords, Identification of medial syllable, final syllable identification, identification of the medial phoneme, phonemic manipulation, Alliteration and Reading nonwords. The students of GI showed superior performance on the post-tests, in these subtests, considering that subtests which involved the perception and manipulation of the sounds were the best results, reflecting on reading and encouraging the conversion phono - grapheme mechanism.

These results show that working with the correspondence of the name of the letter and its corresponding sound, favors later reading development of students with and without learning difficulties, being emphasized its importance to the establishment of a phonological basis, on the initial phases of the literacy process (Cunningham & Carroll, 2011).

This result is important since the discovery of the graph - phonological relationship of writing, the student acquires the ability to reflect on the sounds of speech and its relation to the graphemes, which favors the development of phonological awareness and the development of metalinguistic skills, fundamental to the acquisition of aspects related to reading and writing (Germano, Pinheiro & Capellini, 2009; Vaessen & Blomert, 2010).

Table 1. Distribution of mean, standard deviation, minimum and maximum value of p on the performance of students of GI, on the review session

Pair of variables	N	Mean	Standard deviation	Minimum	Maximum	Value of p
IALmp	8	26,00	0,00	26,00	26,00	> 0,999
IALop	8	26,00	0,00	26,00	26,00	

ISmp	8	26,00	0,00	26,00	26,00	0,016*
ISop	8	24,25	1,17	22,00	26,00	
RWmp	8	15,00	0,00	15,00	15,00	0,042*
RWop	8	13,00	2,62	8,00	15,00	
RNWmp	8	5,00	0,00	5,00	5,00	0,009*
RNWop	8	3,63	0,52	3,00	4,00	
IISmp	8	6,00	0,00	6,00	6,00	0,317
IISop	8	5,88	0,35	5,00	6,00	
IMSmp	8	6,00	0,00	6,00	6,00	0,010*
IMSop	8	4,50	0,76	3,00	5,00	
IFSmp	8	6,00	0,00	6,00	6,00	0,023*
IFSop	8	5,00	0,76	4,00	6,00	
IIPmp	8	8,00	0,00	8,00	8,00	0,180
IIPop	8	7,13	1,64	4,00	8,00	
IMPmp	8	8,00	0,00	8,00	8,00	0,008*
IMPop	8	6,00	0,53	5,00	7,00	
IFPmp	8	8,00	0,00	8,00	8,00	0,059
IFPdo	8	7,13	0,99	6,00	8,00	
SMmp	8	4,00	0,00	4,00	4,00	0,157
SMop	8	3,75	0,46	3,00	4,00	
PMmp	8	4,00	0,00	4,00	4,00	0,014*
PMop	8	3,25	0,46	3,00	4,00	
RYMmp	8	12,00	0,00	12,00	12,00	0,083
RYMop	8	11,25	1,04	10,00	12,00	
ALImp	8	12,00	0,00	12,00	12,00	0,026*
ALIop	8	10,75	1,04	9,00	12,00	
RWHFmp	8	5,00	0,00	5,00	5,00	0,157
RWHFop	8	4,75	0,46	4,00	5,00	
RWLFmp	8	5,00	0,00	5,00	5,00	0,157
RWLFop	8	4,50	0,93	3,00	5,00	
NWmp	8	5,00	0,00	5,00	5,00	0,038*
NWop	8	4,13	0,83	3,00	5,00	

**Subtitles:** IAL: identification of the alphabet letters, IS: identification of sounds, RW: reading words, RNW: Reading of nonwords IIS: Identification of the initial syllable IMS: Identification of the medial syllable, IFS: Identification of the final syllable, IIP: identification of the inicial phoneme IMP: identification of the medial phoneme, IFP: identification of the final phoneme, SM: syllable manipulation, PM: phoneme manipulation, RYM: rhyme, ALI: alliteration, RWHF: real words of high frequency, RWLF: real words of low frequency, NW: nonwords mp: maximum performance, op: obtained performance.

Table 2 shows the distribution of performance in the intervention group GII, with metalinguistic skills and reading program. It becomes possible to verify a statistically significant difference when comparing pre-and post-testing, on the subtests of Identification of sounds and identification of the medial phoneme. On the other subtests, there was no statistically significant difference, considering the group of students without learning disabilities. These results reinforce the importance of working with the phonological aspects for students with learning difficulties, and without learning disabilities, since they also benefit from the training, foreseeing difficulties, or even facilitating the learning of content whose base is the letter relationship and sound.

Table 2. Distribution of mean, standard deviation, minimum and maximum value of p in the performance of students from GIII, on the review session

Pair of variables	N	Mean	Standard deviation	Minimum	Maximum	Value of p
IALmp	8	26,00	0,00	26,00	26,00	> 0,999
IALop	8	26,00	0,00	26,00	26,00	
ISmp	8	26,00	0,00	26,00	26,00	
ISop	8	24,63	1,69	22,00	26,00	0,038*
RWmp	8	15,00	0,00	15,00	15,00	0,102
RWop	8	14,50	0,76	13,00	15,00	
RNWmp	8	5,00	0,00	5,00	5,00	0,063
RNWop	8	4,25	0,89	3,00	5,00	
IISmp	8	6,00	0,00	6,00	6,00	> 0,999
IISop	8	6,00	0,00	6,00	6,00	
IMSmp	8	6,00	0,00	6,00	6,00	0,059
IMSop	8	5,38	0,74	4,00	6,00	
IFSmp	8	6,00	0,00	6,00	6,00	> 0,999
IFSop	8	6,00	0,00	6,00	6,00	
IIPmp	8	8,00	0,00	8,00	8,00	> 0,999
IIPop	8	8,00	0,00	8,00	8,00	
IMPmp	8	8,00	0,00	8,00	8,00	0,024*
IMPop	8	6,88	0,83	6,00	8,00	
IFPmp	8	8,00	0,00	8,00	8,00	0,317
IFPdo	8	7,88	0,35	7,00	8,00	
SMmp	8	4,00	0,00	4,00	4,00	0,317
SMop	8	3,88	0,35	3,00	4,00	
PMmp	8	4,00	0,00	4,00	4,00	0,157
PMop	8	3,75	0,46	3,00	4,00	
RYMmp	8	12,00	0,00	12,00	12,00	> 0,999
RYMop	8	12,00	0,00	12,00	12,00	
ALImp	8	12,00	0,00	12,00	12,00	0,157
ALIop	8	11,75	0,46	11,00	12,00	
RWHFmp	8	5,00	0,00	5,00	5,00	> 0,999



RWHFop	8	5,00	0,00	5,00	5,00	
RWLFmp	8	5,00	0,00	5,00	5,00	
RWLFop	8	5,00	0,00	5,00	5,00	> 0,999
NWmp	8	5,00	0,00	5,00	5,00	
NWop	8	5,00	0,00	5,00	5,00	> 0,999

**Subtitles:** IAL: identification of the alphabet letters, IS: identification of sounds, RW: reading words, RP: Reading of nonwords IIS: Identification of the initial syllable IMS: Identification of the medial syllable, IFS: Identification of the final syllable, IIP: identification of the inicial phoneme IMP: identification of the medial phoneme, IFP: identification of the final phoneme, SM: syllable manipulation, PM: phoneme manipulation, RYM: rhyme, ALI: alliteration, RWHF: real words of high frequency, RWLF: real words of low frequency, NW: nonwords mp: maximum performance, op:nobtained performance.

The effectiveness of the intervention programs with metalinguistic skills, focusing on phonological and syllabic skills such as: identification, segmentation, manipulation, rhyme among other skills, have been established by several studies (Broom & Doctor, 1995; Capellini 2001; Capellini, Oliveira & Pinheiro, 2011; Silva, 2013; Pinheiro, 2014) and the findings of this study corroborate these notes .

The improvement of the reading activity, with marked increase in the decoding ability, which can be verified with the advance of the ability to read nonwords, corroborates the findings of authors, such as: Ryder, Tunmer and Greaney (2008 ) and Castles et al. (2009 ), indicating that this improvement in reading ability may result from the implementation of the intervention programs, focused on the development of metalinguistic skills, thus influencing the development of reading and literacy process, as a whole.

#### 4.0 Conclusion

The results of GI and GIII, concerning the computerized intervention program for reading and metaphonological skills, presented increased performance during the sessions, with emphasis on the acquisition and development related to the identification and manipulation of sounds skills. Thus, the intervention program proved to be effective, since, after reassessment with the assessment program developed in Study 1, the students of groups underwent the intervention, showed superior performance in tasks involving the manipulation of sounds, reading words and nonwords.

According to these findings, it was confirmed the hypothesis of this study, in which the development of a computerized assessment program with metaphonological and reading skills, can help identifying impaired abilities. It can also support the achievement of a targeted intervention program for reading difficulties, as well as the effectiveness of the intervention program developed, being an important tool for working with students with and without learning difficulties in computer rooms of schools .

#### Acknowledgements

Special thanks to the Coordination of Improvement of Higher Education Personnel (CAPES) for providing a PhD scholarship to support this research

#### References

- Borges-Neto, H. (1999). Uma classificação sobre a utilização do computador pela escola. *Revista Educação em Debate*, 27, 135-138.
- Broom, Y. M., & Doctor, E. (1995). A. Developmental phonological dyslexia: a case study of the efficacy of a

remediation programme. *Cognitive Neuropsychology*, 12, 725-766.

Capellini, S. A. (2001). Eficácia do programa de remediação fonológica em escolares com distúrbio específico de leitura e distúrbio de aprendizagem. Tese (Doutorado em Ciências Médicas) - Faculdade de Ciências Médicas, Universidade Estadual de Campinas. 294f.

Capellini, S. A., Oliveira, A. M., & Pinheiro, F. H. (2011). Eficácia do programa de remediação metafonológica e de leitura para escolares com dificuldades de aprendizagem. *Revista da Sociedade Brasileira de Fonoaudiologia*, 16, 189-197.

Casalis, S., & Colé, P. (2009). On the relationship between morphological and phonological awareness: effects of training in kindergarten and in first-grade reading. *First Language*, 29, 113-142.

Castles, A., Coltheart, M., Wilson, K., Valpied, J., & Wedgwood, J. (2009). The genesis of reading ability: what helps children learn letters-sound correspondences? *The Journal of Experimental Child Psychology*, 104, 68-88.

Combos, G. M. (1979). Manual de emergências oftalmológicas. São Paulo: Manole.

Cunha, J. A. (2000). *Psicodiagnóstico V*. Porto Alegre: Artes Médicas.

Cunningham, A., & Carrol, J. (2011). Age and schooling effects on early and phoneme awareness. *Journal of Experimental Child Psychology*, 109, 248-255.

Ecalles, J., Kleinz, N., & Magnan, A. (2013). Computer-assisted learning in young poor readers: The effect of grapho-syllabic training on the development of word reading and reading comprehension. *Computers in Human Behavior*, 29, 1368-1376.

Ellis, R. (2008). Principles of instructed second language acquisition. *CAL Digest*.

Germano, G.D., Pinheiro, F. H., & Capellini, S.A. (2009). Desempenho de escolares com dislexia do desenvolvimento em tarefas fonológicas e silábicas. *Revista CEFAC*, 11, 213-220.

Griffiths, C. (2008). *Lessons from the good language learner*. Cambridge University Press.

Kamberi, L. (2013). Computer assisted versus classroom instruction: the big dilemma-revised. *Procedia - Social and Behavioral Sciences*, 70, 1691-1695.

Northern, J. L., & Downs, M. P. (1989). *Audição em crianças*. 3 ed. São Paulo: Manole.

Oliveira, V. B. (1996). *Informática em Psicopedagogia*. São Paulo: Editora SENAC..

Piasta, S. B., & Wagner, R. K. (2010). Learning letter names and sounds: Effects of instruction, letter type, and phonological processing skill. *Journal of experimental Child Psychology*, 105, 324-344.

Pinheiro, F. H. (2014). *Elaboração de procedimento avaliativo-terapêutico computadorizado para escolares com dificuldades de aprendizagem*. Tese (Doutorado em Educação). Universidade Estadual Paulista. 204 f.

Raven, J. C. *Teste das matrizes progressivas*. 1938.

Romero, J. F. (1995). As relações sociais das crianças com dificuldades de aprendizagem. In: Coll, C. *Desenvolvimento psicológico e educação: necessidades educativas especiais e aprendizagem escolar*. Porto Alegre: Ed. Artes Médicas.

Ryder, J. F., Tunmer W. E., & Greaney, K. T. (2008). Explicit instruction in phonemic awareness and phonemically based decoding skills as an intervention strategy for struggling readers in whole language classrooms. *Read & Write*, 21, 349-69.

Shih, Y., & Alessi, S. M. (2004). "Effects of text versus voice on learning in multimedia courseware." In Nassaji, H. (Org). *Input Modality and Remembering Name-Referent Associations in Vocabulary Learning*.

Silva, C. (2013). *Programa de intervenção fonológica com intervenção fonológica com escolares de risco para a dislexia: elaboração e intervenção*. Tese (Doutorado em Educação). Universidade Estadual Paulista. 249 f.

Vaessen, A., & Blomert, (2010). L. Long-term cognitive dynamics of fluent reading development. *Journal of Experimental Child Psychology*, 105, 213-231.

Valente, J. A., Freire, F. M. P. (2001). *Aprendendo para a vida: os computadores na sala de aula*. São Paulo: Cortez.

Valente, J. A. (1993). *Computadores e conhecimento: repensando a educação*. Campinas: Unicamp.

Ziolkowski, R. A., & Goldestein, H. (2008). Effects of an embedded phonological awareness intervention during repeated book reading in preschool children with language delays. *Journal of Early Intervention*, 31, 67-90.

# Development and validation of the information literacy assessment in connectivism learning environment for undergraduate students

Kulachai Kultawanich, Prakob Koraneekij\*, Jaitip Na-Songkhla

*Department of Educational Technology and Communications, Faculty of Education, Chulalongkorn University, Bangkok 10330, Thailand*

---

## Abstract

Connectivism is a new learning theory, which used for designing the world's first Massive Online Open Course (MOOC), and become accepted to be an alternative way to design information literacy (IL) course with information-rich environment. Though there are, few papers have reported the development and validation of a Connectivism assessment tool for undergraduate students. This paper aim to report on the development and validation of the information literacy assessment tools for undergraduate student. The assessment tools consisted of three instruments including (1) IL Test, (2) IL Rubric, and (3) Information Literacy Self-efficacy (ILSE) Scale. Three information literacy experts were selected to validate the content using item objective congruence, and five undergraduate students were selected to validate the face validity. Then thirty undergraduate students were selected to try out the instruments. The results suggested that the development of these tools be appropriate for undergraduate students.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords: Information Literacy, Connectivism, Assessment Tools*

---

## Introduction

From the researchers recent paper at the World conference on educational sciences which was held in Malta in 2014 (WCES 2014). We have proposed the cloud-based virtual classroom learning model, constructed from the basis of Connectivism theory. After the model had been proposed, the researchers were continuing to study on the information literacy assessment, to develop the suitable assessment tools.

### *Connectivism Learning Model*

From the researchers proposed model at WCES 2014, the Connectivism learning model consisted of four steps that students have to proceed on the cloud-based virtual classroom as follows:

(1) Aggregation: In the first step, learners have to find the main topic to study from communication tools, and then list the topics and keywords to conduct searching strategies. After accessing to the information, learners have to store and organize information by using collaboration tools.

(2) Remixing: In the second step, learners have to transfer the prior knowledge to decide which information should be used in their work, then evaluate the quality of information by using data gathering tools, and sharing the information with friends by using collaboration tools.

(3) Repurposing: In the third step, learners have to use the content creation tools to read and summarize the relevant information. After gathering enough summary, learners have to analyze and synthesize the data to generate a new information by using content creation tools, and then evaluate their work and revise.

(4) Feed-forward: In the final step, learners have to publish their work by using presentation tools, and sharing their work with classmates to exchange the opinion, and then feed-forward their work to the social network by using communication tools to get feedback on their work. After the feed-forward process they have to reflect their thinking and feeling about the feedback, and plan to develop their ability in the next project.

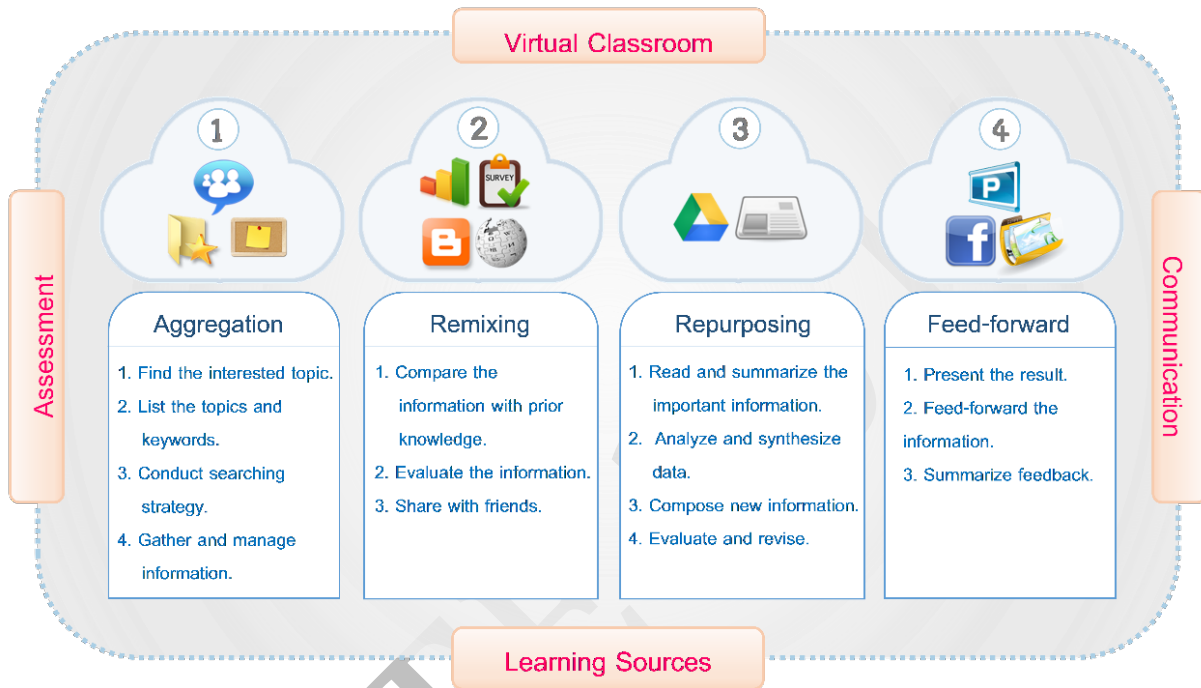


Fig. 1. A Proposed Model of Connectivism Learning Using Cloud-based Virtual Classroom

#### Assessment Framework

*“Information Literacy is the ability to identify what information is needed, understand how the information is organized, identify the best sources of information for a given need, locate those sources, evaluate the sources critically, and share that information.”* (University of Idaho, n.d.)

According to the definition of information literacy and the process of the learning model as the researchers mentioned above, the information literacy can be divided into two set of skills, were cognitive skills and psychomotor skills. From the study found that the focus of assessment in information literacy has been shifted from traditional assessment to the new dimension of assessment. The traditional assessment was focused on using the test or examination to assess the information literacy skill from the students, but the traditional assessment has some limitation. The tests can only assess the cognitive and knowledge skill, but cannot assess the psychomotor skills, which were an important domain of information literacy assessment too. So the information literacy rubrics has been proposed to eliminate the limitation of assessing students’ psychomotor skills (Colorado State Department of Education, 1996). Moreover, the important factor that made students become successful in learning is the students’ self-efficacy, Kurbanoglu, Akkoyunlu and Umay (2006) have proposed the new dimension of information literacy assessment by using the information literacy self-efficacy scale (ILSE) along with the traditional assessment. From

this perspective, the recent trend of information literacy assessment is often measured students' information literacy more than one dimension. So the researchers conducted the information literacy assessment framework into 3 dimension as follows: (1) Knowledge and Cognitive Dimension, (2) Performance and Practice Dimension and (3) Self and Attitude Dimension.

#### *Assessment Tools*

According to the information literacy framework, the researchers have selected suitable tools to assess the information literacy of students in three dimensions as see on the table 1.

Table 1. Dimensions of assessment and tools.

Dimensions	Tools
Knowledge and Cognitive Dimension Assessment	Information Literacy Test
Performance and Practice Dimension Assessment	Information Literacy Rubrics
Self and Attitude Dimension Assessment	Information Literacy Self-efficacy Scale

From the table 1, the first dimension is knowledge and cognitive dimension assessment, a representative of traditional information literacy assessment dimension. The multiple choices information literacy test was chosen to assess this dimension. The second dimension is performance and practice dimension assessment, a representative of psychomotor dimension assessment. The information literacy rubrics was chosen to assess this dimension. So the last one is self and attitude dimension assessment the representative of affective dimension assessment. The information literacy self-efficacy scale was chosen to assess this dimension.

#### **Methodology**

The main purpose of this study is to describe the development and validation of three information literacy tools designed to measure three dimensions of information literacy from the students and find out how well the instrument can assess. The researchers have tryout these tools with 30 undergraduate students from the Faculty of Education, Chulalongkorn University. The development and validation of these tools divided into 3 phases as follows:

##### *Phase 1: Construct the assessment structures*

In the first phase, the researchers have reviewed all of the related documents to construct the assessment structure of these tools. The structure of information literacy tests was constructed from the literature reviewed, and four main categories, (1) Accessing Information, (2) Managing Information, (3) Evaluating Information and (4) Creating Information, were named, and to covering each category 45-multiple choices test items were developed. The structure of information literacy rubrics was constructed follow the learning activities in Connectivism learning model, three scale rubrics, anchored with notations: Good, Fair and Poor, was used to construct the information literacy rubrics. Moreover, the ILSE scale was modified from Kurbanoglu, Akkoyunlu and Umay (2006) ILSE scale by using the symmetric translation method into Thai language, then re-categorize the seven categories into the researchers' four main categories.

### *Phase 2: Validate the Tools*

In this phase, the nine-information literacy experts were selected to validate the assessment tools by using item objective congruence (three experts for each tool), and then validate the face validity of these tools by gathering the data from five undergraduate students.

### *Phase 3: Tryout the Tools*

In the third phase, the researchers have tryout the assessment tools with 30 undergraduate students from the Faculty of Education, Chulalongkorn University. Then analyze the reliability using Kuder-Richardson method for the IL Test, and using Cronbach's alpha for the ILSE test. Except the IL rubrics were tryout by selected two instructors to bring the IL rubrics to use with the sample of student works, and then calculated the correlation of the scores between two instructors.

## **Results**

### *The Result from Development and Validation of IL Tests*

The multiple choices IL test have 45 questions in four categories (Access, Manage, Evaluate and Create Information). After the experts validate the test items, there were 30-test items covering each category have IOC scores more than 0.67 and also have the face validity from the students more than 0.67 every item too. The result from the tryout was analyzed by using Kuder-Richardson method indicated that the P-Value (Difficulty) of every test items are between 0.2 to 0.8, and R-Value (Discrimination) of every test items are more than 0.6. This mean the IL test can be used to assess the information literacy in Knowledge and Cognitive Dimension.

### *The Result from Development and Validation of IL Rubrics*

The IL rubrics have three-scoring scales (Good, Fair and Poor), every item in IL rubrics have IOC scores more than 0.67 from the experts validation and also have the face validity from the students more than 0.67 every item too. The correlation between the scores from 2 instructors was greater than 0.7, so this IL rubrics can be used to assess the information literacy in Performance and Practice Dimension.

### *The Result from Development and Validation of ILSE scale*

The modified Kurbanoglu's seven-point ILSE scale have 28 items in four categories (Access, Manage, Evaluate and Create Information). Every item in ILSE scale have IOC scores more than 0.67 from the experts validation and also have the face validity from the students more than 0.67 every item too. The Cronbach's alpha of ILSE scale equals 0.97, so this mean the IL test can be used to assess the information literacy in Self and Attitude Dimension.

## **Acknowledgements**

This research was funding by the 90th Anniversary of Chulalongkorn University Fund (Ratchadaphiseksomphot Endowment Fund).

## **References**

Colorado State Department of Education. (1996). *RUBRICS for the Assessment of Information Literacy*. Denver. State Library

and Adult Education Office.

Kurbanoglu, S., Akkoyunlu, B., and Umay, A. (2006). Developing the information literacy self-efficacy scale.  
*Journal of Documentation*. 62(6), 730 – 743.

University of Idaho. (n.d.). *Information Literacy*. Retrieved June 28, 2014, from [http://www.webpages.uidaho.edu/info\\_literacy/](http://www.webpages.uidaho.edu/info_literacy/)

INTE 2014

# Development of “educational faculty students’ attitudes towards their departments” attitude scale study

Yucel Gelisli<sup>a\*</sup>

<sup>a</sup>Gazi University Gazi Faculty of Education Educational Sciences Department  
Curriculum and Instruction Program, Ankara, 06500 Turkey

---

## Abstract

The aim of the study is to develop an attitude scale measuring Gazi University Gazi Faculty of Education students’ attitudes towards their departments. In the context of the study the adaptation of the previous 26-item Vocational Educational Faculty Students’ Attitudes towards Their Departments Attitude Scale developed by the researcher has been made. After the adaptation of 26-item Vocational Educational Faculty Students’ Attitudes towards Their Departments/Programs Attitude Scale, 6 items have been added to the scale. The trial form of the prepared scale has been composed of 32 likert-type trial sentences from item pool. The items have been evaluated in terms of content validity with expert opinion and the final version of the 32-item trial form has been prepared. The developed trial form has been applied to 340 students from Gazi University Gazi Faculty of Education from different departments and grades.

**Keywords:** Attitude, attitude towards department, attitude scale development

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

---

## 1. Introduction

The expectations of students from learning and teaching processes have an important effect on their inclinations towards school and courses. The expectation levels of students are also very important in shaping their attitudes towards school and courses.

School success is the basic benchmark showing how much an individual has benefited from a specific course or program in school environment. Various factors affect the success of students at school. These factors, also known as “learning variable”, are related with physiologic, psychologic, cognitive, psychomotor, emotional and social conditions. Moreover the experiences the students gained in previous learning processes also effect them in gaining positive or negative attitudes towards school and courses (Gelisli,2010). Attitudes are important determiners of inclinations towards school and courses.

In other words affective features can be handled as one of the most important determiners of school success. In this context affective factors such as attitude, self sufficiency, motivation, anxiety can be thought to effect many factors foremost the will and interest of students towards courses therefore many other factors all resulting in effecting student performance and therefore academic success (Kan, Akbaş, 2005; 228 ).

To like or dislike or to approve or unapprove a situation encountered helps to show the attitude of an individual but would be incomplete to tell the attitude exactly. However to accept or reject a situation, to show inclination to a situation or not, to be on side of a situation or not all show the attitude of an individual throughly. The basis of the attitude is the manner of the individual fostered to a situation. The manner of the individual effects the acceptance or



rejection of the situation by the individual (Çetin, 2006; 30).

“Attitudes are learnt inclinations towards specific objects, situations, institutions, contents and other people. With this meaning inside, attitude could be said to include the guidance of individual’s behaviour, thoughts and feelings towards the psychological object moreover the situation of being on side or opposed of that situation, object or person. Attitudes are formed in a psychological intellectual formation and with the effects of social value, norm and relationships” Pehlivan, 1994; 49).

Student attitudes about school and learning that are more generalised to a wider aim than a specific subject or course becomes more determined in course of time and so changing it with external factors becomes hard. Even in some situations attitudes go forward than school and learning and becomes the self attitude (self concept) and in this instance it is much more difficult to be changed. For all these reasons all educational institutions should determine the attitudes of its students towards course, institution, staff members, friends and should make an effort to change when a negative situation is investigated (Pehlivan, 1994; 50).

Attitudes are one of the most important determinants of human behaviours. The attitudes of individuals significantly affect their love, hatred and behaviours. Attitude is one of the psychological variables that are subject to measurement and research in behavioral science. The measurements of attitudes are depended upon their identification. In this respect measuring the attitudes and knowing the attitude level people have towards related object or situation is a desirable situation in most fields. Attitude is a phenomenon that is acquired with learning, guiding the individual’s behaviours and having the likelihood of causing partiality in decision making process. Developing positive attitude towards a course includes behaviours such as; the will to attend and participate in the course, being satisfied for responding, accepting that it has a value and accepting it as a value (Tezbaşaran, 1997; 1. Kan, Akbaş, 2005; 228).

In also higher education various factors affect student success. Courses given in the faculty, the quality of teaching environments, scholarships, employment qualities, facilities for social and sportive activities increase the school satisfaction levels of students, help them to reach their expectations, affect their success levels (Gelisl;2010).

Various reasons have important roles for students’ attitude development towards their departments. Staff members’ attitudes towards students, department programs, the fulfillment levels of expectations from these programs, physical equipment qualities of the teaching environment, equipments and employment opportunities after graduation are effective in students’ attitudes they develop towards their departments. Aim

The aim of this study is to develop an attitude scale in order to determine the attitudes of Gazi University Gazi Faculty of Education students’ towards their departments.

## Method

In this research aiming to develop a scale that measures the attitudes of Gazi University Gazi Faculty of Education students towards their departments, survey model has been used. In this section, the study group, development of the measurement tool and the techniques used in data analysis has been dealt.

### 2.1. Study Group

The study group of the research has been composed of the students of eleven teacher training programs in Gazi University Gazi Faculty of Education in 2013-2014 academic year. In composing the sample of the research grade and teacher training program have not been regarded.

**Table 1:** Distribution of Students According to Teacher Education Programs

Teacher Education Programs	Number	Percentage
Preschool Education	81	23,8
Psychological Counseling and Guidance	36	10,6
English Language Education	29	8,5

Social Sciences Education	6	1,8
Primary School Teaching	68	20,0
Turkish Language Education	49	14,4
Elementary Mathematics Education	16	4,7
Philosophy Education	20	5,9
Computer Education and Instructional Technology	5	1,5
Art Education	20	5,9
Science Education	10	2,9
<b>Total</b>	<b>340</b>	<b>100,0</b>

A total of 340 students from eleven teacher training programs have participated in the research. 23% of students were from preschool education training program, 20% of students were from primary school teaching program and 14.4% of the students were from Turkish Language education program.

**Table 2:** Gender Distributions of the Students

Gender	Number	Percentage
Female	268	78,8
Male	71	20,9
Not specified	1	,3
<b>Total</b>	<b>340</b>	<b>100,0</b>

Out of total 340 students participated in the research 268 were female (%78.8) and 71 were male (%20.9).

## 2.2. Development of the Scale

In the scope of the study 26-item “Vocational Educational Faculty Students’ attitudes Towards Their Departments Attitude Scale” (Gelisl; 2010) previously developed by the researcher has been adapted to faculty of education in order to determine the attitudes of faculty of education students towards their departments. Item adaptation to the 26-item Vocational Educational Faculty Students’ attitudes Towards Their Departments Attitude Scale has been made according to the general educational faculties’ departments/programs; thereafter 6 items have been added to the scale. The new scale has been composed of 5-point-Likert type 32 items taken from item pool. The items have been evaluated in terms of content validity with expert opinion and the final version of the 32-item trial form has been formed. In order to obtain information about the validity of the scale over the obtained data positive items were scored according to likert type scale format as 5= Strongly Agree, 4= Agree, 3= partly agree, 2= Disagree, and 1= Strongly Disagree whereas the negative items were scored exact opposite. The developed trial form has been applied to a total of 340 students from different departments and grades in Gazi University Gazi Faculty of Education.

After the attitude sentences have been scored, item analysis has been made in order to elect the items not working well. Attitude statements prepared by item analysis have been examined in terms of being consistent among themselves, being decisive and having the power of awakening the desired response without awakening the undesired responses. For this purpose, correlation between for each item scores the group has taken from that item and the scores the group has taken from all scale items have been computed. Items showing high correlation with the whole scale scores have been kept while the others are eliminated. After the content validity of the scale has been examined, three stages have been implemented for structure validity. These are factor analysis, item total correlations and item discriminate analysis (Tavşancıl; 2006).

With the factor analysis implementation whether the 32-item “Educational Faculty Stundets’ Attitudes towards their Departments” scale was single or multi factor has been tried to determine. With this aim one of the factor analysis techniques, principal components analysis has been used on the data in the analysis made, no intervention has been made to the number of the factors and factors have been set free.

In the first stage whether the data are adequate for factor analysis or not has been controlled by Kaiser-Meyer-Olkin (KMO) coefficient and Barlett Sphericity test (Büyüköztürk, 2005). After the adequacy of the data for factor analysis, descriptive factor analysis for examining the structure validity and factor structure of the Educational Faculty Students’ “Attitude Scale towards Their Department” has been used while principal components analysis

has been used as factoring technique. In the analysis; common factor variance of factors on each variable, factor loads of items, variance ratios explained and line graph have been examined. Factor loadings of the items have been chosen as minimum .45

## Findings And Discussion

Before factor analysis has been made to the scale, reliability analysis has been made and cronbach alpha reliability coefficient of the scale has been found as .924. The adequacy of the scale for factor analysis has been controlled by Kaiser-Meyer-Olkin (KMO) coefficient and Barlett Sphericity test. The result for KMO (Kaiser Meyer Olkin) was found as 0.908 and for Barlett test (Bartlett's test of Sphericity) it was found 4200,325 ( $p < 0.01$ ). Taken into account that the KMO values more than .600 could be accepted (Büyüköztürk, 2005, Akgül, 1997:581) it is understood that the obtained KMO value is a very high value. According to both test results it is concluded that the factor analysis made are the adequate analysis for the data obtained.

Before intervening to the factors principal components analysis has been made to scale; items having factor load more than .45 have been taken into examination and it has been observed that the scale has three dimensions. 8 items having less than .45 factor loading has been removed from the scale and the scale has been composed of 24 items. According to principal components analysis, before applying varimax (vertical) rotation method to the data obtained, first factor's solely described variance value has been found as 37,186 %.

**Table 3:** Total Variance Explained,( Extraction Method: Principal Component Analysis.)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8,925	37,186	37,186	8,925	37,186	37,186	4,976	20,732	20,732
2	2,470	10,290	47,476	2,470	10,290	47,476	4,366	18,192	38,923
3	1,584	6,602	54,078	1,584	6,602	54,078	3,637	15,155	54,078
4	1,088	4,534	58,612						
5	,985	4,102	62,714						
6	,935	3,895	66,609						
7	,893	3,722	70,330						
8	,736	3,066	73,396						
9	,705	2,938	76,334						
10	,643	2,681	79,015						
11	,572	2,384	81,399						
12	,522	2,175	83,574						
13	,488	2,032	85,607						
14	,466	1,943	87,550						
15	,439	1,830	89,380						

16	,370	1,544	90,924						
17	,346	1,442	92,366						
18	,332	1,383	93,749						
19	,312	1,302	95,051						
20	,291	1,212	96,263						
21	,250	1,043	97,306						
22	,235	,979	98,285						
23	,220	,917	99,202						
24	,192	,798	100,000						

INTE 2014

As well as there are strong evidence that the scale is one dimensional it has been decided to use varimax (vertical) rotation method by looking at the structures of the items. At the end of the process it has been seen that eigenvalue of 24 items analysed have been gathered around three factors. It has been seen that first factor alone explained the 37,186% of the total variance; the second factor 10.290%, third factor explained 6.602%, total of three factors explained 54,078% of the total variance. It is observed that the common variance of three factors described about the items vary between .513 and .792.

**Table 4:** Rotated Component Matrix<sup>a</sup>

	Component		
	1	2	3
M16	,792		
M17	,790		
M15	,751		
M6	,745		
M4	,740		
M9	,646		
M5	,590		
M1	,545		
M2	,513		
M29		,794	
M30		,771	
M28		,668	
M13		,634	
M27		,634	
M23		,567	
M7		,553	
M8		,525	
M26		,514	
M31			,754
M21			,735
M25			,699
M19			,628
M18			,580
M20			,558

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser

Normalization.<sup>a</sup>

a. Rotation converged in 5 iterations.

Besides; the mean, standart deviation, item-total correlations of the Gazi Faculty of Education Students' Attitudes towards Their Departments Attitude Scale have also been computed and determined that for all the items in the scale item-total correlations vary between .43 and .71 and t-values have been meaningful ( $P < .001$ ). Taken into consideration that items having item-total correlation more than .30 can distinguish individuals well (Büyüköztürk, 2005) it can be said that the reliabilities of the items in the scale are high and intended to measure the same behaviour. Item-total correlations for every subfactor in the scale vary as; between .48 and .63 for factor 1; between .43 and .71 for factor 2 and between .47 and .59 for factor 3. According to these values, each item discriminates the attitudes of Gazi Educational Faculty Students' Attitudes towards their Department/Program. Values obtained from the analysis during the development of the scale are given in table 5, 6 and 7.

In the Gazi Faculty of Education Students' Attitudes towards Their Departments attitude scale adaptation study, first factor (finding the department functional) of the scale has been composed of items 1, 2, 4, 5, 6, 9, 15, 16, 17; items 7, 8, 13, 23, 26, 27, 28, 29, 30 in the second factor (being pleased with the department); items 18, 19, 20, 21, 25, 31 in the third factor (appreciating the department). Items in the scale have been composed of 18 positive, 6 negative items.

**Table 5:** Validity-Reliability Analysis Results of Gazi Faculty of Education Students' Attitudes towards Their Departments

Items and Factors	Mean	Standard Deviation	Communality Common Variance	Compenet Factor Load	Varimax Factor Load	Item Total Correlations	t value
Factor I. Finding the Department Functional							
1. Faculty is in accordance with my expectations that were before my registration.	2,71	1,18	,477	,672	,513	,62	14,110
2. My department/program is in accordance with my expectations that were before my registration.	2,88	1,20	,458	,665	,545	,61	14,405
4. The curricula of our department/program provide the skills needed for teaching profession.	3,11	1,10	,580	,601	,740	,54	11,752
5. The competencies of staff members are in accordance with my professional expectations.	3,33	1,00	,472	,573	,590	,52	10,225
6. The curricula are in accordance with my professional expectations.	2,92	1,03	,604	,637	,745	,58	13,248
9. Applied studies related with the field in our department/program are sufficient.	2,77	1,18	,447	,537	,646	,48	10,531
15. I think that the content of the courses in our department/program are appropriate to the current professional developments.	3,22	1,10	,578	,545	,751	,48	10,036
16. I think that the curriculum of our department/program is functional.	3,13	1,00	,694	,692	,792	,63	15,229
17. The curriculum of our department/program is aimed at meeting our professional needs.	3,24	1,03	,648	,613	,790	,55	12,198
Factor II. Being Pleased with the Department							
7. I fondly attend our department/program.	3,14	1,22	,590	,757	,553	,71	18,612
8. I fondly participate in all social activities in our department/program.	2,75	1,19	,376	,566	,525	,52	11,539
13. I am very happy for studying in this department/program.	3,12	1,20	,606	,739	,634	,69	15,845
23. I become happy when I participate in applied activities in our department/program.	3,34	1,11	,478	,569	,567	,53	9,687
26. I enjoy attending theoretical courses in the department/program.	3,02	1,16	,309	,475	,514	,43	7,982
27. I enjoy participating in applied courses in our department/program.	3,33	1,15	,556	,620	,634	,58	10,814
28. Courses in our department/program are interesting for me.	3,12	1,09	,642	,752	,668	,71	16,490
29. I like reading publications about our department/program.	3,37	1,09	,643	,562	,794	,51	9,081
30. I like following the scientific meetings about our department/program.	3,19	1,12	,605	,522	,771	,47	8,242
Factor III. Appreciating the Department							
18. I find my department/program very boring.	3,41	1,26	,468	,579	,580	,54	10,848
19. I find the courses in our department/program nonsense and	3,49	1,17	,527	,634	,628	,59	12,236

useless.								
20. I am not fond of the teaching activities in our department/program.	3,17	1,18	,483	,641	,558	,59		12,654
21. I find the behaviors of the staff members towards us negative.	3,27	1,23	,573	,527	,735	,49		9,944
25. I feel unhappy while preparing for the practical courses in our department/program.	3,33	1,25	,571	,536	,699	,50		10,023
31. I am not fond of the staff members in our department/program.	3,25	1,22	,592	,508	,754	,47		9,578

**Table 6:** Gazi Educational Faculty Students' Attitudes towards Their Departments Attitude Scale  
Variance explained by the Subfactors and Alpha Coefficients

Factor	Variance Explained	Alpha
Factor 1	% 37,186	,87
Factor 2	% 10,290	,87
Factor 3	% 6,602	,82
Total	% 54,078	,908

Table 6 presents variance explained by each factor which are respectively 37.186%, 10.290%, 6.602% and the total is 54.078%. Alpha coefficient for the I. factor was computed as .87, the same coefficient for the II. Factor was .87 and computed as .82 for the III. Factor.

Total alpha value of the scale is .90. When the evaluation criteria for alpha coefficient is examined (if it is  $0.80 \leq \alpha \leq 1.00$  then the scale is highly reliable; Özdamar, 1999:522) it can be said that the scale has highly reliability.

**Table 7:** Gazi Educational Faculty Students' Attitudes towards Their Departments Attitude Scale  
Correlation Table

Factors	N	X	Ss	Min	Max	Fak1	Fak2	Fak3
Factor 1	340	27,35	7,10	9,00	43,00	----	,48**	,83**
Factor 2	340	28,43	7,36	9,00	45,00	----	---	,61**
Factor 3	340	19,95	5,36	6,00	30,00	----	---	---

\*\*p<.01

Table 7 shows the correlation coefficients of Gazi University Gazi Faculty of Education Students' Attitudes towards Their Departments attitude scale. It is seen from the table that the correlation between the first and the second factor is .48, between the first and the third factor .83 and finally the correlation between the second and the third factor is .61. It is observed that there is a meaningful and medium and high level relationship among the factors. These data could be thought as evidence that attitude items in the scale are gathered in three independent factors.

## Results

In this study in order to determine the attitudes of Gazi Faculty of Education students towards their departments, development (adaptation) of a valid and reliable measurement tool has been aimed.

After the application of the 32-item scale to 340 students and the analysis thereafter 8 items has been removed and the final scale has been composed of a total of 24 items 18 of which positive, 6 of which are negative. It has been seen that these items reflected the three basic structures (finding the department functional, being pleased with the department and appreciating the department) of the students' departments which has been taken into consideration during the preparation of the scale.

With its current form "Educational Faculty Students' Attitudes Towards Their Departments Attitude Scale" after the reliability and validity analysis has been accepted as a reliable and valid three dimension measurement tool measuring novice teachers' attitudes towards teaching profession. It can be concluded from the reliability evidence of the scale that Attitude Scale of Gazi Faculty of Education Students towards Their Departments/Programs could be trustfully used to measure the attitudes of Gazi Faculty of Education students towards their departments.

## References

- Akgül, A. (1997). *Tıbbi araştırmalarda istatistiksel analiz teknikleri*. Ankara: Yüksek Öğretim Kurulu Matbaası.  
 Büyüköztürk, Ş. (2005). *Sosyal bilimler için veri analizi el kitabı*. Ankara: Pegem A Yayıncılık .  
 Çetin, Ş. (2006), Öğretmenlik mesleği tutum ölçeğinin geliştirilmesi (Geçerlik ve güvenirlik çalışması), *Gazi Üniversitesi Endüstriyel Sanatlar*

- Eğitim Fakültesi Dergisi*, 18., 28-37.
- Gelisli, Y. (2010). Mesleki Eğitim Fakültesi Öğrencilerinin, Öğrenim Gördükleri Bölüme Yönelik Tutum Ölçeği Geliştirme Çalışması, 1. *Ulusal Eğitim Programları Ve Öğretim Kongresi* 13-15 Mayıs 2010, Balıkesir Üniversitesi Necatibey Eğitim Fakültesi Ve Eğitim Programları Ve Öğretim Derneği Balıkesir-Ayvalık/Türkiye
- Kan, A., Akbaş, A., (2005), Lise öğrencilerinin kimya dersine yönelik tutum ölçeği geliştirme çalışması, *Mersin Üniversitesi Eğitim Fakültesi Dergisi*, Cilt 1, 2, 227-237.
- Özdamar, K. (1999). *Paket programlar ile istatistiksel veri analizi*. Eskişehir: Kaan Kitabevi.
- Tavşancıl, E. (2006). Tutumların ölçülmesi ve SPSS ile veri analizi. Ankara: Nobel Yayınevi.
- Pehlivan, H. (1994). Eğitim bilimleri öğrencilerinin öğrenim gördükleri bölüme yönelik tutumları, *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 10, 49-53.
- Tezbaşaran, A. A., (1997). *Likert tipi ölçek geliştirme kılavuzu*. Ankara: Türk Psikologlar Derneği Yayınları.



# Development of a challenge based learning model via cloud technology and social media for enhancing information management skills

Sathaporn Yoosomboon<sup>a</sup> \*, Panita Wannapiroon<sup>b</sup>

<sup>a</sup>*Business Computer Division, Faculty of Business Administration, King Mongkut's University of Technology North Bangkok Rayong Campus, Rayong, 21120, Thailand.*

<sup>b</sup>*Information and Communication Technology for Education Division, Faculty of Technical Education, King Mongkut's University of Technology North Bangkok, Bangkok, 10800, Thailand.*

---

## Abstract

This research was conducted for research and development purposes. The aims of this study were to: 1) design a challenge based learning model via cloud technology and social media for enhancing information management skills. Students can then use this technology as a tool for learning, and 2) to evaluate the use of the challenge based learning model via cloud technology and social media for enhancing information management skills. The research methods are divided into two phases. The first phase involves the design of the model and the second phase involves model evaluation. The sample group in this research consisted of nine experts in the field of design challenge based learning, cloud technology, social media and information management skills. These experts were selected by purposive sampling. Data has been analyzed using arithmetic mean and standard deviation. The research findings are organized as follows: 1) studying the contents, 2) arranging the challenge based learning process and 3) summarizing the results. The process of developing the challenge based learning model consisted of the following five stages: 1) the big idea, 2) the essential question, 3) the challenge: guiding question, guiding activity, 4) the solution section and 5) the assessment: publishing the student sample and reflection. The objective of the model is to help develop information management skills. The experts agree that a learning activity was appropriate for this activity.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** Challenge Based Learning, Social Media Cloud Technology, Information Management Skills

## Introduction

For decades, rapid developments in information and communication technologies meant that organizations were required to continually adapt themselves to these changes. This scenario was especially true for educational organizations, which were required to adjust their technologies in order to improve their ability to organize learning systems and update teaching models to meet policy standards (Elena & Wilson, 2005). For example, the National Policy Framework (B.E. 2554-2563 (ICT 2020)) has created a technological strategic plan in order to inform the development of e-Education.

Challenge based learning is a learning and teaching model that aims to help students to find ways to present or solve problems. This model can also be used via websites and mobile phones. The aim of the device is to support students to share knowledge and search for information, as well as to encourage students to study in their given field of interest (Apple, 2010).

One interesting aspect of the challenge based learning model is cloud computing. This allows the user to access a fast internet connection without a requirement for hardware and an operating system (Bhaskar et al., 2009), (Mariana

---

\* Corresponding author. Sathaporn Yoosomboon. Tel.: +66-90-969-8688  
E-mail address: sathaporny@kmutnb.ac.th

& Merwe, 2011) In addition, cloud computing can also be thought of as a device to support learning and teaching models that are relevant for the 21<sup>st</sup> century and challenge based learning.

Nowadays, social networking is very popular because it can reach many groups of people in a variety of different contexts. Social networking is defined as the interaction between people, with a purpose of sharing or exchanging information and opinions (Toni et al.,2008). Furthermore, social networks are also used to support teaching, learning, communication, information storage and information co-using. Using social networks in this way is likely to become increasingly popular in future.

Hence, in order to manage learning systems in the 21<sup>st</sup> century, people need to begin to educate themselves on information management skills such as producing, collecting, evaluating, searching, and presenting data by creating information systems, and on how to spread information effectively, both in and outside of organizations. There are currently a wide range of information and communication technologies, policies and strategies available to manage information, including information searching tools, source evaluation and library skills (Bhaskar et al.,2009), (Myburgh, 2000), (Middleton,2002).

The current study will explore how researchers have developed a challenge based learning model via cloud technology and social media for enhancing information management skills, and how this can be seen as a good example of a successful learning and teaching tool.

### **Purpose of the study**

2.1 To design a challenge based learning model via cloud technology and social media for enhancing information management skills.

2.2 To evaluate the challenge based learning model via cloud technology and social media for enhancing information management skills

### **Conceptual Framework**

The conceptual framework of this study integrates a learning design using the ADDIE Model with the challenge based learning model, cloud technology and social media, as shown in Figure 1.

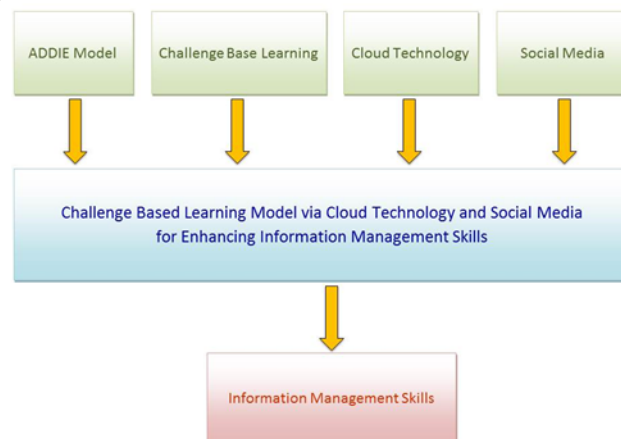


Figure 1: Conceptual Framework

## Scope of the study

### 4.1 Population:

The study population included nine experts in challenge based learning, cloud technology, social media and information management skills.

### 4.2. Samples:

Experts were chosen using purposive sampling of individuals with more than 5-year experience in relevant fields.

### 4.3. Study Variables:

4.3.1 The independent variable was the challenge based learning model via cloud technology and social media for enhancing information management skills.

4.3.2 The dependent variable was the evaluation of the model's appropriateness.

## Research Methodology

### 5.1 The first phase

The first phase involved developing the challenge based learning model via cloud technology and social media for enhancing information management skills:

5.1.1 The development of the model of challenge based learning via cloud technology social media for to enhancing information management skills used data collected from studies and analyses of relevant documents and other research

5.1.2 To present the challenge based learning model to an advisor for consideration and revision to present the challenge based learning model to the experts for consideration by means of in-depth interviews. To create the tools for evaluating the suitability of the model of challenge based learning.

### 5.2 The second phase

The second phase of the project was an evaluation of the challenge based learning model via cloud technology and social media for enhancing information management skills. The method was as follows:

5.2.1 To present the developed activity to the nine experts from the fields of challenge based learning model via cloud technology and social media for enhancing information management skills for a suitability evaluation.

5.2.2 To improve this model according to the suggestions of the experts.

5.2.3 To present this model in the form of a diagram within this report.

5.2.4 To analyze the results of evaluation of the model using mean ( $\bar{X}$ ) and standard deviation (S.D.) values from ratings on five evaluation criteria, measured using Likert scales. Response options included; very good, good, moderate, bad and very bad.

## Result

The result of this research is divided into 2 phase:

### 6.1 The first phase

The challenge based learning model via cloud technology and social media for enhancing information management skills is illustrated in Fig. 2.

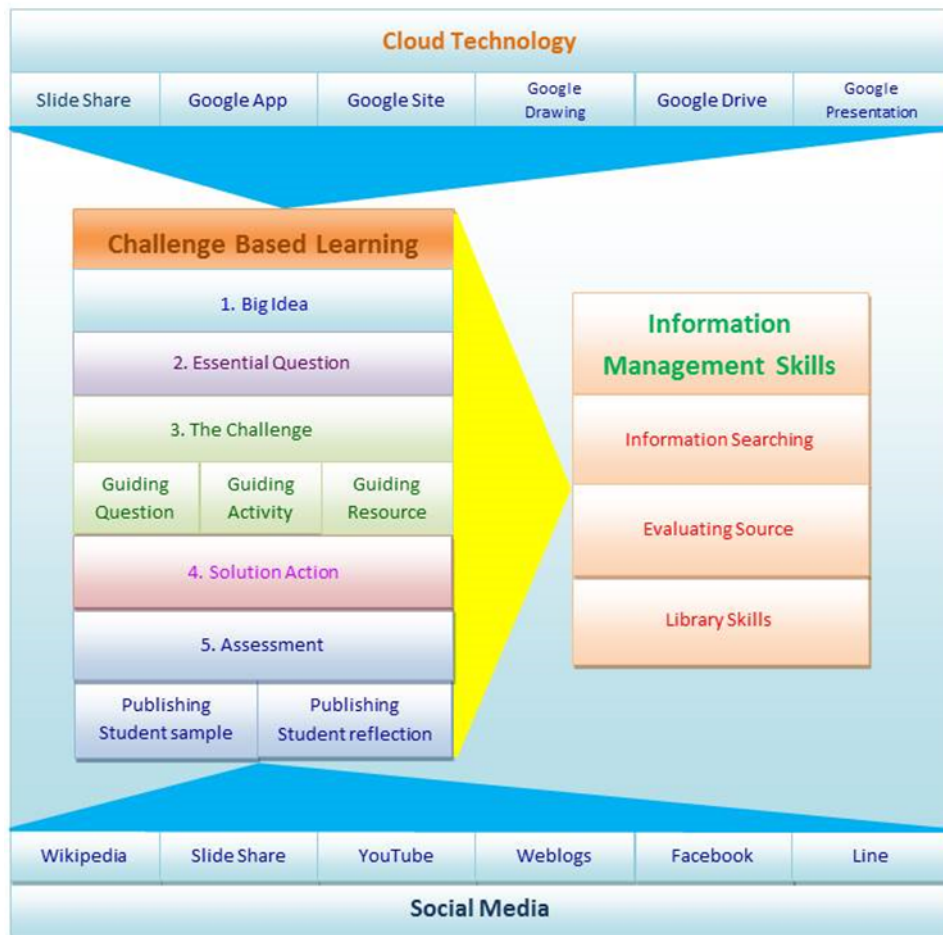


Fig. 2. The model of a Challenge Based Learning Model via Cloud Technology and Social Media for Enhancing Information Management Skills.

There are four main components to the challenge based learning model via cloud technology and social media, as follows:

- 1) The principles of the instruction model is a challenge based learning model via cloud technology and social media, and information management skills.
- 2) The objective of the instruction model is to develop information management skills.
- 3) The instruction process uses challenge based learning via cloud technology and social media in order to develop information management skills. This consists of a preparation before the learning component and operational instruction.
- 4) The assessment will involve examination of data collected on information management skills. This will consist of three components as follows: information searching, library skills and evaluating the source.

The challenge based learning model via cloud technology and social media for enhancing information management skills is divided into two stages: Part one involves the preparation process before actual instruction. This involves learners using challenge based learning activities via cloud technology and social media. Part two incorporates the challenge based learning instruction operation process via cloud technology and social media. This consists of five stages: 1) the big idea, 2) the essential question, 3) the challenge, 4) the solution action, and 5) the assessment.

## 6.2 The second phase

The results of the evaluation of the appropriateness of the challenge based learning model via cloud technology and social media for enhancing information management skills by nine professionals are presented in table 1.

Table 1: Suitability Evaluation of the Developed Instruction Model

Area Appraised	$\bar{X}$	S.D.	Suitability Quality
1. Components of the model are appropriate for information management skills development.	4.58	0.09	Very Good
2. The model's activities and process are appropriate for information management skills development.	4.61	0.08	Very Good
3. The model's activities and process are appropriate through cloud technology social media.	4.49	0.06	Good
4. The challenge based learning model via cloud technology and social media for enhancing information management skills is appropriate for real-life utilization.	4.56	0.08	Very Good
<b>Summary</b>	<b>4.56</b>	<b>0.01</b>	<b>Very Good</b>

This table shows that the nine experts agree that the appropriateness of the learning activities were very good (mean= 4.56, S.D. = 0.01). The elements in the list rated the highest are “the collaborative learning model using case-based learning via cloud technology and social media is appropriate for real-life utilization” (mean= 4.60, S.D. = 0.55), “components of the model are appropriate for ICT Literacy development” (mean = 4.40, S.D. = 0.55), “components of the model are appropriate for problem-solving skills development” (mean = 4.00, S.D. = 0.00), and “the model's activities and process are appropriate for problem-solving skills development” (mean = 4.00, S.D. = 0.71).

## Discussion

The results of the evaluation of a challenge based learning model via cloud technology and social media for enhancing information management skills is relevant to the research written by Siti Mariam Tajuddin and Azrol Jailani which states that challenge based learning is beneficial and effective for intelligent learning. Other research written by Utpal Jyoti Bora and Majidul Ahmed, 2013 states that when challenge based learning is applied to instruction processes, it can help learners to learn more effectively. The results of this study are also relevant to research written by the Department for Education and Skills (Department for Education and Skills, 2003) which states that information management skills can help learners to learn successfully..

## Recommendations

Educational institutions that wish to apply these learning models should be well prepared in terms of their infrastructure needs and network systems in order to successfully connect users of cloud technology and online social media to the internet.

## References

- Apple Inc., (2010). Challenge Based Learning: A Classroom Guide.
- Toni Ahlqvist, Asta Bäck, Minna Halonen and Sirkka Heinonen. (2008). *Social media road maps exploring the futures triggered by social media*, VTT Tiedotteita – Valtion Teknillinen Tutkimuskeskus.
- Bhaskar Prasad Rimal, Choi E and Ian Lumb. (2009). *A Taxonomy and Survey of Cloud Computing Systems*. Fifth International Joint Conference on INC IMS and IDC, Aug, 44-51.
- Elena and T.D. Wilson. (2005). *Introducing Information Management: an Information Research Reader*. London: Facet Publishing 3-17.
- Mariana Carroll and Merwe Avd. (2011). *Secure Cloud Computing Benefits*. Risks and Controls Information Security South Africa(ISSA), Johannesburg, South Africa: IEEE, Aug.
- Thailand's ICT Policy Framework B.E. 2554-2563. (2000). Ministry of Information and Communication Technology.
- Myburgh, Sue. . (2000). *The Convergence of Information Technology & Information Management*. Information Management Journal, April.
- Middleton, Michael. (2002). *Information Management: A Consolidation of Operation, Analysis and Strategy*. Wagga, NSW: Charles Sturt University, Centre for Information Studies. , Wagga Wagga, NSW, Australia, v-viii.
- Johnson, F. Laurence, Smith, S. Rachel, J. Smythe, Troy, Varon, and K. Rachel. (2009). *Challenge-Based Learning: An Approach for Our Time* Austin, The New Media Consortium, Texas.
- Siti Mariam Tajuddin and Azrol Jailani (2013). *Challenge Based Learning in Students for Vocational Skills*. International Journal of Independent Research and Studies 2(.2), 89-94
- The Department for Education and Skills (2003). *Information Management Skills for Success*, DfES Publications, Sherwood Park.
- Utpal Jyoti Bora, Majidul Ahmed (2013). *E-Learning using Cloud Computing*. International Journal of Science and Modern Engineering (IJISME) 1(2).

# Development of a model of Thai literature hypermedia electronic books with social media based on the reader-response theory to enhance reading comprehension of elementary school students

Jitlada Kumnuansin, Jintavee Khlaisang\*

*Department of Educational Technology and Communications, Faculty of Education, Chulalongkorn University, Bangkok 10330, Thailand*

---

## Abstract

This research study aims to develop a model of Thai literature hypermedia electronic book with social media based on reader-response theory to enhance reading comprehension of elementary school students. The model was developed based on the review of literature and the experts' interview. Then, it was tested by 20 elementary school students, followed by the approval from the experts. Data analysis indicated that there was statistical difference between pre and post test scores at .05 level of significant. The results of this study showed that the model should consist of 6 elements as detailed in the article.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** E-book; Thai literature; Social Media; Reader-response Theory; comprehension

---

## 1. Introduction

Literature is valuable to represent cultures, society and traditions in the past, but almost of people do not read it because literature is about history with ancient words that hard to understand the meaning, moreover the teaching methods are focus on memorizing vocabulary, passage or poem for examination more than reading comprehension.

In 1938, Louis Rosenblatt developed the reader-response theory for teaching literature. The theory focuses on the readers interact their experience and backgrounds with the text by questioning and discussing their ideas and opinions with other reader through personal meaning and perspectives that lead to the development of literature skill, reflective thinking, critical thinking and communication skills. Also note taking after reading for verify and extend the knowledge and comprehension.

Reading comprehension is an important thing and it is the primary goals of reading. The related literature and studies found that most students are low in Thai reading comprehension and inattentive to read especially in long text or passage that requires much effort and tools or text to help students understand what they're reading. Teachers do not help students to develop their reading comprehension also. When students lack of understanding reading comprehension, it will affect their reading habit.

Online learning classes have been use more and more today. The technology of online learning has been developed to support the sending and receiving message, ultimately leading to the creation of Social media. This asset to cooperation, sharing between learners, development of ideas, we can save time and we don't need to study in class and create more interpersonal communication. Therefore, it's appropriate to a model of Thai literature hypermedia e-book to exchange their experience with other readers.

The study found that one method to encourage people to read is interesting content, material, cover,

illustrations and an innovation of reading that different from the general book or technologies to support knowledge and reading comprehension. So, it interests researchers in developing a model of Thai literature hypermedia electronic books with social media based on the reader-response theory to enhance reading comprehension of elementary school students.

## 2. Methodology and Analysis

The research is divided into 3 phases:

*2.1 Phase 1: The development of a model of Thai literature hypermedia electronic books with social media based on the reader-response theory to enhance reading comprehension of elementary school students.*

- The research instrument
  - (1) A draft of the model.
  - (2) An interview form for 5 experts in educational technology or e-book, Thai language or reading comprehension, and Thai literature or reader-response theory.
  - (3) A model assessment form for 3 experts in educational technology or e-book, Thai language or reading comprehension, and Thai literature or reader-response theory.
- Research methodology and Results
  - (1) Researching the concepts, theories and related research in E-Book, Thai literature, social media, reader-response theory and reading comprehension for defining a framework and determine the elements of the model.
  - (2) Analysis and synthesis the essence and drafting the model. A draft of the model was patrolled by advisor and improved as the suggestion.
  - (3) Interviewing 5 experts on the draft model and revise.
  - (4) 3 experts assess the draft model and found that the prototype was highly possible to use for indicating.
  - (5) Enhance the model followed by an advice from the experts. The prototype of the model consist of 6 elements and 3 steps. The 6 elements were 1) Hypermedia 2) Social media 3) E-Book structure 4) Multimedia 5) Content and 6) Reading Strategy. The 3 steps were 1) The pre-reading phase 2) The during reading phase and 3) The post-reading phase.

*2.2 Phase 2: The tryout of a model of Thai literature hypermedia electronic books with social media based on the reader-response theory to enhance reading comprehension of elementary school students.*

- The research instrument
  - (1) An E-Book that was evaluated the quality by 5 experts.
  - (2) A reading comprehension parallel multiple choices for pre-test and post-test of 20 items.
  - (3) An observation form is divided into 4 items each item divided into 4 behavior levels, including 16 points.
  - (4) A student satisfaction towards studying with this model test. All questions used a 5-point Likert scale.
- Research methodology and Results

The research methodology and results consisted of 2 parts were

*Part 1: To create research tools for experiment according to the model.*

- (1) Analysis content, student, learning object, E-book's theory and the design to flowchart and E-book structure. According to the model and study lead to create an E-book and have 5 experts evaluates it. The result of the evaluation average is 4.58. After that, have 2 small groups of 3 and 9 students take the test, and improve it.
- (2) Create a reading comprehension parallel multiple choices test for pre-test and post-test, each test has 30 items for assessment by 5 experts. A test was revised on the advice of experts and trials with a similar group of students, then analysis it.



- 3) Create an observation form divided into 4 items each item has 4 behavior levels, including 16 points.
- 4) Create student satisfaction towards the model test. All questions used a 5-point Likert scale, had 3 experts evaluate questions and content.

*Part 2: To trial the model*

- 1) Before trial, preparing the place, computer, program and facilities for trial
- 2) 1<sup>st</sup> week, orientation the students and give them the pre-test.
- 3) 2<sup>nd</sup> – 5<sup>th</sup> week, the students read the E-book
- 4) 6<sup>th</sup> week, the students take the post-test and do the evaluation to see their satisfaction towards the model test.
- 5) The researcher analyzed the data with statistical system. The average of a student satisfaction towards the model test is 4.75. The first three items were E-book is attractive and interesting (mean= 4.80), Students have a better understanding of the content by questioning and answering their question (mean=4.75) and last, Sticky note is an interesting tool to share an idea and taking a note to summarize what they have read (mean=4.75).

The result of the reading comprehension test and the observation score is below by the table.

Table 1: Reading Comprehension Test

Test	Score	Mean $\bar{x}_s$	S.D.	t	Sig.
Pre-test	20	11.25	4.44	6.71**	.000.
Post-test	20	16.35	2.93		

\*\*p < .05

The results indicate that students who participated in the experimental group had reading comprehension post-test mean scores that were higher than their pre-test mean scores at the .05 level of significance

Table 2: Observation Score

Observation	Score	Mean $\bar{x}_s$	S.D.	t	Sig.
1 <sup>st</sup>	16	11.40	1.96	**4.97	.000.
4 <sup>th</sup>	16	14.10	1.334		

\*\*p < .05

The results show the observation score on the 4<sup>th</sup> week is higher than the score on the 1<sup>st</sup> week at the .05level of significance.

*2.3 Phase 3: The propose of a model of Thai literature hypermedia electronic books with social media based on the reader-response theory to enhance reading comprehension of elementary school students.*

- The research instrument

1) A model evaluation form for 5 experts in educational technology or e-book, Thai language or reading comprehension, and Thai literature or reader-responds theory

- Research methodology and Results

1) Assessed and qualified a model by 5 experts. The result was shown that the average is 4.76. The Elements of the model consist of 6 elements are 1) Hypermedia, 2) Social Media, 3) E-book, 4) Multimedia, 5) Content, and 6) Reading Strategy

### 3. Results

The results of this study consist of 6 elements which:

1) Hypermedia is internal and external link such as link into index or link to other sites through the text, pictures or buttons that appear on every page of the book; index button, dictionary button and social sticky note button.

2) Social Media is a two-way communication with a variety of mixed media. Interrelating in anytime, anywhere on the concept of Web 2.0 for exchange ideas with other readers to gain more knowledge.

3) E-book structure is the design like reading a book. The basic structure of the book consists of a cover page, table of contents, text, illustrations, reference and the name of its author. But E-book adds sound, animation, link, menu bar, turn to the next page or turn backwards.

4) Multimedia is the presentation in variety media. This innovation combines with content, pictures, animation, audio, games and other media. The principles of screen design and the appropriation of the students are necessary. This research has examined the literature that related to the multimedia principles are:

4.1) Illustration: colorful colors, simple, clear and corresponds to the content, placed in the middle or on the left and right side of the book, illustration's size is suite with book's dimension.

4.2) Font: 18-20 point, handwriting font type or round shape, font color depends on the background, the new words should be in red, present step by step if the message too long, allow students to control text bar if they want to read more, the text should not exceed 50 percent of the area of the screen, the text layout should balance with the background or illustration.

4.3) Game: The new game or the existing game is related with the content is useable, the game can be played by single player, has an instruction, providing feedback, should not be longer than 2 minutes and show timer of the game.

4.4) Audio, Video and Animation: Sound and pictures are clear, students can control the buttons, the image size fits to the screen, relating to the content and close to or on the experience of the students such as movies, advertisements and news.

5) Content is Thai prose or poem literature that appropriate with elementary school students and also duration for teaching.

6) Reading strategy is the techniques used to teach reading comprehension that reader-response theory for this research. The reader-response theory has 3 steps:

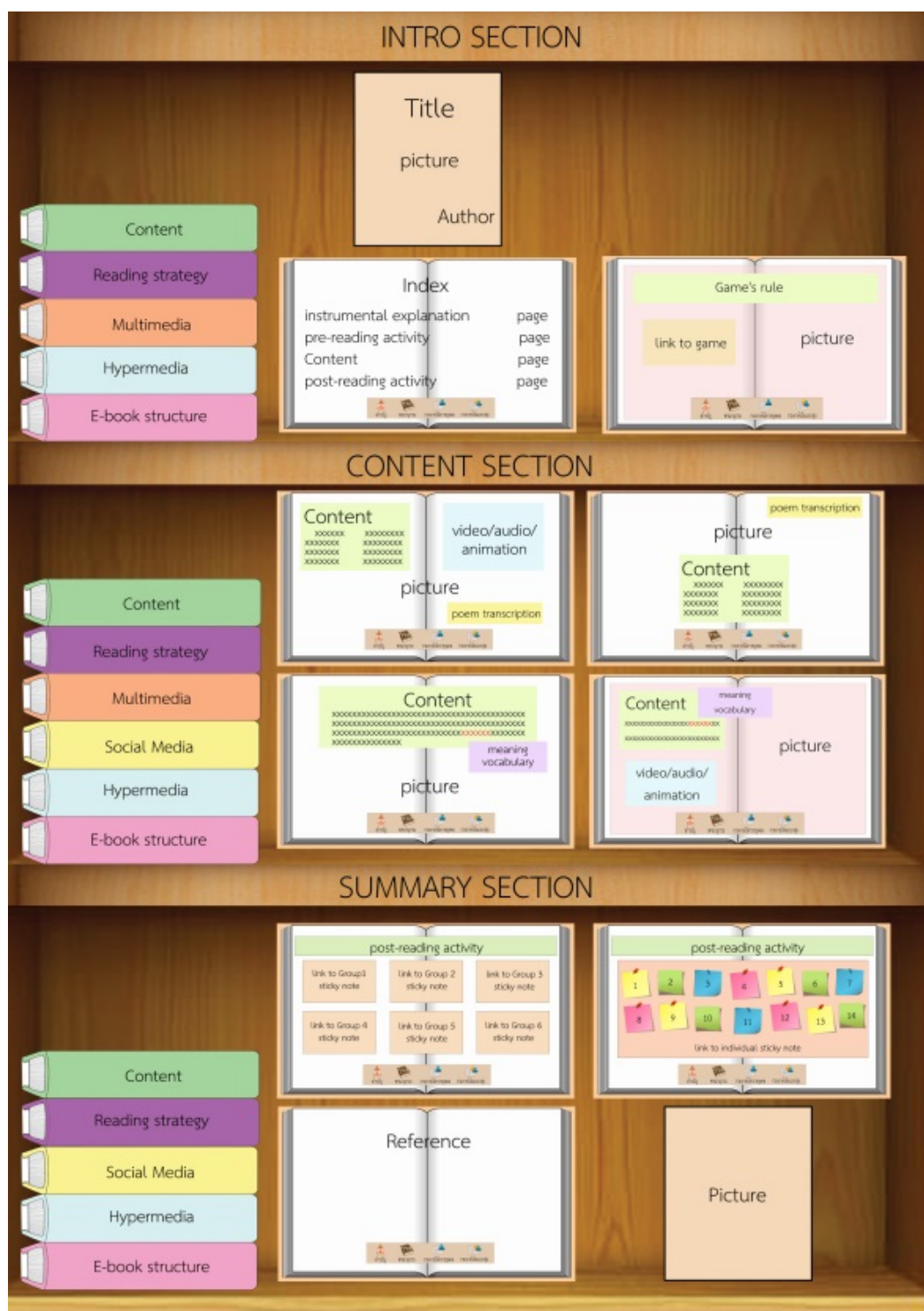
6.1) The pre-reading phase: motivate the students to read the literature by game which involve the experience of students and content in literature

6.2) The during reading phase: students read the E-book that contains text, video, audio, illustration, website, sticky note. Readers take note about impressive or confusing content, and new vocabulary in sticky note (individual).

6.3 The post-reading phase: divided students into groups, each group has 5-6 students. Teacher assigned 2 questions in social sticky note (group) then the students ask their friends with 1 question and select 1 question to answer, so student can share their experience, knowledge to achieve a comprehension.

INTE 2014

## **Appendix A. The Illustration of the proposed model**



## Acknowledgements

The researchers would like to thank The 90<sup>th</sup> Anniversary of Chulalongkorn University Fund (Ratchadaphiseksomphot Endowment Fund) and Chulalongkorn Conference Grant for funding this research.

## References

- Beach, R. (1993). *A Teacher's introduction to reader-response theories*. Urbana: National Council of Teacher of English.
- reading comprehension and reflective thinking abilities of undergraduate students. Master Thesis, Chulalongkorn University.
- Chase, N.D., and Hynd, C.R. (1987). Reader response: an alternative way to teach students to think about text. *Journal of Reading*. 30(6), Mar: 530-540.
- Huang, H.S. et al. (2011). *Reading comprehension strategies on fifth graders' reading comprehension ability*. Human-Computer Interaction. 6764, 570-579.
- Khlaisang, J. (2012). *Desktop Publishing to E-Book*. Bangkok: Chulalongkorn University Publishing.
- Larson, L.C. (2009). Reader response meets new literacies: empowering readers in online learning communities. *The reading teacher*. 62(8): 638-648.
- National Statistical Office. (2012). *The survey of Thai people's reading behavior in 2011*. [Online]. Available from: [http://service.nso.go.th/nso/nsopublish/themes/theme\\_2-3-1.html](http://service.nso.go.th/nso/nsopublish/themes/theme_2-3-1.html) [2013, July 22].
- Poore, M. (2013). *Using social media in the classroom*. California: SAGE.
- Pornthip, S. (2004). *A development of Thai literature instructional model based on reader response theory to enhance literature responding*.
- Pratern, M. (2000). *Teaching reading*. Bangkok: Odienstore.
- Songkram, N. (2011). *Multimedia for learning: Design & Development*. Bangkok: Chulalongkorn University Publishing.
- Sununtha, M. (1991). *Principles and methods of teaching reading in Thailand*. Bangkok: Thaiwattanapanich.

# Development of a two-tier diagnostic test to assess undergraduates' understanding of some chemistry concepts

Ayfer Mutlu<sup>a\*</sup>, Burcin Acar Sesen<sup>b</sup>

<sup>a</sup>Kirklareli University, Vocational School of Health Service, Kirklareli, 39100, Turkey

<sup>b</sup>Istanbul University, Hasan Ali Yücel Education Faculty, Science Education Department, 34070, Istanbul, Turkey

---

## Abstract

The purpose of this study was to develop a valid and reliable two-tier diagnostic test to assess students' undergraduates' understanding of some concepts in the context of undergraduate general chemistry course. For developing this test, firstly, content boundaries, learning objectives and alternative conceptions were identified. The first version of the test with an open ended part was applied on 68 pre-service science teachers, and qualitative analyses were made on open-ended part. According to results, both tiers were made in multiple-choice format. The test was validated by five chemistry educators and test was applied with 151 pre-service science teachers. The final version of the two-tier diagnostic test was consisted of 44 items, reliability coefficient was found to be 0.84.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** Acids and bases, chemical equilibrium, chemical kinetic, electrochemistry, thermochemistry, two tier diagnostic test

---

## 1. Introduction

Many students hold on to their own personal views and inadequate interpretations of particulate phenomena that develop from their individual experiences, culture and classroom instruction (Duit & Treagust, 1995). These interpretations called misconceptions influence how students learn new scientific knowledge play an essential role in subsequent learning (Özmen, 2004). Therefore alternative conceptions at all school levels constitute a major problem of concern to science educators and some methods have been developed to identify them.

Two-tier diagnostic test have been regarded as an effective assessment tool to determine students' conceptual understanding and alternative conceptions (Treagust, 1988; Odom & Barrow, 1995). In this test, there are two tiers and the first tier of each item consists of a multiple-choice question includes content knowledge. The second tier of each item contains reason for students' choosing to the first tier. The second tier included two, three, four or five responses, one of which was the expected answer. Distractors derived alternative conceptions from literature, interviews, and students justifications. This alternative assessment method has been used widely to assess students' understanding (e.g. Chandrasegaran, Treagust & Mocerino, 2007; Chu, Treagust & Chandrasegarana, 2009; Tan, Goh, Chia & Treagust, 2002; Tsui & Treagust, 2010)

### 1.1. Purpose of the Research

In this study, it was aimed to develop a two-tier diagnostic test to assess undergraduates' understanding of the subjects of *thermochemistry, chemical kinetics, chemical equilibrium, acids and bases and electrochemistry* in the context of undergraduate general chemistry course.

---

\* Corresponding author. Ayfer Mutlu Tel. +90-0288-214-38-25 fax: +0-000-000-0000  
E-mail address: ayferkaradas@gmail.com.

## *.2. Participants*

This study was conducted with 219 pre-service science teachers (18 to 21 years of aged) in an education faculty in Turkey. 68 of them were answered multiple-choice test with an open ended part. Two-tier diagnostic test was applied to 151 of them. The pre-service science teachers' socio- economic statuses were similar and all the participants achieved General Chemistry II course.

## *.3. Procedures*

In this study, two-tier diagnostic test was developed based on following Treagust's methods (1988) by the researchers. Development process was conducted on three phases and ten steps. The flowchart of instrument development process was presented in Figure 1.

### *Phase 1: Define the content area*

In this phase, firstly, content boundaries and learning objectives were determined according to research purpose. Following learning objectives were documented related to research area.

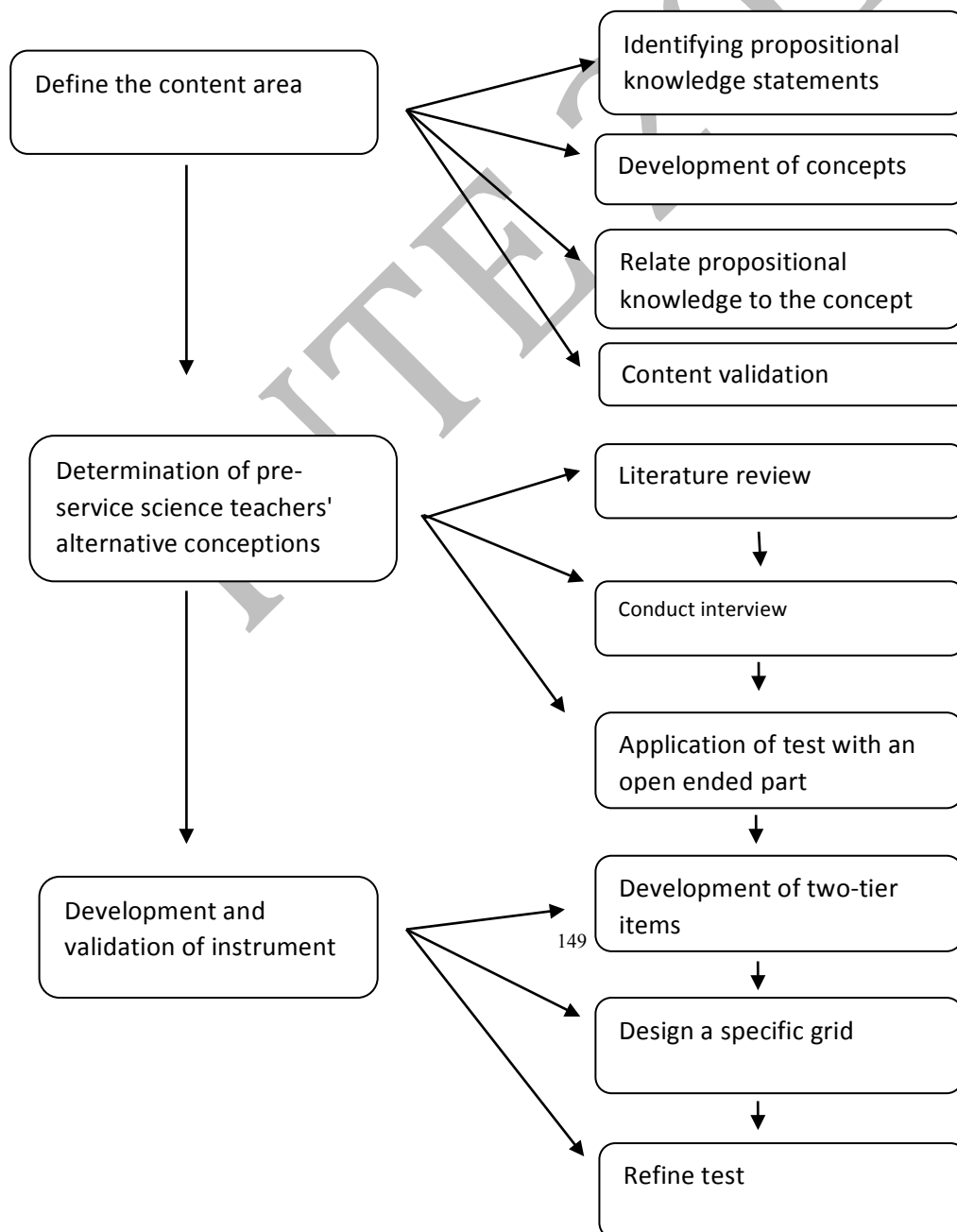
Thermochemistry;

- Students are able to explain reaction enthalpy.
- Students are able to calculate reaction enthalpy.
- Students are able to explain conversation of energy.
- Students are able to explain endothermic reactions.
- Students are able to compare different reactions' enthalpy by using calorimeter.
- Students are able to explain bond energy.

Chemical Kinetic

- Students are able to explain reaction rate.
- Students are able to compare value of reaction constant on multiple-step reactions.
- Students are able to interpret effective collisions.
- Students are able to interpret effect of concentration on reaction rate.
- Students are able to compare effect of temperature on endothermic and exothermic reactions' rate.
- Students are able to explain effect of temperature on reaction constant.
- Students are able to explain effect of surface on reaction rate.
- Students are able to interpret effect of catalyst on reaction rate.

Figure 1: Scheme of the development process of two-tier diagnostic test based on Treagust (1988) in this study





#### Chemical Equilibrium

- Students are able to explain equilibrium dynamics on a reaction.
- Students are able to explain Le Chatelier Principle.
- Students are able to explain effect of concentration on equilibrium.
- Students are able to explain effect of temperature on equilibrium

#### Acids and Bases

- Students are able to explain strength of acids and bases.
- Students are able to explain pH.
- Students are able to interpret neutralization.
- Students are able to interpret acid-base equilibrium.
- Students are able to explain indicators and principles of their using.
- Students are able to explain titration.
- Students are able to choose best indicator for titration.
- Students are able to explain properties of end point.
- Students are able to explain properties of equivalence point
- Students are able to compare end point and equivalence point.
- Students are able to describe buffers.
- Students are able to interpret buffers mechanism.

#### Electrochemistry

- Students are able to determine anode and cathode according to several variables.
- Students are able to explain metal electrodes.
- Students are able to explain plating and galvanization.
- Students are able to explain effect of concentration on cell potential.

Then, concept maps for each subject were developed and relationship between propositional knowledge and concept maps was examined. All concept maps were validated by five chemistry educators. Development of the test depend the final version of the propositional knowledge statements and concept maps.

#### *Phase 2: Determination of pre-service science teachers' alternative conceptions*

In this phase, alternative conceptions were identified according to literature review (step 5) and pre-service science teachers' semi-constructive interviews (step 6). Later, 46 multiple-choice items with an open ended part, in which students were required to explain their reason for their answers to the first part, was constructed. Test was validated by five chemistry educators and it was applied to 68 pre-service science teachers. The responses of the open-ended questions were analyzed. A list of pre-service science teachers' responses was constructed from their justifications that were provided to the 46 multiple-choice items, literature review and their interviews. Distractors included alternative conceptions were constructed according to this list. These alternative conceptions were subsequently used in the construction of the two-tier multiple-choice diagnostic instrument.

### Phase 3: Development and validation of instrument

In the last phase, two-tier diagnostic test was developed in which the first tier is the conventional multiple choice step and the second tier is the possible reasons of the given answer for the first tier. The second tier included two, three, four or five responses, one of which was the expected answer. Distractors included high frequencies incorrect reasons and scientifically unacceptable conceptions held by pre-service science teachers, literature review and interviews. Distributions of items according to subjects and an example question were presented respectively in Table 1 and Table 2.

Table 1. Distributions of items according to subjects in the final version of the two tier diagnostic test

Subjects	Items
Thermochemistry	Q6, Q15, Q24, Q35, Q41, Q44
Chemical Kinetic	Q1, Q4, Q7, Q8, Q10, Q11, Q12, Q14, Q16, Q18, Q38
Chemical Equilibrium	Q27, Q30, Q32, Q34, Q36
Acids and Bases	Q2, Q5, Q9, Q13, Q17, Q19, Q20, Q21, Q23, Q25, Q28, Q29, Q31, Q37, Q42, Q43
Electrochemistry	Q3, Q22, Q26, Q33, Q39, Q40

For content validity, the test was examined by five chemistry educators and this test was applied on 151 pre-service science teachers. Then, item analysis and reliability analysis were made.

Table 2. An example question related to catalyst

$\text{H}_2\text{O}_2 + \text{I}^- \rightarrow \text{OI}^- + \text{H}_2\text{O}$ $\text{H}_2\text{O}_2 + \text{OI}^- \rightarrow \text{H}_2\text{O} + \text{I}^- + \text{O}_{2(g)}$ <hr/> $2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_{2(g)}$ <p><b>In the reaction above, which of the following is true about I<sup>-</sup> ?</b></p> <p>a) It serves as an indicator.  b) Products energy is increased by it.  c) If it isn't in the reaction environment, reaction does not occur.  d) It doesn't affect reaction equilibrium.  e) Reaction enthalpy is decreased by it.</p> <p><b>BECAUSE;</b></p> <p>A) Reaction is gone to equivalence point quickly by it.  B) Reaction yield is increased by it.  C) Both forward and reverse reaction rate is increased same ratio by it.  D) It provides energy to occur the reaction  E) It causes to change potential energy of product and reactant.</p>
--

## Results and Discussion

In this study, item analysis was conducted to identify items discrimination and difficulty. Results were presented in Table-3 for all tiers.

According to item analysis results, two items took off from the test because their discrimination indices were negative. Other items discrimination and difficulty indices were average level. The difficulty levels were 0.3 and 0.77 with an average of 0.50 based on the two-tier test scores item analysis. Moreover, discrimination levels were identified between 0.2 and 0.64 and average of them was calculated as 0.39. The final version of the two-tier diagnostic test was consisted of 44 items. Item discrimination indexes below 0.19 should be eliminated or completely revised (Crocker & Algina, 1986; Tan, 2006); and there were not any indexes below the criteria in our study as presented in the Table-3.

Moreover, the responses were analysed using a SPSS statistics software program. While analyzing these data, the answer was considered to be correct if both tiers were correctly answered (Treagust, 1988). Therefore one point was given for items only when both parts of the item were correctly answered, and zero point were given for items when either part was incorrectly answered. The reliability of the instrument was established by a Cronbach alpha coefficient of 0.84. If reliability coefficient is over 0.70-0.80, instrument is reliable (Özgül, 1998) and our value was also consistent with other two-tier tests (e.g. Chandrasegaran, Treagust & Mocerino, 2007; Tsui & Treagust, 2010).

Table 3. Item statistics of two tier diagnostic test

First Tier					Second Tier				
Items	Disc. Index	Diff. Index	Disc. Index	Diff. Index	Items	Disc. Index	Diff. Index	Disc. Index	Diff. Index
1	0.63	0.28	0.62	0.29	24	0.30	0.62	0.33	0.59
2	0.60	0.24	0.60	0.27	25	0.62	0.31	0.38	0.52
3	0.72	0.27	0.62	0.27	26	0.46	0.47	0.30	0.59
4	0.60	0.23	0.60	0.29	27	0.74	0.25	0.32	0.59
5	0.59	0.35	0.62	0.26	28	0.72	0.26	0.36	0.57
6*	0.38	0.56	0.15	-0.10	29	0.37	0.43	0.36	0.48
7	0.73	0.26	0.48	0.25	30	0.46	0.32	0.46	0.20
8	0.60	0.33	0.40	0.43	31	0.41	0.30	0.34	0.56
9	0.72	0.40	0.72	0.39	32	0.59	0.32	0.57	0.34
10	0.46	0.25	0.30	0.22	33	0.63	0.33	0.50	0.32
11	0.60	0.37	0.51	0.32	34	0.67	0.35	0.59	0.42
12	0.37	0.52	0.30	0.57	35*	0.44	0.47	0.20	-0.13
13	0.46	0.45	0.32	0.42	36	0.59	0.39	0.31	0.59
14	0.50	0.44	0.34	0.59	37	0.36	0.45	0.41	0.37
15	0.40	0.47	0.44	0.48	38	0.42	0.21	0.32	0.56
16	0.82	0.20	0.53	0.26	39	0.32	0.56	0.31	0.57
17	0.56	0.29	0.47	0.50	40	0.75	0.20	0.66	0.23
18	0.73	0.27	0.63	0.21	41	0.47	0.22	0.63	0.22
19	0.32	0.54	0.34	0.54	42	0.77	0.29	0.66	0.40
20	0.30	0.27	0.32	0.57	43	0.62	0.41	0.58	0.47
21	0.30	0.48	0.32	0.64	44	0.45	0.42	0.32	0.54

22	0.63	0.35	0.27	0.64	45	0.55	0.34	0.41	0.46
23	0.61	0.26	0.51	0.20	46	0.30	0.64	0.56	0.21

In the light of the results it can be concluded that the developed two-tier test provide to be a reliable and valid instrument to assess undergraduates' alternative conceptions and identify their conceptual understanding of the subjects of *thermochemistry*, *chemical kinetics*, *chemical equilibrium*, *acids and bases* and *electrochemistry* in the context of undergraduate general chemistry course.

## References

- Chandrasegaran, A. L., Treagust, D. F., & Mocerino, M. (2007). The development of a two-tier multiple-choice diagnostic instrument for evaluating secondary school students' ability to describe and explain chemical reactions using multiple levels of representation. *Chemistry Education Research and Practice*, 8(3), 293-307.
- Chu, H. E., Treagust, D. F., & Chandrasegaran, A. L. (2009). A stratified study of students' understanding of basic optics concepts in different contexts using two-tier multiple-choice items. *Research in Science & Technological Education*, 27(3), 253-265.
- Crocker, L., & Algina, J. (1986). *Introduction to classical and modern test theory*. Florida: Holt, Rinehart and Winston INC.
- Duit, R., & Treagust, D. F. (1995). Students' conceptions and constructivist teaching approaches in Fraser B. J. and Walberg H. J. (ed.), *Improving science education* (pp. 233-248). Chicago, IL: The National Society for the Study of Education.
- Odom, A. L., & Barrow, L. H. (1995). Development and application of a two-tier diagnostic test measuring college biology students' understanding of diffusion and osmosis after a course of instruction. *Journal of Research in Science Teaching*, 32(1), 45-61.
- Özgüven, İ. E. (1998). *Psikolojik testler*. Ankara: PDREM Yayınları.
- Özmen, H. (2004). Some student misconceptions in chemistry: A literature review of chemical bonding. *Journal of Science Education and Technology*, 13(2), 147-159.
- Tan, Ş. (2006). *Öğretimi planlama ve değerlendirme*. Ankara: Pegem A Yayıncılık.
- Tan, K. C. D., Goh, N. K., Chia, L. S., & Treagust, D. F. (2002). Development and application of a two-tier multiple choice diagnostic instrument to assess high school students' understanding of inorganic chemistry qualitative analysis. *Journal of research in Science Teaching*, 39(4), 283-301.
- Treagust, D. F. (1988). Development and use of diagnostic tests to evaluate students' misconceptions in science. *International Journal of Science Education*, 10(2), 159-169.
- Tsui, C. Y., & Treagust, D. (2010). Evaluating Secondary Students' Scientific Reasoning in Genetics Using a Two-Tier Diagnostic Instrument. *International Journal of Science Education*, 32(8), 1073-1098.

# Development of an Attitudes Scale toward Online Assessment

Emrah GÜL<sup>a</sup> \* Ömay ÇOKLUK<sup>b</sup>, Çilem DOĞAN GÜL<sup>c</sup>

<sup>a</sup>Ankara University, Faculty of Educational Sciences, Department of Measurement and Evaluation, Ankara, Turkey

<sup>b</sup>Ankara University, Faculty of Educational Sciences, Department of Measurement and Evaluation, Ankara, Turkey

<sup>c</sup>Ankara University, Faculty of Educational Sciences, Department of Measurement and Evaluation, Ankara, Turkey

## Abstract

Measurement and evaluation applications via Internet have an important position in education and psychology. Online assessment provides considerable opportunities particularly in teaching and education to monitor students' academic achievements when combined with well designed learning goals. The purpose of the study is to develop "Attitudes toward Online Assessment Scale". As a result of the literature review, an initial form that included testing items was obtained and those items were submitted to expert view. In the light of expert views, scale items were rearranged and the initial form was given to a total of 231 pre-service teachers included in online assessment applications (113 from Department of Science and Technology; 118 from Computer Education and Educational Technology). Exploratory and confirmatory factor analyses were performed to determine constructional validity of the scale. As a result of exploratory factor analysis, it was seen that it was a 3-factor-scale consisting of "contribution of online assessment applications to teaching and education", "liking online assessment applications" and "use of online assessment applications" and a total of 26 items. Factor loadings of the scale items ranged from 0.45 to 0.78; item total correlations from 0.20 to 0.76; reliability coefficients from 0.62 to 0.91. What's more, the 3-factor construction obtained from the exploratory factor analyses was tested by confirmatory factor analyses and it was seen that the tested model was confirmed with high fit indices. The findings obtained from the study showed that the "An Attitudes Scale Toward Online Assessment" was valid and reliable.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** Online assessment, attitude, exploratory factor analysis, confirmatory factor analysis

## 1. Introduction

Education is undoubtedly the most crucial process in shaping and improving societies. Effective and fruitful utilization of the process is critical for educational goal attainment. The process requires proper planning, implementation and evaluation. It is known that different methods used to increase students' academic achievements make significant contributions to the elevation of education to desired levels. Inarguably, the concept of attitude, which increases academic achievement and constitutes an important part of learning-teaching processes, has been one of the most significant study fields of education and psychology for years.

An attitude is a cognitive, affective and behavioral response to any psychological objects or attitude objects in the environment or to social issues or incidents, organized by individuals based on their experience, motivation and knowledge. Smith (1968) defines attitude as "a tendency that regularly constitutes people's thoughts, emotions and

\* Corresponding author. Emrah GÜL. Tel: (0 312) 363 33 50  
E-mail address: egul@ankara.edu.tr

behaviors toward a psychological object". The psychological object means any objects that make sense to an individual or that an individual is aware of whereas an attitude object is a thing to which one has an attitude. An attitude is a phenomenon that is learned, shapes people's behaviors and causes bias in decision making process. Attitudes are formed as a result of experiences and learning process (Tavşancıl, 2006).

In the age of technology, computers have become attitude objects. Therefore, students' attitudes toward both computers and online applications are crucially important. When educational literature development is considered, online applications have also led to significant developments in education, as in many fields, and have been used by many researchers. Research on online applications particularly in measurement and evaluation applications, an indispensable part of teaching, has shown the significance of assessment (Robles and Braathen, 2002; Wen and Tsai, 2006).

Online assessment can be used for the evaluation of academic achievement. Online assessment significantly contributes to learning when assessed because it provides students with prompt feedback on learned information or concepts. In consideration of practices in traditional classes, generally a few students, when asked a question by teachers, have the chance of answering that question and it is not possible to assess whether others have understood the topics covered during the lesson or not. When students are asked questions online, teachers might give instant feedback, seeing each student's question while teaching and thus teaching becomes much more successful (Robles and Braathen, 2002). We may suggest that the number of applications in higher education where online assessment is effectively used is rather restricted although online assessment methods have the above mentioned advantages (Wen and Tsai, 2006). The number of educational software is increasing every day and such software is offered to students' access. It is essential to pay attention to technological developments also in measurement and evaluation since technology has become integrated with education. Offering online tests for evaluation of students' performances, and familiarization and guidance will make both test applications more economical and reporting process faster. What's more, confidentiality of tests will be controlled more.

Generally speaking, when online test applications are historically considered, it is seen that such applications are not new and can be traced back to the 1970s (Walter, Daeschner, Hoffman and Lyons, 1970). As a result of the online test application studies by The US Army and clinical psychologists, some advantages such as unbiased scorers and controlled test validity have been mentioned. Until 1985, research showed that especially when psychological tests were applied online, there were no significant differences between the test scores obtained from paper and pencil forms and online forms to measure intelligence and abilities and high correlations were observed between the forms (Mills, Potenza, Fremer, Ward, 2002; Russel, Goldberg, O'Connor, 2003).

Use of online assessment applications in general ability and intelligence tests has advantages, especially in drawing shapes, visual aid utilization and so on. In their study, Pellegrino, Hunt, Abate and Farr (1987) suggested people could be offered stable and mobile objects on account of computer technology and also variables such as response time in answering test items could be measured.

Attitudes, of course, are good predictors of academic achievement. Attitudes of students toward online assessment are critical as they enable them to use online applications effectively. In recent years, it has been observed that technology was largely employed in most educational studies. However, it is also clear that the number of studies to explore attitudes of students toward online assessment is not high (Dermo, 2009). Generally, in technology supported research, attitudes toward computers and technology are measured and academic achievement is attempted to be predicted by those variables, but attitudes of students toward online assessment applications might be negative although their attitudes toward computers are positive (Bindak and Çelik, 2006; Ergün, 2002).

PISA Report (2010) of Computer Based Assessment of Student Skills in Science, it examined whether score means obtained from a paper and pencil test and an online test version of student skills in science significantly varied. Data analysis showed that there were no significant differences between the test scores of the students obtained from the paper and pencil form and the online form of the test, but the male participants got higher scores in the online version of the test when compared to the female ones. However, it was suggested that the high performances of the male participants in the online version of the test could not be predicted by those variables as there were no significant differences between motivation, computer familiarization and enjoyment and the test performances.

The discussions above show that it is essential to examine attitudes and views of participant students in online assessment applications because attitudes toward assessment influence the face validity of assessment (Anastasi, 1982). If students do not trust tests they have taken, then they will not give reliable reactions to test stimulants (Domino and Domino, 2006). The attitude variables observed in the above mentioned studies are not sufficient to predict online applications. The main purpose of the research is to develop a reliable, valid attitude scale for online assessment.

## **1. “Attitudes toward Online Assessment Scale (AOAS)” Development Steps**

### **1.1. Step I: *Item Writing***

For the AOAS development, the literature was reviewed first. In the review, assessment studies were taken into account and a 52-item item pool was started. It was particularly regarded that the scale items would be about cognitive, affective and behavioral components of attitudes and would include statements in present tense and first person narrative perspective in general (Erkuş, 2003). In wording, the items that would cause similar responses from individuals with different attitudes were considered as they were known to be insufficient in attitude measurement. The numbers of positive and negative expressions were converged as much as possible. Out of 52 items, 26 were arranged to serve cognitive components, 14 to serve affective components and 12 to serve behavioral components and 29 of them were positively constructed while 23 items were negatively constructed.

The initial form consisting of a total of 52 items was rearranged pursuant to expert view. The scale was assessed by three experts of measurement and evaluation according to suitability for attitude components. The scale was finalized by extracting the items which did not give good fit in factors and did not have the features of attitude components. Then, the scale was examined by a linguist in terms of language and wording. After the necessary changes, the number of the scale items was lowered to 41 and was ready for the pre-test application. The participants were asked to mark their attitudes on a 5 point Likert type scale with the following options: “I totally agree”, “I agree”, “I am uncertain”, “I disagree” “I totally disagree”.

### **1.2. Step II: *Pilot Study and Study Group***

The study group of the research consisted of a total of 213 pre-service teachers from Department of Computer Education and Educational Technology (N=113) and Department of Science Teaching (118) of Firat University and Atatürk University. During the selection of the study group, pre-service teachers’ familiarization with online assessment applications was the main concern; in other words, they were expected to have used those applications for a semester at least. In this context, it can be said that the study group consisted of those who constantly used online assessment applications and grasped the nature of online assessment. 135 of the pre-service teachers included in the study group were female (58.4%) while 96 were male (41.5%).

### **1.3. Step III: *Validity Studies of the AOAS***

In abstract concepts, like attitudes, that could not be directly observed, presenting the obtained scores and the relevant construct or evidence for the existence of a construct which is considered to be relevant to scale scores are important in that the measurement tool serves the intended measurement. Therefore, construct validity study is done to see whether the measurement tool which is developed to measure a construct predicted by scientists actually measures the estimated construct (Erkuş, 2003; Tavşancıl, 2002).

Construct validity is the extent to which a measurement tool shows theoretical construct that is intended to be measured by that tool (Anastasi, 1982). Factor analysis is the most frequently used method for construct validity. Exploratory factor analysis was performed to determine validity of the AOAS.

### 1.3.1. Exploratory Factor Analysis (EFA)

Kaiser-Meyer-Olkin (KMO) test, before factor analysis application, was employed to test factorization fit of the sample size. As a result of the analysis, KMO value of the sample that consisted of 231 participants was found 0.93. In the light of this finding, the sample size was considered “excellent” for factor analysis (Tavşancıl, 2006; Çokluk, Şekercioğlu and Büyüköztürk, 2012). Also, the result of Bartlett Sphericity Test was significant ( $\chi^2_{(2:3413.28, p < 0.01)}$ ). These findings showed that the data set had good fit for factor analysis. In order to show factor construct of the scale, principal components analysis, as the factorization method, and Varimax, one of vertical rotation methods, were employed. 0.32 was taken as the minimum limit for factor loadings while deciding whether the scale items were to be extracted or not.

As a result of exploratory factor analysis, the number of factors was decided in consideration with eigen values and scree plot graphs. It was seen that three factors had eigen values higher than 1 and the split in scree plot was in the third factor and a plateau pattern was seen on the graph followed by that value. Thus, a three-factor restriction was decided. As a result of the second factor analysis, total explained variance was found 53.77%. As a result of EFA, 15 items with factor loadings lower than 0.32 and/or with high factor loadings in more than one factor were extracted and re-analyzed. A difference of .10 between factor loadings was taken as the criteria to explore whether the items had high factor loadings in more than one factor or not (Tavşancıl, 2006). The Attitudes toward Online Assessment Scale is grouped under a total of three factors and the rotated factor loadings are presented in Table 1.

As it is clear from Table 1, the first factor entitled “Contribution of Online Assessment Applications to Teaching and Education” of the “Attitudes toward Online Assessment Scale” consisted of 10 items and the vertically rotated factor loadings by using Varimax method ranged from 0.53 to 0.76. When item-total correlations of the items in this factor are considered, it is seen that they ranged from 0.59 to 0.76. The unique variance explained by this factor was 23.58 %.

“Liking Online Assessment Applications”, the second factor of the “Attitudes toward Online Assessment Scale” consisted of 11 items and the vertically rotated factor loadings by using Varimax method ranged from 0.49 to 0.78. When item-total correlations of the items in this factor are considered, it is seen that they ranged from 0.63 to 0.73. The unique variance explained by this factor was 22.39 %.

“Use of Online Assessment Applications”, the third factor of the “Attitudes toward Online Assessment Scale” consisted of 5 items and the vertically rotated factor loadings by using Varimax method ranged from 0.45 to 0.68. When item-total correlations of the items in this factor are considered, it is seen that they ranged from 0.20 to 0.64. The unique variance explained by this factor was 7.80 %.

Table 1. Exploratory Factor Analysis Results for the Attitudes toward Online Assessment Scale

Factor I: Contribution of Online Assessment Applications to Teaching and Education	Rotated Factor Loading	Corrected Item-total Correlation
--	------------------------	----------------------------------



Item 1	.76	0.69**
Item 2	.75	0.64**
Item 3	.73	0.73**
Item 4	.72	0.69**
Item 5	.69	0.76**
Item 6	.69	0.59**
Item 7	.64	0.67**
Item 8	.63	0.63**
Item 9	.61	0.71**
Item 10	.53	0.65**
Eigen Value= 11.40 and Explained Variance= 23.58%		
Factor II: Liking Online Assessment Applications		
Item 11	.78	0.69**
Item 12	.71	0.70**
Item 13	.71	0.63**
Item 14	.69	0.67**
Item 15	.62	0.63**
Item 16	.62	0.66**
Item 17	.61	0.69**
Item 18	.59	0.68**
Item 19	.59	0.72**
Item 20	.56	0.73**
Item 21	.49	0.63**
Eigen Value= 1.67 and Explained Variance= 22.39%		
Factor III: Use of Online Assessment Applications		
Item 22	.68	0.20*
Item 23	.59	0.42**
Item 24	.46	0.64**
Item 25	.45	0.37**
Item 26	.45	0.63**
Eigen Value= 1.45 and Explained Variance=7.80%		
$\chi^2: 3413.28, p < 0.01$		
KMO: .93		
Total Explained Variance: 53,77%		
**p< 0.01 *p< 0.05		

### 1.3.2. Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis is an analysis which tests whether a pre-defined, restricted construct is confirmed as a model (Brown, 2006). The research examined whether the 3-factor construct assessed by EFA was confirmed by CFA. As a result of CFA, fit indices were found  $\chi^2=747,64$  (sd=321,  $p<.001$ ), ( $\chi^2$ /sd)=2.32, RMSEA=0.07, GFI=0.81 and AGFI=0,77. Coefficients of item-factor correlations calculated by CFA are presented in Figure 1.

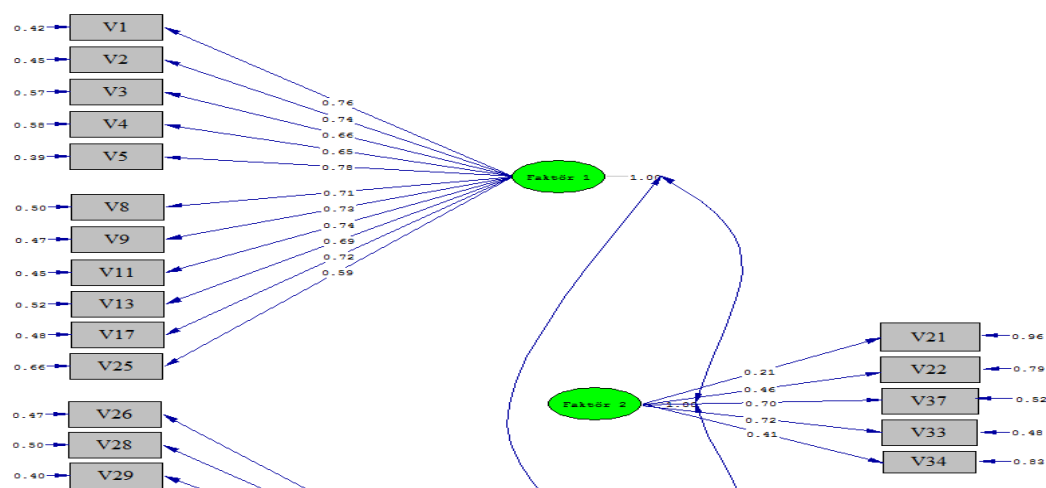


Fig. 1. CFA Results of the AOAS

When CFA results are considered, the construct that was tested to decide if  $\chi^2/df= 2.32$  had excellent fit (Kline, 2005). RMSEA=0.07, another fit index, indicates good fit (Hu and Bentler, 1999; Thompson, 2004). It is suggested in the literature that GFI and AGFI values equal to 1 represent excellent fit (Hooper, Coughlan and Mullen, 2008; Kelloway, 1989; Schumacker and Lomax, 1996; Sümer, 2000). In this study, the following values were found: GFI= 0.81 and AGFI=0.77 and they were accepted as sufficient.

#### **1.4. Step IV: *Reliability Studies of the AOAS***

For reliability of the AOAS, Cronbach alpha coefficient was employed. Cronbach alpha coefficients of the overall test and the factors were found 0.93, 0.91, 0.91 and 0.62 respectively. The estimated Cronbach alpha coefficients showed that the scale had high reliability.

## **2. *Results***

The study aimed at developing a reliable, valid data gathering instrument to be employed in the exploration of attitudes of pre-service teachers toward online assessment methods. The scale that initially consisted of 41 items was applied to a group of pre-service teachers after a period of preparation, and reliability and validity analyses were performed on the data obtained from the pilot study. As a result of exploratory factor analysis, the scale items were grouped under the following three factors: “contribution of online assessment applications to teaching and

education”, “liking online assessment applications” and “use of online assessment applications”. On the other hand, 15 items were extracted as they had low factor loadings or high factor loadings in more than one factor.

As a result of the exploratory factor analysis of the scale, the construct clustered under three factors was tested by confirmatory factor analysis and  $\chi^2/df$ , RMSEA, GFI and AGFI fit indices were evaluated and it was observed that all the indices were sufficient in terms of model fit. Also, the estimated Cronbach alpha coefficients showed the scale had high reliability.

As a result, the first factor of the AOAS consisted of 10 items, the second 11 items and the third 5 items. The scale was scored in the following way: 1-I totally disagree and 5-I totally agree. Moreover, a total of nine items in the scale were reversely scored.

When the findings of the exploration of validity and reliability of the “Attitudes toward Online Assessment Scale” are collectively considered, we may suggest that the scale is a reliable, valid tool to be employed in studies to explore attitudes of pre-service teachers toward online assessment. In the light of the findings obtained from the research, it can be suggested that the tool developed in the study will cover a considerable need in the literature and be a measurement tool with psychometrically sufficient qualities for further studies.

## References

- Anastasi, A. (1982). *Psychological testing*. London: Macmillan.
- Bindak, R. ve Çelik, H.C. (2006). Öğretmenler için Bilgisayar Tutum Ölçeğinin Güvenirlik Geçerlik Çalışması, *Eurasian Journal of Educational Research-EJER*. 22: 38 - 47.
- Çokluk, Ö., Şekercioğlu, G. ve Büyüköztürk, Ş. (2012). *Sosyal Bilimler için Çok Değişkenli İstatistik: SPSS ve Lisrel Uygulamaları*. Ankara, Pegem Akademi
- Dermo J., (2009). E-Assessment and the student learning experience: A survey of student perceptions of e-assessment. *British Journal of Educational Technology*, 40 (2) 203-214
- Domino, G. ve Domino, M. L. (2006). *Psychological testing: an introduction*. Cambridge: Cambridge University Press.
- Ergün, E. (2002). Üniversite Öğrencilerinin Bilgisayar Destekli Ölçmeden Elde Ettikleri Başarının Kalem-Kâğıt Testi Başarısı, Bilgisayar Kaygısı ve Bilgisayar Tecrübeleri Açısından İncelenmesi. Yayımlanmamış yüksek lisans tezi. Anadolu Üniversitesi Eğitim Bilimleri Enstitüsü, Eskişehir.
- Erkuş, A. (2003). Psikometri Üzerine Yazılar, *Türk Psikologlar Derneği Yayınları* No: 24, Ankara.
- Hooper, D., Coughlan, J., ve Mullen, M. (2008). Structural equation modeling: Guidelines for determining model fit. *The Electronic Journal of Business Research Methods*, 6 (1), 53-60.
- Hu, L. ve Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1-55.
- Kelloway, K. E. (1989). *Using LISREL for structural equation modeling: A researcher's guide*. London: Sage.
- Kline, R. B. (2005). *Principles and Practice of Structural Equation Modeling*. (Second Edition). NY: Guilford Publications, Inc.
- Millî Eğitim Bakanlığı. (2011). Fırsatları Artırma Teknolojiyi İyileştirme Hareketi. Web: <http://fatihprojesi.meb.gov.tr/tr/icerikincele.php?id=6>
- Mills, C. N., Potenza, M.T., Fremmer, J.J., Ward, W.C. (2001). *Computer Based Testing: Building the Foundation for Future Assessment*. Lawrence Erlbaum Associates, Publishers: Londra
- Özguven, E. (1994). *Psikolojik Testler*, Ankara: Yeni Doğu Matbaası
- Pellegrino, J.W., Hunt, E.B., Abate, R. ve Farr, S. (1987). A Computer-based test battery for the assessment of static and dynamic spatial reasoning abilities. *Behavior Research Methods, Instruments & Computers*. 19(2), 231-236.
- PISA (2010). *PISA Computer- Based Assessment of Student Skills in Science*. OECD Publications.
- Robles B., ve Braathen S. (2002). Online assessment techniques. *Delta Pi Epsilon Journal*, 44(1).
- Russel, M., Goldberg, A., O'Connor, K. (2003). Computer Based Test and Validity: a look back into the future. *Assessment in Education*. 10, 279- 293.
- Schumacker, R. E., & Lomax, R. G. (1996). *A beginner's guide to structural equation modeling*. NJ: Lawrence Erlbaum Associates, Inc.
- Smith, M. B. (1968), *Attitude Change*, *International Encyclopedia of the Social Sciences*, Crowell Collier and MacMillan.
- Sümer, N. (2000). Yapısal eşitlik modelleri. *Türk Psikoloji Yazıları*, 3 (6), 49-74.
- Tabachnick, B. G. ve Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). Needham Heights, MA: Allyn & Bacon.
- Tavşancıl, E. (2006), *Tutumların Ölçülmesi ve SPSS ile Veri Analizi*, Ankara, Nobel Yayın Dağıtım
- Tezbaşaran, A. (1997). *Likert tipi ölçek geliştirme kılavuzu*. Ankara: Türk Psikologlar Derneği Yayınları.
- Thompson, B. (2004). *Exploratory and Confirmatory Factor Analysis: Understanding Concepts and Applications*. (First Edition). Washington: American Psychological Association.
- Walter, J., Daeschner, S., Hoffman, R. ve Lyons, T. (1970). Computer-Test Development Center Project. Nihai Rapor. *Teaching Research*, Oregon
- Wen, M.L., ve C.-C. Tsai. 2006. University students' perceptions of and attitudes toward (online) peer assessment. *Higher Education* 51: 27 44

INTE 2014

# Development of an instructional learning object design model for tablets using game-based learning with scaffolding to enhance mathematical concepts for mathematic learning disability students

Suwit Waiyakoon<sup>a</sup>, Jintavee Khlaisang<sup>a\*</sup>, Prakob Koraneekij<sup>a</sup>

<sup>a</sup>Department of Educational Technology and Communications, Faculty of Education, Chulalongkorn University, Bangkok 10330, Thailand

<sup>b</sup>Second affiliation, Address, City and Postcode, Country

---

## Abstract

This study aimed to develop an instructional Learning Object design model for tablet using game-based learning with scaffolding approach to enhance mathematical concept for learning disability students. This article reported on phase one of the study by synthesizing the literature in relating to the instructional design models, LO for tablet, game-based learning and scaffolding approach, mathematical concept, and mathematics learning disability. The framework was presented in five elements along with 10 respective steps: 1) feasibility evaluation, 2) project planning, 3) need analysis, 4) functional analysis, 5) objective elimination, 6) identifying terminal objectives, 7) design, 8) develop, 9) implement, and 10) evaluation

Keywords: Learning Object, Game-based learning, Scaffolding, Mathematical concept, Mathematic Learning Disability, Tablets  
© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

Keywords: Learning Object; Game-based learning; Scaffolding; Mathematical concept; Mathematic Learning Disability; Tablets

---

## Introduction

Learning Disability students (LD) are students who have more difficulty in learning than general students. It is a defect of the psychological process that is related to understanding spoken and written language. It could be expressed with the incomplete capability, which causes difficulty for students in their daily life. The expression of social behavior and interaction with others are concerned to the problems of language use e.g. listening, reading, speaking, writing and spelling or calculating and movement problem, emotional recognition, behavior which is not from disability of their mind.

Currently, there are many learning disability students. From the record of Thailand statistics, there are 6-10% of LD students among the school-age children. Students in this group always consider themselves as the disability students and have no confidence in their ability. They will always dependence on others, to solve the problem even in the daily life. The natures of these students are short attention, easily distracted, trouble in remembering and linkage. Learning is abstract and limitation in language. Reading for understanding and solving mathematical problems will cause them in depressing achievement behind their friends, especially mathematic learning disability students, which caused their knowledge is not relate to the age e.g. calculation.

Mathematic learning disability caused students' recognition problem in numbering, ordering, quantity etc. facing difficulty to understand, summarize, and indicating relationship of process, management and number measurement.

---

\* Corresponding author. Tel.: +6-681-617-8708

E-mail address: jintavee.m@chula.ac.th

It causes students to have problems in mathematic learning, facing difficulty and not succeed in their study. Then they could not develop themselves towards the key performance as expected.

The method for helping students who have the problem in mathematic learning, apart from classroom instruction, is providing opportunity for them in self-learning with joyful activities and knowledge that they can gain automatically, under the following methods of support:

The development of an instructional learning object design model for tablets by using game-based learning. It is a pattern of digital media design for self learning by using games as the main activity to present the content. This helps to create a challenging learning environment, joyful and competitive which provides systematic methods and concept of design in response to learning disability students in mathematics.

Scaffolding Approach is the method of learning support by using proper conceptual scaffolding of learners into learning object on tablet. This helps students to be able to do it by themselves. It's the design of process and tool on learning object which help students to conduct each activity by themselves.

The instructional design by using Math Makes Sense Model is mathematic learning for understanding, for students to understand by themselves or be able to link the new knowledge to their existing concept or knowledge, which causes them to be able to understand mathematical topics.

The development of an instructional learning object design model for tablets using game-based learning with scaffolding to enhance mathematical concepts for mathematic learning disability students will benefit the students directly, and also teachers could be able to use this model for instructional learning object design model for tablets using computer game-based learning with Scaffolding content in mathematics, and use it as a concept for further research and development in other instructional design for disability students.

### *Objective*

To develop an instructional learning object design model for tablets using game-based learning with scaffolding to enhance mathematical concepts for mathematic learning disability students

### **Research Framework**

#### Population for this research

- The population in this study review on mathematical problem, learning style to enhance mathematical concepts for mathematic learning disability students, are 949 teachers in the Special Education Schools from 77 provinces. (1st phase)
- The population in this study review on learning object design model are specialists in Technology and Educational Innovation, Computer and Multimedia, Special Education (learning disability), and Mathematics (2nd phase)
- The population in this study for the result of applying learning object design model are 1) Mathematics teachers and specialist teachers in Technology and Educational Innovation. 2) Primary School students in grade 1, who are considered as the mathematics learning disability students. Both teachers and students are from Municipality schools in Amphoe Phra Nakhon Si Ayutthaya, Phra Nakhon Si Ayutthaya Province. (3rd phase)
- The population in this study for evaluation and recommendation for this learning object design model are experts in Technology and Educational Innovation, and Special Education (learning disability)

## Literature Review

### *Instructional design models*

It's a pattern which applicable directly in classroom or in sub-group instruction which is proper for students. This pattern also includes books, movies, tape recorders, computer programs and course curriculums in each style. It gives a concept of design in order to help students to achieve the different goals. It's an explanation of environment which causes learning including the behavior of teachers, while they are using that instruction format. There are several instructional designs (Joyce, Weil and Calhoun, 2009) which have the following benefits

1) A process in systematically decision-making, which helps the education planner to decide for the proper instruction naturally. It helps to see the objectives clearly and perform them step by step. 2) Teaching with standards will help to decrease or eliminate some factors which affect to learning, and serve the different type of learners. 3) Recycling and value will help to reduce the expense per students (Seels and Glasgow, 1998)

There are two parts in the model of this learning object design, which consist of the instructional design of learning objects and learning object design

- **Instructional Design of Learning Object:** The format is used as a guideline for instructional design of learning objects (Mowat, 2007) There are 10 steps; 1) Feasibility evaluation; they are conducting, scoping, collecting data and analysis, in order to confirm the possibility and correction. The efficient design needs to be evaluated before starting the project or generating learning object. This role is for instructional designer (teacher) or project manager (team and project arrangement, needs analysis and function analysis). 2) Team arrangement and project planning; it's a project for generating learning objects, which needs collaboration from the different people. There are teamwork, communication and project plans that are related to skill identification which is important to the project (Instructional Designer and Specialist), selection of members of the team according to their skill, communication, monitoring, documentary, members' role monitoring, process management, identification of project risk and process that likely to occur, and development of the documentary and strategic to reduce risky, decision for tools, project management, process of operation and to draft the project plan. 3) Needs analysis; is for customization and clarification of data which are collected during the needs evaluation, in order to collect the important data for production design and process implementation. It consists of job analysis, task analysis, learner analysis (learning style), performance goal and analysis the existing data for previous object. 4) Functionality analysis. is the analysis of content management systems, storage, dissemination and display the contents which are platform analysis that learners will be able to access, identify and analyze software for development, choosing tools for generating of the original model, analyze management in the organization, utilization standard and safety. 5) Identification and elimination of the duplicated terminal objectives, are utilizations of common purposes from each job, and avoids using duplicated objectives in order to have the outcome toward the objectives. 6) Identification the enabling objectives. The process in step 5 and 6 will be used for generating of learning objects from existing content. Both steps will support for instructional design which has been modified the existing instructional design for re-using by identifying the performance target and sub-objectives, diagramming the instruction, monitoring, eliminating and identifying sub-objectives to be related to the main objectives. The use of content towards objectives should be able to be monitored. 7). Design, learning object design; is the design for development in content, format of data display and activities which appear in the module list, displaying the selected result, providing direction and guidance in objectives and multimedia to support in generating learning objects. The mentioned process consists of flowchart design to present the relations of each monitor, in terms of complex relation, which is good to response for the qualifications of hypermedia. Apart from this, storyboard scripting will help to show the appearance on screen, and also the interaction between learners and the presentation program which need to be considered by specialists and the production team. 8) Development; is a review to give feedback according to the storyboard, then generating program, linkage and insert some technique which already developed periodically. 9) Implementation; in

order to monitor, edit and take action plan which already created earlier in the project, learning toward plan, review planning project and identify the period of project (According to flowchart, storyboard and all plans) Then, present all problems which might occur and 10) Evaluation, which is an evaluation in the beginning, during or at the end of operation, in order to measure the output according to criteria of successful, which is recognized in the beginning of the project (creating and evaluating the evaluation tools).

- Learning Object Design: It's the design and development of learning object as Atkins and Jones (2004) stated in 4 areas; 1) Pedagogical Design, which is a design of learning objects that focus on learners, content integrity, usability and accessibility in the format of digital media. Apart from these, the design and development of multimedia will use education theory and strategies in teaching strategies, in order to motivate learners in thinking, analyzing, calculating or understanding the concept of instruction by themselves through learning objects. 2) Design for interaction; is the design for interaction in content, so learners can interact with the lesson. The design in this part needs various methods to motivate students' attention. 3) Information design; is the design for presentation of various kinds e.g. images, animation, sound, text, etc. The presented materials need to be considered in learning objectives and concern to the benefit from applying multimedia technology as much as possible, in order to present the new and challenge materials for learners. And 4) Interface design; is the design for interface which is very important and needs to consider the suitability for learners e.g. age or learning experience. It consists of character design, and use of sound, graphic and animation. Functional use e.g. mouse, keyboard or typing, screen, exit, help, rollover and hover text or glossaries.

### *LO for tablet*

A learning object on a tablet is a computer instruction that contains multimedia presentation in both image and animation by using digital multimedia or Learning Object (LO) to develop lessons (type of game). It's designed for learners to achieve their learning in each subject, via tablet use. This study will design for the instruction by tablet based learning which is the qualification of tablet computer with Android operating system. It's an Open Source operating system that is widely used. Android architecture is different from other operating system. Therefore, Android's architecture is proper for learning object game-based design, as follow;

1) Accelerometer, they are tilting images or objects, which controlled on tablet according to our demand such as tilting ball into pots. Movement control is for controlling the movement of images or objects according to the limitation of game speed. 2) MultiTouch using, is an image movement controlling, resize or enlarge images controlling with matrix transformation.

### *Game-based learning*

Game-based learning is a learning instruction which uses media for learning. It's designed for learning with joyful, by intervening contents into the game, and letting the learners play. Learners will gain knowledge through game playing, which helps them to create their knowledge in the level of retention and understanding. It helps to motivate learners to study, and interact in the learning process, until they can learn by themselves. Game-based learning design needs to consider the elements of games and type of games, for LO design.

- Elements of Game-base: In order to design the game, we need to consider the existing elements of game to identify the concept of completed game development as follow (Alessi, 2001; Prensky, 2001) 1) Goals, it's important to identify goals for learners to achieve, in order stimulate and excite the attention. This goal should not too difficult for learners, and they should be able to strengthen their knowledge and expertise while they are studying toward the goal. 2) Rules, it's a defining of regulation, scope and limitation for learners within the lesson, which is adjustable. 3) Competition, it's a competition with others or with themselves or even competition with time or other factors. 4) Challenges, is a challenge for learner to achieve the goal. Some challenges should be flexible and adjustable for learners' ability. 5) Imagination (Fantasy) is



an element to motivate learners. Levels of imagination in game are different, ranging from realistic to fanciful. 6) Safety, it's important to concern about safety of learners by simulating in safety situation, which might occur and danger to learners or related people, such as fighting situation, etc. 7) Entertainment; giving knowledge and skills to learners is important, but entertainment is also important, since it is the key factor to motivate learners, which affects the learning situation.

- Type of Game-based; It's about game identification for LO design which helps to enhance LD students' concept, as follow; (Prensky, 2001) 1) Arcade-type Game; it's a game which competes with time and oneself by using time and score to excite and always enhance themselves. There is a competition between time and mathematic answer in each person. 2) Logic Game; it's a game which requires students to use logic for solving problems especially in mathematics. 3) Psychomotor Game; it's a game which assembles of practicing skill and thinking ability without suggestions. Learners need to seek the method to defeat the antagonist by themselves. And 4) Role-Playing Game; it's a game which learners need to be part of the lesson, and have to find out the solution that they are facing.

### *Scaffolding approach*

Scaffolding approach is learning strategies. Enhancing of learning or scaffolding systems is help students who are not able to achieve the goals. Then we need to help them gradually, step by step, until they reach the goal. It's guidance for the answer, which helps them to think and solve the problem in each situation easily, and open the opportunity for students to control their learning by themselves. The Conceptual Scaffolding helps learners to present the concept of what they are learning and identify knowledge of the concept. It's about arrangement the suggestions to learners for their consideration or reflect to learning experience (Hannafin, 1999; Sherman, 2005) It's designed by 1) Mechanism to prioritize the relationship by Graphic Organizer. 2) Stating comments with outline of fragment characteristic and 3) Proposing information or hint by specialists who will support and give suggestions to learners, in order to be able to solve the problem and understand in mathematics.

### *Mathematical concept*

Cooney, Davis and Henderson (1975) ; Eggen and Kauchak (1989) Toumasis (1995) gave the meaning of mathematical concept that, it's thinking and understanding of people to stimulation, that can classify the stimulation which consist of the same qualification through learning process or final thoughts in mathematics, which caused by learning of students with stimulation. Students can identify the type of stimulation which is related or not related to each other, and they can conclude their thoughts for the definition or meaning of that subject. This study will design the learning instruction in Math Makes Sense Model, which is mathematic learning for understanding by oneself, or linkage to the existing concept or knowledge, which help students to be able to understand in mathematics. There are four parts as follow;

1) Problem solving; it's the instruction management with new concept presentation by proposing some problem to students and asking them to solve it. They can solve the problem individually, in pairs, or in teams. 2) Understanding Concepts; it's the instruction management by using various types of activities which allow students to present their experiences for the new concept utilization. Proposing questions to stimulate students to learn the new experience, conclude the main concept, and let them work independently. 3) Application of procedures; it's the instruction management that allows student to conduct by themselves, and be able to use it. It's clear and extends in learning, finding some routine experience for using calculator, computer or strategic presentation for new problem solving. 4) Communication; it's the instruction management which encourages students to respond by using their own thoughts which appear in terms of images, number or word, preparing communication opportunity for balancing in speaking and writing. Apart from these, teaching by Math Makes Sense Model also consists of strategies in mathematic learning e.g. Drawing, simulations, drawing, solving an easy problem, guess and examine.

Mathematics learning disability student is called Dyscalculia, which is named by National Center for Learning Disabilities (2012). They are students who have difficulty and failure in learning mathematics from the regular class e.g. not understanding in numerical value and number, not understanding in place value, not able to remember or write the mathematical symbols, facing the problem to compute, etc. This research study will bring characteristics of general LD student, that is suitable for the development of learning media appropriately, as Sriya Niyomtham (2002); Padhung Arawinyu (2001) stated as follows:

1) Well learn from practice and visibility use. Due to the difficulty in writing and spelling e.g. not understand to read, wrong reading or reading letters alternately. 2) Learning from image or shape more than listening since they are not understanding the numerical value e.g. one ten hundred etc., having episodic memory from number. 3) Well learn from using the multi-sensory which are viewing, listening and practicing. Capability to recognize from doing several things in the same time (recognition of multimedia technology simultaneously.) 4) Well learn without reading due to the difficulty in reading, writing and spelling e.g. not understand to read, wrong reading or reading letters alternately. And 5) Right brain works better than left brain (imagination and creativity, but no step of thoughts) having confused ideas and no step of working.

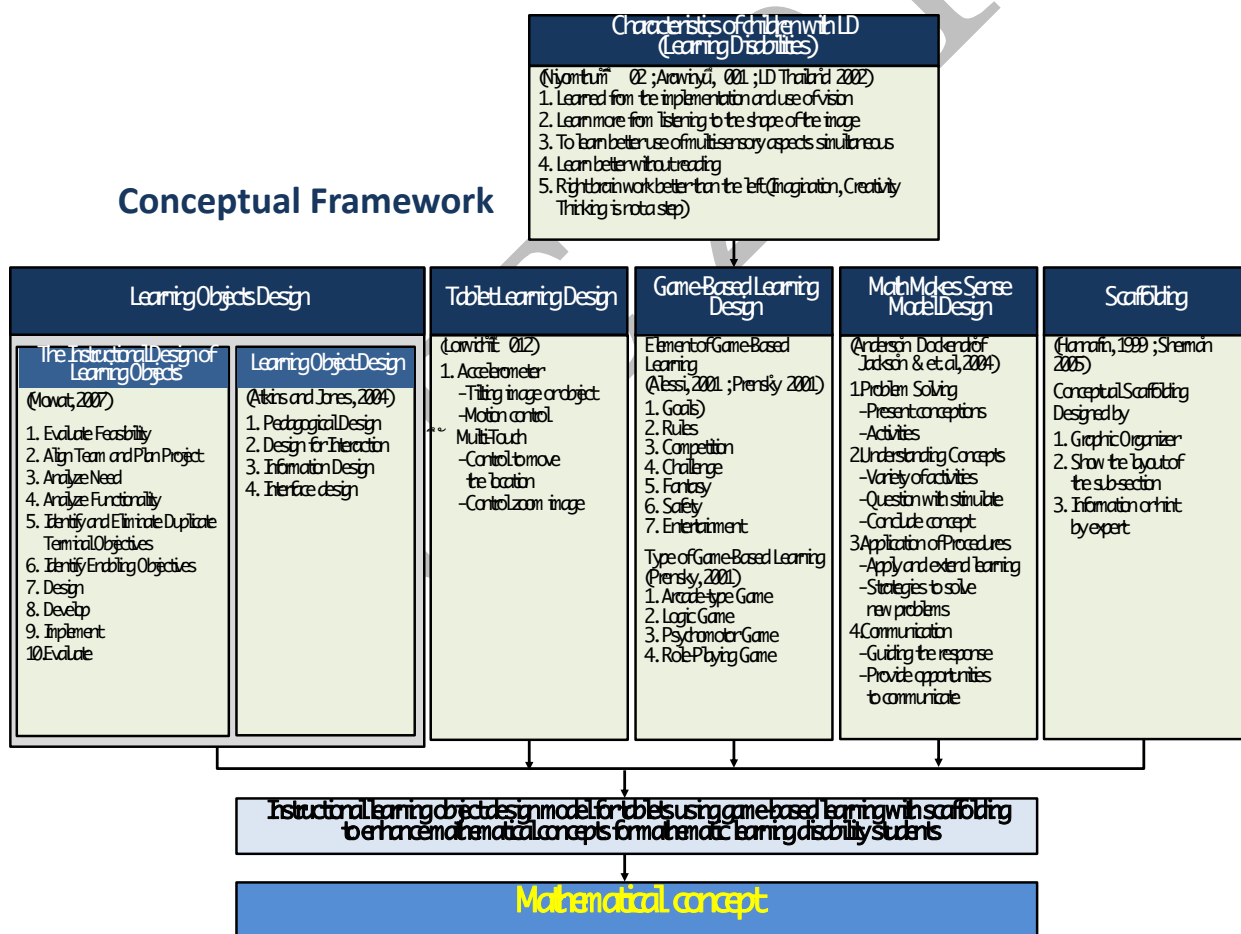


Fig. 1. (Conceptual framework)

#### 4. Research methodology

This research is a research and development which aims to develop of an instructional learning object design model for tablets using game-based learning with scaffolding to enhance mathematical concepts for mathematic learning disability students. There are four phases of research as follow;

Phase 1 Study on comments of teachers from Special Education School in each province about category and style of learning to enhance mathematical concepts for mathematic learning disability students

Phase 2 Generating the design of a Learning Object model for tablets using game-based learning with scaffolding, to enhance mathematical concepts for mathematic learning disability students.

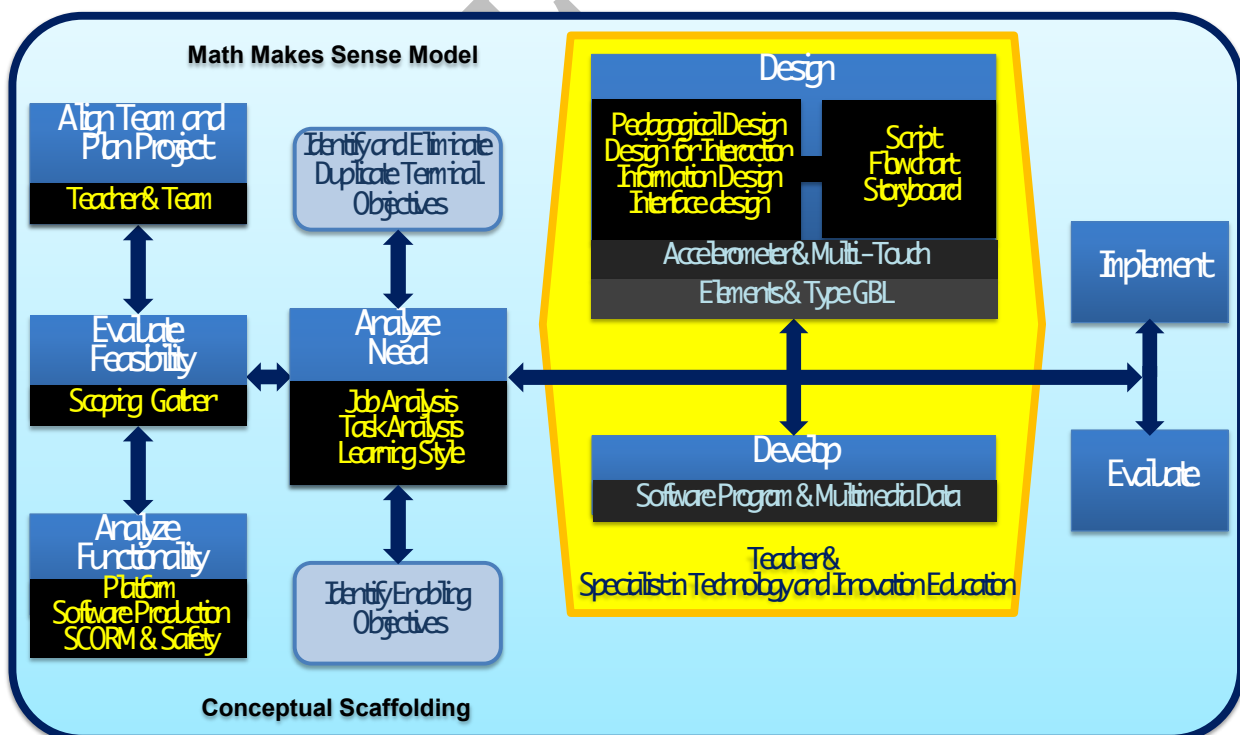
Phase 3 Study the results from the use of Learning Object model for tablets using game-based learning with scaffolding to enhance mathematical concepts for mathematic learning disability students.

Phase 4 Recommend and present that Learning Object model for tablets using game-based learning with scaffolding to enhance mathematical concepts for mathematic learning disability students.

As studied in principles, concepts and theories including related researches as mentioned, which appeared this Learning Object model for tablets using game-based learning with scaffolding to enhance mathematical concepts for mathematic learning disability students.

Therefore, in order to develop the Learning Object model for tablets using game-based learning with scaffolding to enhance mathematical concepts for mathematic learning disability students, the researchers will use guideline for development from various parts, starting from analyzing the characteristics of LD students (LD : Learning Disabilities) in order to design for Game Base Learning instruction. Instruction design with Math Makes Sense Model, Instruction design by tablet learning, Scaffolding, Conceptual Scaffolding to develop the design of Learning Object Model which benefits directly to mathematic learning disability students and teachers.

#### The Illustration of the proposed model



## References

- Alessi, S. and Trollip, R. (2001). *Multimedia for Learning : Methods and Development*. Needham, MA: Allyn & Bacon.
- Anderson, C., Dockendrof, M., Jackson, M., & et. al. (2004). *Mathematics Makes Sense*. Toronto: Pearson Education Canada.
- Arayawinyu, P. (2001). *Children with Learning Disabilities*. (2nd ed.). Bangkok: Wankaew.
- Atkins, S. and Jones, D. (2004). *Consideration for learning design*. [Online]. Available : <http://www.thelearningfederation.edu.au/tlf2/sitefiles/assets/docs/ldpaper310804final.pdf>. [20013, January 27]
- Cooney, J., Davis, Edward J. and Henderson, K.B. (1975). *Dynamics of Teaching Secondary School Mathematics*. Boston: Houghton Mifflin.
- Eggen, P. and Kauchak, D. (1989). *Methods for teaching : a skills approach*. Columbus: Merrill.
- Hannafin, R. D. (1999). Can teacher attitudes about learning and computer use be affected? *Journal of Computing in Teacher Education*, 15(2), 6-13.
- Joyce, B., Weil, M. & Calhoun, E. (2009). *Model of Teaching*. (8th ed.). Boston: Pearson/Allyn and Bacon.
- Mowat, J. (2007). *The Instructional Design of Learning Objects*. Learning Solutions e-Magazine. Santa Rosa: CA.
- National Center for Learning Disabilities. (2012). [Online]. Available: <http://www.Ldonline.org> [2012, November 20]
- Niyomtum, S. (2002). *Learning Disabilities Difficulties*. Bangkok: Prannok.
- Prensky, M. (2001). *Digital Game-Based Learning*. New York: McGraw-Hill.
- Seels, B., Glasgow, Z. (1998). *Making Instructional Design Decision*. The United State of America: Merrill Upper Saddle River, NJ.
- Sherman, G. (2005). *Desperately seeking scaffolds*. *Virginia Society for Technology in Education*. 19 (1): 2-5.
- Toumasis, C. *Concept Worksheet : An Important Tool For Learning*. *The Mathematics Teacher*. 88 (2) (February 1995) : 98 – 100.

# Development of collaborative learning using case-based learning via cloud technology and social media for enhancing problem-solving skills and ICT literacy within undergraduate students

Jarumon Nookhong<sup>a</sup> \*, Panita Wannapiroon<sup>b</sup>

<sup>a</sup>Lecturer, Department of Information Management, Faculty of Humanities and Social Sciences at Suan Sunandha Rajabhat University, Bangkok, 10300, Thailand.

<sup>b</sup>Assistant Professor, Information and Communication Technology for Education Division, Faculty of Technical Education, King Mongkutt's University of Technology North Bangkok, Bangkok, 10800, Thailand.

---

## Abstract

This study is conducted in terms of research and development aiming for developing collaborative learning using case-based learning via cloud technology and social media. The research process is divided into 2 phases: 1) the development of collaborative learning using case-based learning via cloud technology and social media, and 2) the affirmation of collaborative learning using case-based learning via cloud technology and social media. The research samples are five experts selected by purposive sampling. The research instruments are the model of collaborative learning using case-based learning via cloud technology and social media, and the evaluation of the model's appropriateness analyzed by means and standardized deviations statistically. The research result shows that: 1. There are four components consisted in the model which are 1) the principles of instruction model, 2) the objective of instruction model, 3) the instruction process which is divided into 2 stages: 3.1) the preparation process before actual instruction, and 3.2) the operation of instruction, and 4) evaluation and examination of data collection. 2. The five experts assessed the instruction model, and pointed out that the developed instruction model is highly appropriate. This shows that the developed instruction model can be used for enhancing problem-solving skills and ICT literacy, and improve the instruction as a whole effectively.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

**Keywords:** collaborative learning; case-based learning; cloud technology; social media

## Introduction

Thailand's ICT Policy Framework 2020 identifies e-Education strategies by supporting and encouraging ICT as an educational instrument in order to enhance the general class-based instruction. This creates a variety of instruction models (B.E. 2554-2563 (ICT 2020)) including "Collaborative Learning" which is based on constructivism, a theory that promotes group participation among learners. The students will be divided into small groups in which students with distinct skills cooperate with each other. By exchanging ideas and sharing learning resources, each member has to be responsible both in terms of collective studying and individual assignments while communicating with other members. It (Taylor, 2000) states that collaborative learning is the heart of collaborative working. In order to solve the existing problems, collaborative learning is considered as an effective approach for supporting students to solve problems (Chu et al., 2009)

Case-based learning is an instruction approach aiming for students' training based on actual participation or problem-based simulation which reflects ideas from the experiences embedded in the identified case studies (Choi & Lee, 2008) By having objectives for developing learning and problem-solving skills within learners, learners will be

---

\* Corresponding author. Jarumon Nookhong. Tel.: +66-86-683-2925; fax: +66 (2) 160 1285

E-mail address: jarumon.no@ssru.ac.th, jarumon.ssru@gmail.com

able to train their critical thinking and problem-solving skills. This, hence, becomes an instructional strategy that promotes systematically critical thinking process for students. Students will gain knowledge from active learning by having instructors as educational supporters and facilitators in order to enhance problem-solving skills relevant to assignment. It (Dyer et al., 2013) states that case-based learning helps learners to enhance problem-solving skills.

Cloud computing model is a computing model for massive IT structure which can be transferred to internet users (Gartner, 2008) via cloud technology. This works on cloud computing system built upon the model of web browser or application as an instrument supporting learning activities. This influences the learners directly in terms of perspectives and new learning models, and becomes a communication medium between learners and instructors.

Online social media is another tool for social communication using in learning. Social media means online social media that utilizes online tool existed in internet network by selecting social media in internet network as a medium for supporting communication between learners and instructors as well as collective data collection, information sharing, and idea exchanging from wherever via the network system. It (Gerlich et al., 2010) states that social media can be used as a learning tool effectively in relevance. with ICT literacy which is a basic ICT skill for studying, learning, working, and surviving in this ICT age. The appropriate utilization of ICT should enhance the learners' skills in association with 21st century educational system.

Therefore, the researcher had an idea to develop the collaborative learning using case-based learning via cloud technology and social media in order to enhance problem-solving skills and ICT literacy within undergraduate students as a beneficial guideline for effective educational management in the future.

### **Purpose of the study**

2.1 To develop the collaborative learning model using case-based learning via cloud technology and social media in order to enhance problem-solving skills and ICT literacy within undergraduate students.

2.2 To evaluation the appropriateness of the collaborative learning model using case-based learning via cloud technology and social media in order to enhance problem-solving skills and ICT literacy within undergraduate students.

### **Scope of the study**

#### *3.1 Population:*

The study population was experts in instructional design, information and communication technology (ICT), and undergraduate-level instruction.

#### *3.2. Samples Groups:*

The samples are 5 experts in instructional design, information and communication technology (ICT), and undergraduate-level instruction selected by purposive sampling who have more than 3-year experiences in the related fields.

#### *3.3. Variables of the study:*

3.3.1 An independent variable is the collaborative learning model using case-based learning via cloud technology and social media in order to enhance problem-solving skills and ICT literacy within undergraduate students.

3.3.2 A dependent variable is the evaluation result of the model's appropriateness.

## Methodology

### 4.1 The first phase

The first phase was to develop collaborative learning model using case-based learning via cloud technology and social media in order to enhance problem-solving skills and ICT literacy within undergraduate students with the following method:

4.1.1 Development of the model of collaborative learning model using case-based learning via cloud technology and social media in order to enhance problem-solving skills and ICT literacy within undergraduate students by using data collected from studies and analyses of relevant documents and researches.

4.1.2 Propose the collaborative learning model to advisor for considering and revising in accordance with recommendations.

4.1.3 Propose the model to the experts through in-depth interviews.

4.1.4 Create an evaluation tool to evaluate the appropriateness of the model.

### 4.2 The second phase

The second phase of the project was an evaluation of the collaborative learning model using case-based learning via cloud technology and social media in order to enhance problem-solving skills and ICT literacy within undergraduate students. The process is as below:

4.2.1 Propose the developed model to 5 experts in the field of curriculum design, information and communication technology (ICT), and undergraduate-level instruction. The experts will consider and assess the appropriateness of the model, and then the researchers will modify the model in accordance with the experts' suggestions.

4.2.2 Analyze the results from the evaluation of the model's appropriateness by using means and standardized deviations statistically. The evaluation form is built upon 5-point Likert Scale; that is, very good, good, moderate, bad and very bad.

## Result

The result of this research is divided into 2 parts.

*Part 1 The collaborative learning model using case-based learning via cloud technology and social media in order to enhance problem-solving skills and ICT literacy within undergraduate students is illustrated in Fig. 1.*

5.1 The Components of collaborative learning model using case-based learning via cloud technology and social media consisted of four components as follows: 1. The principles of instruction model, 2. The objective of instruction model, 3. The instruction process, and 4. Assessment and examination.

5.1.1 The principles of instruction model are collaborative learning via electronic media, case-based learning, integration of cloud technology and social media for collective learning, problem-solving skills building, and ICT literacy.

5.1.2 The objective of instruction model is to develop problem-solving skills and ICT literacy.

5.1.3 The instruction process is collective learning by using cloud technology and social media in order to develop problem-solving skills and ICT literacy. This is consisted of 1) The preparation process before actual instruction, and 2) the operation of instruction.

5.1.4 Assessment and examination of data collection: 1. the examination and assessment of problem-solving skills by using MEQ-style evaluation form which is consisted of four stages: 1.1 problem identification, 1.2 root-cause analysis, 1.3 solution finding, and 1.4 solution assessment and 2. the examination and assessment of ICT utilization

consisted of six components as follows: 2.1 access, 2.2 management, 2.3 integration, 2.4 evaluation, 2.5 creation, and 2.6 communication.

5.2 The collective learning process using case-based learning via cloud technology and social media in order to enhance problem-solving skills and ICT literacy within undergraduate students is divided into 2 stages:

5.2.1 Preparation process before actual instruction is the preparation for learners by using case-based collective activities via cloud technology and social media.

5.2.2 Collective learning instruction's operation process by using case-based learning via cloud technology and social media is consisted of five stages: 1. problem understanding, 2. problem analysis, 3. solution proposal, 4. solution choosing, and 5. solution summarization.

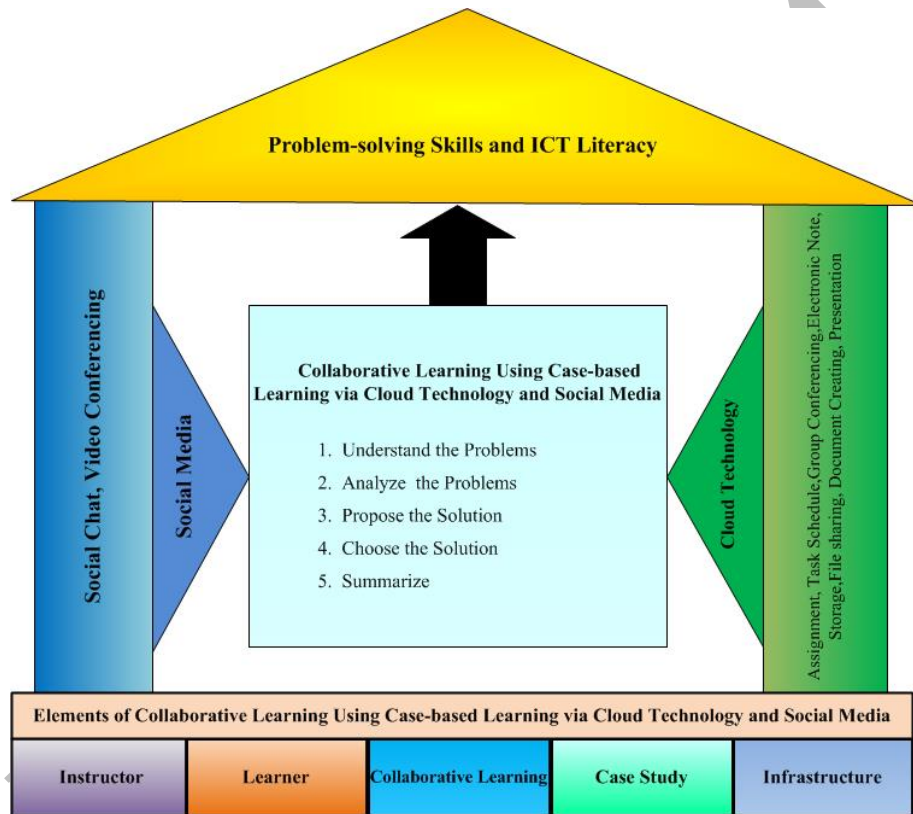


Fig. 1. The model of collaborative learning using case-based learning via cloud technology and social media

*Part 2 The evaluation results of the appropriateness of the collaborative learning model using case-based learning via cloud technology and social media in order to enhance problem-solving skills and ICT literacy within undergraduate students*

Table 1. The Evaluation Result of the Developed Instruction Model

Evaluation Lists	$\bar{X}$	S.D.	Level of Quality
1. Components of the model are appropriate for problem-solving skills development.	4.00	0.00	Good



2. Components of the model are appropriate for ICT Literacy development.	4.40	0.55	Good
3. The model's activities and process are appropriate for problem-solving skills development.	3.80	0.45	Good
4. The model's activities and process are appropriate for ICT Literacy development.	4.00	0.71	Good
5. The collaborative learning model using case-based learning via cloud technology and social media is appropriate for real-life utilization.	4.60	0.55	Very Good
Summary	4.16	0.45	Good

According to Table 1. in terms of the whole image of the model, the experts rated the model as Good appropriate ( $\bar{X} = 4.16$ , S.D. = 0.45). The elements in the list that are rated as first three highest are “the collaborative learning model using case-based learning via cloud technology and social media is appropriate for real-life utilization” ( $\bar{X} = 4.60$ , S.D. = 0.55), “components of the model are appropriate for ICT Literacy development” ( $\bar{X} = 4.40$ , S.D. = 0.55), “components of the model are appropriate for problem-solving skills development” ( $\bar{X} = 4.00$ , S.D. = 0.00), and “the model's activities and process are appropriate for problem-solving skills development” ( $\bar{X} = 4.00$ , S.D. = 0.71), respectively.

## Discussion of results

The evaluation result of the collaborative learning model using case-based learning via cloud technology and social media in order to enhance problem-solving skills and ICT literacy within undergraduate students is relevant with the research written by (Yoo & Park, 2013) which states that case-based learning is beneficial and effective for enhancing problem-solving skills at bachelor's degree level as well as another research written by (Craig Van Dyke et al., 2005) which states that case-based learning on web browser is an effective approach for accessing information and presenting interaction and participation. The result is also relevant with a research written by (Pheeraphan, 2013) which states that the grouping of ICT, including ICT literacy that is applied to instruction process helps he learners to learn effectively.

## Recommendations

### 7.1 Recommendations for research result's application

Educational institutions where are using the developed model should prepare the infrastructure for necessary network system in order to connect to the internet for using cloud technology and online social media that will enhance the ICT literacy.

### 7.2 Recommendations for further research

The further research should apply the output from this study in order to test the outcome and examine the instruction according to the developed instruction model, and then apply the outcome to further learners' development in different contexts.

## References

- Thailand's ICT Policy Framework 2020. (2000). *Ministry of Information and Communication Technology*. Framework A-3, 57- 59.
- Taylor Kathleen. (2000). *Developing adult learning: strategies for teachers and Trainers*. San Francisco: Jossey-Bass. A Wiley Imprint.
- Chu, H. C., Hwang, G. J., Tsai, C. C., & Chen, N. S. (2009). *An innovative approach for promoting information exchanges and sharing in a web 2.0-based learning environment*. *Interactive Learning Environments*, 17(4), 311- 323.
- Choi, I., and Lee, K. (2008). *Designing and Implementing A Case-Based Learning Environment for Enhancing Ill-Structure Problem Solving* :

- Classroom Management Problems For Prospective Teachers. *Journal of Education Technology Research Development*, 57, 99-129.
- Dyer, W.G., Dyer, W.G., and Dyer, J.H. 2013. Team Building Proven Strategies for Improving Team Performance. 4th Edition. San Francisco, CA : *John Wiler and Sons*, Inc.
- Gartner. (2008). *Cloud Computing: Defining and Describing an Emerging Phenomenon*. Publication Date: 17 June 2008.
- Gerlich, Browning and Westermann. (2010). The Social Media Affinity Scale: Implications For Education. *Contemporary Issues in Education Research* 3(11), 35-41.
- Moon-Sook Yoo and Jin-Hee Park. (2013). Effect of case-based learning on the development of graduate nurses'problem-solving ability. *SciVerse ScienceDirect*. 34, 47–51.
- Craig Van Dyke et al. (2005). Case-based learning on the web. *International Congress Series*. 1287, 269– 271.
- Nutteeerat Pheeraphan. (2013). Enhancement of the 21st Century Skills for Thai Higher Education by Integration of ICT in Classroom. *Procedia – Social and Behavioral Sciences*. 103, 365 – 373.

# Development of continuing motivation via distance learning model in unrest southernmost provinces, Thailand

Monton Pholboon<sup>a\*</sup>, Wuttisak Pochanukul<sup>a</sup>, Jutta Tammachart<sup>a</sup>,  
Kittisak Na Badalung<sup>a</sup>

<sup>a</sup>*Faculty of Education, Prince of Songkla University, Pattani 94000 Thailand*

---

## Abstract

The purpose of this study was to develop continuing motivation of distance learning model in unrest southernmost provinces of Thailand. The research objectives consist of; (1) to synthesize continuing motivation pattern of distance learning model in unrest area and (2) to verify continuing motivation pattern of distance learning model in unrest area. Focus group discussion in distance classroom was performed for data collecting. Concept synthesizing involved document and examining format quality by experts. Quantitative research was used for data analysis; induction conclusion and quantitative data was analyzed using descriptive statistics such as mean and standard deviation.

The results of the study revealed (1) continuing motivation of distance learning model consists of 4 elements under learning environment context; before action review, project operation, assistance, and learning outcome which divided into 2 periods – Pre-project engaging and On-project engaging period and (2) the assessment of continuing motivation of distance learning model in unrest southernmost provinces was statically significant with the mean value of 4.44 and standard deviation at 0.66.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* Continuing Motivation, Distance learning, Unrest Southernmost Provinces;

---

## Introduction

Human being has learning and developing ability, this continuous learning process establishes learning capacity which could turn to such a great outcome by individual knowledge awareness, proper context, and self-directed learning.

---

\* Corresponding author. Tel.: +66869670600.  
E-mail address: leemonton@gmail.com

Teaching context is support self-directed learning along with keeping level of continuing motivation of learners.

Maehr (1976), stated that the motivation is very important in all kind of education. In addition, he called an unceasingly “eager to know” behavior as “Continuing Motivation”. Continuing motivation encourages learner to see the need of gaining their knowledge in order to survive in society and to be capable of thriving in the world of constant change.

Continuing motivation in human development must be considered. Brockett and Hiemstra (1991) mentioned about components that effected continuing motivation of self-directed learning that it is consist of personal responsibility, self-direction learner, self-directed learning, and social context. Self- direct learning is the process

that each learner can engage in what he/she really subjects in. Once the learner becomes self-direct learner, he/she could function and be responsible in his/her learning achievement. The relationship between learner and learning process reflects the wellness of continuing motivation. Also, it is a vital factor in designing the learning process in order to develop learner's effective learning ability.

### **The purpose of study**

The main purpose of study is to develop continuing motivation of distance learning model in unrest southernmost provinces, Thailand. The minor purposes are (1) to examine related factor in establishing continuing motivation of distance learning model from opinion of student in unrest southernmost provinces, Thailand and (2) to synthesize continuing motivation of distance learning model in unrest southernmost provinces, Thailand

### **The scope of study**

The researchers started from examining related factor in establishing continuing motivation of distance learning model from students' opinion in unrest southernmost provinces which covered 4 keystones; the reasons to engage in the project, the expectation toward the project, learning achievement factor, and unceasingly distance learning factor. The outcome would be synthesizes with self-directed learning concept and continuing motivation concept.

Continuing motivation of distance learning model in unrest southernmost provinces had included nine standard quality checks; analysis of context and minor detail, model and minor detail designing, model procedure plotting, pre-project planning, on-project, assistance, project outcome, motivation on project, and appropriateness model in general.

### **Research Methodology**

The study was the combination of quantitative and qualitative research. It was consisted of 2 steps; the study of related factors of continuing motivation in distance learning and the synthesis of continuing motivation in distance learning. The processes are;

#### *The study of related factors of continuing motivation in distance learning model*

The sample was selected from grade 12 students in 5 distances classroom, 9 students from each classroom, be the total of 45 students to focus on group discussion, analyze contents, and create inductive conclusion.

#### *The synthesis of continuing motivation in distance learning model*

The outcome of focus group discussion would be synthesized along with self-directed learning concept and continuing motivation characteristic. The evaluation was done by experts and used standardize development contained a 5-item rate scale questionnaire (4.51-5.00 Exemplary, 3.51-4.50 Mature, 2.51-3.50 Competent, 1.51-2.50 Developing, 1.00-1.50 Basic).

### **Research findings**

The study on related factors of continuing motivation in distance learning model to students' opinions were founded 4 results: the student's encouraging to attend project is students' need of higher education entrance exam; the student expectation towards program is the variety of exam samples that the students can use for practicing before attending higher education entrance exam; the most important factor that indicates the achievement of distance learning is learner's factor; program classification, determination, diligence, patience, attempt, and

participation; and the factor that encourages unceasingly distances learning the most is facility; fully equipped facilities and well learning environment in a classroom.

The synthesis of continuing motivation in distance learning in unrest southernmost provinces were founded from the discussion that; continuing motivation is a tendency that learner will retrospect to continue working on his/her interest which has never been in same context before, this happened from inner self interest without any external influence. Self-directed Learning is process that the learner has to decide what he/she needs to learn, aims for an achievement, selects learning method, and evaluate progress with/without assistance. The determination of self-directed learning component used the PRO Model of Brockett and Hiemstra (1991) was consisted of 4 components; personal responsibility, self-direction learner, self-directed learning, and social context

Continuing motivation was designed as: INPUT-learner has the goal of educational achievement, acknowledge his/her own ability, self-controlled and motivated, eager to know, be responsible and pay attention, be determined and patient. Teacher has to be friendly, knows how to contribute and extend idea, how to carry out proper contents, and how to find out creative way to introduce students the classroom activities to engage in sustained motivation of their own; public relations should be well arranged; reach the target learner, classified learner according to their program, preparing text, teaching note and distribute before hand, teacher assistant should standby to serve in distance classroom; factors in society (school and household) should be tarried and supportive; Internet system, equipment, and tools should be efficient and useful. PROCESS-Public Relations should be done before starting project to encourage student to participate. The need and achievement have to be indicated, the activities should be used to urge the students to consider their own target and make an agreement with teacher on learning premise; activity schedule is prepared and distributed, including pre-test to recognize the presence of student condition, in order to establish activity participation; Classroom motivation can be arranged to create good learning atmosphere among students by applying praise and reward in group and on-line activities; Content summary must be compiled after every single class and interconnection between distance schools should be set up to collaborate in term of learning network. OUTPUT-leaning achievement is number of students enters in higher education institute as they demanded.

Continuing motivation in distance learning model is divided into 4 sections; (1) *Pre-preparation*: Before action review consists of 4 components; *Management*: Project owner has to engage in good public relations, program classification, text preparation and distribution, classroom schedule planning, and teacher assistance arrangement; *Leaning Resources*: Communication system and method have to be directed and widespread to learner either at school or home. Equipment and facilities have to be well organized and effective; *Teacher*: He/she has to be friendly, knows how to contribute and extend idea, how to carry out proper contents, and how to find out creative way to introduce students the classroom activities to engage in sustained motivation of their own; *Learner*: Learner has set the goal of educational achievement, acknowledge his/her own ability, self-controlled and motivated, eager to know, be responsible and pay attention, be determined and patient including prepared himself/herself to be skillful in internet and distance learning. (2) *Procedure* could be divided into 3 stages; *establishing awareness* could be done by Public Relations to encourage student to participate. The need and achievement have to be indicated, the activities should be used to urge the students to consider their own target and make an agreement with teacher on learning premise; *instructional planning* could be arranged by notifying activity schedules, distributing text and related content, evaluating student's presence of condition, establishing activity participation, summarizing, and winning the exam; *learning assessment* is a must in considering of knowledge, attitude, and learning satisfaction. (3) *Assistance* is set for offering help to learner to achieve highest capacity and quality through internet network; *Retrospective teaching tool* is to note all teaching activities and plan for the absentee to review the missing lesson. *Revision teaching tool* is to summarize important part of teaching activities for the student to revise after class. *Assistance and inquiry service* is set to be a channel of communication for learner to get any necessary aid. *Learning Network* is set to intercommunicate between distance learning school in exchanging of knowledge and activities. And (4) *Learning Outcome* is the result the learner would acquire from project such as Ordinary National Educational Test score and university entrance exam result.

Continuing motivation of Distance Learning System Model in Unrest Southernmost Provinces could be summarized as chart shown in Figure 1



Fig. 1. Continuing Motivation of Distance Learning System Model

The report of continuing motivation appropriateness (see Table 1) that was approved by experts was found that it was quite fully appropriate (mature). The minor detail of context analysis, the assistance, are filed in exemplary level (creatively appropriateness) etc.

## Finding Conclusion

Development of continuing motivation of distance learning model in unrest southernmost provinces consists of (1) Before action review (2) Project Operation (3) Assistance, and (4) Outcome. Before action review is pre-learning process in term of learner, teacher, management, and resources in accordance with Keller's concept (1999 cited in Balaban-Sali, 2008) which giving significance not less than other processes. It is the process of learner's information analysis to identify learner characteristic; Learner skill, attitude, background, motivation, and related factor. These can lead to distinct learning achievement and outcome. Project operation is the management of learning process as prescribed plan according to course description by using proper learning activities analyzed since before action review stage. Project operation creates learner's positive inquiring attitude. Apart from individual continuingmotivation, the relationship between lesson and learner is also very important because it establishes positive attitude toward value of education and promotes the character of "eager to know" which results in continuing motivation at last (Malone, 1981 cited in Kinzie, 1990). Assistance is the supportive process to create

Table 1. The report of continuing motivation appropriateness

Descriptions	outcome		
	$\bar{X}$	S.D.	level
1. Analysis of context and minor detail	4.80	0.45	Exemplary
2. Model and minor detail designing	4.60	0.55	Exemplary
3. Model procedure plotting	4.40	0.55	Mature
4. Pre-project planning	4.00	0.71	Mature
5. On-Project	4.40	0.55	Mature
6. Assistance	4.60	0.55	Exemplary
7. Project outcome	4.20	1.30	Mature
8. Motivation on project	4.20	0.84	Mature
9. Appropriateness model in general	4.80	0.45	Exemplary
<i>Summary</i>	4.44	0.66	Mature

effective learning. Assistance system in distance learning is very important due to distance learning is non-face to face system which reflected less two-way communication. Learner cannot get advice service on real-time; absentee would be difficult to follow up past lesson and could be the cause of retirement. Outcome is the model pointed on learner's creative ability, learner's value toward education, subject to achieve the learner's objective, self selective method which Brockett and Hiemstra (1991) stated about this characteristic as self-directed learning which encourages learner to gain the educational awareness and be responsible to his/her decision towards education. The learner would have characteristic "eager to know" which this model is a supportive tool to establish this character.

### Recommendations

The findings indicated that the development of continuing motivation of distance learning system model in unrest southernmost provinces could be applied in 2 stages; Pre-project (before action review) and on-project (project operation) as shown in Figure 2:

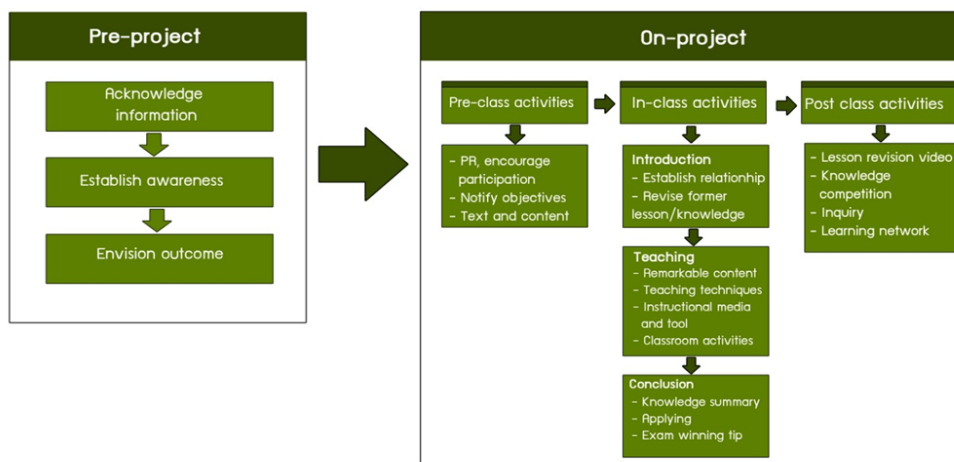


Fig. 2. Application guideline of continuing motivation of distance learning system model for educational development in unrest southernmost provinces

## References

- Balaban-Sali, J. (2008). Designing motivational learning systems in distance education. *The Turkish Online Journal of Distance Education*, 9 (3) Article 13.
- Boonumpai, T. (1997). *The development of distance tutorial system via electronic mail for Sukhothai Thammathirat Open University*. Thesis Ph.D, Chulalongkorn university.
- Bosch, H. (2004). ICT: driving force behind competency-based distance learning. Paper presented at the Open Universities. *National models for a European model*; International conference by the Italian Chamber of Deputies, Rome.
- Brocket, R. G. and Hiemstra, R. (1991). *Self-Direction in Adult Learning*. New York: Routledge.
- Bruenger, S. (2009). *School-wide goal environment and continuing motivation in music*. [online]. Available from: <http://web.ebscohost.com/ehost/detail?vid=5 &hid=107 &sid=b4e2bab 5-31f5-439c-9d77194fc7485bbe%40sessionmgr 15&bdata =JnN pdGU9ZWWhv c3QtbGl2Z Q%3d%3d#db=ehh&AN=38120554> [2010, February 11]
- Burghstahler, S. (2003). *Design and implementation of web-enabled teaching tools*. Hershey : IGI Publishing.
- Chansri, C. (2000). *A Study of Classroom Motivational Strategies of English Language Teachers at the Lower Secondary Education Level in Schools under the Department of General Education, Bangkok Metropolis*. Thesis M.Ed., Chulalongkorn University.
- Donlevy, J. (2000). Online learning in virtual high school. *International Journal of Instructional Media*, 30 (2), 117-122.
- Falowo, R. O. (2007). Factors impeding implementation of web-based distance learning. *Association for the Advancement of Computing In Education Journal*, 15(3), 315-338. Chesapeake : VA.
- Kanasawat, J. (2003). *Effects of using learning contract in e-Learning system upon achievement motivation and learning achievement of undergraduate students with different levels of prior knowledge in foundations of computer for education subject*. Thesis M.Ed., Chulalongkorn university.
- Keller, J.M. (2006). *What is motivational design?*. [online]. Available from: <http://arcsmodel.com/pdf/Motivational%20Design%20Rev%20060620.pdf> [2010, February 11]
- Kinzie, M. B. (1990). Requirements and Benefits of Effective Interactive Instruction: Learner Control, Self-Regulation, and Continuing Motivation. *Educational Technology Research & Development*, 38(1), pp. 5-21
- Koohang, A. & Durante, A. (2003). Learners' Perceptions toward the Web-based Distance Learning Activities/Assignments Portion of an Undergraduate Hybrid Instructional Model. *Journal Information Technology Education*, 2, pp.106-113
- Maehr, M.L. (1976). Continuing Motivation: An Analysis of a seldom Considered Educational Outcome, *Review of Educational Research*, 46, pp. 443-462.
- Mazza, R. (2004). *Using information visualisation to facilitate instructors in web-based distance learning*. Università della Svizzera italiana.
- Picciano, A.G. (2001). *Distance Learning: Making Connections Across Virtual Space and Time*. New York : Simon & Schuster Prentice-Hall.
- Rao, S., (2006). Distance education and the role of IT in India. *The Electronic Library*, 24 (3), pp. 225-236.
- Reiser R.A. & Demsey J.V. (2002). *Trends and issues in instructional design and technology*. New Jersey : Merrill Prentice Hall.
- Sangwong, S. (1999). *A development of the program for developing continuing motivation for mathayom suksa one students*. Thesis M.Ed., Chulalongkorn university.
- Srisa-arn, W. (1986). *Distance education*. Nonthaburi : Sukhothai Thammathirat Open University.
- Wong, L. F., & Trinidad, S. G. (2004). Using Web-based distance learning to reduce cultural distance. *The Journal of Interactive Distance Online Learning*, 3(1), pp. 1-13



# Development of e-portfolio management system towards Thai qualifications framework for higher education

Prakob Koraneekij<sup>a\*</sup>, Jintavee Khlaisang<sup>b</sup>

<sup>a</sup>Assistant Professor, Department of Educational Technology and Communications,  
Chulalongkorn University, Bangkok, 10330, Thailand (prakob.k@chula.ac.th)

<sup>b</sup>Associate Professor, Department of Educational Technology and Communications,  
Chulalongkorn University, Bangkok, 10330, Thailand (jintavee.m@chula.ac.th)

---

## Abstract

This research aims to develop the E-Portfolio Management System (EPMS) in support of the Thai Qualifications Framework for Higher Education (TQF: HED). The system was based on the need analysis of 183 instructors and 261 students and tested by 90 undergraduate students in regard to their satisfaction towards the system, the appropriateness of teaching methods, assessments, and TQF artifacts. The content analysis and descriptive method were used to analyze the collected data. The results showed that the system should consist of two respective sub-systems, the e-portfolio system and the rubric creator system, and one reference page as the TQF guidelines.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* E-Portfolio Management System; Thai Qualifications Framework; Higher Education

---

## Introduction

According to the National Education Act B.E. 2542 (1999), Section 22, education must adhere to the principle that all learners are capable to learn and develop themselves and learners are considered the most important. Education process has to encourage students to develop naturally to their highest potential. Section 26 stated that educational institutes had to assess learners' development, behaviors, study habits, activity participation, and tests in lines with the teaching process according to the different levels and forms of education. Therefore, the assessment according to mentioned guidelines should be evaluated by a variety of methods and tools to obtain accurate information of learners.

The use of electronic portfolios is one of the methods to evaluate the actual condition by using computer and network technology. It enables the portfolio owner to accumulate and store their works in various forms, including audios, videos, images, and text. It uses database and hypertext to link the works that were selected based on the criteria to reflect the achievement and development of learners (Barrett, 2000). In addition, the portfolio can also be used to evaluate the works of learners including formative progress and summative evaluation. The process of portfolio also provides opportunities for learners to develop knowledge, understanding, analysis, synthesis, application of knowledge, and critical thinking under the cooperation of many parties (Klenowski, 1998).

According to the Office of Higher Education Commission has set the Thailand Qualifications Framework for Higher Education (TQF: HED), the Framework requires the student to be developed from the experience gained during the study in the higher education institutes for at least five areas: 1) Ethics and Moral, 2) Knowledge, 3) Cognitive Skills, 4) Interpersonal Skills and Responsibility, and 5) Numerical Analysis, Communication and

---

\* Corresponding author. Tel.: +662-218-2644 ; fax: +662-218-2644  
E-mail address: prakob.k@chula.ac.th

Information Technology Skills. Since Thailand Cyber University Project has a mission to provide and maintain the central computer system to manage online course, called Content Management System (CMS) with Learning Management System (LMS), TCU recognized the need to conduct research to develop E-Portfolio Management System (EPMS) which works with the Learning Management System and to enhance the system to evaluate the actual condition with EPMS, according to the TQF: HED.

### The Research Study and The Findings

The research objectives of this study were: (1) study the condition and need of e-portfolio based on the TQF: HED, (2) develop EPMS based on the TQF: HED, (3) study the use EPMS based on the TQF: HED, and (4) present EPMS based on the TQF: HED. Accordingly, the research methods in this study comprised of 3 phases: Phase 1 study the opinion of instructors and learners about the condition and need of EPMS based on Thai Qualifications Framework for Higher Education, Phase 2 develop EPMS based on Thai Qualifications Framework for Higher Education, and Phase 3 study the use EPMS based on Thai Qualifications Framework for Higher Education. The details are described as follows.

#### Phase 1 Study the opinion of instructors and learners about the condition and need of e-portfolio based on Thai Qualifications Framework for Higher Education.

The sample consisted of 183 instructors and 261 students. Instruments were questionnaires about the condition and need of e-portfolio. The questionnaires were divided into two forms for instructors and learners. The questionnaires were verified for content validity by 3 experts. The data was collected and analyzed using descriptive statistics. The results showed that the 83.6 percent of instructors and 66.7 percent of students have used portfolio before as shown in Figure 1. There were 90.7 percent of instructors and 66.3 percent of students who were interested in using electronic portfolios as shown in Figure 2. There were 91.8 percent of instructors and 82 percent of students who had no or little knowledge about electronic portfolios and needed more training, as shown in Figure 3. There were 44.8 percent of professors and 15.7 percent of students who could use LMS with Moodle LMS at the top as shown in Figure 4.

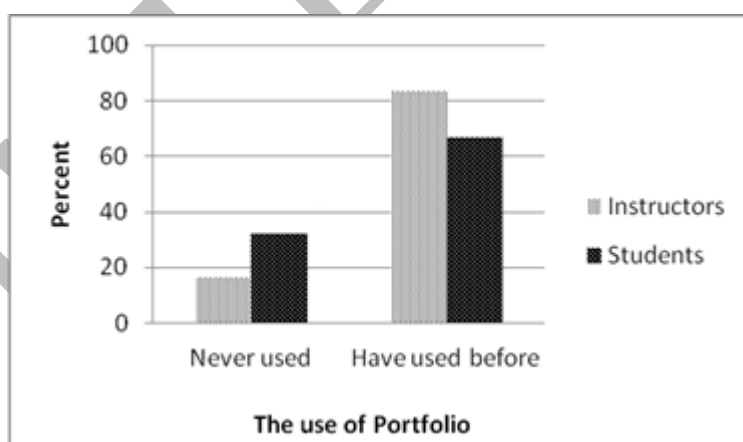
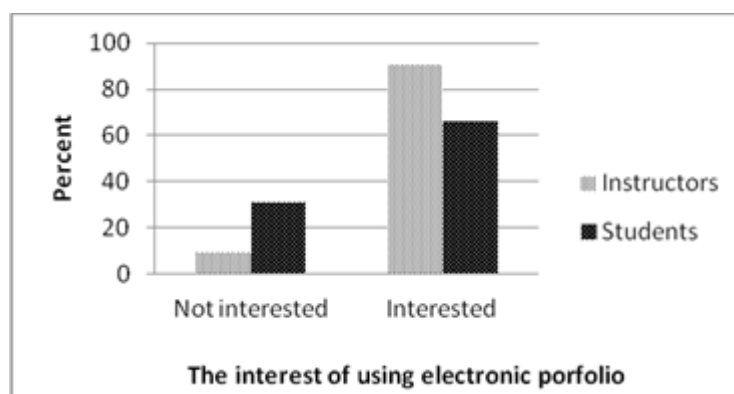
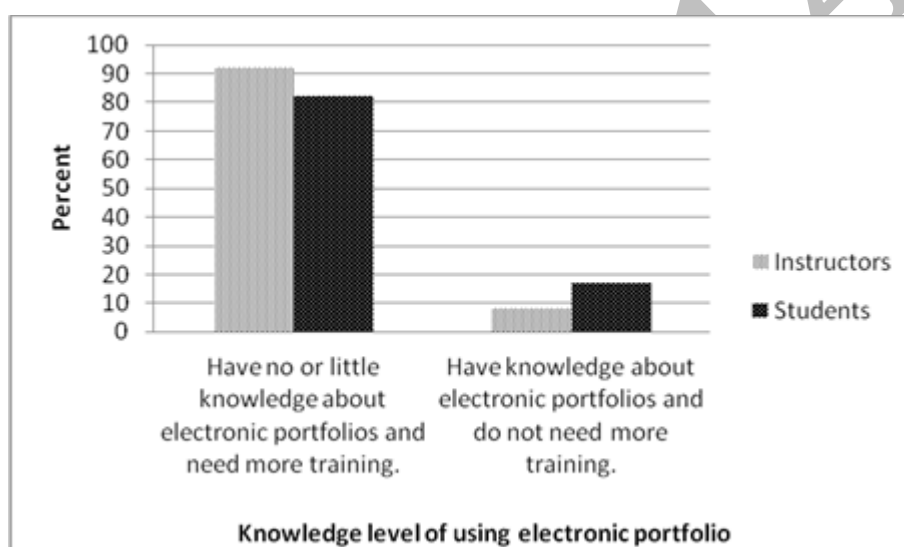


Fig. 1 The use of portfolio of instructors and students



**Fig. 2** The interest of using electronic portfolio of instructors and students



**Fig. 3** Knowledge level of using electronic portfolio of instructors and students

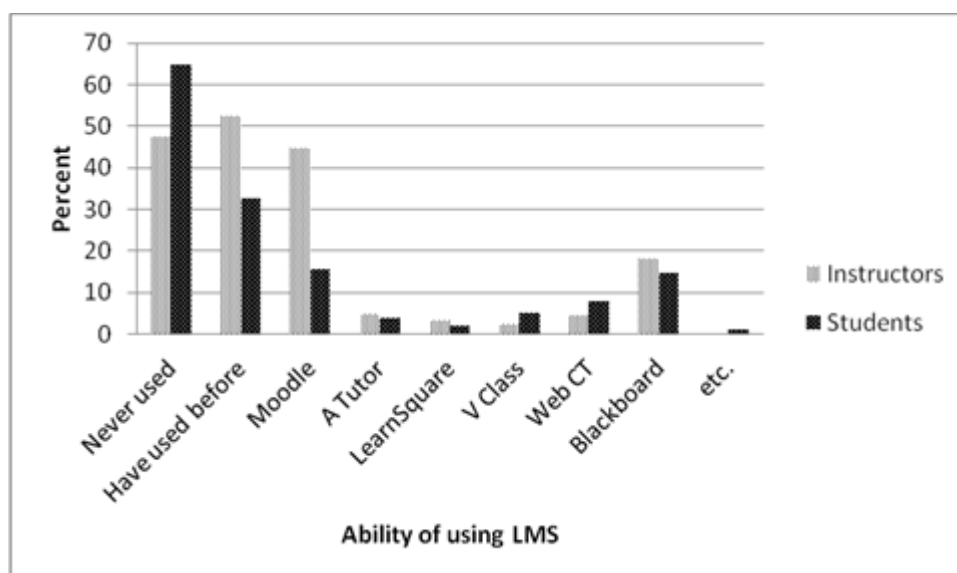
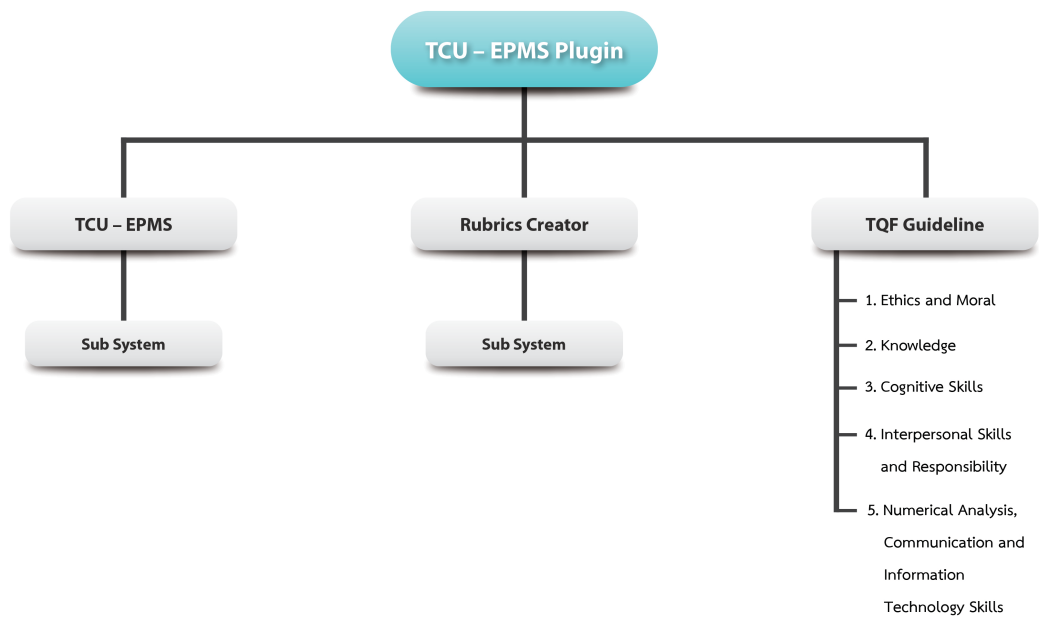


Fig. 4 Ability of using LMS of instructors and students

#### Phase 2 Develop EPMS based on Thai Qualifications Framework for Higher Education Researchers outline the features of the electronic portfolio management system.

The researcher developed a draft of EPMS system features, system plan, and storyboard of the screen. The draft was examined by 5 experts on e-Learning or EPMS. The draft was improved according to the suggestions of the experts. The system and manual of EPMS were developed based on Mahara E-Portfolio System. The system and manual were checked by 5 experts on e-Learning or EPMS. Then the system was improved according to the suggestions of the experts. The research found that the system should consist of two respective sub-systems, the e-portfolio system and the rubric creator system, and one reference page as the TQF guidelines as shown in Figure 5. Screen captures of TCU-EPMS are shown in Figure 6 and 7. The average evaluation rating results were mean = 4.77 and SD = 0.36 which was the highest level according to evaluation rating criteria: mean 5.00–4.50= highest, 4.49–3.50= high, 3.49–2.50= medium, 2.49–1.50 = low, and 1.49–1.00= lowest. The details are as shown in Table 1.



**Fig. 5** Diagram of TCU-EPMS Plugin and TQF Guideline

The figure shows a screenshot of the TCU EPMS user interface on the left and a table titled "TCU TQF Template" on the right.

**TCU EPMS Screen:** The interface features a purple header with the "TCU EPMS" logo. Below the header, there's a "Welcome" message and a "Create and collect" section with icons for "Update your profile", "Update your site", "Create your portfolio", and "Publish a portfolio". The "Organise" section includes "Browse your portfolio" and "Organise your portfolio into pages". The "Share and network" section has "Find friends and join groups", "Find friends", "Join groups", "Control your privacy", and "Discuss topics". There's also an "Inbox" section with "Institution membership confirmation" and "Topics I am following".

**TCU TQF Template Table:**

Outcome	TQF Artifact	Reflection	Assessment
1. Ethical & Moral		Outcome 1 Reflection <a href="#">eportfolio</a>	Outcome 1 Scoring <a href="#">Rubric Score</a> <a href="#">Score Report</a>
2. Knowledge		Outcome 2 Reflection <a href="#">eportfolio</a>	Outcome 2 Scoring <a href="#">Rubric Score</a> <a href="#">Score Report</a>
3. Cognitive skills		Outcome 3 Reflection <a href="#">eportfolio</a>	Outcome 3 Scoring <a href="#">Rubric Score</a> <a href="#">Score Report</a>
4. Interpersonnal & Reponsibility		Outcome 4 Reflection <a href="#">eportfolio</a>	Outcome 4 Scoring <a href="#">Rubric Score</a> <a href="#">Score Report</a>
5. Analytical & Communications		Outcome 5 Reflection <a href="#">eportfolio</a>	Outcome 5 Scoring <a href="#">Rubric Score</a> <a href="#">Score Report</a>

Below the table is a "Feedback" section with links for "Place feedback", "Report objectionable material", "Print", and "Add page to wishlist".

**Fig. 6** TCU EPMS screen

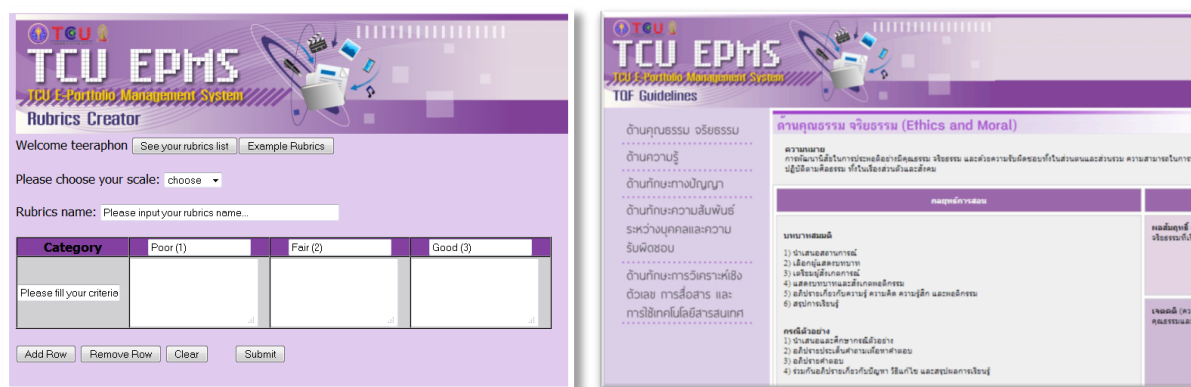


Fig. 7 Rubric Creator and TQF Guideline screen

Table 1 Results from expert assessment

Items	Mean	S.D.	Rating
<b>1. Site Structure Design</b>			
1.1 Site structure was well designed and organized from head topics to sub-topics.	4.80	0.45	Highest
1.2 Site structure was designed to cover objectives and information.	4.80	0.45	Highest
1.3 Site structure reflects the type of information in the site.	4.60	0.55	Highest
1.4 Site structure covers technical information of the site.	4.40	0.55	High
1.5 Site structure is suitable for the target group.	4.80	0.45	Highest
<b>2. Storyboard Design</b>			
2.1 Storyboard has suitable design and layout.	4.80	0.45	Highest
2.2 Storyboard has well organized content.	4.80	0.45	Highest
2.3 Storyboard has color tone that is suitable for the content.	4.60	0.55	Highest
2.4 Storyboard has suitable picture layout.	4.60	0.55	Highest
2.5 Storyboard has suitable text layout.	4.80	0.45	Highest
2.6 The design of color, picture, and graphic is consistency in every page.	5.00	0.00	Highest
<b>3.TCU-EPMS</b>			
3.1 Log-in process.	5.00	0.00	Highest
3.2 Navigator system.	5.00	0.00	Highest
3.3 Portfolios and evidences collection are in line with the TQF: HEEd.	5.00	0.00	Highest
3.4 Thinking reflection.	4.40	0.55	High
3.5 Assessment of works by related persons (students themselves, instructors, and classmate).	4.80	0.45	Highest
3.6 Assessment of portfolios	5.00	0.00	Highest
3.7 Log-out process.	5.00	0.00	Highest
<b>4. Rubrics Creator</b>			
4.1 Creating rubrics	4.60	0.55	Highest
4.2 Editing rubrics	5.00	0.00	Highest
4.3 Deleting rubrics	5.00	0.00	Highest
4.4 Examples of rubrics	4.80	0.45	Highest
<b>5. TQF Guideline</b>			
5.1 Ethics and moral	4.60	0.55	Highest
5.2 Knowledge	4.60	0.55	Highest
5.3 Cognitive skills.	4.60	0.55	Highest
5.4 Interpersonal skills and responsibility.	4.60	0.55	Highest

Items	Mean	S.D.	Rating
5.5 Numerical analysis, Communication, and information technology skills.	4.60	0.55	Highest
<b>6. Overall Design</b>			
6.1 Text	4.60	0.55	Highest
6.2 Picture	4.80	0.45	Highest
6.3 Color	4.60	0.55	Highest
6.4 Icons and buttons	4.80	0.45	Highest
6.5 Links	4.80	0.45	Highest
<b>7. General applications</b>			
7.1 EPMS is easy and convenient to use.	4.60	0.55	Highest
7.2 Model of EPMS is suitable to use.	4.80	0.45	Highest
7.3 EPMS has a system to prevent user errors in every step.	4.40	0.55	High
7.4 EPMS can be used to evaluate the actual condition in line with the TQF: HEd	4.80	0.45	Highest
<b>8. Manual</b>			
8.1 The manual describes how to use the system clearly and orderly.	5.00	0.00	Highest
8.2 The manual covers contents for users.	5.00	0.00	Highest
8.3 Language in the manual is easy to understand.	4.80	.045	Highest
8.4 The manual has clear and appropriate illustrations.	5.00	.000	Highest
Total	4.77	0.36	Highest

### Phase 3 Study the use EPMS based on Thai Qualifications Framework for Higher Education

The sample group consisted of 90 students, divided into 30 students in Science and Technology, 30 students in Health Sciences, and 30 students in Humanities and Social Sciences. Research instrument was the questionnaires on the satisfaction of EPMS which was verified for content validity by 3 experts. The data was collected analyzed data using content analysis and descriptive statistics. The results showed that students in Science and Technology, Health Sciences, and Humanities and Social Sciences had overall opinions about EPMS at mean = 4.33 and SD = 0.67, mean = 4.48 and SD = 0.60, and mean = 3.88 and SD = 0.77 respectively, as shown in Table 2. The sample group had opinions on the use of EPMS as follows.

**Table 2** Opinions of the sample group on EPMS

Items	Science and Technology		Health Sciences		Humanities and Social Sciences		Total	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
1. Attitude	4.40	0.62	4.46	0.66	3.79	0.82	4.22	0.70
2. Practicability	4.35	0.75	4.50	0.60	3.55	0.76	4.13	0.70
3. Acceptability	4.39	0.64	4.55	0.57	3.88	0.85	4.27	0.69
4. E-Portfolio Management System	4.28	0.68	4.51	0.57	3.97	0.70	4.25	0.65
5. The design of EPMS	4.29	0.70	4.43	0.60	3.94	0.81	4.22	0.70
6. Implementation procedure of EPMS	4.26	0.67	4.50	0.56	3.97	0.76	4.24	0.66
7. General features of EPMS	4.41	0.62	4.47	0.61	3.95	0.74	4.28	0.66
8. Easy and convenient in self-assessment	4.26	0.64	4.41	0.63	3.96	0.74	4.21	0.67
<b>Total</b>	4.33	0.67	4.48	0.60	3.88	0.77	4.23	0.68

Table 2 shows that students in Health Science had the highest opinion about the general features of EPMS ( $\bar{x}$ = 4.41), followed by attitude ( $\bar{x}$ = 4.40), and acceptability ( $\bar{x}$ = 4.39), respectively. Students in Science and Technology had the highest opinion about acceptability ( $\bar{x}$ = 4.55), followed by E-Portfolio Management System ( $\bar{x}$ = 4.51), and the implementation procedure of EPMS and the practicability ( $\bar{x}$ = 4.50), respectively. Students in Humanities and Social Sciences had the highest opinion about e-Portfolio Management System and the implementation procedure of EPMS ( $\bar{x}$ = 3.97), followed by easy and convenient in self-assessment ( $\bar{x}$ = 3.96) and the general features of EPMS

( $\bar{x}$  = 3.95), respectively.

The results shows that the sample group consisted of students in Health Science, Science and Technology, and Humanities and Social Sciences had overall opinion about the manual of EPMS at mean = 4.11 and SD = 0.84 which was at high level as shown in Table 3. The sample group had opinion about the manual of EPMS as follows.

**Table 3** Opinions of the sample group on EPMS manual

Item	Total	
	Mean	S.D.
1. Usability: describe the process of using the system clearly and orderly.	4.14	0.78
2. Usability: Have comprehensive content for users.	4.08	0.75
3. Language: Language used in the manual is easy to understand.	4.04	0.92
4. Usability: Have clear and suitable illustrations.	4.16	0.89
<b>Total</b>	<b>4.11</b>	<b>0.84</b>

Table 3 shows that the assessment in usability: have clear and suitable illustrations had the highest scores ( $\bar{x}$  = 4.16), followed by usability: describe the process of using the system clearly and orderly ( $\bar{x}$  = 4.14), and usability: have the content covered for users ( $\bar{x}$  = 4.08), respectively.

## Discussion and Conclusions

According to the need analysis of instructors and students and the test of the system, discussion and conclusions of the report is described as follows.

TCU-EPMS Plugin was developed based on Thai Qualifications Framework for Higher Education (TQF: HE) by improving from MaharaePortfolio System which was electronic portfolio system in the Software-Server required category (Barrett, 2012). The researchers added the ability for a system to evaluate and to be compatible with Moodle LMS which made TCU-EPMS Plugin classified as Assessment Systems - Hosted Services category (Barrett, 2012). The average evaluation rating from the experts was at mean = 4.77 and SD = 0.36 which was the highest level. The system test among 90 students in 3 disciplines found that students in Science and Technology, Health Sciences, and Humanities and Social Sciences had overall opinions about E-Portfolio Management System at mean = 4.33 and S.D. = 0.67, mean = 4.48 and S.D. = 0.60, mean = 3.88 and S.D. = 0.77, respectively. The sample group had additional opinions to develop and apply the system in the real situation. In conclusion, the system was very useful for storing the trace evidence of learning. However, the use of the system was difficult to understand. It was believed if the users used the system regularly or had an opportunity to use it more often, they would be able to use the system more effectively. Therefore, in order to enable the system to be implemented, the researcher considered to add clearer information in the manual and organize training in a timely manner and according to the needs of the users.

The results of this research were in line with the research on *Development of Electronic Portfolio Model with Reflective Feedback through Assessment of Secondary School Student Learning Development under the Office of the Basic Education Commission* (Koraneekij & Sothayakom, 2012). The research studied the opinions of teachers and students on the use of electronic portfolios. It was found that the teachers realized the importance of using electronic portfolios and that it could evaluate learning development of students. In addition, the teachers commented that electronic portfolios could store information of students without wasting resources. Most students preferred to use electronic portfolios because it made them know information for self-improvement and its cost effectiveness. Also, students were satisfied with the results of learning development evaluation using electronic portfolios. Furthermore, it was consistent with Koraneekij (2009) that students commented that the electronic portfolio process was appropriate at the high level.

The results of this research were also consistent with the research on *E-Learning System to Enhance Cognitive Skills for Learners in Higher Education* (Songkram & Khlaisang, 2012). The research aimed to develop e-Learning system to enhance the cognitive skills of higher education learners (Generic system) and the application models for each discipline (Specific system). It demonstrated the guideline in system design for each discipline to enhance learners' cognitive skills. The benefit was the guideline for the development of learners in line with the national



education reform in 1999 on the pursuit of knowledge through technology and the Qualifications Framework for Higher Education in 2009 on enhancing cognitive skills. Also, higher education instructors can use e-Learning system to enhance cognitive skills for learners to apply in specific system for research, academic, and teaching development.

In addition, the system from the research was developed from Moodle Learning Management System which was an opensource. Therefore, the source codes of the program could be further developed. The research has proposed the development from the Qualifications Framework for Higher Education. It included activities and assessments that focused on the evidence from behaviors in the online context that was consistent with thinking process of each disciplines according to the Qualifications Framework for Higher Education (Khlaisang & Songkram, 2013). It can be seen that the results of this research was the development of authentic assessment system that was in line with the Qualifications Framework for Higher Education.

## Acknowledgement

The authors would like to express our sincere appreciation to Thailand University Project, Office of Higher Education Commission, Ministry of Education in financial supporting this research study. Our appreciation also extend to all experts instructors, and students, participated in this study.

## References

- Office of Higher Education Commission (1999). **National Education Act B.E. 2542 (1999)**. Office of the Educational Council, Royal Thai Government.
- Office of Higher Education Commission (2009). **Office of Higher Education Commission Gazette: Guideline for Qualifications Framework for Higher Education, B.E. 2552 (2009)**. Office of Higher Education Commission, Ministry of Education. [Online]. Available from: <http://www.mua.go.th/users/tqf-hed> [2011, July 6]
- Office of Higher Education Commission (2009). **Ministry of Education Gazette: Qualifications Framework for Higher Education, B.E. 2552 (2009)**. Office of Higher Education Commission, Ministry of Education. [Online]. Available from: [http://www.air.or.th/paper/20101111\\_61330-3.pdf](http://www.air.or.th/paper/20101111_61330-3.pdf) [2012, April 10]
- Bureau of Higher Education Standards and Evaluation (2004). **List of Courses, Disciplines, and Degree of Higher Education under OHEC**. Bureau of Higher Education Standards and Evaluation. [Online]. Available from: [http://www.mua.go.th/users/bhes/front\\_home/book\\_program.pdf](http://www.mua.go.th/users/bhes/front_home/book_program.pdf) [2011, July 6]
- Barrett, H. (2000). Create Your Own Electronic Portfolio. **Learning & Leading with Technology**, Vol. 27, No. 7, pp. 14-21.
- Barrett, H.C. (2012). **Categories of ePortfolio Tools**. Online]. Available from: <http://electronicportfolios.org/categories.html> [May 5, 2013].
- Klenowski, V. (1998). **Guideline for Portfolio Use in Initial Teacher Education**. [Online] Available from: <http://www.ied.edu.hk/cric/series/pdf/98paper1.pdf>
- Khlaisang, J. and Songkram, N. (2013). E-Learning System to Enhance Cognitive Skills for Learners in Higher Education: A Review of Possibly Open Education. **International Journal of the Computer, the Internet and Management**, Vol. 21 No.1 (January-April 2013) pp 17-23.
- Koraneekij, P. and Sothayakom, P. (2012). **Final Report of Research on 'Development of Electronic Portfolio Model with Reflective Feedback through Assessment of Secondary School Student Learning Development under The Office of The Basic Education Commission'** Funded by the National Research Council of Thailand in 2012.
- Koraneekij, P. (2009). **An Effect of Levels of Learning Ability and Types of Feedback in Electronic Portfolio on Learning Achievement of Students in Electronic Media Production for Education Subject**. Bangkok : Faculty of Education Chulalongkorn University.
- Songkram, N. and Khlaisang, J. (2012). **Final Report of Research on E-Learning System to Enhance Cognitive Skills for Learners in Higher Education** Funded by the National Research Council of Thailand in 2012.

# Development of learning outcome based e-portfolio model emphasizing on cognitive skills in pedagogical blended e-learning environment for undergraduate students at Faculty of Education, Chulalongkorn University

Prakob Koraneekij<sup>a\*</sup>, Jintavee Khlaisang<sup>b</sup>

<sup>a</sup>Assistant Professor, Department of Educational Technology and Communications, Chulalongkorn University, Bangkok, 10330, Thailand (prakob.k@chula.ac.th)

<sup>b</sup>Associate Professor, Department of Educational Technology and Communications, Chulalongkorn University, Bangkok, 10330, Thailand (jintavee.m@chula.ac.th)

---

## Abstract

This research aims to develop the learning outcome based e-portfolio model that emphasizes cognitive skills in pedagogical blended e-learning environment. The model was developed based on the survey of 360 students, and the interview from 3 administrators and 12 instructors at Faculty of Education, Chulalongkorn University, Thailand. Then, it was tested by 36 undergraduate students at Faculty of Education. Analysis of repeated measures ANOVA indicated that there was statistical difference at .05 level of significant. Then, the model was approved by the experts. Accordingly, the results showed that the model should consist of 6 elements along with 8 steps.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* Electronic Portfolio; Learning Outcome; Cognitive Skills; Pedagogical Blended e-Learning Environment

---

## Introduction

The use of electronic portfolios is one of the methods to evaluate the actual condition by using computer and network technology. It enables the portfolio owner to accumulate and store their works in various forms, including audios, videos, images, and text. It uses database and hypertext to link the works that were selected based on the criteria to reflect the achievement and development of learners (Barrett, 2000). In addition, the portfolio can also be used to evaluate the works of learners including formative progress and summative evaluation. The process of portfolio also provides opportunities for learners to develop knowledge, understanding, analysis, synthesis, application of knowledge, and critical thinking under the cooperation of many parties (Klenowski, 1998).

According to the resolution of the Council of Chulalongkorn University, there are nine desirable qualities of the graduates. One of the qualities was thinking skills, including critical thinking, creative thinking, and problem solving (Chulalongkorn University, 2010), which are cognitive skills based on the Qualifications Framework for Higher Education (The Office of Higher Education Commission, 2009). Also, the university has a policy focusing on providing learning activities via electronic media that allows students to access learning easily and study with the potential of each individual without the limitation of time and place. Computers and network were used as the main tool to access the content of the lesson and be a channel for interaction in the learning process. (Centre for Learning Innovation, Chulalongkorn University, nd)

E-Learning system in blended learning environment combines the benefit of classroom and online learning in content delivery, activities, and measurement and evaluation. Blended e-Learning has become widespread in higher

---

\* Corresponding author. Tel.: +662-218-2644 ; fax: +662-218-2644  
E-mail address: prakob.k@chula.ac.th

education because of its flexibility for instructors to integrate educational technology in teaching. Also, instructors can offer more effective teaching by implementing student-centered method. Students can access and study contents anywhere and anytime. They can participate and exchange ideas in classroom and learning social media. Therefore, instructors can improve learner's cognitive skills and necessary learning attitudes in the classroom period. It can be seen that e-Learning system in blended learning environment will help improve learning potential, especially cognitive skills. There are four important elements for the designing of this teaching method: electronic contents, learning management system, communication, and evaluation. All elements focus on teaching method that the students have more proactive role as a learner in a process of e-Learning system in blended learning environment (Khlaisang, 2011; Khlaisang, 2010; Khlaisang and Koraneekij, 2009; Bonk & Graham, 2006).

Based on the rational and importance of the above mentioned problem and to respond to the policy of Chulalongkorn University that encourages instructors to provide learning activities focusing on learning outcomes which the university identifies as desirable qualities of the graduates, the management of learning environment based on blended e-Learning system, and the evaluation focusing on actual condition using electronic portfolios, the researchers conducted the research on Development of Learning Outcome Based E-Portfolio Model Emphasizing on Cognitive Skills in Pedagogical Blended e-Learning Environment for Undergraduate Students at Faculty of Education, Chulalongkorn University.

### **The Research Study and The Findings**

The research objectives of this study were: (1) to study the condition and need of E-Portfolio model emphasizing on cognitive skills in pedagogical blended e-Learning environment for undergraduate students at Faculty of Education, Chulalongkorn University; (2) to develop E-Portfolio model emphasizing on cognitive skills in pedagogical blended e-Learning environment for undergraduate students at Faculty of Education, Chulalongkorn University; (3) to study the use of E-Portfolio model emphasizing on cognitive skills in pedagogical blended e-Learning environment for undergraduate students at Faculty of Education, Chulalongkorn University; and (4) to evaluate of E-Portfolio model emphasizing on cognitive skills in pedagogical blended e-Learning environment for undergraduate students at Faculty of Education, Chulalongkorn University.

Accordingly, the research methods used in this study comprised of 4 phases; Phase 1: study the condition and need of E-Portfolio model emphasizing on cognitive skills in pedagogical blended e-Learning environment for undergraduate students at Faculty of Education, Chulalongkorn University, Phase 2: develop and test E-Portfolio model emphasizing on cognitive skills in pedagogical blended e-Learning environment for undergraduate students at Faculty of Education, Chulalongkorn University, Phase 3: study the use of E-Portfolio model emphasizing on cognitive skills in pedagogical blended e-Learning environment for undergraduate students at Faculty of Education, Chulalongkorn University, and Phase 4: evaluate E-Portfolio model emphasizing on cognitive skills in pedagogical blended e-Learning environment for undergraduate students at Faculty of Education, Chulalongkorn University. The details are described as follows

**Phase 1:** Study the condition and need of E-Portfolio model emphasizing on cognitive skills in pedagogical blended e-Learning environment for undergraduate students at Faculty of Education, Chulalongkorn University.

The report from phase 1 of the study included the survey of 360 students to identify the needs from the target users. Then, the interviews from the 3 administrators and 12 instructors were conducted in order to find the need solution based on the need identification and analysis of the survey results. Details are described as follows.

The sample group consisted of 360 undergraduate students. G\* Power program with the confidence level at 95%, error at  $\pm 5\%$ , power of the test at 0.95, medium effect size at 0.25, and eight groups for analysis were used to determine the sample group (Faul F. et.al., 2009). The random sampling was classified by the department. Research instrument was a questionnaire for students about the condition and need of E-Portfolio model emphasizing on cognitive skills in pedagogical blended e-Learning environment. The questionnaire was verified for content validity by 3 experts and had the reliability at 0.889. The data was collected and analyzed using descriptive statistics. The results showed that most students have used portfolio before at 94.2 percent as shown in Figure 1. There were 55.0 percent of students who have never used electronic portfolio as shown in Figure 2. Most students were interested in using electronic portfolio at 73.6 percent, as shown in Figure 3, because electronic portfolios helped store the works

online, facilitate in storage, and can back up the works, reducing the risk of data loss.

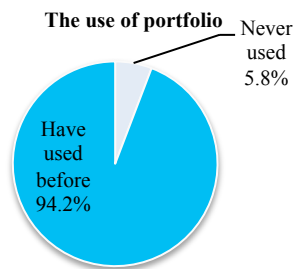


Fig. 1. The use of portfolio

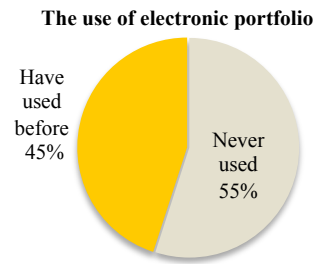


Fig. 2. The use of electronic portfolio

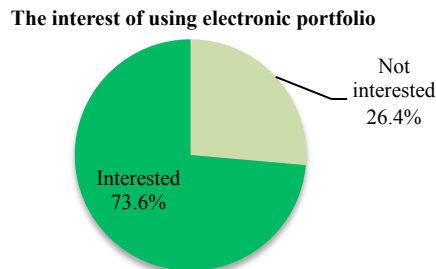


Fig. 3. The interest of using electronic portfolio

The analysis of the condition of E-Portfolio model emphasizing on cognitive skills in pedagogical blended e-Learning environment found that the overall opinions of the respondents was at medium level ( $\bar{x} = 2.78$ ,  $SD = 1.229$ ). Students have seen other people's electronic portfolio before, have experiences in using electronic portfolio, and was able to develop electronic portfolio to evaluate an actual condition at low level ( $\bar{x} = 2.13, 2.24, 2.24$ ;  $SD = 1.379, 1.440, 1.476$ , respectively). The analysis of the need to use E-Portfolio emphasizing on cognitive skills in pedagogical blended e-Learning environment found that the overall opinions of the respondents was at high level ( $\bar{x} = 4.20$ ,  $SD = .794$ ). Students' need to develop creative thinking, critical thinking, and problem solving skill from teaching and learning management was at high level ( $\bar{x} = 4.40, 4.36, 4.32$ ;  $SD = .712, .706, .727$ , respectively).

Correspondingly, the interviews from the 3 administrators and 12 instructors were conducted in order to find the need solution based on the need identification from the survey. The administrators strongly supported the survey result showing the readiness of students in using e-portfolio. Also, they all agreed to the design of e-portfolio in integrating the cognitive skills' learning outcomes, since it has been promising not only from the university but also from the Office of Higher Education Commission. While the results from the interviewing 12 instructors found that they gave more emphasis on the design of e-learning in blended learning environment. The proportion of the face to face and online activities needed to be clear. Also, the pedagogy integrated into the design needed to be suitable, such as the use of project-based learning, and problem-based learning. Since the evidences of cognitive skills should be able to collect and evaluate, the learning design should be focused on the authentic type of activities showing both students' work and the process of learning.

**Phase 2:** Develop and test E-Portfolio model emphasizing on cognitive skills in pedagogical blended e-Learning environment for undergraduate students at Faculty of Education, Chulalongkorn University

The researchers studied, analyzed, and synthesized concepts, theories, and researches related to electronic portfolio for students, cognitive skill Learning outcomes, rubric assessment, e-Learning in blended environment, and the results from opinion analysis of administrators, instructors, and students from research phase 1. Then, the draft of E-Portfolio model was developed. The draft was examined by the interview with 7 experts and improved according to the suggestions. The model was later approved by 5 experts using evaluation form of electronic portfolio model.

E-Portfolio model emphasizing on cognitive skills in pedagogical blended e-Learning environment for

undergraduate students at Faculty of Education, Chulalongkorn University consisted of 6 elements and 8 steps. Elements included (1) E-Port Objectives, (2) E-Port Artifacts, (3) Roles of Individuals, (4) E-port Tools, (5) Pedagogy BLE, (6) E-Port Assessment.

Eight steps included (1) State objectives, contents, and e-port criteria, (2) Create artifacts congruence with cognitive skills in pedagogical blended e-learning environment, (3) Collect artifacts or evidences for working e-portfolio, (4) Self-reflect and assess of the artifacts, (5) Feedback by individuals involved, (6) Select artifacts for presentation e-portfolio, (7) Make the presentation e-portfolio public, and (8) Assess potential impact of the presentation portfolio. The result of model development was showed in Figure 4.



Fig. 4. Elements and steps of Learning Outcome Based E-Portfolio Model Emphasizing on Cognitive Skills in Pedagogical Blended e-Learning Environment for Undergraduate Students at Faculty of Education, Chulalongkorn University

**Phase 3:** Study the use of E-Portfolio model emphasizing on cognitive skills in pedagogical blended e-Learning environment for undergraduate students at Faculty of Education, Chulalongkorn University

The sample group in the study of the use of E-Portfolio was undergraduate students at Faculty of Education, Chulalongkorn University. It was divided into 2 groups: 1) 17 students using of E-Portfolio model emphasizing on cognitive skills in pedagogical blended e-Learning environment with project-based learning and 2) 19 students using of E-Portfolio model emphasizing on cognitive skills in pedagogical blended e-Learning environment with problem-based learning. The study time was 6 weeks. The tools used in this study included the plan for blended e-Learning pedagogy, E-Portfolio manual for students, evaluation criteria or evidences of the learning outcomes of cognitive skills which included (1) problem solving, (2) creative thinking, and (3) critical thinking, and evaluation criteria for E-Portfolio. The qualities of all tools were assessed by 3 experts. The examples of plan for blended e-Learning pedagogy, tools, and outcomes can be summarized in Table 1.

Table 1. Overall activities plan by integrating project-based learning pedagogy

Overall activities plan Module 1			
E-learning in blended learning environment by integrating Project-Based Learning pedagogy		Learning outcomes of cognitive skills of undergraduate students, measured by the trace on E-Portfolio	
<b>E-learning in blended learning environment</b> E-Learning system in blended BLE combines the benefit of classroom and online learning. Learning tools includes: 1. Learning Management System 2. Social Web Application, including Google Drive (group planning tool, research	<b>Pedagogy</b> This module focuses on project-based learning. The steps are as follows. 1. Preparing by clarifying the objectives of the activity. 2. Each group decides the topic. 3. Each group plans the project. 4. Research and prepare the presentation using methods. 5. Each group presents the work and exchange the work with other	<b>Creative thinking</b> Evaluation form for creative thinking has elements that cover 4 creative thinking dimension including; 1. Readiness in competency – Originality dimension 2. Courage to encounter problems and challenges - Fluency dimension 3. Ability to presents various solutions to the problem -	<b>Problem solving</b> Evaluation form for problem solving has elements focusing on problem solving process rather than the work. It contains 4 steps including; 1. Identifying problem. 2. Interpreting the problem to identify various solutions (Analysis). 3. Developing hypothesis / determining the best

tool, presentation tool, and comment tool), Social Sticky Note: Lino (brainstorming tool), and Social Inspiration Board: Pinterest (collecting tool) 3. Outcome Based E-Portfolio	group. 6. Students take an assessment to check the understanding of the activity. 7. Students reviews and apply knowledge by discussing the results in learning reflection record together.	Flexibility dimension 4. Ability to present creatively and applicably - Elaboration dimension	solution (Synthesis). 4. Testing hypothesis / best solution. Applying the solution and evaluating (Assessment)
--	---	--	---

Data was analyzed using frequency, percent, mean, standard deviation, t-test and repeated measures ANOVA. The research results indicated as follows.

### 1. The results of E-Portfolio model emphasizing on cognitive skills in pedagogical blended e-Learning environment with *Project-Based Learning*

1.1 The analysis of the differences of the average scores of problem solving found that there was statistical difference at .05 level of significant ( $t = -12.813$ ,  $sig = .000$ ). The scores from the 2<sup>nd</sup> test ( $\bar{x} = 12.177$ ,  $SD = .951$ ) was higher than the scores of the 1<sup>st</sup> test ( $\bar{x} = 9.294$ ,  $SD = .470$ ) as detailed in Table 2.

1.2 The analysis of the difference of the average scores of creative thinking found that there was statistical difference at .05 level of significant ( $t = -14.741$ ,  $sig = .000$ ). The scores from the 2<sup>nd</sup> test ( $\bar{x} = 13.294$ ,  $SD = 1.213$ ) was higher than the scores of the 1<sup>st</sup> test ( $\bar{x} = 9.706$ ,  $SD = .470$ ) as detailed in Table 2.

**Table 2.** The analysis of the difference of the average scores of problem solving and creative thinking

Problem solving	N	$\bar{x}$	SD	t	sig	Result
1 <sup>st</sup> Test	17	9.294	.470	-12.813	.000	2 <sup>nd</sup> Test > 1 <sup>st</sup> Test
2 <sup>nd</sup> Test	17	12.177	.951			
Creative thinking	N	$\bar{x}$	SD	t	sig	Result
1 <sup>st</sup> Test	17	9.706	.470	-14.741	.000	2 <sup>nd</sup> Test > 1 <sup>st</sup> Test
2 <sup>nd</sup> Test	17	13.294	1.213			

### 2. The results of E-Portfolio model emphasizing on cognitive skills in pedagogical blended e-Learning environment with *Problem-Based Learning*

2.1 The analysis of the differences of the average scores of problem solving found that the average scores of problem solving in repeated measures was statistical difference at .05 level of significant (Wilks' Lambda = 111.866,  $sig = .000$ ; Sphericity Assumed = 120.407,  $sig = .000$ ). The errors of measures in variables was equal in all groups (Mauchly's W = .992, Approx. Chi-Square = .143,  $sig = .931$ ) as detailed in Table 3. The result of the average score comparison of the two tests found that the repeated measures of the 1<sup>st</sup> and 2<sup>nd</sup> test ( $F = 96.983$ ,  $sig = .000$ ) and the 2<sup>nd</sup> and 3<sup>rd</sup> test ( $F = 34.517$ ,  $sig = .000$ ) was statistical difference at .05 level of significant. The scores from the 2<sup>nd</sup> test ( $\bar{x} = 11.737$ ,  $SD = 1.759$ ) was higher than the scores of the 1<sup>st</sup> test ( $\bar{x} = 9.105$ ,  $SD = 1.941$ ). However, the scores from the 2<sup>nd</sup> test ( $\bar{x} = 11.737$ ,  $SD = 1.759$ ) was lower than the 3<sup>rd</sup> test ( $\bar{x} = 13.421$ ,  $SD = 2.063$ ). It can be concluded that the 3<sup>rd</sup> test had the highest average scores, followed by the 2<sup>nd</sup> and 1<sup>st</sup> test.

2.2 The analysis of the differences of the average scores of critical thinking found that the average scores of critical thinking in repeated measures was statistical difference at .05 level of significant (Wilks' Lambda = 120.748,  $sig = .000$ ; Sphericity Assumed = 94.597,  $sig = .000$ ). The errors of measures in variables was equal in all groups (Mauchly's W = .931, Approx. Chi-Square = 1.209,  $sig = .546$ ) as detailed in Table 3. The result of the average score comparison of the two tests found that the repeated measures of the 1<sup>st</sup> and 2<sup>nd</sup> test ( $F = 96.728$ ,  $sig = .000$ ) and the 2<sup>nd</sup> and 3<sup>rd</sup> test ( $F = 10.782$ ,  $sig = .004$ ) was statistical difference at .05 level of significant. The scores from the 2<sup>nd</sup> test ( $\bar{x} = 11.105$ ,  $SD = 1.449$ ) was higher than the scores of the 1<sup>st</sup> test ( $\bar{x} = 8.053$ ,  $SD = 1.545$ ). However, the scores from the 2<sup>nd</sup> test ( $\bar{x} = 11.105$ ,  $SD = 1.449$ ) was lower than the 3<sup>rd</sup> test ( $\bar{x} = 12.263$ ,  $SD = 1.939$ ). It can be concluded that the 3<sup>rd</sup> test had the highest average scores, followed by the 2<sup>nd</sup> and 1<sup>st</sup> test. The details are shows in Table 3.

**Table 3.** The analysis of differences of average scores in problem solving and critical thinking

Learning Outcomes	N	$\bar{x}$	SD	Wilks' Lambda		Mauchly's Test of Sphericity			Sphericity Assumed	
				F	sig	Mauchly's W	Approx. Chi-Square	sig	F	sig
Problem solving										
1 <sup>st</sup> test	19	9.105	1.941	111.866	.000	.992	.143	.931	120.407	.000
2 <sup>nd</sup> test	19	11.737	1.759							
3 <sup>rd</sup> test	19	13.421	2.063							
Critical thinking										
1 <sup>st</sup> test	19	8.053	1.545	120.748	.000	.931	1.209	.546	94.597	.000
2 <sup>nd</sup> test	19	11.105	1.449							
3 <sup>rd</sup> test	19	12.263	1.939							

**Phase 4:** Evaluate E-Portfolio model emphasizing on cognitive skills in pedagogical blended e-Learning environment for undergraduate students at Faculty of Education, Chulalongkorn University.

The E-Portfolio model emphasizing on cognitive skills in pedagogical blended e-Learning environment for undergraduate students at Faculty of Education, Chulalongkorn University is presented in the following figures.



**Fig. 5.** Homepage of E-Portfolio model  
emphasizing on cognitive skills



**Fig.6** Page of artifacts of E-Portfolio model  
emphasizing on cognitive skills

The model was approved by 7 experts. It was confirmed that the appropriate model should consist of 6 elements and 8 steps. The scores of the appropriateness of the model were mean = 4.64 and SD = 0.10 which was at the highest level. The scores of the elements of electronic portfolio were mean = 4.60 and S.D. = 0.17 which was at the highest level. The scores of the process in developing electronic portfolio were mean = 4.63 and S.D. = 0.19 which was at the highest level. The scores of the model and explanation was mean = 4.50 and S.D. = 0.10 which was at the highest level. The experts had additional suggestions that the model can be used as a guideline in developing the appropriate model of teaching in every course. Details of cognitive skill should be included by adding a definition and identifying the guideline of choosing problem-based learning or project-based learning. Also, information about which pedagogy will develop which cognitive skills should be added. From the suggestions, the researchers have added operating terms for more effective use.

### Discussion and Conclusions

According to the student need analysis and the model testing, discussion and conclusions of the report are described as follows. E-Portfolio model emphasizing on cognitive skills in pedagogical blended e-Learning environment for undergraduate students at Faculty of Education, Chulalongkorn University consists of 6 elements and 8 steps. The study shows that the Project-Based Learning model helps develop problem solving and creative thinking skill and the Problem-Based Learning model helps develop problem solving and critical thinking skill. The development process of student electronic portfolios starts from Step 1 which is stating objectives, contents, and e-port criteria. This process allows the students to participate and make them know what they were expected to be (Koraneekij, 2009). Step 2 is to create artifacts that reflect cognitive skills by Problem-Based Learning or Project-Based Learning. Problem-based learning is the learning that uses a problem as a basis to achieve learning objectives. Instructors would present a situation and allows students to search for solutions or knowledge. It emphasizes on encouraging students to seek knowledge to solve problems and work together as a team with instructors as a facilitator of learning (Khlaisang & Koraneekij, 2009). The instructors help students to understand learning objectives, identify the problem, present and analyze the problem, plan, research, or study more information using different methods. Students will create, synthesize, and test the hypothesis and make a conclusion. They would take assessment to test the understanding of the activities and review and apply knowledge by discussing the results in learning reflection record together. This will enhance the ability to identify problems, interpret problems to identify various solutions, research and assess the credibility of the source, develop the hypothesis, make an assessment to find the best solution, test the hypothesis, and apply the best solution to trial and evaluate it.

Project-based learning is the learning that encourages students to study and practice according to their interest, skills, and abilities under the supervision and guidance of instructors. The learning starts by making the students understand learning objectives, identify the project topic, plan the project, research and prepare the presentation using appropriate methods. Then the students present their project, exchange learning with other groups, take an assessment to test the understanding of the activities, and reviews and apply knowledge by discussing the results in learning reflection record together. This will enhance the ability to identify problems, interpret problems to identify various solutions, research information, develop the hypothesis and assess to find the best solution, test the hypothesis, and apply the best solution to trial and evaluate it. In addition, the learning process will help develop the dimensions of originality, fluency, flexibility, and elaboration.

This is also consistent with the research of Khlaisang and Likhitamrongkiat (2012) on e-Learning system in Blended Learning Environment (BLE) to enhance cognitive skills for learners in higher education. The research concluded that e-Learning system in BLE to enhance cognitive skills should focus on teaching methods which were different in three major disciplines. Teaching method suitable for Health Sciences is problem-based learning, including inductive and group discussions teaching method. Teaching techniques are brainstorming and conversation. Teaching method suitable for Science and Technology is project-based learning, including scientific process and lecture teaching method. Teaching techniques are mind map and systematic thinking. Teaching method suitable for Humanities and Social Sciences is collaborative learning, including game-based learning and group



discussions teaching method. Teaching techniques are brainstorming and mind map. The research has suggested that the feedback which was the evaluation should be divided into formative assessment and summative assessment. Formative assessment or sub assessment is the assessment during the study period by observing learning in free-to-free context and evidences of behaviors in online context that is relevant to thinking process of each discipline. Formative assessment is important to support summative assessment or overall assessment which is cognitive skills assessment of e-Learning of three disciplines.

This research can respond to the collecting of evidences that shows thinking process according to nine desirable qualities of the graduates. One of the qualities was thinking skills, including critical thinking, creative thinking, and problem solving (Chulalongkorn University, 2010), which are cognitive skills based on the Qualifications Framework for Higher Education (The Office of Higher Education Commission, 2009). Also, the results of this research are consistent with the research of Khlaisang (2012) on pedagogical blended e-Learning model using cognitive tools based upon constructivist approach for knowledge construction in higher education. Based on the research finding, the top three pedagogical blended e-Learning models included (1) Collaborative Discussion-Based Learning (CDBL), (2) Collaborative Project-Based Learning (CPjBL), and (3) Collaborative Problem-Based Learning (CPBL). Based on the research findings, it can be concluded that all three pedagogical blended e-Learning model are effective. However, when compared among the three modules, module 3 (CPBL) showed the highest scores of knowledge creation, followed by module 3 (CPjBL), though the scores are slightly different. Further suggestions based on the research findings are the effectiveness of the cognitive tools used in such models should be further examined for the most appropriate tools in constructing cognitive knowledge, especially the higher level of knowledge including analyzing, evaluating, and creation, as well as the cognitive skills including problem solving skills, Creative thinking skills, and critical thinking skills which are considered the ultimate goals of 21st century skills in higher education.

This is also consistent with the research of Khlaisang and Koraneekij (2012) on the developing of Blended E-Learning Model by Online Interactive Reflective Learning Logs (OIRL). Based on the finding, it can be concluded that the OIRL can help the process of self-study and practice according to students' interest, skills, and abilities. Also, it helps support the process of reviewing and applying by the discussion of reflection record which develops the ability to identifying the problem, interpreting the problem to identify various solutions. According to the model procedures, it was found that the use of blended e-Learning can enhance opportunities for learners to experience, review for in-depth understanding from both in class and online activities, such as class demonstration, brainstorming activities, practice, and presentation, then shift from in class to online further discussion, and presentation of projects through blog. Such activities presenting the fine transition from face to face to online activities. In addition, with the use of OIRLs, it would help learners to present whether they really understand the concept of the course content, as well as learning process. To support such implication, based on the learners' survey of their satisfaction, they expressed that in class lecture and demonstration from the lecturers helped them to understand concept of the course content, and by reviewing learning courseware, it has enhanced their understanding. When writing OIRLs, it helped learners to review both course content, as well as learning process. Then, in the step of reading, giving feedback, and revising OIRLs, it was found that learners in both groups really enjoyed receiving the comments and supports which could turn out to be positive reinforcement for their learning. Learners also expressed informative feedback was helpful in drawing conclusion. The conclusion and discussion of this work are also congruence with this research regarding the effectiveness of OIRL to develop the ability to identifying the problem, interpreting the problem to identify various solutions.

In addition, the development process of E-Port will help students to reflect on their own works and evaluate themselves. It enabled students to think and review the works, their strength and weakness and to seek ways to improve their works. The process of portfolios also provided opportunities for students to develop knowledge, understanding, analysis, synthesis, application of knowledge and critical thinking under the cooperation of many parties (Forker & McDonald, 1996; Klenowski, 1998). This was consistent with the research of Barbera (2009) and Luchoomun, McLuckie, and Van (2010) which found that the evaluation will help promote learning experience of the students. Evaluating and using electronic portfolios will help develop collaborative working skills and student's learning process.

## Acknowledgement

The authors would like to express our sincere appreciation to Chulalongkorn University's Ratchadapisek Sompot fund in supporting this research study. Our appreciations also extend to all experts instructors, and students, participated in this study.

## References

- Office of Higher Education Commission (2009). **Ministry of Education Gazette: Qualifications Framework for Higher Education, B.E. 2552 (2009)**. Office of Higher Education Commission, Ministry of Education. [Online]. Available from: <http://www.air.or.th/paper/201011161330-3.pdf> [2012, April 10]
- Barbera, E. (2009). Mutual feedback in e-portfolio assessment: an approach to the netfolio system. **British Journal of Educational Technology**. 40(2), 342–357.
- Khlaisang, J. (2012). Development of Pedagogical Blended E-Learning Model Using Cognitive Tools Based Upon Constructivist Approach for Knowledge Construction in Higher Education. **Proceedings of the Fourth International e-Learning Conference 2012**, organized by the Thailand Cyber University Project, Office of the Higher Education Commission, Bangkok, Thailand, June 14, 2012.
- Khlaisang, J. and Koraneekij, P. (2009). Pedagogy-Based Hybrid Learning: from concept to practices. **Faculty of Education, Chulalongkorn University Journal**, 38 (1), 93-108.
- Khlaisang, J. and Koraneekij, P. (2012). Development of Blended E-Learning Model Using Online Interactive Reflective Learning Logs to Enhance Faculty of Education Students' Inquiring Mind and Retention at Chulalongkorn University. **Proceedings of the Fourth International e-Learning Conference 2012**, the Office of the Higher Education Commission, Bangkok, Thailand, June 14, 2012.
- Khlaisang, J. and Likhitdamrongkiat, M. (2012). **Final Report of Research on 'E-Learning System in Blended Learning Environment to Enhance Cognitive Skills for Learners in Higher Education'** Funded by the National Research Council of Thailand in 2012.
- Koraneekij, P. (2009). **An Effect of Levels of Learning Ability and Types of Feedback in Electronic Portfolio on Learning Achievement of Students in Electronic Media Production for Education Subject**. Bangkok : Faculty of Education Chulalongkorn University.
- Luchoomun, D., McLuckie, J., and Van W. M. (2010). Collaborative e-Learning: e-Portfolios for Assessment, Teaching and Learning. **Electronic Journal of e-Learning**. 8(1), 21–30.
- Forker, E.J. and McDonald, E.M. (1996). "Perspective on Assessment. Methodology Trends in the Healthcare Profession : Portfolio Assessment". **Nurse Educator**. 21,5, pp.9-10
- Faul, F. et.al., (2009). **Statistical power analyses using G\*Power 3.1: Tests for correlation and regression analyses**. Behavior Research Methods, 41, 1149-1160
- Klenowski, V. (1998). **Guideline for Portfolio Use in Initial Teacher Education**. [Online] Available from: <http://www.ied.edu.hk/cric/series/pdf/98papr1.pdf>

# Development of non-formal adult education in the Czech Republic

Jan Kalenda<sup>a\*</sup>

*<sup>a</sup>Research Centre, Faculty of Humanities, Tomas Bata University in Zlín,  
nám. T. G. Masaryka 1279, 760 01 Zlín, Czech Republic*

---

## Abstract

This paper deals with the development of adult education in the Czech Republic after 1989. In this regard it analyses the development of participation in adult education and its influencing factors. For this purpose the paper uses primary and secondary data from five research surveys. The paper shows that there has been a slight increase in the number of adult participants in education in the last 25 years but it also shows that there are still certain groups of people that are excluded from education. The paper also outlines the main phases of development in adult education in relation to government politics; namely the liberal politics of the 1990s and the partially-regulated politics after 2000.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* adult education, educational policy, non-formal education, participation in education, history of education.

---

## Introduction

This paper deals with the development of adult education in the Czech Republic (hereinafter CZ) in the last twenty-five years. We consider it important to deal with this phenomenon because without gaining insight into it, it is not possible to understand the current state of lifelong learning in CZ. It involves the transformation of the participants as well as of political and legislative framework changes that modify this phenomenon, which represents the basic macro-social characteristics of adult education.

The reason why we focus on the period after 1989 is because there is a transition from a communist to a democratic regime in CZ at this time. During this phase, adult education emerges from the state and political influence and becomes subject to economic competition and customer's choice. Therefore, the field of adult education also changes completely. Our aim is not only to describe this transformation, which happened mainly during the early 1990s, but also to outline the trends of adult education after 2000. Here we have to note that by adult education we mean mainly non-formal education (unless stated otherwise). By non-formal education we designate all organized education occurring outside the educational system (schools). This mostly involves various forms of leisure and vocational education (cf. e.g. Palán, 2002; European Commission, 2000, p. 8). We believe that by emphasising non-formal education we will be able to cover the main characteristics of that part of lifelong learning that are not under the direct patronage of the state, mainly leisure and vocational education, which is precisely the part of adult education that was most affected by the transformation of the communist regime and by the creation of an education market.

So far, there has been no comprehensive attempt at describing the development of adult education after 1989 in CZ in specialized literature. To date, the research has focused mainly on two basic issues. The first issue covers research surveys dealing with the number of participants in non-formal adult education (see e.g. Rabušicová & Rabušic, 2008; Kalenda, 2014a, 2014b). The second covers the studies dealing with government policy on adult

---

\* Corresponding author. Tel.: +420733690925  
E-mail address: kalenda@fhs.utb.cz

education (see e.g. Veteška, 2009; Krystoň, 2013). However, we rarely see that: (1) researchers would focus on the development of adult education from a long-term perspective, i.e. the whole period after 1989, making individual researches atomized and lacking mutual interconnection as well as a wider socio-historical context; (2) the participation in adult education would be directly related to changes of government policy on adult education and to the changes in the level of state regulation.

In this study we will try to make up for the two main shortcomings of current research by focusing on the development of non-formal education since 1989 up to the present day and also by trying to outline the main relations between participation of adults in non-formal education and changes of government policy in this field. This is because we firmly believe that without a proper understanding of the socio-political background of adult education in a historical context, it is not possible to understand the contemporary aspect of this phenomenon. Both separated fields, i.e. research into participation of adults in education and research into the social framework in the form of educational policy, need to be connected again. This is also something that a number of adult education theorists already have been calling for (Green, 2002; Jarvis, 2005; Olesen, 2011; Tight, 1998, 2002). A similar trend can also be seen in some the empirical studies (Roberts, 1982; Rubenson, 2006, 2011; Rubenson & Desjardins, 2009).

Of course, it is not possible to address all issues connected with the development of non-formal education in CZ in this short study. Therefore, we will limit our endeavour to outlining a socio-political framework which the data on adult participation in non-formal education can be related to. This will allow us to better explain the causes for an increase or decrease of adult participation in education, and for the inclusion of some social groups in education or the exclusion of others.

### Theoretical foundations

There are two basic starting points for the conceptualization of a socio-political framework. The first is the concept by Andy Green which focuses on political models of adult education on the basis of the *scale of state regulation* and the second is Schutz and Casey's theory emphasising the goals of *educational policy*.<sup>\*</sup> Green (2000, 2002) distinguishes between three "ideal types" (Weber, 1998) of adult education policy: (1) a state-led system, where the state steadily regulates the activities connected with lifelong learning on a long-term basis; (2) a market-led system, where the customer's demand for educational services is the leading principle; (3) a social partnership-led system, where the state and other participants of further education cooperate. Moreover, Schutz and Casey (2006: 282-283) advocate a four-model approach: (1) the emancipatory model (also sometimes called the social justice model), which stresses equal educational opportunities for all citizens; (2) the cultural model, focused on the individual needs of an adult; (3) the "open society" model, which is characterized by regarding lifelong learning as the most suitable system for educating citizens; (4) the human capital model, which focuses on the necessity for adult education as the best way to develop a qualified labour force.

We are convinced that these two concepts do not oppose each other. They rather describe different dimensions of an educational policy and of professional, political and other discourses connected with educational policy because each of Green's models can include one or more of Schutz and Casey's models, even though co-occurrence of some is more probable than co-occurrence of others. Further (see Table 1 as well), we will use a theoretical framework composed of both concepts to better examine the changes in adult education policy in CZ.

Table 1 Ideal-typical models of adult education policy

Policy goals/ Method of regulation	Equal opportunities policy	Individual needs	Creation of a lifelong learning system	Human capital development
State-led	State-led system with an	State-led system with an	State-led system with an	State-led with an

<sup>\*</sup> For a different take on these two concepts see (Kwon, Daeyon, 2011).

	emphasis on equal opportunities	emphasis on individual needs	emphasis on the creation of a lifelong learning system	emphasis on the development of human capital
Social partnership-led	Social partnership-led system with an emphasis on equal opportunities	Social partnership-led system with an emphasis on individual needs	Social partnership-led system with an emphasis on the creation of a lifelong learning system	Social partnership-led system with an emphasis on the development of human capital
Market-led	Market-led system with an emphasis on equal opportunities	Market-led system with an emphasis on individual needs	Market-led system with an emphasis on the creation of a lifelong learning system	Market-led system with an emphasis on the development of human capital

One thing to note is that our theoretical bases implicitly presume the existence of the field of adult education\* inside which all educational activities take place. The main actors involved in this field are educational companies/organizations/individuals offering educational services and customers/consumers demanding these services. But, as Pierre Bourdieu (1998, chap. no. 4) argues, this field does not exist on its own but always in relation to other social fields. In particular, it is the relation to the state and labour market which change their purely utilitarian logic by their demands and interventions. Inside this field it is possible to observe the strategies and tactics of individual participants – educational organizations, companies and also customers consisting of individuals or social groups – by which they attempt to improve their position in the field and to benefit more from it. Therefore, the role of the state is crucial in this case. The state enters the field of education by means of interventions, thereby creating advantages for certain market segments at the expense of others, and it also guarantees the existence of the educational field in its own right (Bourdieu, 1998, chap. no. 4). In the case of CZ, the main state bodies which guarantee and regulate the field of adult education are the following: the Government, the Research, Development and Innovation Council, the Ministry of Education, the Youth and Sports and the Ministry of Labour and Social Affairs. These organizations are responsible for carrying out most of the adult education policies, from defining their goals to establishing regulatory measures.

## Methodology

In this study we combine two main areas of data. The first area consists of the results of the research focused on the participation of adults in education carried out by the author as well as of others surveys. The second area deals with an analysis of the sources containing information on government policy on adult education. More specifically, we mean the documents containing the direct goals of such policy and/or ways of directing the adult education system.

The data for the research on adult education in CZ were taken from the following sources: (1) the International Adult Literacy Survey research (IALS, 2000) carried out in CZ in the second half of the 1990s. It quite accurately depicts the situation of adult education in the first years after the transformation from a communist to a democratic regime; (2) the annual Eurostat research, taking place in CZ since 2002. Even though the data from this research is non-specific and combines various kinds of education (mainly formal and non-formal) into one category, they represent a main source of longitudinal data on the average participation in further education; (3) the Rabušic research from 2005 mapping the situation of adult education and covering the exclusion of the most prominent social groups (Rabušicová & Rabušic, 2008); (4) the research by Jan Kalenda (2014a, 2014b) from 2013, mapping the current situation and focusing on non-formal adult education.

Concerning the primary data on government politics and regulation of adult education, the sources used are mainly international treaties and agreements specifying the issue of adult education. In this regard, two treaties signed by CZ are essential. The first is the so-called Maastricht Treaty from 1993. The second is the Treaty of Lisbon from 2009. Both define, in different contexts, the need for adult education which should lead to the preparation of qualified workers and specialists. Strategic documents on adult education in CZ and the laws defining

\* We use the term field in the same way as Pierre Bourdieu (1998).

the field are further interconnected with international treaties. The following six documents specifically represent strategic documentation: Memorandum on Lifelong Learning (MCU, 2000), White Paper – National Programme for the Development of Education (BK, 2001), Human Resources Development Strategy (SRL, 2003), Lifelong Learning Strategy in the Czech Republic (SCU, 2007), Strategy Implementation Plan for Lifelong Learning (IPCU, 2008) and Guide to Further Education (PDV, 2010). Statutory regulations on adult education are mainly represented by: Education Act No. 435/2004 Coll., defining the requirements for application for the accreditation of educational programmes; Labour Code Act No. 262/2006 Coll., defining the rights and obligations of workers with regards to training in the workplace and professional studies; and last but not least Act No. 179/2006 Coll., defining the process of verification and recognition of results in further education and describing the issues of participants 'qualification, rights and obligations in further education..

### **First phase of transformation: 1989 – 2000**

To understand the change that non-formal adult education underwent after 1989, it is important to name its main features before this date. Adult education in CZ was directly governed by state bodies from 1951 to 1989. A special committee of the Ministry of Education and Culture was authorised to coordinate and be responsible for its activities and development according to the Act No. 123/1963 Coll. State led adult education took place on several levels: (1) the level of formal education, functioning as a means to adopt certain working qualifications according to the requirements of the developing socialist economy; (2) the level of non-formal corporate education, regulated by two crucial Acts – Act No. 264/1966 Coll., emphasizing that corporate education should primarily serve as complementation and extension of work qualifications, and Act No. 42/1972 Coll., regulating cyclic executive education in all types of leading positions. Executives were then educated in the field of political culture in order to be able to subsequently spread it to their subordinates; (3) the level of non-formal leisure education, which would lead to self-fulfilment of individuals in accordance with the principles of the communist regime.

This overview shows that the state had direct control over the entire field of adult education. Its goals, content and forms then corresponded to the government's interests. The state dictated what part of non-formal education should deal with the development of human capital and what part should be concerned with "self-fulfilment" and relaxation.

The Velvet Revolution of November 1989 did not only end the communist reign in CZ, but it also started a whole new era in the development of adult education. The state policy towards further education fundamentally changed. The whole field had to be de-idealized and democratized, which meant that other participants beside the state were allowed to enter the field of adult education. And, at the same time, all references to ideologically-contaminated adult education needed to disappear. This is the reason why, for example, higher education study programmes called "education and upbringing of adults" were renamed to andragogy and any 'upbringing' elements were pushed to the background.

The emphasis on making non-formal education democratic led to the point where the state gave up all attempts to regulate this part of the social field generating the fast creation of a non-regulated education market with its main participants in CZ. On the one hand, private education companies and agencies were established offering various forms of educational workshops focused primarily on leisure education. On the other hand, individuals started to look for ways to satisfy their educational needs, mainly connected with vocational training.

So the state had completely withdrawn from the field of adult education, except the field of retraining programmes. This is even supported by the fact that, except for the Maastricht Treaty, there was no legislation in CZ establishing the rules or conditions for running non-formal education activities in CZ. The first strategic documents in this area are from 2001, twelve years after the fall of the communist regime. That is why the only market regulator in the field of adult education became the "free hand of the market", which led to the expansion of educational organizations with various levels of quality and range of services.

The changes in non-formal education occurred even in companies which started to create their own models and concepts of corporate education. However, due to the intense transformation of these companies, (Mlčoch, Machonin & Sojka, 2000) this dimension of corporate management was not emphasised much. If there was any corporate education, then it was focused on coping with the effects of company transformations, be it an already existing company or just in an emerging one.

Goals and reasons of adult education also underwent some changes. If we take the only binding document for the government from this era, the Maastricht Treaty, we discover that adult education had become a synonym for the preparation and extension of a qualified workforce. Then, if we examine the state education policy as a whole, we find that it transformed from a *state-led system* which emphasised mainly *the development of human capital* to a *market-led system* which, while still emphasising *the development of human capital*, also started to focus on *satisfying the needs of individual customers*.

All these changes were naturally reflected in the structure of participants in non-formal education in CZ. The IALS research (2000; cf. Desjardins et al., 2006; Desjardins, 2011) which was carried out in CZ in 1997 shows that the overall participation in any form of non-formal education of adults between 18 and 65 years was 26.4%. Where 19.8% of respondents stated that their educational activity was focused on work, i.e. aimed at the development of vocational knowledge and skills, and only 8% of adults maintained that they participated in education for reasons other than work. On average, adults spent 23.4 hours annually on educational activities focused on their work. Leisure education showed a much higher number – 83.2 hours annually. Therefore, it is possible to observe that only one quarter of the Czech adult population had some experience with non-formal education, of which 47% were graduates of higher education working as highly qualified personnel in the services (45%). On the other hand, elderly people (55 years and more) showed a much lower participation rate (8.8%) which is also true for pensioners (5%), unqualified manual workers (18.7%) and people with only primary education (17.7%). In the case of these social groups, around 85-95% of members did not participate in any kind of non-formal education.

### Second phase of transformation: 2001 – 2013

In the late 1990s new problems began to emerge which adult education in CZ needed to face. First, unemployment appeared shortly after the switch of regimes as a consequence of the socio-economic changes – the transformation from a socialist to a market economy. The number of unemployed increased from 2.1% to 10.5% between 1990 and 2004 (ČSÚ, 2013). This led to the creation of a new educational policy agenda which was connected to an increase of employability of graduates on all levels as well as to an active employment policy and development of human capital. That was the reason why the state started to take adult education as one of the means to fight unemployment. Second, foreign capital appeared in CZ. More and more companies started to set up their branches in CZ or began buying shares in Czech companies. While in the middle of the 1990s only 5% of Czech companies had a foreign owner, ten years later about 30% of companies were already in foreign ownership (ČSÚ, 2013). This change led to a higher integration of CZ into the global structure of the capitalist economy (Holubec, 209, pp. 130-133) which in turn produced higher demands on competitiveness and the need for a qualified workforce.

In the face of all these changes, the state put an end to its *laissez faire* approach to adult education and once again started to affect the field of adult education by its policy and regulations. In other words, the state began to introduce new legislation which defined the rights and obligations of participants in the field of adult education. It also started to produce strategic documents which conceptualized the issue of adult education in a new way, by setting new goals, target groups and development tendencies for adult education.

The first socio-political measures that the state introduced were the “opening up” of higher education to a larger number of students. In this regard, CZ used the Bologna Process which sought to standardize higher education and make it universal (Pabián, 2008; Prudký, Pabián & Šíma, 2010). This process was important because it significantly expanded adult participation in formal education and did not lead to any substantial increase of participants in non-formal education.\* Therefore the number of students in higher education in CZ increased from 190,000 in 1999 to 381,000 in 2012. What is even more important is the fact that the number of students in distant education increased from 42,000 to 102,000 (RVVI, 2014). As a result, formal rather than non-formal education became the main domain of further education in CZ because it offered state guaranteed qualifications with the highest value.

The second domain of state policy was legislative activity through which the state started to partially regulate the field of adult education. Passing the Act No. 435/2004 Coll. can be considered the first action of its kind. It gave the state the power to approve accreditation even of those educational programmes which were not in the field of higher

---

\* This is supported by a quite low participation of adults between 18 to 35 years in non-formal education (Kalenda, 2014a, 2014b).

education. Thanks to this step, state bodies could determine which educational programmes would receive state sanctification and which would not. Two years later, Act No. 179/2006 Coll. was passed, introducing new processes of verification and recognition of the results in non-formal education which in addition led to the regulation of companies offering non-accredited educational workshops. This Act also practically applied the concept of a national qualification system. By means of this system, all types of working activity and their necessary skill sets would be determined resulting in the state starting to control indirectly even the existing possibilities for vocational education. The last legislative activity in the field of education in this period was Act No. 179/2006 Coll. which specified the rights and obligations of workers covering educational activities in the workplace. As a consequence, the field of corporate education was formalized and regulated.

The third domain of state policy is represented by the state's attempts to set new goals and plans for the development of adult education which had an impact on non-formal education. In this regard the state first passed the Memorandum on Lifelong Learning (MCU, 2000), followed by a number of documents dealing with the issue (BK, 2001; SRL, 2003; SCU, 2007; PCU, 2008; PDV, 2010). The documents show the gradual transition from a general definition of adult education as an important dimension for state intervention to support the concept of lifelong learning, which should become the main process of organized education. Last but not least, two recent documents – Strategy Implementation Plan for Lifelong Learning (PCU, 2008) and Guide to Further Education (PDV, 2010) already fully emphasise the concept of further education. The reason why it should be the focus of state policy is because it represents the most suitable framework for improving the competitiveness of CZ. All the documents also define the target groups of non-formal education. The early documents emphasize the diversity of educational needs while the later ones highlight the financial resources which have become an obstacle for the development of further education – the higher participation of individuals. The documents emphasize that if this barrier was to be removed then non-formal education would become more inclusive.

Financial barriers are the reason why the state started to regulate the field of adult education not only directly but also indirectly through financial incentives from European Structural Funds. The Human Resources and Employment Operational Programme and The Education for Competitiveness Operational Programme were created for this purpose in 2004. Through these funds the resources were distributed to subjects in the education market by means of project competitions amounting to 65 billion Czech crowns between 2004 and 2013.\* Because of these activities market mechanisms were disrupted. Demand in the education market was affected by customers looking only for those educational activities which were in some way supported by European Structural Funds since they were much more convenient. Educational companies and subjects also reacted to this fact by attempting to gain resources from the funds to become more competitive in the changing market. Thus, the education market then became more dependent on financial resources distributed by the state.

If we are to sum up the changes of state policy on adult education after 2000, it is important to note that the state started to regulate the field of adult education more directly by means of legislative actions and indirectly by economic incentives or by supporting formal adult education. The state also tried to define more in detail and to systematize the field of non-formal education by structuring it. Therefore, the state policy in this era could be described as a *social partnership-led system* where the state partially regulated the field of adult education and where *equal opportunities, creating a lifelong learning system and development of human capital* were emphasized in various contexts. The goals of state policy had differentiated and shifted from the issue of satisfying the market needs of individuals to the interests of the state and national economy.

When dealing with non-formal education in CZ after 2000 we can see a slight increase in the amount of participants. The number of participating adults had grown from around 25% in 1997 to 34% in 2005, out of which 6% participated in educational activities regularly (at least 3 times in the past year), 10% participated occasionally (twice in the last year) and 18% participated only rarely (no more than once in the past year). Thus, two thirds of adults did not participate in any form of non-formal education. The structure of the main participants did not change at all. The highest participation rate can be seen among persons with higher education (68% participate in some form of education) and among highly qualified personnel (77%). On the other hand, the elderly over 60 are largely excluded from further education (only 12% of them participate in education) as well as non-qualified manual

---

\* The amount is a sum from accessible markers on European Social Funds in CZ website relevant to The Human Resources and Employment Operational Programme and The Education for Competitiveness Operational Programme (ESF, 2014).



workers (27% participants) and people with only primary education (12% participants). The differences in the participation rate between men and women had stabilised in comparison with the previous period. While in the 1990s men were the predominant group of participants, in the new decade women already showed the same participation rate as men (Rabušicová & Rabušic, 2008).

And this situation didn't change in the next eight years because, according to data from 2013, the adult participation rate in non-formal education was approximately 33%. But certain changes occurred in the frequency of participation in educational activities. 9.5% of adults started to participate regularly, 10.5% occasionally and 13% rarely. So the number of regular participants in non-formal education had increased. The pattern of participants and excluded groups had stayed the same. The highest participation rate in non-formal education was achieved by people with higher education working as highly qualified personnel (73%) or as senior managers (83%). The research from 2013 also showed an intense educational activity among "middle-sized" and "large" entrepreneurs. Up to 60% of them participated in education regularly. On the other hand, the elderly over 60 years of age, pensioners, manual workers and people with only primary education remained excluded. In their case, most members of these groups (85-95%) do not participate in education (Kalenda, 2014a, 2014b).

## 6. Conclusion

The answer to the question whether there is a close connection between adult participation in non-formal education and state policy in this field is, without a doubt, positive. In last twenty-five years, adult education policy has always reacted to socio-economic challenges. First, it was the collapse of the communist regime and then the involvement in a competitive global economy. This led the state to primarily withdraw from the field of adult education, leaving it to market regulation, and then, after about twelve years, it started once more to intensively regulate this field. But this regulation was based on different strategies than during the communist regime. Strategies of direct legislation and conceptual provisions as well as indirect regulations – economic incentives and support of formal education were implemented. When compared to formal education, the number of participants in non-formal education increased only slightly due to the above-mentioned state regulations. What is even more important, the profile of participants in educational activities has not changed despite the intensive state policy implemented during the last ten years. Therefore, many social groups are still excluded from participation in non-formal education.

## References

- Bourdieu, P. (1998). *Teorie jednání*. Praha: Karolinum.
- ČSÚ. (2013). *Česká republika od roku 1989 v číslech. Vzdělávání a kultura*. Praha: Český statistický úřad.
- Desjardins, R. (2011). Participation in Adult Learning. In Rubenson, K. (Ed.). *Adult learning and Education* (pp. 205-215). New York, Toronto: Elsevir, Academic Press.
- Desjardins, R. et al. (2006). *Unequal chances to participate in adult learning: international perspectives*. Paris: UNESCO: International Institute for Educational Planning.
- European Commission (2000). *A Memorandum on Lifelong Learning*. Brussel: European Commission.
- ESF (2014). Evropský sociální fond v ČR. Dostupné přes webové stránky: <http://www.esfcr.cz/evropsky-socialni-fond-v-cr>
- Green, A. (2000). Lifelong learning and the learning society: Different European model of organization. In A. Hodgson (ed.). *Policies, Politics, and the Future of Lifelong Learning* (pp. 35-50). London: Kogan Press.
- Green, A. (2002). The Many faces of lifelong learning: recent education policy trends in Europe. In: *Journal of Education Policy* 17(6): 611-626.
- Holubec, S. (2009). *Sociologie světových systémů*. Praha: SLON.
- IALS. (2000). *Literacy in the information Age. Final Report of the International Adult Literacy Survey*. Paris: OECD Publishing.
- Jarvis, P. (2005). *Adult Education and the State. Towards a politics of adult education*. London: Routledge.
- Kalenda, J. (2014a). The issue of non-formal adult education in the Czech Republic. In print.
- Kalenda, J. (2014b). Neformální vzdělávání dospělých ve volném čase. In print.
- Krystoň, M. (2013). Potenciál kulturno-andragogických procesů v spektru strategických dokumentů. In *Paidagogos* 13(1): 30-44.
- Kwon, D-B, Daeyeon, Ch. (2011). Overview of Lifelong Learning Policies and Systems. In Rubenson, K. (Ed.). *Adult learning and Education* (pp. 180-185). New York, Toronto: Elsevir, Academic Press.
- Mlčoch, L., Machonin, P. & Sojka, M. (2000). Ekonomické a společenské změny v české společnosti po roce 1989. Praha: Karolinum.
- Olesen, H., S. 2011. Modernization Processes and the Changing Function of Adult Learning. In Rubenson, K. (Ed.). *Adult learning and Education* (pp. 253-258). New York, Toronto: Elsevir, Academic Press.
- Palán, Z. (2002). *Lidské zdroje. Výchova, vzdělávání, péče, řízení*. Praha: Academia.
- Pabián, P. (2008) Od elitního přes masové k univerzálnímu terciárnímu vzdělávání: koncepce Martina Trowa. In: *Aula* 16 (2): 31-40.

- Prudký, L., Pabián, P. & Šíma, K. (2010). *České vysoké školství na cestě od elitního k univerzálnímu vzdělávání 1989-2009*. Praha: Grada Publishing.
- Rabušicová, M. & Rabušic, L. (eds.). (2008). *Učíme se po celý život? O vzdělávání dospělých v České republice*. Brno: Masarykova univerzita.
- RVVI. 2014. RVVI. (2013b) *Analýza stavu výzkumu, vývoje a inovací v České republice a jejich srovnání se zahraničím v roce 2013*. Praha: Úřad vlády České republiky, Rada pro výzkum, vývoj a inovace.
- Roberts, H. (1982). *Culture and Adult Education. A Study of Alberta and Quebec*. Alberta: The University of Alberta Press.
- Rubenson, K. (2006). The Nordic model of Lifelong Learning. *Compare* 36(3), 327-341.
- Rubenson, K. (2011). Barriers to Participation in Adult Education. In Rubenson, K. (Ed.). *Adult learning and Education* (pp. 216-224). New York, Toronto: Elsevier, Academic Press.
- Rubenson, K. & Desjardins, R. (2009). The Impact of Welfare State Requirements on Barriers to Participation in Adult Education. A Bounded agency model. *Adult Education Quarterly* 59(3), 187-207.
- Schuetze, H. G. & Casey, C. (2006). Models and meanings of lifelong learning: Progress and barriers on the road to a learning society 36(3): 279-287.
- Tight, M. (1998). Lifelong learning: opportunity or compulsion: *British Journal of Educational Studies* 46(3), 251-263.
- Tight, M. (2002). *Key Concepts in Adult Education and Training*. London, New York: Routledge.
- Veteška, J. (2009). Kvalifikace a kompetence v kontextu hospodářských a sociálních změn. In J. Veteška et al. *Nové paradigma v kurikulu vzdělávání dospělých*. Praha: Educa Servis.
- Weber, M. (1998). *Metodologie, sociologie, politika*. Praha: Oikoymenh.

## Documents

- MCU (2000). *Memorandum o celoživotním učení*. Praha: Ministerstvo školství mládeže a tělovýchovy.
- BK (2001). *Bílá kniha – Národní program rozvoje vzdělávání v ČR*. Praha: Ministerstvo školství mládeže a tělovýchovy.
- SRL (2003). *Strategie rozvoje lidských zdrojů*. Praha: Ministerstvo školství mládeže a tělovýchovy.
- SCU (2007). *Strategie celoživotního učení v ČR*. Praha: Ministerstvo školství mládeže a tělovýchovy.
- IPCU (2008). *Implementační plán strategie celoživotního učení*. Praha: Ministerstvo školství mládeže a tělovýchovy.
- PDV (2010). *Průvodce dalším vzděláváním*. Praha: Ministerstvo školství mládeže a tělovýchovy.

# Development of the open educational rajabhat university students resources using service learning to enhance public consciousness and creative problem solving

Poggade Chanayotha<sup>a\*</sup>, Jaitip Na-songkhla<sup>b</sup>

<sup>a</sup>Ph.D. (Candidate) <sup>b</sup>Associate Professor

Department of Educational Technology and Communications, Faculty of Education, Chulalongkorn University, Bangkok and 10330, Thailand

---

## Abstract

Technologies have been crucial in education in terms of transmitting both academic knowledge and local wisdom to society. The study aimed to develop and study the effects of the open educational resources of which goals focused on enhancing public consciousness creative problem solving of the students through social service activities. The procedures of the open educational resources were as follows; phase I: field study investigating the information about local food; phase II: design and development of the media regarding the local food as well as its implementation and evaluation; phase III: publicizing and appreciating his or her piece of work.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* Open Educational Resources; Service Learning; Public Consciousness; Creative Problem Solving

---

## Introduction

Thailand Qualifications Framework for Higher Education has the main mission to develop the Bachelor's degree students who are able to work and complete with interpersonal skills, system thinking, critical thinking in terms of analysis and synthesis, problem solving, creative thinking, responsibilities for oneself and public society as well as public morality and ethics (Sinlarat, 2010). For the teacher students to become the professional instructor, the preparation for their profession is necessarily considered because they are able to comprehend and know what the world is up to along with realization of the importance of their social development.

---

\* Corresponding author: Poggade Chanayotha. Tel.: 00-000-000-0000  
E-mail address: Poggade@gmail.com, Jaitip.n@chula.ac.th

Faculty of Education, Thepsatri Rajabhat University is the educational institution which produce the new generation of teacher who have the knowledge and morality, including create the knowledge base and conserve native culture, also publish in worldwide to response the main objective. Inducing the concept Open Educational Resource (OER) is to open provision of educational resources, enabled by information and communication technologies, for consultation, use and adaption by a community of users for non-commercial purposes (UNESCO, 2002), also offer opportunity to others accessing to share, use and reuse that knowledge (Smith & Casserly, 2006) to be responsible for public. Moreover the students could be supported by using open educational resources with the emphasis on service learning could support capability of the application and development of educational innovations and technologies for learning management and the creation of learning community (Basic Education Commission, 2010).

The integration of both concept of service learning concerning the enhancement of public consciousness

and creative problem solving was taken into consideration because the service learning is integrated with what the students have learned to solve any problems with their initiative thinking. Whenever the students are endowed with the problem solving skills towards any troubles caused in their community with public mind, the awareness of being a good citizen of society will be emerged (kraft, 1996).

## **2. Objectives**

- 1) To develop the open educational resources with service learning to enhance the Rajabhat University students' public consciousness and creative problem solving
- 2) To study the effect of the OER development to students' public consciousness and creative problem solving

## **3. Methodology**

Step 1: Analyzed and synthesized the documents or related researches on the followings; the open educational resources, service learning and creative problem solving. Investigated the Rajabhat University students' needs in using the open educational resources according to the content analysis model.

Step 2: Develop the open educational resources by using Moodle for E-learning website so that the students could be participated in activities provided for this study

Step 3: Evaluate the open educational resources and investigate the satisfaction of the students with the resources by using the test of creative problem solving and the test of public consciousness of which questions were designed in the form of situational dialogue.

Step 4: Ask for the verification and approval of the open educational resources from the experts.

## **4. Sampling group**

The 75 students programming in early childhood education, studying the Educational Innovation course in the second semester of the academic year 2013 at Thepsatri Rajabhat University, were sampling to this research by a purposive technique. The samplings were grouped to fifteen, for each is five students and take part in any activities provided in the study and create the media about the local food for public relations.

**5. The Open Educational Rajabhat University Students Resources Using Service Learning Model**

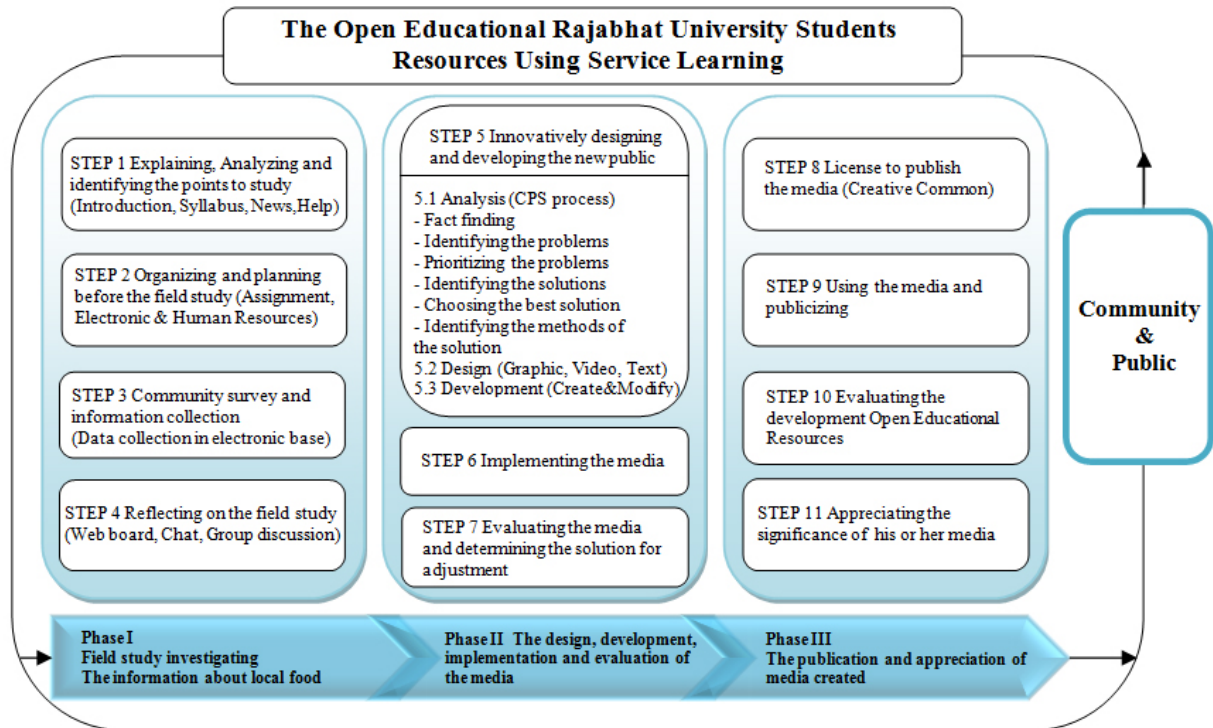


Fig. 1. (a) The Open Educational Rajabhat University Students Resources Using Service Learning Model

The explanation of the figure “The Open Educational Rajabhat University Students Resources Using Service Learning Model.” There are three phases of the research procedure with their steps as follows:

*Phase I: Field study investigating the information about local food*

This phase is the beginning of public consciousness model in order that the students perceive and realize by emphasized on the preparation and comprehension of the learning including planning, identifying and barnstorming the activities for the students’ community, so that the public consciousness was introduced and gradually instilled in them.

The steps in the first phase were as follows;

*Step 1: Explaining how to implement the resources, analyzing and identifying the points to study*

The learning introduction, syllabus, objectives and contents were informed by the researcher. The lists of the local food which should be preserved were presented to the students to choose according to their interest so that they were assigned to create the media of that food in order to publicize afterward.

*Step 2: Organizing and planning before the field study*

Each student in a group consisted of five students presented the information of each local food he or she preferred. Then, only one local food from each group was selected with the reasons why the group chose it. After that, the members of each group must plan how to collect the information and data about the local food in their community, and even discuss the method or instruments they used for data collection (e.g. interviewing, investigating the local people, taking a photo, voice or video recording, etc.)

*Step 3: Field study and information collection*

The aforementioned step referred to the survey and gaining the information of the local food not only its recipe such as its ingredients, directions and nutrition, but the relationship between local food and various aspects of the community such as its geography, folkways, customs and ways of life. Along this step, the opportunity to study

the media used for local food public relations was provided for the students. The students themselves were assigned to ask for the local people's opinion who directly gave them the information about the local food as well as types of media used for public relations.

*Step 4: Thought reflecting on the field study*

The students reflected their thought towards the experiences gained from the field study where they could learn from the actual context, local wisdom and the causes why the local people had been keeping cooking and preserving the local food. Moreover, the type of media used for local food public relations was revealed in this step.

*Phase II: The design and development of the media regarding the local food as well as its implementation and evaluation*

After investigating, Phase II is the enhancement of public consciousness in students was provoked by giving the morality through learning sessions, critical thinking, implementation and the activities dedicated to public society. In this phase, there are three steps as follows;

*Step 5: Designing and developing the new public media about the local food*

The fifth step looked complicated because it was subcategorized into three steps as followings;

*Step 5.1 Media Analysis before its design:* There are six sub-steps as follows;

5.1.1 Fact finding (Perceiving of the states of media used at present time): The media used for the local food public relations were studied by each group as followings; printed materials, audio-visual media, social network media, electronic media, etc. Each group must identify the information about the media used for local food public relations in terms of its sources, objectives, and the analysis of the details such as pros and cons of the media type selected.

5.1.2 Identifying the problems: The problems in details of each media type were revealed and identified by the students. Furthermore, they must identify the principles they used to categorize the problems.

5.1.3 Prioritizing the problems: The students must identify the most important problem to be dealt with first after they had put in order. The summary of the problem each group would deal with was elaborated with the reasons.

5.1.4 Identifying the solutions: The problem solving skill was emerged in each student when he or she identified a variety of solutions for each problem together with a reasonable reason and possible solution into practice, that comprises of fluency, flexibility and originality.

5.1.5 Choosing the best solution: Each group provided themselves the better solutions along with its pros and cons and the reasons why that solution was selected with their consideration of the evaluation and equivalence of the context, decreasing of the expenses, worthiness and time consuming as a criterion to determine.

5.1.6 Identifying the methods of the solution: The plans and the procedure for the implementation were produced including their outcomes.

*Step 5.2 The Media design:* The information collected in the step of media analysis was used and shown in the form of a flowchart in order to design the media about the local food of which image is different from any other and much more interesting. In the flowchart, the students must identify the things would be contained in the media such as its photos, text, graphics, video clip, etc.

*Step 5.3 The development of the media:* Each group developed the media as they had planned and designed. The communication on the form of synchronous (office hour of the researcher or chat on the online media) and asynchronous (such as a blog or web board) were provided once the students need helps.

*Step 6: Implementing the media*

The developed medium about the local food was verified and tested before the application, so that it became accurate and appropriate to publicize.

*Step 7: Evaluating the media and determining the solution for adjustment*

The medium was revised and checked once the comments or suggestions were identified. The publication of the medium was allowed to do when it was approved.

*Phase III: The publication and appreciation of the media created*

Phase III of the model focus on the appreciative reflection of students in practicing and media publicizing. The steps in the final phase were as follows;

*Step 8: asking for the certificate or license to publish the media;*

The legal license called “Creative Commons”, a nonprofit organization that works to increase the amount of creativity available in the body of work that is available to the public for free and legal sharing, use, repurposing, and remixing, was generated once the medium on the purpose of local food broadcasting was considered complete. The license which was applied on top of copyright can be modify the students, as a generator and creator of the medium, the terms to best suit their needs.

*Step 9: Using the medium and publicizing*

The medium produced for local food publication was accessed by anyone on the Internet.

*Step 10: Evaluating the developed open educational resources*

The medium was evaluated by the user of the Internet who was publicized by the local food advertisement in order that the students could make use of some mistakes found in it, the comments or suggestions in the medium improvement. The users can be varied such as from anyone who felt interested in to a person who was the expert in local food , a gourmet, a tourist, or even an organization such as Tourism Authority of Thailand, etc.

*Step 11: Appreciating the significance of his or her media.*

After the medium had publicized on the online media, the awareness of an inspiration to the advantages of the published medium were perceived by the students once they were encouraged to review their medium. The medium of the students will be beneficial to the public society in terms of the preservation of the local wisdom regarding local food, knowledge sharing to anybody in the world via the online media and, last but not least, the appreciation of the significance in the medium that they generated by themselves.

## **6. Results**

### *6.1 Result of Public Consciousness sampling*

The results show that the average of overall public consciousness ability of sampling students is in very good level (103.28). As analyzing the point range, the public consciousness ability of 65.33 percent of all students (49 students) is in very good level (point range from 102 to 120). 32 percent of all students (24 students) and 2.67 percent of all students (2 students) are in good level (point range from 84 to 101) and fair level (point range from 66 to 83) respectively, analyzed by questionnaire situation 30 multiple choice questions. Each choice is the point level from 1 to 4.

### *6.2 Result of Creative Problem Solving Sampling*

The results show that the average of overall creative problem solving ability of the sampling students is 3.47 which is in good level. As analyzing the point range, 64 percent of all students (48 students) is in very good level (point range from 3.51 to 4.00) . 36 percent of all students (27 students) is in good level (point range 2.51-3.50), analyzed by Test of Creative Problem Solving Ability, provided by questionnaire situation 8 questions (written answer). Each choice is the point level from 0 to 4, the criteria is 5-point rubric.

## **7. Discussions**

7.1 According to the results of the study, the well-organized and planned design of the open educational resources aiming at service learning resulted in very good level of the students' public consciousness. Almost 2 of 3 in sampling students is in very good level. For the rest students, the less level is directly variable with the number of them. It was because the students could understand and realize the importance of service learning that included the students' good opportunity to do field study investigating the information about food which interests them, and that related to local wisdom and the life style of people in the community. Additionally, the aforementioned design provided the students the opportunity to consider the method to present the public their developed medium. The good procedure of design affected satisfying results as mentioned in the study of Berle (2006) stating that the positive public awareness could be enhanced in student since what they had made different in learning and had applied knowledge in real world situation were what they preferred to do.



Moreover, the procedure of which participant had collaborated to achieve the goal could improve public relations and relation with strategic partners according to the results gained from the well publicized OER project (Hodgkinson-Williams, 2010). Furthermore, the open educational resources provided the students how to make use of technology for communication, and let them participate in the creative activities writing and posting of the Internet, mixing and constructing multimedia and developing their own content (Lenhart and Madden, 2005). All in all, the students become very proud of and realized the beneficial knowledge bank gained from the community because of the procedures of the media design. That is, the medium was developed after students had assisted and taken part in, had done the field study including had publicized to public

7.2 According to the results of the study, almost 2 of 3 in sampling students is in very good level, the overall creative problem solving in student enhanced at a good level on accounting of the open educational resources that supported the students to develop the medium using for public relations. The medium of which design and procedure of its development leading to creative problem solving was come up with differently from those used and seen generally. Its procedures consisted of the analysis of the states of media used at present time, prioritizing the problems and eventually finding as well as selecting the best solutions to design, develop, implement and evaluate the medium. The results of this study was equivalent to the studies of Parnes (1967) mentioning the steps of creative problem solving which comprised objective finding, find out the fact, find out the problem, find out the idea, find out the solution and acceptance finding.

The results of the development of the open educational resource based on web-based system was similar to the study of Minamino and Kinoshita (2010) studied about group idea generation where the students were able to exchange an idea to one another and compete with others in finding good points of evaluated member idea based on web-based system. The system enhanced those students in creative problem solving.

Additionally, the open educational resources system developed into online system could support the students the development of thinking, and then they could exchange it so that its conclusions were made at anytime and anywhere. Furthermore, it could store and record the activities completed by learners in the format of both individual and group. The aforementioned system was equivalent to the design of web-based creative problem solving system using knowledge-based management that enhanced the students' creative problem solving according to the study of Lin and Hsien-Sheng (2004). In addition, the service learning in students led to creative problem solving as mentioned in the study of Wei and Jianjun (2012) focusing on how to enhance the students' higher-order skills through community service learning using scaffolding for creative problem solving. According to the study of Wei and Jianjun (2012), their instruments used could enhance the students' creative problem solving, learning efficiency, and reflection of learning experiences to the African American student's future careers.

## 8. Recommendations

8.1 The students should be prepared and got ready for skills in using the open educational resources by the instructor in order that they were acknowledged the steps and process of its implication. Therefore, the students could follow them and be facilitated by the instructor once the assistance or suggestions were needed.

8.2 Public consciousness in the students could be instilled when it was inserted into each activities provided in the open educational resources which encourage and inspire them to realize the value of the develop medium and ability to create it for society.

8.3 The instructor's roles are to encourage the students to enhance the creative problem solving by expressing opinions to find out various solutions. The instructor should precisely design the activities of which objectives or goals are concerned with.

## References

- Basic Education Commission. (2010). *Handbook of Assessment Teacher Competency*, Bangkok, Teachers and Basic Education Personnel Development Bureau: Office of the Basic Education Commission of Thailand.
- Berle, David. (2006). Incremental Integration: A Successful service-Learning Strategy. *International Journal of Teaching & Learning in Higher Education*. Vol 18. Number1.2006, pp 43-48.
- Hodgkinson-Williams, C. (2010). *Benefits and challenges of OER for higher education institutions*. Paper presented at the Open Educational Resources (OER) Workshop for Heads of Commonwealth Universities, Capetown, South Africa. Retrieved from

- [http://www.col.org/SiteCollectionDocuments/OER\\_Benefits\\_Challenges\\_presentation.pdf](http://www.col.org/SiteCollectionDocuments/OER_Benefits_Challenges_presentation.pdf).
- K. Minamino and T. Kinoshita. (2010). A Web-based System to support Group Idea Generation for Creative Problem Solving. *Technological Developments in Education and Automation*, pp361-367. Retrieved from [http://download.springer.com/static/pdf/694/chp%253A10.1007%252F978-90-481-3656-8\\_66.pdf?auth66=1402852473\\_3be91a85ab4282213979a4225b2a23f9&ext=.pdf](http://download.springer.com/static/pdf/694/chp%253A10.1007%252F978-90-481-3656-8_66.pdf?auth66=1402852473_3be91a85ab4282213979a4225b2a23f9&ext=.pdf)
- Kraft, Richard J. (1996, February). Service Learning : An Introduction to It's Theory, Practice, and Effects. *Education and Urban Society*. 131 – 159.
- Lenhart, A. & Madden, M. (2005). *Teen content creators and consumers*: Pew Internet & American Life Project. Retrieved from <http://www.pewinternet.org//02/11/2005teen-content-creators-and-consumers/>.
- Lin-Jung Wu, Hsien-Sheng Hsiao. (2004). Using a Knowledge-Based Management to Design a Web-Based Creative Problem Solving System in Advances in Web-Based Learning – ICWL 2004(2004) *Lecture Notes in Computer Science*. Volume 3143, 2004, pp 225-232 [http://download.springer.com/static/pdf/91/chp%253A10.1007%252F978-3-540-278597\\_29.pdf?auth66=1402852869\\_45e3aa6cc2b26f1b4c18b88a7066036d&ext=.pdf](http://download.springer.com/static/pdf/91/chp%253A10.1007%252F978-3-540-278597_29.pdf?auth66=1402852869_45e3aa6cc2b26f1b4c18b88a7066036d&ext=.pdf).
- Parnes, S. J. (1967). *Creative Behavior Guid Book*. New York: Charles Scribner's Son.
- Smith, M., & Casserly, C. (2006). The promise of Open Educational Resources, *Change: The magazine of Higher Learning*. Retrieved from <http://www.icde.org/The+Promise+of+OER.9UFRzIXH.ips>.
- Sinlarat, P. (2010). *Thailand's Qualifications Framework for Bachelor's Degree (TQF)*. Retrieved April 20, 2014, from [www.onesqa.or.th/onesqa/th/file/.../3-1600-Pitoon.pdf](http://www.onesqa.or.th/onesqa/th/file/.../3-1600-Pitoon.pdf).
- UNESCO. (2002). *Forum on the impact of open courseware for higher education in developing countries: Final report*. Retrieved from [www.unesco.org/iiep/eng/focus/poensrc/PDF/OERForumFinal Report.pdf](http://www.unesco.org/iiep/eng/focus/poensrc/PDF/OERForumFinal Report.pdf).
- Wei, Z. & Jianjun, Y. (2012). Enhancing Students' Higher-Order Skills through Community Service Learning Using Scaffolding for Creative Problem Solving: *American Society for Engineering Education*. America.

# Dialogue education in Turkey – France relations

Bilgehan Gültekin,<sup>a</sup> Tuba Gültekin<sup>b\*</sup>

<sup>a</sup> Ege University Faculty of Communication, İzmir – 35100, Turkey

<sup>b</sup> Dokuz Eylül University, Buca Faculty of Education, İzmir – 35150, Turkey

---

## Abstract

The most strategic emphasizes on the dialogue education in Turkey- France relations are public relations campaigns, developing communication strategies and communication campaigns management giving on to dialogue education. Dialogue management perspective and the perspective of dialogue in the education of correct positioning require a strategic communication understanding. In a dialogue education project and campaign about Turkey-France relations; the mutual consensus motif creation, diversity management, intercultural communication reconciliation, social call mechanism developed for both countries and coding social call intercultural communication are important steps. Therefore, while a dialogue education modal is developing, it must be based on the strategic dialogue management vision. Social public relation campaigns that will conducted in the spirit of the strategic modal establish the basic policies for dialogue management.

*Keywords:* Dialogue education, peace education, *Intercultural Communication*.

---

## Production of a strategic model

Concerning relations between Turkey and France the production of a strategic model is a very important headline regarding dialogue education. Strategic model production is a model comprising headlines like public relations, public education, social responsibility, peace education, social campaigns and undertaking social initiative. The understanding of strategic model production includes conducting public relations campaigns, activities and strategies. Public education is one of the most important stages of strategic model production. “Strategic dialogue is based on a management philosophy where everyone must be involved through a “linking pin” system”(Bazelga,Brandon,2010). On the field of public education the biggest support to come from public relations can be messages through campaigns, developing ideas and raising social awareness. It means focusing on public education and evaluating data from the campaign during the production process.

Herewith the most important starting point tha public relations can provide is determining the content. A content planning which comprises education headlines and education schedules facing public education must be done. A content survey is a survey looking for themes which could form campaign models for public relations. Therefore, public education and constituting a communication scale as a step of strategic communication are critical points of strategic model production. While making a content planning and survey regarding Turkey-France dialogue education, it is important to create a strategic scale. “Dialogue, as a form of discourse, is critical to the systems design process”( Kincheloe ,Lorn,2007). The perception of peace in Turkish and French public, the leadership of Turkey-France relations, the language of peace used in Turkish and French media, the peace literature composed at the two countries schools, peace politics which will be constituted by Turkish and French educators and the peace curriculums of both countries schools must be evaluated as main factors of this scale.

Preparing scales which determine start points and criteria for each category is a very important phase within strategic model production. Scales are a whole of standards comprising, evaluation criteria of each radius of action determined by social campaigns and social responsibility fields, movement principles, shared points and strategic

---

\* Corresponding author. Tel : 90 507 231 36 72

E-mail address: tgultekin@hotmail.com

decision processes. The first step to create these scales is public education and planning of the content. Articles which are suggested regarding the production process of public education and communication scale in public relations and for the perspective of dialogue education in Turkey-France relations are as follows:

1. Acting based on social needs, determining social needs for the two countries' peace education.
2. Creating a profile of Turkish-French peace educators and developing an ideal social responsibility criteria.
3. Need of ideal communication leaders regarding public peace education
4. Bring new communication actors in front of the Turkish and French public who will perform leadership portraits in front of both communities.
5. Determine public education gaps within Turkey-France peace relations and take position as leaders at the determined fields.
6. Strengthen peace communication regarding Turkey-France relations by undertaking the leadership of a particular public education field and transform this leadership into a corporate project and corporate recovery activity.
7. It must be confirmed by both communities that the Turkey-France dialogue education project is filling an important gap: Social confirmation is an important stage regarding dialogue education efforts. It expresses an important consent mechanism, where the public expresses the necessity of the conducted education campaign, the acquirements and contributions just by itself and which are accepted by the public. Therefore, the education scale developed for Turkey-France dialogue education must establish a mechanism to comprise the social consent. Each public relations campaign must have a route map to see which conditions are realized and if the social consent and acceptance criteria are fulfilled.

#### **Qualified issue selection in dialogue education and social call**

Within the framework of a strong public education, in order to develop models of public relations campaigns, one of the first starting points is to develop qualified issue selection for public education. Performing a qualified subject selection is a strategical issue for proper educational planning. To guide for social responsibility studies and selection of topics, factors that create Perception of Corporate Social Responsibility should be considered. First starting point for qualified issue selection and qualified content planning of social education is the determination of the issue with the public and ensuring the involvement of the community. In this point the most important strategic communication emphasis is designing of social calls in terms of educational campaigns. Therefore, the communicative coding of call that will be made to Turkish and French public in terms of dialogue education is an important part of dialogue management. For example, in the European Parliament elections in May 2014, the electoral victory of the far right in France has been a threat factor between the two countries. In a dialogue education campaign that addressing this issue to the French public conscience, positioning of the call is extremely important. In this context; by making a call to local governments in both countries; for example, by establishing a dialogue education office in the Municipality of Paris, forming local governments into educational actors is an important communication strategy.

Social call is one of the most crucial points in public relations. Because, developing a social call, ensuring social inclusion to the messages beyond message production, getting feedback are performing strategic message management and at the same time creating a social certificate of participation. At this point, there needs a particular focus on social call concept and a clarification to the issue. Because, public relations and communication campaigns and success of the efforts is especially developing a planning about how much these calls understood and to what extent these are acceptable in society. Taking social initiative and contributing to the social motion is also one of the most important tools.

## Social call motives for Turkey-France dialogue education

In public education and other social campaigns, mission must be clarified with a description and responsibility of social call. Making a call to the community is the most effective and persuasive part of message production. Because, by making a call to the society in the production process, you provide a gathering address and style around the message you give. By performing a call, there is a process with the public, but where you're a pioneer, that will be achieved and progressed together. But this process is now a process that in which social movement is the focus and where you expect response, initiative, involvement, support and action from the community. "Communicating knowledge within the terms of a discourse of "dialogue" and "participation" carries the promise of equitable, democratic relations among the participants and action directed towards creating greater social equity"(Phillips,2011). In a dialogue education model and campaign that will be oriented to Turkey-France relations, gathering addresses are reasonable communication partners and contact areas. Reasonable contact areas are the places, formed of peaceful activities and policies in both countries and institutions that symbolize the Turkish-French dialogue, civil formations, artistic platforms, cultural representations and local areas. And reasonable communication partners are the dialogue leaders that will undertake peacekeeping missions in those areas. "Yet, these qualities deserve strong attention in changing pluralistic, global setting where controversy and social change call for continuing dialogue and negotiation among reasoning and reasonable citizens"( Ochoa-Becker,2007).

Making a social call means creating a message that you especially want to share with the community. It is creating a share map for the message you want to share with the community. To clarify the subject, in Turkish-French relations, it is needed to determine accurately the areas in which both societies share most and to incorporate into the message production process. With social call, a key which is seeking for establishing a dialogue to understand whether the target and interlocutors received the message that we want to convey and more importantly, including them in the message is presented. This key is the first open point offered to both communities to attract audience to your call and to convince them. Wealth of cultural heritage in both countries can be clearly seen in Turkish-French Palaces example. Social call that Dolmabahce Palace and the Palace of Versailles will make to the Turkish-French public is the management of cultural heritage at this open point. When any message is converted to a call, there occurs a content planning, which provides a common climate where the audiences or addressees of the message will have chance to meet with the institution that makes the call.

A social call or a campaign, by the name "Water initiative for peace", by water sports federations of both countries as partners about marine pollution and the protection of marine biodiversity is much more than an ordinary campaign or message production. With a joint initiative of the two countries; from the moment the initiation of a message with a theme "Turkish-French waves in peace waters", there must be found a spot and a subject where the audience will want to be included and it must be positioned in an accurate communicative plane. To do this, point of the campaign and reasons for the campaign, more precisely, a concrete point must be shared. For instance, installing agencies in both countries for two months by Turkey and France Water Sports Federations for the concerned campaign, providing a virtual social movement in these areas and positioning these as symbolic activity centers will increase the call's communicative effectiveness. Establishment of activity areas and campaign centers in campaigns towards social call is to capture an important focal point in the acceptance and effectiveness of your social call and in expanding the effectiveness of these social sharing. To capture this focus point when we perform any social call, activity centers will be the main places where the call will be developed. These activity areas should be the best to represent the social call, carry the message the and protect these messages. Being in the center of the call is considered as call capital of social campaign. Therefore, selection of these centers that can be considered as the call capital between Turkey-France relations is extremely important in terms of dialogue training. As the Turkish film, *Winter Sleep* won the "Golden Palm" in the Palme d'Or Film Festival in May 2014 in France in Cannes, the idea considering Cannes as an activity center is moved to a strategic point. Holding dialogue events in Cannes France and college campuses in Turkey, Antalya, where the most palm trees are found in Turkey with the project "Palm trees of the peace", is an important dialogue management project.

In social acceptance and confirmation of the call, activity centers are considered as symbolic reference areas. In terms of persuasive communication, to configure messages in the form of a call, providing a response in which recipient of the message can take the initiative themselves, respond to messages and provide a reaction that will

occur spontaneously, is a strategic communication step. Symbolic reference centers should be considered as a social workshop. Making a community call, in other words, finding a response in the society is based on a social base. Messages to be community-based and their evaluation as a social production center will be one of the main topics in the production process and one of the main tracks in public relations.

#### *Message's participation coefficient in dialogue education*

The main point agreed in encoding a message as a social call is to enhance the participation coefficient of the message and to ensure message is provided with the participant codes. Production process in public relations offers new opportunities in terms of social sharing. To convert a public message into a call, message's participation frame and coefficients should be expanded. "Dialogue is essential to a human understanding of communication because through dialogue, communication becomes communion and communion is genuine meeting" (Ohler, Holba, 2009). Message's participant frame and coefficient are the establishment of communication fields where the message will have more responses and capture of the communication points. To increase the participants' coefficient of the message and to bring it to an ideal point of contact, messages participant area should be caught correctly. The right determination of message's participant frame and coefficient also enables the correct identification of the public relations activities in the production process in public relations. Starting point for message's participation coefficient is establishing joint idea workshops for a message to convert into a call and leading to communication platforms. For this reason messages should be prepared with a preliminary consensus. Preparing the message with the society until the last step and including the society in the process allows the message to turn into a social call. To develop a social call and convert a message into a social call, beyond message team to be formed community-based and the creative work of one person or group on a message, there needs to be installed a structure where message team is in communication with society layers and public, and where public can express themselves in the call or the message. For this reason, message's participant coefficient must be taken by taking public consultation, engaging with the people based on their responses.

The dialogue education project that will be carried out in Turkey-France relations and community-based realization of the dialogue management campaign is an important title. For this reason, by establishing peace ballot boxes in all universities in Turkey and France in the same day and time and asking the question "Do you accept to enter the campus union to achieve peace between Turkey and France?" and considering this as a public relations campaign presents a serious contribution to the education dialogue. Just like a constitution as European Union, forming a campus union among Turkish and French universities converting this project into a dialogue education and management project presents a strategic contribution to the process.

A further point in conversion of a social message into a call and having accepted and responded by the society is conversion of the main idea and thought of the message or the activity in the core of the call into participant idea and creating an idea, hope and vanishing point in general of the society. The idea or the point shared that is expressed to turn message into a call must create a neutral area. Acceptance of social call and formation of a neutral area is a fundamental operation point. In providing the message's participant coefficient, this area should be defended by an audience as broad as possible. Identification of the unbiased framework to ensure message's participant coefficient, determination of its criterias are important steps in the production process. Within the context of neutral framework, conversion of the message into social call will take effect at the point of participation of the respondents, negotiation of differences and diversity. The point differences settle and diversities get together offers a neutral space and gives framework.

In a dialogue education campaign that will be held on Turkey-France relationships, the creation of this neutral area and be turned into an essential element offers new perspectives on dialogue education. The healthiest road map in this regard is developing "Common Sense Leaders Training Project" between Turkey and France. Opening postgraduate programs in the faculty of communications and international relations department of universities of Turkey and France within the aid of Ministry of Foreign Affairs titled as "Turkey-France Common Sense Leadership Management" is one of the steps in this topic. Likewise; developing sister school projects between two countries primary schools with the support of National Education, Culture and Ministry of Foreign Affairs and putting peace education course one hour a week are supportive strategic elements in terms of dialogue management. At the point of converting a prepared social message into a call and delivering it to the society or within context of

considering a social message as a call, the point that needs to be focused most is by whom this call is raised and by whom this social call is made. The starting point is the selection of people for communication campaigns whose social call will have a response in the society. At this point for a message to turn into a social call, most conciliatory, most charismatic and the person representing the most common sense of the community should be included in the process. Decisive concept on Turkey-France dialogue education projects is common sense leadership. Social common sense is extremely critical in leaders public relations, process of production and expression of social call. The characteristics of common sense leader that will be selected can be summarized as follows:

- Leaders of common sense should be chosen among people whose earlier calls in the community have found response and whose efforts were recognized by the public.
- Leaders of common sense should be chosen among people recognized by the general public and his contribution to social peace has been confirmed by the society to ensure social peace.
- Leaders of common sense should be chosen among people who are a pioneer leader in terms of career management.
- Leaders of common sense should be chosen among people who are experienced in social mediation and turns this mediation into an efficient communication.
- Leaders of common sense should be chosen among people whose international success and support have been confirmed by various national and international institutions.
- Leaders of common sense should have sharing and initiatives that have become synonymous with their names and is the subject of continuous reference to himself/herself.
- Leaders of common sense should be chosen among people who combined and configured his/her leadership traits and leadership image at the point of especially human values.
- Leaders of common sense should be chosen among people who can offer a route for the future and has something to say about the future.
- Leaders of common sense should be chosen among people who is inspiring society and has a life story that is important in social messages to be converted to the call of the community.
- Leaders of common sense should be chosen among natural leaders who is personally invited and called by the community itself. This is an important point. Namely, one of the most effective characteristics of Leaders of common sense is, they are the ones that have been called by the society itself and whose call has been accepted beforehand.

### *3.2. Social consensus on Turkey-France dialogue education*

Social consensus panorama is one of the primary steps regarding compromise with the society while in a public relations production process and in preparing each production process by consulting the society. "People who have to negotiate, even before they take a seat and prior to becoming fully aware of all necessary step of the real negotiation, are often in a particular predisposition from which they have to judge a subsequent determination of facts, the nature of the conflict, past disputes, and last but not least, the negotiations that sit on the other side of the table". (Aquilar, Gallucciu, 2008). Social consensus panorama is the reflection of composed social consensus at each phase of the production process and evaluating this together with the society, as well as preparing each phase of the production process together with the society. To provide the social consensus and togetherness regarding the Turkey-France dialogue education, it is recommended to determine the dialog education themes, which will be presented to the society, together with the "deliberation of the deliberations" method. The message to be insisted and delivered regarding the perspective of dialogue education is that social campaigns are conducted by means of deliberations. Namely, every message intended to deliver in public relations must be included in some extent to the deliberation process and must be conducted simply with deliberation titles. At the point of dialogue education, the deliberation method regarding a topic, which would be handled as a public relation campaign, must be determined by public consensus. Realizing an activity named "Peace mission of Mediterranean cities" between the two countries as a peace education project of Turkey and France by determining Mediterranean as the theme, would

provide a campaign management facing dialog education. Conducting the deliberation of such an activity would be the first step of communication based on deliberation. “The mutual exchange of cultural information exchange accounts for the shape of this consensus, and in that sense influences the situation as a whole, not just the participants”( Blommaer,1991). Regarding the campaign it is at first necessary to offer the society a project and to act within the bounds of a project. The focus of the “Peace mission of Mediterranean Cities” activity will be the leadership of Turkish and French peace educators regarding a local campaign about the spirit of peace and providing a contribution to arise an atmosphere of peace. To transform such an important thought into a social deliberation it is necessary that this idea is opened for deliberation with a high level of participation and to form deliberation titles. For the inclusion of deliberation titles to a campaign and to achieve a communication success, it is necessary to conduct a communication course, deliberation method and process management.

At first step, it is necessary to create corporate cooperation and consensus of both countries peace educators on a local and national scale. Such as, introducing a definition appropriate to the Turkish-French initiative of Mediterranean peace would be the strongest theme of dialogue education. Regarding Turkish-French relations, words which transferred from French to Turkish language may evoke a communicative association and may submit a definition appropriate to Turkish-French relations. For instance the word initiative transferred from French to the Turkish language and peace initiative is one of the most important titles of the peace education. From this point forth, it is proposed to develop a dialog campaign with the title “From tongue to heart an initiative of conscience in the Mediterranean”. What is the difference that Turkish-French spirit will bring into being for peace in the Mediterranean? With which extents could this difference be transformed into a participatory strategy? A strategic focus must be caught at point. All university students from Paris and Ankara coming together at peace meetings at each city’s most popular squares and slogans upon which they agreed being shouted by thousands and altogether will be an activity pointing out the peace approach of both countries in the name of deliberation. Herein, comprising social deliberation titles related to each theme is considered as a critical process. It is necessary to catch the shared focus of the themes when forming the titles of social deliberation. The shared focus of the theme, varying points of view and the evaluations are the field of expression which they found themselves within the campaign. The concepts “shared focus” and “expression field of the campaign” must be accentuated here at this point. A shared focus, within the production process of the public relations campaign is a common field composed primarily by thoughts and ideas on which all persons and groups who are supposed to be included in the process must agree. It is advisable to form common priorities for different persons and groups within dialogue education campaigns and activities based on social consensus and to bring those priorities forth as campaign models. “The greater goal is to create a peacemakers’ web that connects responsible peace leaders, peace bureaucrats, and civilian peacemakers in rhetoric, policies, and grassroots peace building activities”( Savir,2008). Using the theme of preserving the biologic diversity regarding the Turkish-French dialogue education, for example, would be a strong campaign step forward. A campaign schedule by binding biological and cultural diversity together with a consensus is an effective dialogue management project

Important institutes conducting a campaign based on animals and plants which are under protection in both countries combined with the common colours of both countries flags – e.g. a slogan of French institutes like “Red-white protection within the Black Sea basin” and as well Turkish institutes with a slogan like “Red-White protection of male orchids” which are under protection in France – would be steps for effective dialogue management. It is important to render a common focus and determine the priorities of the Black Sea region within an elaborated public relations campaign based on developing an environment and climate sensibility. For instance, by analysing biological diversity and social economic data within a very critical organization period, protection priorities for the Black Sea region and 73 protected areas revealed. The Black Vulture and the brown bear are animals under protection living in the Black Sea region. The Black Vulture with white stripes under its wings is one of the world’s heaviest flying birds with a wingspan of 250-300 cm. The spots of the male orchid flower, which can be along the Mediterranean coast of France, are remarkable. Using the stripes on the black vulture and the spots of the male orchid as a symbol of cultural variety and harmony for the dialogue education campaign is a very effective communication strategy. From this point forth, using the slogan “We are protecting natural stripes for peace with peace spots”, and producing a campaign where for each white stripe of the black vultures wings, the names of French Mediterranean cities and for each spot on the white orchid the names of cities in the Black Sea area will be written, will establish creative parts of the dialogue education campaign.



#### 4. Expression fields at dialogue education campaigns

The concept of campaign expression field is another concept which comes up at the point of dialogue education campaigns and which must be mentioned. In the context of generating a social consensus, the concept of expression field of the campaign in the perspective of dialogue education is forming communication channels which can be used as a power of expression where manners, ideas and thoughts, each one of those are supposed to be represented within the campaign. A social appeal must be mentioned first to form a social deliberation channel regarding dialogue education, which shall develop the relations between Turkey and France.

Determining the appeal which will form the campaigns expression field concerning the Turkish-French dialogue and this appeal having a strong dialogue channel is a distinctive campaign motive. At this point radio is suggested as an educational tool. It is also suggested to establish a peace radio with the leadership of official Turkish and French TV channels, leading the peace education of both countries 24 hours long. It is a very strong dialogue communication strategy to announce radio frequencies intensively and together with a public relation campaign within a powerful appeal to the public of both communities. It must be provided that the broadcast guidelines of the said radios are set by voting at a wide search conference organised in Paris and Istanbul. It is a very important step for the consensus to establish a contact group for the communication with political parties in Turkey and France, to form an extensive declaration with the articles each party would like to add to the broadcast guidelines. In order to provide the consensus, forming a contact group to continue the communication with each sector and environment and providing an agreement by adding data of each stage to the next one will reveal a perfect route map. Dialogues with 50 civil non-profit organisations in Turkey and France concerning this matter at any stage of the production process, for instance, is a strategic point of the production process, whereas negotiated and agreed articles based on a social consensus are announced to the public by the method of declaration.

Developing a production process by the means of declaration, means highlighting that declared, namely each expression and message is comprised by social agreement and making this point a main campaign highlight. Official announcements that highlight the consensus of differences provide the most powerful support to the expression field of the campaign. Another matter to repose on during the dialogue management process regarding social consensus is evaluating social acceptance and objection fields by a campaign project and transform those into effective communication strategies. Therefore when an announcement for social sensitivity and participation is realized, objections and as well social recognition must be included into the campaign for a while and this process must be analyzed based on social consensus. One of the most neutral and powerful supporter regarding the development of a campaign based on social consensus is the evaluation of social objections within the scope of dialogue management and proving by various messages, activities and campaigns that the objections are met during the production process. Herewith it is important to develop methods to meet social objections within campaigns aiming to provide social consensus and those must be included in the communication process. For example, to meet social objections for Turkey-France dialogue education following points must be paid attention:

1. The most important target group within such a campaign are elementary schools. On 24 December 2015 with the participation of 24 elementary schools in France and Turkey, chosen by the campaign, determining a road map with the slogan “24 steps for the campaign” in 24 separate areas and determining the objection points are activity steps of effective public relations.
2. Incorporating the Turkish and French population to the campaign and taking the opinions and suggestions of the people is another very important approach for the campaign. Therefore, especially when important campaigns are concerned, presentations population-wide and especially evaluating and including the reactions are facts which will raise participation and interaction. So, realizing symbolic referendums, organizing voting whit ballot boxes placed at particular cities and putting so the campaign on a base are effective communication steps.
3. Speaking out objections regarding the campaign formally and establishing a “dialogue council” where decisions are finalized and symbolic decision are made, a committee with high participation comprised of members whom everyone would listen and who would make symbolic decisions by voting and sharing these decisions with the public.

Within the dialogue education campaign objections and rejection fields based on social consensus must be formed very clearly and included in the process and it is always necessary to include always pointed out human values. Within this scope, a voting realised through social media which will be included to the campaign, will elect names which represent a common sense in Turkey and in France and will form a “common sense blog”, so this will be one of the most powerful points to form the campaign around a centreline of social consensus of the campaign. The team which will be announced with following slogan: “It is not a block which is separating societies and cultures; we are making a call to form a peace blog where people hand in hand interlock”, this team should have the task to enrich the campaigns mission. Sharing with the public the reception of objections and including those into the process will also add a feeling of trust and reliability to the campaign. Not only taking the objections, it is also a very critical and important process to meet objections and put them into a communication project. Here creating a social media, a twitter account using the hashtag #IHAVEOBJECTION and this to be organised directly by the foundation which is in charge of the campaign, will add reliability to the cause. Meeting the objections will show at the same time that those who organise the campaign are self-confident and open to criticism and building a consensus. Those methods with the participation of the public and starting activities with social base will add a communication strategy accent to determined symbols and images which will express the campaign.

## Conclusion

The most important factor, which will make a dialogue education conducted between Turkey and France successful is configuring the project base around the centreline of the communication campaign. Popularizing the dialogue education between the two countries and achieving success makes public relations and communication campaigns between the cultures necessary. The most important phase of dialogue education campaigns is especially forming a peace apprehension and making peace communication the main theme of the campaign. Starting with peace curriculums conducted at elementary schools up to establishing peace platforms at universities will provide the inclusion of a wide variety of education politics to the campaign. Apart from that, opening the communication channels at both populations and developing these channels, bringing new communication actors to the play who will lead the dialogue, choosing the right peace themes and making these themes the motifs of the campaign, all together these are main characteristics of a public relation campaign which is organised for dialogue education. The other stage of a healthy and effective working dialogue education between the two countries is organised public relations activities and campaigns together with the inclusion of the communities in the process and providing the support of the public. In order to open channels for a dialogue and entering the peace politics between Turkey and France into the lives and apprehension of people it is essential to mobilize the public and create a peaceful public opinion. The process of dialogue education is also a process of public opinion formation.

## References

- Jenlick,M.,P.(2007),Activity Theory as a Framework for Designing Educational Systems.J.L.Kincheloe,&R.A. Lorn(Ed.).*The Praeger Handbook of Education and Psychology*(pp.780-790).Westport:Praeger Publishers.
- Borgbrant,J.(2006),Strategic dialogue-a framework to improve developmental processes in construction companies. A. Bezelga& P.S.Brandon(Ed). *Management, Quality and Economics in Building* (pp.52-63).London:Chapman&Hall
- Phillips,L.(2011). *The Promise of Dialogue: The Dialogic Turn in the Production and communication of knowledge*.Amsterdam: John Benjamins Publishing Company
- Ochoa-Becker,A.S.(2007). *Democratic Education for Social Studies: An Issues Centered Decision Making Curriculum*. Charlotte: Information Age Publishing
- Baker-Ohlar&M.Holba,M.A.(2009). *The Communicative Relationship Between Dialogue and Care*.Amherst:Cambria Press.
- Aquilar,FG&Gallucciou,M.(2008). *Psychological Processes in International Negotiations: Theoretical and Practical Perspective*.New York:Springer Science
- Blommaert,J.(1991 ). How Much Culture?.J.Blommaert&J.Verschueren(ed). *The Pragmatics of International and Intercultural Communication: selected papers from the The International Pragmatic Conference* (pp.13-30).Antverp: John Benjamins Publishing Company.
- Savir,U(2008). *Peace First: A New Model to End War: Easy Read Comfort Edition*.San Francisco:Berrett-Koehler Publishers

INTE 2014

# Digital spaces: between educational tools and student uses

Cathia Papi\*

*Téluq- Université du Québec 455, rue du Parvis Québec (Québec) G1K 9H6 CANADA*

---

## Abstract

While the generation currently in basic training has grown up in an environment that is rich in information and communication technologies, since the beginning of this century, the French national education system has been promoting the development of skills in the use of ICTs and the creation of digital institutional spaces. However, these spaces sometimes appear incomplete or less attractive than the commercial platforms or social networks, and certain teaching activities tend to use these latter tools, with which the students are a priori more familiar. To what extent would these students be more likely to prefer and use one type of environment or the other for their studies? In order to advance some avenues of thought, we will analyse the responses provided by nearly 1,000 students registered at the Université de Picardie between 2012 and 2014. We will examine their tastes and habits in using the social media and the university's digital work environment in order to seek to better understand their technology preferences and practices in connection with recreational and learning activities.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* digital work environment; e-learning; media preferences; social network

---

## Introduction

In France, for several decades, the desire to computerize and then to digitize education has given impetus to various initiatives and to a few large-scale programs, such as the one focused on “educational television” in the 1960s or the “computers for all” and “audiovisual for all” plans in the 1980s. However, the institutions and groups targeted generally tended to be limited. Since 1998, the governmental action program to bring France into the information society (PAGSI) is presented as one facet of a more general desire to develop the Internet network and to break away from the former experimentation policies: “While, as Philippe Breton (2000) notes, the plan for a society reorganized around communication through the ongoing production of new tools dates from the immediate postwar period and continues to be placed at the forefront by the media on a cyclical basis, with regard to the Internet, it should be underlined that there has been a change of scale in the instruments used by the political sphere, which marks a difference in comparison to previous initiatives. Actions targeting certain sectors have been followed by actions of a much wider scope, and communications on a more territorial basis have given way to widespread communication.” (Thibault, 2007, p.10)

Hence, starting from the 2000s, particularly following demands for the creation of digital campuses, various systems fostering the integration of ICTs in education have been implemented, such as digital regional universities (DRUs), digital thematic universities (DTUs) and digital work environments (DWEs). At the same time, at the international level, various sites and social networks have been emerging, also often created in an academic context in order to foster the sharing of knowledge and social ties between students. While institutional platforms and networks take time to be deployed and adopted, those open to the public at large have quickly conquered young audiences, as illustrated notably by the social website *Facebook*. This “Who’s Who”, initially created for Harvard University, has in fact just celebrated ten years since its creation, and has over one billion users around the world. But whereas the tools made available to students are becoming increasingly numerous both in their private life and

in their academic life, what are their social and scholastic preferences and uses?

In order to advance some avenues of thought, we will analyse the answers provided by nearly 1,000 students registered at the Université de Picardie Jules Verne (UPJV) between 2012 and 2014. We will examine their tastes and habits concerning use of the social media and of the University's digital work environment in order to try to better understand their technology preferences and practices in terms of recreational and learning activities.

## **Spaces for discussion**

For about the past ten years, the digital spaces in which it is permitted to post information, photos, videos, and to communicate in real time or asynchronously have become increasingly numerous.

### *Digital work environments*

In the area of education, it was beginning in 2002 that the creation of digital work spaces was given its impetus, with the third call for tenders for the creation of a digital campus, and then with the policy that followed. DWEs are part of the means deployed in order to modernize higher education. Included within a master plan, DWEs are specific to France in the sense that "With the master plan for digital workspaces, the State positions itself as the prescriber in order to provide a form of industrialization of a certain number of pioneering and experimental solutions set up in the scholastic institutions or at the level of the territorial communities within the territory concerning their activities" (Voulgre, p.589). DWEs are thus distinguished from the virtual learning environments based on open solutions and collaborative platforms chosen at the institutional level in the English-speaking countries. In 2004, the master plan established by the Ministry of National Education defined DWE as: "an overall system providing the user with an access point via networks to all the digital resources and services relating to his or her activity. It is an entry point to access the information system of the institution or school. The digital workspace is intended for all users: pupils, their parents, students, teaching staff, and administrative, technical and supervisory staff of teaching institutions." (MENR, 2004). It thus provides all educational stakeholders with access to an entire range of digital services. However, much like the deployment that took place gradually and more generally starting in 2009, uses take time to develop. Research on social uses of technologies clearly shows that widely available hardware must not be confused with widespread uptake of its uses. However, "We nevertheless observe that above a certain threshold, the broad material distribution of DWEs fosters the development of their use." (Genevois & Poyet, 2010, p. 568). For example, 13 million hits were recorded on a DWE in January 2013\*. But the uses observed are mainly of an administrative nature, and teaching-related uses are not only rarer than expected, but especially, are far from providing the pedagogical innovation hoped for (IGEN, 2012).

Thus, as DWEs gradually become better known and more often used, it appears that this often takes place without a really meaningful uptake liable to foster the implementation of new teaching approaches, particularly since the teaching staff have not been trained for that (Thibert, 2012). Summarizing the studies conducted on DWEs, Bruillard (2011, p.116) thus notes that "the research attests to a process of deployment of DWEs that is slow and non-linear, and an uptake that is still limited, with some technical dysfunction. The research shows that unanticipated problems gradually emerge. While a consensus is taking shape in this research, as well as international comparisons, on the importance of having teaching staff participate from the design phase, as far upstream as possible, the processes at work are very different. What is announced as the inevitable nature of the industrial deployment of DWEs, an infrastructure deemed to be indispensable to the modernization of the education system, goes against observations in the field indicating a 'limited' professionalism. What is anticipated is not problems for the stakeholders, but rather issues of set-up (high speed, fibre optics, etc.) and the DWE is above all one component in processes that are more complex, concerning territories and their relations with the State." In fact, research on

---

\* <http://projets-ent.com/2013/04/16/les-ent-ont-10-ans-verite-des-chiffres-par-francoise-coutellier/>

DWEs is done more in the field of information and communication sciences, from the angle of the theory of the network actor or of the spreading of innovation, than in that of education. Yet it involves artefacts that are supposed to contribute to education and liable to redefine its contours in the sense that “In this movement of transformation connected with the setting up of these new digital spaces, it appears that the school system is caught up in a two-fold process of deterritorialization (the ‘virtual school’ beyond the walls) and of reterritorialization (the ‘wider school’, defined as a territory to be constructed). Rather than a dilation of the educational sphere or an opening of the school system, we are experiencing a recompartimentalization of the scholastic space which seeks, if not to close itself in to protect itself, at least to redefine itself in relation to the Internet and the digital networks.” (Genevois & Poyet, 2010, p.581).

### *Digital social networks*

The uses of the commercial social networks have developed much more rapidly than those of work environments, and seem to be based much more on day-to-day practices. Although initially they were connected with the educational world in the sense that they made it possible to stay in touch with classmates, the social networks, such as *copains d'avant* (old friends) in France or *Facebook* at the international level, have spread quickly and been readily adopted, with the predominance of *Facebook*, which includes for example, an old friends page and attracts many onlookers that inspire mistrust and fear as well as enjoyment and popularity. As soon as they involve revealing personal data and building ties with people who are sometimes barely known or unknown outside the web, the digital social networks tend to play the role of “egotistical catalysts” (Lardellier & Bryon-Portet, 2010, p.33), having ties with education that are not immediately obvious.

While *Facebook*, much like *Yahoo* and *Google*, came into being in the universities (Dagiral, 2011), the initial purpose was not actually of an academic nature. It remains to be seen whether this type of network constitutes a means that is suitable for learning. Several studies into online training (Dupl  a & Talaat, 2011; Papi, 2014) tend to make it clear that the students who communicate the most with their peers or tutors are those who succeed best, regardless of the content of their dialogue. The web 2.0 is therefore potentially suitable for learning according to a connectionist rationale in the sense that “the web surfers contribute to the exchange of information and can interact (share, discuss, etc.) easily, with both the content and structure of pages, but also between them, thus contributing to this social web.” (Dupl  a and Talaat, 2011). However, rather than focusing on the development of networks, the current assessments generally focus on individual knowledge and skills. These can apparently be developed via the social web to the extent that a foreign language can be learned entirely online through cross-referencing, verification of information and discussions with web surfers who are much more numerous than just the teaching staff and classmates, as was noted by C. Develotte (2010, p. 461): “at this stage, we have entered into a logic of networks where those giving out information are numerous and where the recipient learners have more and more leisure to connect to multiple sources, to interact among themselves, and in particular, as regards their language skills, to face numerous evaluation sources, which may or may not be formal or official.”

Certain teachers and learners thus tend to take advantage of the digital social networks with a view to preparing for a diploma. This is the case, for example, in the training for a diploma as online learning and training project leader: “The cooperative approach proposed with learning on the social networks in the CAFEL university degree allows for the inclusion of a number of profiles of learners who have not participated in an overly coercive collaborative system. The members of groups within the social networks will naturally communicate, not to collaborate explicitly to learn according to pre-established scenarios, but rather to cooperate on a basis of freely given consent, putting themselves forward as volunteers to undertake collective tasks if they wish to do so.” (Arnaud 2012, p.21) Similarly, concerning another university degree, T. Gobert (2014) shows that if they are presented with a DWE deprived of the usual communications functions, or with fee-based learning platforms or restricted access in terms of number or time, the students choose to work together via *Facebook*, which then converts into a learning platform because of its many advantages, such as accessibility and being free of charge. However, although it allows for data to be stored on a long-term basis, this social network does not allow users to work together on a common document, nor to classify or search via frequently used key words, as soon as it involves working from a variety of

information sources; hence the use of other complementary tools, such as *Google Drive*.

### *The survey*

It is thus shown that DWEs are not very well suited to communication and that the social networks are not very well suited to learning. A tension thus appears regarding the choice of digital spaces to be used in the educational context: would the students be more inclined to use artefacts already known in a personal context if these are brought outside of this context, or is the context predominant in separating digital spaces? In other words, what relationships do the students maintain with the means of communication and of learning offered them by the school system and by society?

In order to advance some avenues of thought, we propose to analyse certain data resulting from two questionnaires that were answered by 971 students registered at the Université de Picardie Jules Verne (UPJV) in 2012-2013, or in 2013-2014. The first questionnaire was given before the training for the certificate in information technology and Internet (C2i), and the second at the end of the training. We retained only the responses of those students who answered both questionnaires, which we linked by means of the student number. The responses to the closed questions were analysed using the SPSS software, in the form of simple sorts and cross-tabulations with the  $\chi^2$  test, and the open questions underwent content analysis.

61.5% of the respondents were female students, 88% were aged between 17 and 22, and they had mainly come out of the general bachelor's programs (39.6 % scientific, 25.5% economic and social, 17% letters) but also technological (35.5%) and were registered in their first year of a *Licence* in the different streams of science, health, humanities and social sciences, arts, sports, law, etc. offered at the Université de Picardie Jules Verne.

### **Relationships with the digital universe and with education**

Reflecting on digital spaces suitable for students implies knowing their tastes and habits in terms of uses of the media and means of communication available to them.

### *The indispensable connection*

Two thirds of the students state that they are not interested in a computer without an Internet connection and 89% state that they connect at least once per day. It is clearly observed that the Internet is now ahead of other media among the preferences of young people, as reflected in the table below.

Table 1. Media preferences (Percentages in columns).

Appreciation	Books	Press	Radio	Television	Cinema	Internet
I adore	22.5	8.1	11.6	25.3	35	44.2
I love	21.8	21.8	20.4	33.4	35.3	40.6
I like	31.4	42.8	43	28.3	23.3	14
Indifferent	17.8	23	21.8	9.9	5.5	0.7
I don't like	6.5	4.2	3.1	3.1	0.9	0.5

In fact, the Internet can replace all other media in its functions of access to audiovisual information. Also, being accessible from a computer as well as from a tablet or smartphone, Internet and more broadly, the current information and communication technologies, offer many possibilities for communication used with varying degrees of frequency, as reflected in the table below.

Table 2. Frequency of use of various means of communication (Percentages in columns)

Frequency	Regular mail	E-mail	Forums	Chat rooms	Sms, Mms	Telephone conversation	Video-conferencing	Social websites
Never	28.5	4.8	50.4	30.5	0.8	2.6	41.2	6.3
Less than once/month	41.9	12.8	23.7	16.7	0.5	4.2	21.2	2.8
At least once/month	20.7	17.4	11.8	11.1	0.9	9.9	17.4	4.8
At least once/week	6.7	36.9	10.1	21.4	4.9	40.3	14.8	21.3
At least once/day	2.5	28.1	4	20.3	92.9	43	5.4	64.8

While it is hardly surprising to observe the lower frequency of letter writing, it is more surprising to note that barely a quarter of students exchange emails daily, and this in most cases involves only a single email. Forums, chatting and videoconferencing are even more rarely used, and not by all the students. The most popular and most frequently used means of communication is thus shown to be exchanges of text messages, followed by the use of digital social sites or networks; hence the potential interest in diverting these latter means of communication, whose use is already ingrained, for educational purposes.

However, it is apparent that the use of communication technologies for learning purposes is relatively limited. For example, in the course of their school work: 26.8% never communicate by e-mail, 46.7% never communicate by chatting, 75.9% never use forums, 52.2% never use social sites and 18.5% never communicate by telephone. Indeed, while one third of the students state that they connect as soon as possible, and three quarters would go back to pick up their portable phone if they left home without it, this research is mainly linked with a potentially reassuring habit and a recreational aspect (Papi, 2012), so that seven times as many of them state that they use the Internet for enjoyment than for a work-related activity. Moreover, in contrast to the fears often portrayed in the media, of people enclosed in virtual worlds, 73% of the students state that their preferred communication situation in daily life is face-to-face with one person, and 19% prefer communication within a group. While there is some appreciation of text messages, with 5.4% choosing this means of communication, fewer than 1% state that they prefer communication via social websites.

#### *Traditional forms of school work*

Just as they prefer face-to-face contact in daily life, when they arrive at university, students show a preference for lectures (53.1%), working in groups of students with the teaching professional moving around among the groups (23.5%) or individual classes (21.9%); following a distance learning course, whichever resource is used (paper, multimedia, Internet) only tempts 14.4% of them. Indeed, before preparing for the C2i, they generally never had an opportunity to follow any training that was wholly or partly online, and are accustomed to traditional teaching. In fact, their teachers used ICTs relatively little in the courses when they were in secondary school, as reflected in the figures below.

Table 3. Proportion of students whose teachers used ICTs in different ways in secondary school.



Teachers using ICTs in class	Proportion of students
None	30.4
Some, to distribute documents or show videos	45
Some, giving lessons in the form of a slide show or using an interactive whiteboard	16.7
Some showed us how to search for information or work on a computer	0.7
Some teachers frequently used a computer and invited us to do the same	2.1
Nearly all the teachers used the technologies available to them to teach lessons	5.1

Furthermore, in doing their school work, the use of information technology did not seem to be indispensable and the more traditional sources of information came before research on the web, as reflected in the data below.

Table 4. Uses of information technology and Internet in doing school work.

Doing homework and schoolwork on a computer	Proportion of students
Never, I work from the textbooks and write assignments by hand	10.4
Sometimes, for all of a specific project	34.8
Only for the information search phase	20
Only in relation to one particular discipline	5.7
Only for the writing phase of the homework/assignment	7.1
Systematically for all the work	22

Table 5. Preferred sources of information in doing school work.

Preference order	I look in the lesson	I look in the textbooks and books	I go to the library	I ask my friends/family or prof	I search on Internet
First	<b>86.7</b>	5.3	1.4	2.8	14.4
Second	8.6	<b>47.4</b>	6.3	14.9	<b>31.9</b>
Third	2.8	19.6	15.5	<b>31.8</b>	<b>30.5</b>
Fourth	1	20.5	19.9	<b>34.3</b>	15
Last	1	7.2	<b>56.9</b>	16.2	8.2

Questioned about the ways in which they did their school work, the students gave answers that reflected a pervasiveness of traditional practices, broadening out toward the use of digital solutions. This work method is probably rooted in school work practices that have been developed since childhood and that are notably adapted to a mode of evaluation consisting of verifying the mastery of the lessons delivered by the teacher, by means of a handwritten assignment.

### Students and digital environments

Being to a degree accustomed to digital environments, two thirds of the students found a DWE to be clear and easy to take up, although they were generally not trained in its use beyond the brief introduction given as part of their C2i training. While the majority of students considered this environment useful or even indispensable, 17% saw little usefulness in it. In fact, the interest in a DWE is linked to institutional expectations and resources. It is

seen as useful by most of the students to the extent that it constitutes the access route to the C2i training platform; however, the remainder of their appreciation seems to depend on teaching practices. Apart from the C2i training and the consultation of examination results, it is in fact primarily to consult their courses or material potentially placed online by their professors that the students turn to the DWE. The comments of students on this subject reflect an expectation and a real benefit drawn from the material made available to them, whether it involves complete courses, slide-show presentations or course outlines. As long as the traditional evaluation framework of individual assignments based on the course given by the teacher is maintained, the DWE seems to be adapted to the expectations and practices of the students provided that the teachers, or the administration, place the expected resources there. The possibilities for storing differentiated material according to the courses clearly makes this tool more suitable to the work habits of the students than the social networks are. However, what about communication?

In general, students rarely communicate online with their teachers or classmates. However, when they are encouraged to do so with a view to developing their skills, as is the case in the C2i training, it must be noted that nearly two thirds communicate – not all that frequently, of course – with their instructors and classmates, even outside the collaborative activity. It is therefore interesting to observe which means of communication are preferred. Indeed, 93% of the students who communicated with their instructor stated that they had done so by email, but when a message system was available to them on the DWE, and another on the INES training platform, half of them communicated via their personal messaging system, while the other means of communication (forums, chatrooms), whether included on the platform or public, were hardly used. While personal email was also the most common means of communication between students (38%), almost completely obscuring the other two types of messaging (DWE, INES), meetings at the university (26%), telephone conversations (13%) and exchanges on social websites (13%) were also used to an appreciable degree. It thus appears that the contribution of means of communication habitually used outside the school setting is liable to be deployed spontaneously and independently of the institutional means of communication provided.

In conclusion, these results invite us to examine the relevance of developing further means of communication within DWEs, on the one hand, and on the other, that of potential uses of SMS and MMS in education, and finally, of the institutional creation of workgroups on the social networks. Since communication among students, as well as between them and the members of their institution, is a potential source of sociability liable to foster perseverance (Tinto, 1994; Papi & Gobert, 2014), more so than the means, it would appear that it is above all the situations inviting people into discussion that should be developed, and similarly that the possibility of placing resources online could be made to contribute to the development of the pedagogical approach that fosters openness toward reliable sources of knowledge other than only the teacher's course. Given the broad scope of information available, it would seem necessary to develop the critical openness and autonomy of our students by offering forms of coaching that increasingly draw inspiration from practices being implemented in distance learning.

## References

- Arnaud, M. (2012). Apprendre par les réseaux sociaux, qu'est-ce qui change? *Études de communication*, (38), [http://edc.revues.org/3402].
- Bruillard, É. (2011). Le déploiement des ENT dans l'enseignement secondaire entre acteurs multiples, dénis et illusions. *Revue française de pédagogie*, (177), 101-130.
- Dagiral, É. (2010). L'articulation des sociabilités et des savoirs en tension : les réseaux sociaux et l'université. *Transversalités*, 4 (116), 31-44.
- Develotte, C. (2010). Réflexions sur les changements induits par le numérique dans l'enseignement et l'apprentissage des langues. *Études de linguistique appliquée*, 4 (160), 445-464.
- Dupl  a, E. & Talaat, N. (2011). Connectivisme et formation en ligne, Étude de cas d'une formation initiale d'enseignants du secondaire en Ontario. *Distances et savoirs*, 9 (4), 541-564.
- Genevois, S. & Poyet, F. (2010). Espaces numériques de travail et « école étendue », vers un nouvel espace-temps scolaire ? *Distances et savoirs*, 8 (4), 565-583.
- Gobert, T. (2014). Le métissage des outils communicants gratuits en pédagogie : un complément des ENT ? Quand la pédagogie et l'apprentissage font irruption sur Facebook. *TICEMED 2014*.
- IGEN (2012). *Suivi de la mise en œuvre du plan de développement des usages du numérique à l'école*. Paris : Ministère de l'Education Nationale, de l'Enseignement Supérieur et de la Recherche, n° 2012-082. [http://www.education.gouv.fr/cid61368/suivi-de-la-mise-en-oeuvre-du-plan-

de-developpement-des-usages-du-numerique-a-l-ecole.html].

Lardellier, P.& Bryon-Portet, C. (2010). « Ego 2.0 » Quelques considérations théoriques sur l'identité et les relations à l'ère des réseaux. *Les Cahiers du numérique*, 6 (1), 13-34.

MENR. (2004). Schéma Directeur des Espaces numériques de Travail (SDET), [<http://eduscol.education.fr/chrge/SDET-v1.pdf>].

Papi, C. (2012). Connexion et communication : le plaisir ou l'envers de la peur du vide. *Ludovia* 2012, [[http://culture.numerique.free.fr/publications/ludo12/papi\\_ludovia\\_2012.pdf](http://culture.numerique.free.fr/publications/ludo12/papi_ludovia_2012.pdf)].

Papi, C. (2014), *Formation à distance. Dispositifs et interactions*. Londres : ISTE Editions Hermes Sciences Publishing Ltd.

Papi, C. & Gobert, T. (2014) Un objet de recherche en SIC dans l'espace éducatif : l'ENT peut-il favoriser l'intégration universitaire ? *SFSIC* 2014.

Thibault, F. (2007). Campus numérique : archéologie d'une initiative ministérielle. *Études de Communication*, [<http://edc.revues.org/index546.html>].

Thibert, R. (2012). Pédagogie + Numérique = Apprentissages 2.0. *Dossier d'actualité Veille et Analyses*, (79), [[http://ife.ens-lyon.fr/vst/DA/detailsDossier.php?parent=accu\\_eil&dossier=79&lang=fr](http://ife.ens-lyon.fr/vst/DA/detailsDossier.php?parent=accu_eil&dossier=79&lang=fr)].

Tinto, V. (1994). *Leaving College - Rethinking the Causes and Cures of Student Attrition* (2e éd.). Chicago : The University of Chicago Press.

Voultre, E. (2010). Espace numérique de travail en collège. Étude sur la formation des enseignants. *Distances et savoirs*, 8 (4), 585-600.

# Discourses of gender in Brazilian songs: the influence of music in Brazilian education under a gender analysis

Luciana Steffen<sup>a\*</sup>, Daniéli Busanello Krob<sup>a..</sup>

<sup>a</sup>*Faculdades EST – Rua Amadeo Rossi, 467, São Leopoldo, 93030-040, Brasil*

---

## Abstract

Gender inequalities are present in different contexts in Brazil, and are also reproduced in education. This article, realized through a literature review, aims to investigate Brazilian songs from gender analysis and its contribution to education. Gender inequalities and oppressions, especially for women, are often found in Brazilian songs, and encouraged for children and all generations. Gender Studies alert to these issues and contribute to an education aimed at gender equity, respect and solidarity.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* Gender; Brazilian music; education.

---

## Introduction

Gender inequalities are still present in Brazilian culture. They are reproduced in education and are visible in different roles, functions, duties and expectations for men and women. The objective of this study is to investigate the Brazilian songs through a gender analysis and its contribution to education. It is a literature review and brings a critical gender analysis of Brazilian songs. First, it will be examined gender differences present in children's songs. Then, the gender differences present in songs for adults, but which are also heard by children. Finally, it will be presented some contributions of gender analysis in Brazilian music for the area of education.

Gender inequalities are not natural, it means that they aren't the result of biology or of the differences between female and male bodies. They are, in fact, the product of different historical forms of organization among human beings, who gradually had been institutionalized in the form of gender roles. Gender inequalities make women more susceptible to violence and its consequences. We live in a society with patriarchal structure, where women are subordinate to men and youth are subordinate to older men (Narvaz, 2006). In patriarchy, men dictate and determine the social norms, and in this case, when someone - usually women - deviates from this pattern of social conduct correct, violence is used, whether physical or psychological. And the men that uses this violence receive a certain type of authorization or at least tolerance of society in general to punish what are perceived as deviation (Saffioti, 2001).

To modify and build more equitable relationships, it is fundamental the mediation of gender as a category of analysis. Joan Scott defines gender as a entirely social construction of ideas about men and women roles. It is a way to refer to the origins, exclusively social, of the subjective identities of men and women (Scott, 1996, p. 3). Besides the gender category, other issues define the uniqueness of people, such as age, culture, religion, sexual orientation, class, ethnicity, disability etc. Those characteristics are fundamental in gender analysis, because to change situations marked by injustice, it is necessary to understand the contradictions and antagonisms that mark social relations

---

\* Corresponding author. Tel.: +55-51-9173-8533  
E-mail address: lucianast@gmail.com

(Paixão, 2014, p. 23).

Gender Studies include a wide range of areas of knowledge towards interdisciplinary (Bicalho, 2003). Thus, gender analysis in Brazilian songs brings up a worrying scenario with regard to culture and popular education of girls and boys, as it will be discussed forward. As well as gender stereotypes, many songs are also taught from generation to generation. Because music is a cultural element that is in daily life, it has a symbolic, educational and empowering value about gender roles. One of the challenges of the feminist movement is to be attentive and watchful to relationships that happen in everyday life, because is in the intimate of relationships that domination settles and dictate the exclusionary rules, and this rules are consequently naturalized (Paixão, 2014, p 29 - 30).

### **Brazilian Children Songs and Discourses of Gender**

Children's songs are often sung and heard in Brazil in many spaces, like in lullabies sung for new-born children, in games with family and friends, in schools, music lessons, parties, through CD's and DVD's watched or listened at home, in schools and in many different environments. These songs are played and passed down from generation to generation, as well as its several contents.

It is questionable what messages are these songs transmitting to girls and boys and how these songs reproduce understandings about gender relations. It will be presented a gender analysis in Brazilian folk songs, investigating gender roles in the text of the songs. For this, some songs were selected in the following books: *Guia Prático de Heitor Villa Lobos* - Practical Guide Heitor Villa Lobos (Villa-Lobos, 1941), *Quem Canta Seus Males Espanta* - Who Sings Scares Away His Woes (Almeida, 1998), and *Brincadeiras Cantadas* - Sung Jokes (Garcia & Marques, 1992). These books bring folkloric brazilian songs commonly sung for children. The last one results of a research that relates folkloric songs sung in different states of Brazil. Among the surveyed songs, were found several songs that emphasize the normative gender roles, as well as stereotypes and different roles and functions related to male and female were identified. The songs will be analysed according to the text and the theme they bring.

The importance of marriage and having children, especially for girls, appear in several songs, such as: Pombinha Branca (Little White Dove): "little white dove, what are you doing? Washing clothes for the wedding"; A Dona Baratinha (Dona Cockroach): "Who wants to marry Dona Cockroach who is cute and is trying to get married"; Sapo Cururu (Cane Toad): "toad's wife should be inside making lace for the weeding". Another song, Eu Era Assim (I was like this), depicts the stages of women's lives: "when I was a baby, I was like this..." following for: little girl, girl, married, mother, grandmother, senil and skull. One can also notice that the household chores - cooking, sew, washing clothes, among others, are always related to the female, as the song Borboletinha (Lil Butterfly): "lil butterfly is in the kitchen making chocolate for godmother". These skills appear exclusively to girls, and are even encouraged as a profession. In the songs: Galinha Pintadinha (Lottie Dottie Chicken), "the doctor was a turkey, the nurse a vulture"; Ponte da Vinhaça (Bridge of Vinasse): "washerwomen do so, the seamstresses do so", and A Agulha (The Needle): "looks that girl that goes so far [...] looking for a needle I lost here," the differences in the professions expected for each sex are very clear.

Some songs refer to girls as an object that can be selected according the criteria of each one, independent of the girl's desires, as in Anda a Roda (Walk the round): "choose in this round the girl you like, this isn't for me, this I don't like"; Rico Rico Rico (Rich, rich, rich): "give me one of your daughters, choose you the one that you want"; and Arroz com Leite (Rice with Milk): "rice with milk I want to marry a girl who can cook." Songs also mentions stealing a girl or something for her, subduing her, as in the song Minhoca (Worm): "give me a smack, I won't give, I won't give, so I'll steal", and in Para Dentro e Para Fora – Mais um, mais um (In and Out – One more, one more): "I steal this girl, one more, one more, I steal this girl, one more, one more, one more, I put her on the round, one more, one more [ ... ] they dance so cuty, one more, one more."

Girls are also treated as an object of beauty. The terms delight, beautiful and gallant appear in several songs, including sexual connotation, as in the song Menina tão Galante (So Gallant Girl): "O gallant girl, I invite you to dance, [...] ah! What delight, my lovely pair", and almost in Samba-lelê: "Oh beautiful mulatta, where do you live?", that shows black women as sexual objects. In this way, to the female are not related stimulants terms such as the ones related to male: sir, doctor or rooster, as in the songs Galinha Pintadinha (Lottie Dottie Chicken): "purple rooster", and Bamba-la-lão: "Bamba-la-lão sir captain". Besides the allusion to beauty, were found feminine terms as disobedient, liar, and mischievous, as in A Barata diz que tem (The cockroach says she has) "it's a cockroach lie,"

and in A Dona Aranha (Lady Spider): "she is stubborn and disobedient." The song As Conchinhas "The shells" illustrates what happens with a disobedient girl and that wants to be independent - she dies: "I want to catch shells on the beach by the sea, my mom is very scared, never let's us play, then I'll go alone, stand alone too, I'm not afraid, I'm strong, I do not obey anyone. And there was the little crazy, running along the sea, the poor mother was sad, sat down and began to cry, in the morning by the waves, floated dead, the little daughter! Take example, girls, from this unfortunate poor one" (Villa -Lobos, 1941, p. 38).

Children's stories, through fairy tales portray gender stereotypes, almost always containing as characters a beautiful thin white princess, dependent and helpless, who marries a strong and wealthy prince, who also saves her. This are also stories of encouragement and idealization of marriage. Girls idealize this pattern and to men there's the obligation to make their wives happy forever, serving her in all your emotional needs. (Tyson, 2006). These ideas of fairy tales also appear in songs, as in A Linda Rosa Juvenil (The beautiful youth rose): "One day came a bad, very bad, very bad witch that made the rose fell asleep [...] one day came a beautiful king, beautiful king, beautiful king, who awaked the rose" and in Fui Morar numa Casinha (I moved to a little house), "came out there a little princess".

Girls frequently appear as fragile, dependent and submissive in relation to a man: father, brother and/or husband, like in Terezinha de Jesus (Theresa of Jesus): "Therese of Jesus is so mischievous that fell to the ground, three gentlemen came forth, all three with a hat in hand, the first one was her father, the second one, her brother, the third one was the one to whom she gave her hand." The fragility of women also appears in the song O Cravo Brigou com a Rosa (The Carnation had a fight with the Rose): "the carnation had a quarrel with the rose under a balcony, the carnation got hurt, and the rose was in pieces, the carnation got sick, the rose went to visit him, the carnation fainted and the rose cried".

The different roles, functions and duties of men and women are clear in children's songs, like on the importance of marriage and the execution of housework for women, or on the reference of possible professions for women that are always related to care within the household (cooking, sew and being a nurse). This way, women are more intended for the private sector than the public (Teixeira, 2008). Women also appear as an sexual and beauty object, which can be chosen and subjugated by men independent of their desires, in this way it is allowed to "steal a kiss" if the woman does not want to give it. These songs justify and even encourage violence against women, which will also be mentioned in the next point. The characteristics related to women that appear in songs are always pejorative: disobedient, liar, mischievous, dependent, weak and submissive. However, for men appear terms like sir, doctor, rooster, heavy, king, independent, or someone able to make their choices according their desires.

### **From Girls to Women: Music and Gender Discourses in Brazil**

As seen in children's songs, music reveals forms of human behavior. Through each song we can visualize scenarios, historical and social contexts and how human being relate intra and interpersonally. Through prose and poetry found in the repertoire of Brazilian songs, it can be perceived gender discourses and how women are portrayed.

We emphasize here the large number of songs that trivialize and make violence against women an acceptable form to act (Krob, 2010). In 1932, Noel Rosa, through the song Mulher Indigesta (Indigestible Woman), makes it clear to society that women should not have an opinion, much less express their ideas. What this song portrays is that if women do not want to catch, they should keep quiet. Here is an excerpt: "But what a indigestible woman! / Deserves a brick in the forehead! / And when she manifests herself / She deserves arriving on scourging" (Noel, 2014).

The song Ai Que Saudades d'Amélia (How I miss Amelia), composed by Ataulfo Alves and Mário Lago in 1940's, describes an ideal partner in the eyes of sexist, androcentric and patriarchal culture: a woman without their own desire, voiceless and submissive to the needs and desires of the male universe. From this song, many women began to identify herself and started to be identified as Amélias. It was created a female standard where women gives up her desires, and are always subjugating herself for the happiness and well-being of someone else: "I've never seen so much demanding, and even do what you do to me, you do not know what consciousness is, nor see I am a poor boy, you only think about luxury and wealth, all you see, you want, oh my God, I miss Amelia, that was a real woman, sometimes starved by my side, and thought it was nice not having what to eat, when she saw me upset, se said: "My child, what can we do!", Amelia had no vanity, Amelia was a real woman" (Mario, 2014).

Many generations grew up listening, singing and playing songs like this in their daily lives. However, we can still find violence against women stamped in Brazilian songs in a usual way, naturalized and even trivialized, as in *Tapa na Cara* (Face Slapping – 2006), of the band Saia Rodada: "Look she is naughty and likes to catch / And says it's good in love time / catches for sleep, catches to wake up/ catches every day, every hour constantly" (Saia Rodada, 2014).

Another example is the song *Faixa Amarela* (Yellow Band - 1997), of Zeca Pagodinho (2014): "But if she falter, I will give a punishment on her / I'll give you a stroke / Break five teeth and four ribs / I'll get that yellow band / Engraved with her name / And send fire / at the entrance of the slum / I'll buy a good strong rod / to warm up her throat / And make a snack / with homebred chicken / Not to mention this yellow band / Embroidered with her name / I'm gonna have to hang / At the entrance of the slum."

A variety of musical songs appear as spaces for men and women announce their way of thinking about female behaviour and to relate with each other. Music promotes and provoke self-expression, in all societies. One of the functions of music has been the symbolic representation of the ideas and behaviour (Blasco, 2002, p. 77). The music market contributes to the spread of violence against women by providing public access to songs like this. Music can be considered as a dynamic array that happens in time through which we can experience heightened emotions and an alternation of our states of consciousness (McClellan, 2009). The melody and rhythm can mask the text message and people do not perceive, much less question what they're really singing. If they sing, they incorporate ideas and accept them. If accept, allow them to settle (Krob, 2010).

The use of music as a means of expression and communication is one more piece of data to consider in reflecting the inertia of the human being, not only in the presence of noise, but in situations of subjugation and violence which use the power of sound (Forster, 2009, p. 268). However, music can also be used to express the desire that women have to get rid of these stereotypes. To Serafina Blasco music causes and express emotional states regardless of individualism. An personal emotion musically expressed let to be personal to become universal, since the listener can see him or her reflected in similar emotions (Blasco, 2002, p. 77). Through music, women are empowered to share with others what they think about their condition as women in society. In 2000, Rita Lee and Zélia Duncan composed the song *Pagu*, song inspired in one brazilian feminist activist in the early twentieth century, Patrícia Galvão Rehder. Here is an excerpt: "My strength is not gross, I'm not a nun or a bitch / Because not every witch's hump, not all Brazilian women are ass / My chest isn't of silicone, I'm much more macho that many men" (Rita, 2014).

Another example of female musical expression against the subjugation of women is *Desconstruindo Amélia* (Deconstructing Amelia), composed by Pitty and Martin (2008). The music is about a woman who opposes to women's oppression system, she questions gender roles and discovers that she has desires and rights and gets rid of the stereotype of Amelia and the social judgment, demanding equality and dignity: "It is late, everything is right / Everything put in its place / Son sleeps, she gets the uniform / everything ready for when she wakes up / the opportunity made her gifted / she was educated for care and serve / usually she forgets herself / Always the last one to leave / despite so much master degree / Wins unless the boyfriend / And doesn't understand why / There's talent juggler / She is many ones, if you want to know / Today at thirty she's better than eighteen / Not even Balzac could predict / After home, work and children / she still goes to shake in the night / disguises and move on / Every day until be tired / and suddenly she decides then change / turn the table, took the game / Insists on caring herself / not maidservant, nor object / She's doesn't want to be another anymore / Today she is one too" (Pitty, 2014).

However, it is not just women who use music to protest about gender violence and the condition of female subordination in culture and society. Music educates people's sensitivity and somehow modifies social behaviour (Blasco, 2002, p. 597). Some men also sing to this cause, as in *Fiz uma Canção Pra Ela* (I made a song for her), composed in 2011, by Fernando and Anitelli Galldino: "I made a song for her / In the most beautiful translation / Of equality and autonomy / To your body and heart" (O Teatro Mágico, 2014). Human social dimension is reflected in the historical and geographical context in which the song is originated, which enables the individual to recognize himself within a particular culture with its own peculiarities, the same way that helps to anchor their memories and the feeling of belonging to a person, a region, or a personal or social history in a given period (Leão, 2009, p. 350).

Brazilian culture is represented in its songs. Power hierarchies are present in various legal, religious, political, historical, scientific and psychological speeches and practices, creating inequalities between men and women,

between women and men and between men and men, still presents in the daily life and in the songs (Gebara, 2001). There are just a few songs that care about gender equity, with no perpetuation of violence and unequal gender roles.

### **The Influence of Music in Education Under a Gender Analysis**

What the songs as the ones here referenced represent to the independence, self-esteem and the developing knowledge of children? Whereas gender inequalities are present in various contexts, these are also present in several Brazilian songs that reproduce the contexts in which they are created. Thus, these songs reinforce gender stereotypes related to women, such as home care, and care of children and husband (Koller and Narvaz, 2006), always being from someone and for someone (Rios, 2005), submissive and dependent. Consequently, women are not related to work outside home, being very intelligent, have opinions or defending their rights. They're systematically subordinated in relation to men. Men, however, cannot cry or show affection, must be strong and cannot fail (idea of being a boss). Thus, gender stereotypes are restrictive and destructive for both men and women, generating inequalities and oppressions (Tyson, 2006). These papers were found in the surveyed songs and are found in several Brazilian songs, which reduces people's freedom to determine the way of people be and act (Bicalho, 2003).

Songs that stimulate the normative gender roles and inequalities between people become popular and accepted, although its contents. We must pay attention to the fact that gender inequalities, or in relation to disability, class, race/ethnicity, sexual orientation, and other (Forinash, 2006), are being communicated and transmitted from generation to generation by many Brazilian songs. According to Assmann and Sung (2000, p. 79) the culture in which we live in opens and closes the windows through which we see the world. It leads us to see certain aspects of reality and not see other; further leads us to not realize that we do not see these other aspects. As we are unaware that we do not see a particular aspect or part of reality, we believe that what we see is all the reality and all the truth.

Thus, as much in children's songs as in songs for adults, there is the message that the normative gender roles have to be followed, instead of stimulating people, especially girls and women to pursue their own interests and independence in their lives. History shows through discrimination that human dignity is not extended to women. The dignity of all human beings is an ethical and social goal (universalized human dignity) (Assmann and Sung, 2000). This lack of dignity is represented in the songs, including that ones that perpetuate violence against women.

The musical repertoire should create opportunities and foster independence, self-esteem, the potential of each person, and not otherwise. We need to understand the situations of suffering and oppression that girls and women are affected daily and, through the theoretical framework of gender, we can break this domination. Knowing the gender instrumentals and having learning spaces are strategic elements of political and social equality that women still need to learn, know and reframe (Paixão, 2014, p. 24).

Thus, Gender Studies contribute to a more human, equitable and solidarity education. Hugo Assmann and Jung Mo Sung (2000) emphasized the importance of educating for solidarity, reducing gender inequalities, promoting solidarity sensitivity, which is a way of knowing the world that born of the encounter and recognition of the human dignity of who are inside - and - outside the social system; a knowledge marked by an affection, empathy and compassion (feeling on your skin another's pain) Therefore, it is a knowledge and sensitivity that are committed, living the interdependence and mutual recognition of an existential, visceral way, and not only intellectual (Assmann and Mo Sung, 2000, p. 134).

We must therefore question the sexist models of social relations and gender inequalities, seeking more equitable social relations (Ruether, 1993), fair and solidarity that recognize the value of each one and every one, deconstructing the normative gender roles, often oppressives (Gebara, 2001).

### **Conclusion**

Brazilian songs reproduce the still sexist and patriarchal Brazilian context. And make clear the different roles, functions and duties of men and women, that are reproduced since childhood. Ideas that girls need to take care of household chores and their bodies, making it more beautiful to get a wedding and having children, always being dependent and subjugated by their husbands, are passed by the songs, including with allusion to violence. Women are well represented as fragile, while men, on the contrary, are represented as having strength and power.



Music, as a form of culture, reproduces these inequalities and the portrayal of women as objects of beauty and sex and who do not have their wishes respected. Some songs configured evidences of violence against women and appear since in children's songs and in a more direct way on adult's songs, where physical violence is evident. It thus becomes urgent to deconstruct these gender roles and these oppressive images that are encouraged in children.

For a more inclusive education, that aims independence, freedom of choice, respect and dignity of children, it is necessary a more critical look at the Brazilian songs. Gender Studies contribute to education and to a analysis of Brazilian music. Gender inequalities represented by songs oppress girls and boys, delimiting the areas and how they should act, diminishing their potential and affecting mainly women, by stimulating ideas of submission. An education that respects individuality, differences, freedom, children's desires and dignity is fundamental to a healthier, more independent and solidarity development, being necessary to rethink the songs that are being heard.

## References

- Almeida, T. M. M. (1998). *Quem canta seus males espanta*. São Paulo: Caramelo.
- Assmann, H. & Mo sung, J. (2000). *Competência e sensibilidade solidária*. Petrópolis: Vozes.
- Bicalho, E. (2003). Correntes Feministas e abordagens de gênero. In SOTER (Org.), *Gênero e teologia: interpelações e perspectivas* (pp. 37-50). São Paulo: SOTER/Paulinas/Loyola..
- Blasco, S. P. (2002). *Compendio de Musicoterapia*. (vol. I). Barcelona: Herder.
- Blasco, S. P. (2002). *Compendio de Musicoterapia*. (vol. II). Barcelona: Herder.
- Forinash, M. (2006). *Feminist Music Therapy Supervision*. In S. Hadley. (Ed.), *Feminist perspectives in music therapy*. Gilsum: Barcelona Publishers.
- Forster, S. C. (2009). *Música: tortura e maus-tratos*. In E. R. Leão (Org.), *Cuidar de Pessoas e Música: uma visão multiprofissional*. São Caetano do Sul: Yendis.
- Garcia, R. M. R. & Marques, L. A. (1992). *Brincadeiras Cantadas*. (4th ed.). Porto Alegre: Kuarp.
- Gebara, I. (2001). *Rompendo o silêncio: uma fenomenologia feminista do mal*. Petrópolis: Vozes.
- Koller, S. H. & Narvaz, M. G. (2006). Família e patriarcado: da prescrição normativa à subversão criativa. *Psicologia e Sociedade*, 18, 49-55.
- Krob, D. B. (2010). *Comigo não, violão! Musicoterapia com Mulheres em Situação de Violência Doméstica*. Trabalho de Conclusão do Curso de Bacharelado em Musicoterapia. São Leopoldo: Faculdades EST.
- Leão, E. R. (2009). Por uma compreensão e inserção da música no cuidar. In E. R. Leão. (Org.), *Cuidar de Pessoas e Música: uma visão multiprofissional*. São Caetano do Sul: Yendis.
- Mário L. Ai que saudades da Amélia. In Vagalume: Letras de Músicas. Disponível em: <<http://www.vagalume.com.br/mario-lago/ai-que-saudades-da-amelia.html>>. Acesso em: 03 mar 2014.
- Mcclellan, R. apud Leão, E. R.; Silva, M. J. P. da. Sobre o cuidar ampliado. In: E. R. Leão. (Org.), *Cuidar de Pessoas e Música: uma visão multiprofissional*. São Caetano do Sul: Yendis, 2009.
- Narvaz, M. G. (2006). A história das desigualdades de gênero. In: T. Negrão (Org.), *Violência contra a mulher: As políticas públicas de âmbito municipal*. Cachoeirinha: Prefeitura Municipal: Coordenadoria Municipal da Mulher.
- Noel, R. Mulher Indigesta. In Vagalume: Letras de Músicas. Disponível em: <<http://www.vagalume.com.br/noel-rosa/mulher-indigesta.html>>. Acesso em: 07 mar 2014.
- O Teatro Mágico. Fiz Uma Canção Pra Ela. In Vagalume: Letras de Músicas. Disponível em: <<http://www.vagalume.com.br/o-teatro-magico/fiz-uma-cancao-para-ela.html>>. Acesso em: 11 mar 2014.
- Paixão, M. E. L. (2014). Narrativas de vida: mulheres que aprendem e transformam suas histórias. In: A. S. Musskopf & M. Blasi. (Orgs.), *Ainda feminismo e gênero: histórias, gênero e sexualidade, sexismo, violência e políticas públicas, religião e teologia*. São Leopoldo: CEBI.
- Pitty. Desconstruindo Amélia. In Vagalume: Letras de Músicas. Disponível em: <<http://www.vagalume.com.br/pitty/desconstruindo-amelia.htm>>. Acesso em: 03 mar 2014.
- Ríos, M. L. y de los. (2005). *Los cautiverios de las mujeres: madresposas, monjas, putas, presas y locas*. (4th ed.). Coyoacán: Universidad Nacional Autónoma de México.
- Rita Lee. Pagu. In Vagalume: Letras de Músicas. Disponível em: <<http://www.vagalume.com.br/rita-lee/pagu.html>>. Acesso em: 11 mar 2014.
- Ruether, R. R. (1993). *Sexismo e Religião: rumo a uma teologia feminista*. São Leopoldo: Sinodal/IEPG.
- Saffioti, H. I. B. (2001). Contribuições feministas para o estudo da violência de gênero. *Cadernos Pagu*, 16, 115-136.
- Saia Rodada. Tapa na cara. In Vagalume: Letras de Músicas. Disponível em: <<http://www.vagalume.com.br/saia-rodada/tapa-na-cara.html>>. Acesso em: 28 fev 2014.
- Scott, J. (1996). *Gênero: uma categoria útil para a análise histórica*. Recife: S.O.S. CORPO.
- Teixeira, M. (2008). Oliveira. Desigualdades salariais entre homens e mulheres a partir de uma abordagem de economistas feministas. *Niterói*, 9, 31-45.
- Tyson, L. (2006). *Feminist criticism*. In L. Tyson. *Critical theory today: a user-friendly guide*. New York: Routledge.
- Villa-lobos, H. (1941). *Guia prático: estudo folclórico musical*. São Paulo/Rio de Janeiro: Irmãos Vitale.

Zeca Pagodinho. Faixa Amarela. In Vagalume: Letras de Músicas. Disponível em: <<http://www.vagalume.com.br/zeca-pagodinho/faixa-amarela.html>>. Acesso em: 09 mar 2014.

INTE 2014

# Discursivity and creativity: Implementing Pigrum's multi-mode transitional practices in upper division creative production courses

Michael Filimowicz<sup>a\*</sup>, Veronika Tzankova<sup>b</sup>

*Simon Fraser University, Surrey V3T 0A3, Canada  
Simon Fraser University, Vancouver V6B 5K3, Canada*

---

## Abstract

This paper discusses the practical implementation of Derek Pigrum's multi-mode model of transitional practices (2009) within the context of upper division production courses in an interaction design curriculum. The notion of teaching creativity was practically and theoretically connected to a general notion of "discursivity." The concept of "discursivity" was related to students' overall ability to discuss, describe, and engage in a conversation about their creative work. We present a study of (1) the ways in which Pigrum's (ibid) transitional modes can be translated into a variety of course activities, and (2) discuss challenges and outcomes of directly engaging student discursivity in their creative output.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** Teaching creativity; multi-mode transitional practices; discursivity; art and design education

---

## Introduction

Teaching creativity is a challenging task. On numerous occasions, we have heard students majoring in Interactive Arts and Technology complain: "Everybody tells us to be creative, but nobody teaches us how to be creative." Instructional staff members at the School of Interactive Arts and Technology (SIAT) at Simon Fraser University (SFU) find themselves under increasing pressure to find more 'practical' parameters of teaching and encouraging creativity. To date, Derek Pigrum's *Teaching Creativity: Multi-mode Transitional Practices* (2009) is the most consistent, book-length theorization on the philosophical and practical aspects of teaching creativity. The research presented here – conducted across two semesters and four courses – constitutes a systematic exploration of applying Pigrum's model to assignments in upper division courses focusing on interactive narrative (IAT 313 Narrative and New Media), sound design (IAT 340 Sound Design), and new media & video production (IAT 344 Moving Images; IAT 443 Interactive Video). Extending on Pigrum's multi-modal model, we also implemented the notion of "discursivity" as an essential practical and theoretical foundation of creative practices. We define "discursivity" as students' overall ability to discuss, describe, and engage in a conversation about their creative work as well as situate their creative practices within theoretical and conceptual frames.

---

\* Corresponding author. Michael Filimowicz. Tel.: +1-778-782-8178.  
E-mail address: mfa13@sfu.ca, vkt@sfu.ca

## Research questions and methodology

In order to conceptualize the relationship between discursivity and creativity (as a creative and learning outcome), we formulated the following research questions at the beginning of our study:

In what ways can discursivity be implemented into production courses and contribute to students' practice and critical understanding of their creative work?

How translatable is Pigrum's multi-mode model of transitional practices to the kinds of coursework SIAT students undertake in upper division creative production courses?

Will the application of the pedagogic pattern of rich questions and dialogue, combined with discourse-engaging reading and writing activities improve the discursive and creative skills in upper division SIAT students?

In particular, will such a pedagogic intervention result in improved abilities of students to create discourse around their work?

The study was conducted across two semesters, structured as Phase 1 and Phase 2. To address the issues formulated in the research questions, we conducted student surveys for the two courses of investigation during Phase 1 - IAT 340 Sound Design and IAT 344 Moving Images. The surveys were conducted online, using SFU's web survey tool. In Phase 1 of our project, we noticed a tendency to use the web surveys as an opportunity to complain about work load, TA attitudes, and other issues which were not directly related to the objective of the surveys. Accounting for this problem, we decided to analyze the efficiency of the instructional methods in terms of practical results and students' active performance (meaning quality of students' productions) during the second phase of our report (Phase 2). In order to maintain research objectivity, we measured the quality of students' productions against the following criteria:

Internal evaluation of learning processes (performed by Teaching Assistants)

External evaluation of students' projects (a person outside SFU community, but within the field of creative artistic practices was invited to express opinion about students' work)

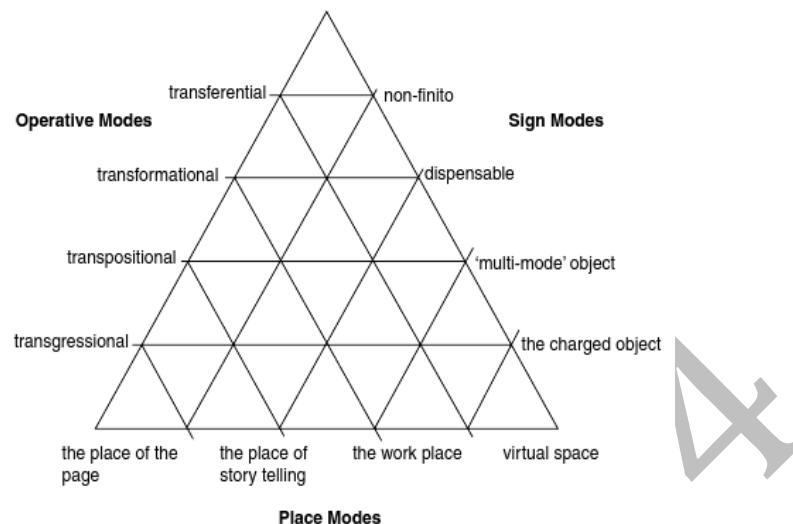
Evaluation of production qualities of students' projects between IAT 344 Moving Images Fall 2012 and Spring 2013 iterations of the course

Comparison of content and formal qualities of students' artistic statements between IAT 340 Sound Design in Fall 2012 and IAT 313 Narrative and New Media in Spring 2013

The above four criteria combined together address each of the research questions through a mix of different aspects and perspectives. In addition, these criteria interrelate in their ability to evaluate not only the teaching and learning objectives of the courses under investigation, but also the level at which these objectives were achieved by the students.

## Outline of Pigrum's multi-mode teaching and learning transitional practices

Building on the foundational work of Donald Winnicott, who elaborated the classical theories of the transitional object and experiences in earlier psychoanalytic and developmental discourses – most famously, the theory of the “security blanket” as the space of negotiation between self and other differentiations in the child, the imaginary object that forms a bridge between inner subjective space and external reality– Pigrum's (2009) notion of “transitional practices” distinguishes between three foundational meta-modes of teaching and learning practices, which are then subdivided into lower-level patterns of interacting and overlapping practices. The three foundational meta-modes are: (1) Sign modes; (2) Operative modes; and (3) Place modes. These are briefly discussed in the following sections.



1. Fig. 1. Pigrum's suggested multi-modes of teaching and learning. Note. Adapted from "Teaching Creativity: Multi-mode Transitional Practices", by D. Pigrum, 2009, London; New York: Continuum.

These three meta-modes are generally related to language and culture (the Sign mode), pragmatics (the Operative mode), and situatedness (the Place mode).

### 1. Sign modes

This meta-mode treats different types of signs as representational spaces which embody multiple, complex, and imbricate significations. Pigrum identifies four sub-levels of this mode: non-finito sign use, "ready-to-hand" dispensable surface of inscription, the "multi-mode" object, and the "charged" object. The non-finito sign use includes practices such as: approaching ideas and definition with an open mind; modification of creative and progressive practices; leaving space for doing, undoing, and redoing; allowing for the inventive power of indeterminacy; and, implementing sketches as a draft of a thought. The "ready-to-hand" dispensable surface of inscription focuses on the pragmatic logistics of learning and advocates for: working on whatever happens to be there; allowing for things displayed by both "us" and "others"; and, a free play of or between absence and presence. The "multi-mode" object focuses on blurred modes of expression which transgress linguistic or visual representations. These may include: shifts between different modes of representation, such as writing, diagramming, and drawing; and, the inclusion of draft-like entities that involve the use of more than one sign mode. The "charged" object mode focuses on identifying the "charge" that objects have for us. These "charges" may serve like clues that can be followed, evolved, confronted, or conformed to.

### 2. Operative modes

The operative modes of teaching and learning encapsulate practices which support a journey through the unknown and the transgression of limiting boundaries. The operative modes include: transferential mode, transformational mode, transpositional mode, and transgressional mode. The transferential mode is used in the recording of artifacts of particular interest that can be carried over to present creative activity. The recording can be a copy, note, or records (referential drawings) which serve as a stock of accumulated memories. The transformational mode emphasizes the importance of teaching and learning practices through the conversion of one form into another. Activities may include: separating and combining forms, displacing activities, and learning

through getting lost. The transpositional mode focuses on the importance of the process of learning on formation of ideas. In this mode, there is no time for reifying operations, where all essential information is highly condensed or contracted and thus constructs a higher order of integration, condensation, and displacement. The transgressional mode is the mode of undoing based on things that are not permanently anything. This mode signifies the transgression of the figurative in the direction of the figural.

### *.3. Place modes*

The modes of place focus on the things that can be learned from the idiosyncratic structure and transparency of the places that surround us. The place modes include: the ontology of the workplace, the place of the page, the place of the story, and the mode of the virtual space. The ontology of the workplace connects the value of being to its situation – to the stable and presentable determination of a locality and the topos of a territory (Derrida via Pigrum, 2009). This mode implies a focus on situations where there are complex patterns to be perceived and where recognition of these patterns enforces certain moves and procedures for solution. The place of the page mode juxtaposes different learning outcomes from various note-taking practices – typing versus handwriting, for example. The place of the story mode discusses how practices are always communicated through stories and the importance of keeping a record of creative and research endeavors as a form of storytelling. The mode of virtual space engages with the shift in sensory and interactive modalities of encountering in virtual environments. Pigrum argues that virtual spaces impose and result in sadness and isolation. Here, we want to mention that there is substantial room for revision in Pigrum's theoretical framing of virtual space. The online sociality of "digital natives" is not explored or understood in a contemporary learning scene. What is of importance is to support online student communities with in-person (in real space) meetings to nurture communication within groups and teams.

### **Mapping Pigrum's modes to coursework**

The teaching and learning methods implemented in the courses included in this study were aimed at enforcing discursive practices that supported students' creativity in their coursework. We introduced new teaching and learning strategies to the courses which were derived from Pigrum's multi-mode transitional practices of teaching creativity. These teaching strategies are discussed throughout sections 4.1 -4.3 of this paper.

### *.4. IAT 313 Narrative and New Media*

IAT 313 Narrative and New Media is an upper division course which aims at exploring narrative strategies in multimedia environments.

#### **Critical/ creative reading**

Students were assigned five "dense" essays and were expected to "steal" and apply ideas (hypothetically, as a creative brainstorming exercise), toward revising their first narrative project. Ten essays were posted online and students were asked to choose five of these as fertile territory in which to creatively steal ideas (rather than regard them as texts that they would have to write research papers about). This activity corresponds to Pigrum's non-finito sign use, transformational mode, transgressional mode, and place of story teaching and learning practices.

#### **Remediation**

Students were asked to transform a linear narrative (short story, video or comic) into a non-linear narrative – in our case, a video game. Students were also assigned two major (dense, high page count) readings on the relationship between game play and storytelling, and asked to produce visual materials that prototype what their short narrative might look like as a video game. This activity corresponds to Pigrum's non-finito sign use, multi-mode object, transformational mode, transgressional mode, and place of story teaching and learning practices.

### **Draft narrative**

Students were expected to submit a draft of their first major narrative project (linear narrative) and receive feedback from the instructor, teaching assistants and their peers. This activity was not graded on results, but on effort (on time submission, completeness). Students were then asked to revise the story based on the feedback they receive. This activity corresponds to Pigrum's transgressional mode of teaching and learning practices.

## **4.2 IAT 344 Moving Images**

IAT 344 Moving Images is a production course which provides the fundamentals of digital video production including: visual theory, composition, lighting, sound, editing, and continuity among others.

### **Peer feedback groups**

Peer feedback groups are formed by four or five students with the aim of organizing online peer evaluation micro-communities. The objective of these micro-communities is the assessment and provision of mutual feedback on each peer-student's work. Prior to forming the groups, students were provided with materials to direct them toward giving meaningful, constructive, and usable feedback. Students were required to submit proof of giving feedback to their peers. The proof consisted of screenshots of the feedback that has been sent to fellow peers. Such feedback organization corresponds to Pigrum's place of the page and teaching and learning practices.

### **A large variety of web-based sources that expand on lecture content**

These were sources available via the online platform for the course –WebCT. The main purpose of the materials was to further elaborate and expand on weekly lecture content in terms of both (1) practical skills, and (2) theoretical knowledge/ conceptualization. This activity corresponds to Pigrum's multi-mode object, place of story, and mode of virtual space teaching and learning practices.

### **Mandatory credit film journals**

In Phase 1 of our project, this assignment was optional (extra credit). In Phase 2, students were asked to read writings and interviews with four major filmmakers - Cronenberg, Scorsese, Fellini, Renoir. This activity corresponds to Pigrum's multi-mode object, place of story, and mode of virtual space teaching and learning practices.

### **Semi-weekly intensive feedback sessions on staged deliverables (6 in total)**

Blended mode instruction was utilized, off-loading much lecture content to WebCT (SFU's course management system) to free up space for individual, one-on-one (team, instructor, and teaching assistant) feedback sessions on deliverables throughout the semester, typically lasting for 30 minutes each. Discursivity employed here refers not only to writing and reading, but also to a dialogic back-and-forth core, in which students articulate and justify their creative decisions. The meetings were set up via Doodle.com and aimed at reviewing the weekly or biweekly assignment deliverables. This feedback organization corresponds to Pigrum's non-finito sign use, and multi-mode object, transformational mode teaching and learning practices.

### **Film blog**

Mirroring professional practice, students were required to create film blogs documenting their process of making throughout the term, combined with such elements as documenting photography, artist statements, adventures in the field, technology used, research in film precedents, and aesthetic ideas. This activity corresponds to Pigrum's non-finito sign use, multi-mode object, transformational mode, ontology of the workplace, place of story, and mode of virtual space teaching and learning practices.

### **Rehearsal footage & draft version of individual video**

Students intentionally produce “throw-away” footage. They shoot their entire team video seriously but without their actors, using just themselves. They act, light, edit, and shoot their video as a rough draft so that feedback can be given on their overall skills before they engage with their final video version. In addition, for their individual video, they submit a draft for feedback and revision. This activity corresponds to Pigrum's transgressional mode of undoing.

#### *.5. IAT 443 Interactive Video*

This upper-division production course explores interactivity through the medium of moving images and video. To support creative learning, we included the following discourse-based elements:

##### **Social issue documentary**

The first project was reformatted to be an online interactive (web-based) documentary on any social issue of students' choice. This format of the assignment situates the project in a general social discursive field. In the past, student projects varied significantly in terms of concept and execution. This change located everyone's project in the same general conceptual field of societal issues. This activity corresponds to Pigrum's and mode of virtual space practice.

##### **Documentary and interactive documentary theory**

The focus of this project allowed for in-depth readings in key documentary and interactive documentary theory (critical reading). These readings develop key modalities (typologies) and students were asked to state which ideas in the texts were closest to their own strategies and intent. This activity corresponds to Pigrum's multi-mode object, transformational mode, and mode of virtual space teaching and learning practices.

##### **Presentations on documentary and social issue concept**

Student teams had to present their documentary and conceptual framework to the class for critique, and a Q&A session. This activity corresponds to Pigrum's non-finito sign use teaching and learning practice.

##### **Faux kickstarter page**

Mirroring contemporary professional practices of independent production with respect to potential funding (crowd funding), students had to develop a faux Kickstarter page (articulating and pitching their project as a potential kickstarter project). This activity corresponds to Pigrum's ontopology of the workplace, and mode of virtual space teaching and learning practices.

##### **Public art calls**

For project 2, which has always been an interactive audiovisual installation (spatial interaction), students were given a multitude of actual public art calls for site-specific installations (from professional sources), and required to articulate their project as a response to an actual site, and a prototype of a project that could work in the specified real space, according to the stated requirements of the call. This activity corresponds to Pigrum's transferential mode, transformational mode, and ontopology of workplace teaching and learning practices.

##### **Installation presentations**

Presentations of final projects have always been required; however, the newly-introduced public art situatedness added a professional aspect and a major discursive element (responding to a real site with limitations, scope, aims etc.). This activity corresponds to Pigrum's non-finito sign use, and ontopology of workplace teaching and learning practices.



### **Project a video image on an object**

Students are asked to bring in footage to project video onto physical objects which alter the meaning of the footage. This activity corresponds to Pigrum's "ready-to-hand" dispensable surface of inscriptions, transpositional mode, and mode of virtual space teaching and learning practices.

## **Results**

### *.6. Internal evaluation*

The teaching assistant for IAT 443 Moving images expressed a positive attitude toward the learning results induced by the instructional changes introduced to the course. It is important to be emphasized that the teaching assistant for the course has also previously taken the course as a student. Based on her experiences both as a teaching assistant and a previous student, the internal evaluator stressed the positive changes in students' performance that the new instructional methods have resulted in.

### *.7. External evaluation*

The external evaluation is important as it indicates the level at which SIAT students' active performance is compatible outside academic environments. The external evaluation conducted for IAT 344 Moving Images expressed a very positive opinion in regard to students' production.

### *.8. Evaluation of production qualities of students' final team videos for IAT 344 Spring 2013 and IAT 344 Fall 2012*

We received 15 final video projects for IAT 344 Spring 2013 and 13 for IAT 344 Fall 2012. To compare the production qualities, we used the following evaluation table:

2. Table 1. Evaluation criteria for students' work.

CONCEPTUAL (concept, narrative structure & elements)	/2.5
TECHNICAL (production values, efforts and techniques)	/2.5
CREATIVE (originality and innovative ideas)	/2.5
OVERALL IMPRESSION	/2.5
Total	/10

After assigning to each video a value out of 10, we calculated an average for each iteration of the course. The average for the final team videos for IAT 344 Spring 2013 was 8.46/10, while the average for IAT 344 Fall 2012 was 7.93/10. The increase in the average from 7.93 to 8.46/10 corresponds to increased quality of students' active performance. We partially assign the increased quality of student production to (1) the introduction of mandatory film journals (Spring 2013) as opposed to optional (Fall 2012), and (2) increased and refined volume of engagement with discursive practices (reading, writing, and audio-visual materials).

### *.9. Comparison of themes in students' artistic statements between IAT 313 Narrative and New Media in Spring 2013 and IAT 340 Sound Design in Fall 2012*

The incentive for students enrolled in IAT 313 Spring 2013 to write an artist statement on their final project was 1 pt. of extra credit. Therefore, a minority of students completed this exercise. We collected 22 artist statements out of 72 students enrolled – a correspondence of 30.5% of the total class enrolment.

For IAT 340 Fall 2012 the artist statements were mandatory.

We conducted thematic analysis of all artistic statements. Thematic analysis refers to "the process of analyzing data according to commonalities, relationships and differences across a data set. The word 'thematic' relates to the aim of searching for aggregated themes within data." (Gibson & Brown, 2009, para. 1)

We identified the following repetitive themes:

Emotions associated with production

Self-reflexivity

Creative styles of verbal expression

Awareness of personal perspectives, approaches, preferences, aesthetics

What we indicated as a difference between artistic statements obtained from IAT 313 and IAT 340 is the elevated level of self-reflexivity and analytical depth reached by IAT 313 students. Where the majority of artistic statements from IAT 340 incorporate description as a means of conveying artistic experience, artistic statements from IAT 313 are distinguished by rigorous writing, and an almost deconstructional approach to personal artistic practice. We also noticed that some students from IAT 313 tried to implement strategies from the course' materials into the graphic design of their artistic statements and thus non-verbally communicate their artistic nature within an otherwise verbal assignment. Again, we partially assign this progress in artistic practices, thinking, and expression to the increased and refined volume of engagement with discursive practices (reading, writing, and audio-visual materials) during the second phase of this teaching and learning project.

## Conclusions

Pigrum's multi-mode transitional practices of teaching creativity (2009) are highly adaptable to a variety of learning situations. With a generalizable field of twelve conceptual themes and practical parameters to explore, it is not difficult to find potential mappings and modifications to assignments that enrich the creative output of students in upper division production courses. This application of theory to pedagogy resulted in a higher number of portfolio quality student work produced in the courses under investigation when compared to previous iterations of the same courses. Thematic analysis of students' writing further revealed improvements in overall verbal and written articulation of their work, herein defined as discursivity, or the ability to create and sustain discourse around their creative output.

## Acknowledgements

The research presented in this paper has been realized with the financial support of the Teaching and Learning Centre at Simon Fraser University.

## References

- Gibson, W. J., & Brown, A. (2009). 8 Identifying themes, codes and hypotheses. In *Working with qualitative data* (pp. 127–145). Los Angeles, [Calif.]; London: SAGE. Retrieved from <http://srmo.sagepub.com/view/working-with-qualitative-data/SAGE.xml>
- Pigrum, D. (2009). *Teaching creativity multi-mode transitional practices*. London; New York: Continuum.

# Discussing the importance of teaching ethics in education

Nur Yeliz Gülcan\*

Faculty of Education, Girne American University, University Drive PO Box 5, Karaoglanoglu, Kyrenia via Mersin 10 Turkey

## Abstract

Today, ethics has an important place in all areas of life. Education is also a fundamental process of human life. Therefore, in education ethics has a very important and effective role. In order to be a good human, ethics should be placed as a course in educational system. In this paper, it will be discussed the ethics education in schools. In doing this, it will be also discussed why teaching ethics is important in education. Before discussing this issue, it is necessary to define what ethics is and what education is.

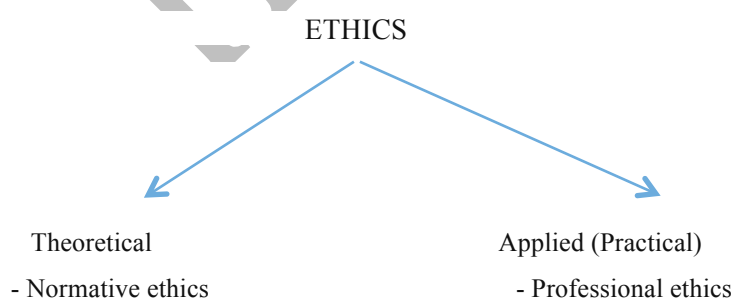
© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** Education, Ethics, Being Human, Values, Ethics Education, Education System

## Introduction

In our present age, ethics has an important place in all areas of life. Ethics has also become important in education, because education is a fundamental process of human life. Therefore, ethics is very important subject in education. We can easily reach all knowledge by technology. In education using technology reveals some ethical problems such as plagiarism. In order to understand the importance of ethics, ethics should be placed as a course in educational system. Before discussing this issue, it is necessary to define what ethics is and what education is.

Ethics is the most important and functioning branch of philosophy in today. In general, ethics is moral philosophy. The term ethics is derived from Greek term *Ethos* which means custom, character. It is related to our values and virtues. Therefore, our actions and our experiences in everyday life are the subjects of ethics. We have the capacity to think about our choices, so we are responsible for all our decisions and actions. In addition to this, it can be said that ethics is the study of what is wrong and what is right. Good-evil, right-wrong, virtue- vice, justice and injustice are some ethical concepts. Ethics is divided into two parts: theoretical ethics and applied ethics. Theoretical ethics includes normative ethics, descriptive ethics and met ethics. Applied ethics refers to professional ethics.



\* Corresponding author. Tel.: +90-535-5934555  
E-mail address: nuryeliz@gmail.com

- Descriptive ethics
- Meta ethics

Normative ethics is the study of what makes actions right and wrong. Meta ethics is about the theoretical meaning and reference of moral propositions. Descriptive ethics is about facts. It examines ethics from observations of actual choices made by *moral agents* in practice

Applied ethics examines the particular ethical issues of private and public life. Professional ethics is one of the important branches of applied ethics. In general professional ethics can be defined as standards or codes to provide people to guidance in their professional lives. In general, there are four basic principles in ethical codes

- 1- Honesty
- 2- Confidentiality
- 3- Conflict of interest
- 4- Responsibilities

## Education

In general sense, education is any act or experience that has a formative effect on the mind, character or physical ability of an individual. Etymologically, the word education is derived from the Latin *Educo* which means educate, train. Education is a process of learning and acquiring information. It means teaching and learning. Education affects on human mind, character and physical abilities. The history of education begins with the human history itself. Education is also a way to become civilized human individuals and it maximizes human potential. Culture and cultural heritage can be transmitted by education, because the main occupation of man is to pass knowledge, skills and attitude from one generation to other.

In ancient Greece some philosopher's views of education such as Socrates, Plato and Aristotle contribute to the development of our present educational system. In general, they all believe that the purpose of education is that improve humankind. Socratic Method is still used modern educational practices. In this method, teachers ask some questions to improve the intellectual abilities of students and students try to answer these questions by using their reasons.

Today's educational theories are based on the philosophies of these philosophers.

Plato, who was the founder of Idealism, claimed that the aim of education was to develop individual's abilities to better serve society. He also was the founder of Academy, the first university of the world. For him both men and women had the right to have education. He claimed that there were different stages of education. According to him, education was a key element for a society.

On the other hand, Aristotle who was the father of realism believed that only citizens could be educated. He believed that educated person was fulfilled person. He defended theoretical, practical and technical education. Education helps development of bodily and mental faculties.

In ancient Greece, education was seen as a function of the state and the aim of it is to serve the ends of state. Today, education also serves both the needs of state or society and citizens. Therefore, education is important for us. It builds character, gives knowledge and helps progressing of state. Education makes a man complete and it also plays an important role in developing society and state. Schools are basic frameworks of education. School helps children to become a good citizen and human being. This is possible only by ethical education, so teaching ethics in school is important.

## The role of ethical education

Why Ethics is important and why ethics should be taught in schools? What kind of ethics should be taught in

schools? In this chapter I will try to discuss this issue.

Ethics education can be divided into four stages:

- 1-Ethics education in family
- 2-Ethics education in school
- 3-Ethics education in university
- 4- Ethics education in business

In family, ethics education should focus on descriptive facts. Children observe their parents' (role models) ethical behaviours and they learn social facts about ethical behaviour.

In school, students learn what is right and what is wrong. This is a value education or character education. In educational systems, generally ethics is associated with religion. Therefore, instead of ethics course students take religious course. However, students should learn values clarification, and making ethical decision. In addition, school fosters to students become trustful, responsible, and just person. Ethics in school can benefit to this.

In university, ethics should be professional ethics. Only some students can take ethics course related to their professions in universities, because in universities ethics does not give as a course in all departments. This kind of ethical education provides students to realize what is right, make good decisions about ethical issues in their professions. In addition, students learn evaluate different moral standpoints.

In business, people learn some ethical codes about their occupations. This kind of ethics tells how people should act in business life.

In Turkish educational system, in general ethics is associated with religion. These are two intermingled terms. Therefore, in educational systems instead of ethics students take religious culture course. Until university students do not take an ethics course in their schools. In universities, not all departments have an ethics course only a few departments have an ethics course like philosophy, psychology, psychological guidance, business faculties etc. In primary, secondary and high schools students take only religious culture and moral course. Moral and ethics are always mixed together, but they refer different subjects. Before as we said ethics is derived from Greek term *Ethos* which means custom, character. On the other hand, morality is a set of beliefs and practices about how to live a good life. Morality comes from the Latin term **Mores** which means custom and manner. The terms ethics and morality are often used interchangeably. They have same roots. Their meanings are the same; custom. However, there is a distinction between them in philosophy. This distinction can be stated as morality is *first-order* set of beliefs and practices about how to live a good life, ethics is a *second-order*, conscious reflection on the adequacy of our moral beliefs.

In other words, *Morality* is used to refer to what we would call *moral conduct* while *ethics* is used to refer to *the formal study of moral conduct*. It can be claimed that morality is related to praxis, but ethics is related to theory.

Gardelli, Alerby and Perssons present three arguments about why ethics should be taught in schools. These arguments are socialization argument, the quality of life argument and the tool argument. According to socialization argument school should help students to become good citizens. To do this ethics is necessary in schools. The second argument, the quality of life argument claims that school helps to students to live a good life. "school has an obligation to foster the students to become persons who act in a morally correct way" This is possible by ethics in school (Gardelli, 2014: 19). And according to the last argument, the tool argument, "the students' results in other subjects would improve if the students had ethics in school". From these arguments, it can be concluded that ethics is necessary in schools because it provides a better life to students.

## Conclusion

In conclude, it can be claimed that education is also an ethical effort. Human beings can be either unfriendly or peaceful by education. The aim of ethical education is to provide people to make decisions by their free wills. You can teach norms easily, but you cannot teach easily to obey these rules unless you teach ethics. Therefore, teaching ethics has an important and necessary place in education. Students who graduated from universities may be well-educated persons in their professions but it is not enough. Aristotle also says, "Educating the mind without educating the heart is no education at all." I may close my remarks by quoting:

In USA, a high school director sent a letter to his teachers every year for opening ceremony. In this letter, he says:

I am one of the people who escaped a concentration camp. I have witnessed things that no human being should have ever seen: gas chambers built by highly trained engineers, children poisoned by well-educated doctors, babies killed by experienced nurses, women and children shot and burned by people who were high school graduate and post graduate. Therefore, I suspect education. My request from you is:

Help your students to become more civilized human individuals. Your efforts should not generate educated monsters to become skilled psychopaths. Reading, writing, mathematics is only important when they help your children to become more human. (Aydın, I.)

## References

- Abbott, Andrew. (1983), "Professional Ethics" in *the American Journal of Sociology* 88 (5), pp. 855-885.
- Aristotle, (1996), "Nicomachean Ethics", *Classics of Moral and Political Theory*, ed. By Micheal L. Morgan, Hackett Publishing Company: Indianapolis/ Cambridge.
- Aydın, I. *Etik Kültürün Geliştirilmesinde Eğitimin Rolü: Etik Eğitimi Politikaları*, [http://www.mta.gov.tr/v2.0/kurumsal\\_yapi/EtikKomisyonu/etik-liderlik/15.pdf](http://www.mta.gov.tr/v2.0/kurumsal_yapi/EtikKomisyonu/etik-liderlik/15.pdf)
- Bailey, Barrow, Carr and McCarthy (Ed). (2010), *Philosophy of Education*. London: Sage Publications
- Barnes, J. (Ed). 1995, *The Cambridge Companion to Aristotle*, Cambridge: Cambridge University Press.
- Davidson, T. (1900). *Aristotle and the Ancient Education Ideals*. New York: Charles- Scribner's.
- Dunn, S. (2005). *Philosophical Foundations of Education*. New Jersey: Pearson.
- Gardelli, Alerby, and Persson (2014). "Why Philosophical Ethics in School: Implications for Education in technology and in General" in *Ethics and Education*, Vol. 9, No:1, pp. 16-28. Routledge: Taylor& Francis Group.
- Ornstein, Allan C. & Levine, Daniel U. (1981) *An Introduction to the Foundations of Education (2nd ed)*, Boston: Houghton Mifflin.
- Plato, (2000). *The Republic*, University Press: Cambridge.

# Distance education for health professions' students

Anna Siri<sup>a\*</sup>, Marina Rui<sup>b</sup>

<sup>a</sup>University of Genova, School of Medicine, Via L.B.Alberti 2, 16132 Genova, Italy

<sup>b</sup>University of Genova, DCCI, Via Dodecaneso 31, 16132 Genova, Italy

---

## Abstract

This paper concerns the use of Moodle 2 as a suitable tool to improve the online learning project for the Health Profession courses offered by the University of Genoa. The student syllabus requires attendance to formal lectures and practical training sessions. Some of the Health Profession courses of our University (e.g., nursing, physiotherapy, and radiology technologist) are taught at different venues across the Liguria Region to facilitate students' access to high education and enhance quality of life-long teaching programs at local health centers. Over the years, managing this complex teaching network has called for the development of new educational tools supported by AulaWeb, the Moodle environment of our University. At the beginning, teachers used AulaWeb merely for information storage. In this experimental project, we investigated how to make some courses more attractive by proposing them in a blended form. Eventually we managed to catch the students' attention also for courses offered totally online. This approach meets two relevant requirements, (a) to ensure consistency, compliance, and quality of teaching at all local centers, (b) to reduce travel expenses for teachers lecturing at different venues. Thanks to the new features of Moodle 2, such as tools to monitor conditioned assets and track the activities performed and/or completed by students, we could arrange online courses that also ensure access of students to attentive and prompt tutorial mentoring.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** E-learning; Higher education; Technology-enhanced learning

## 1. Introduction

The world of the health care professions is complex, for it includes twenty-two non-medical qualifications, each requiring a specific three-year degree to provide adequate skills, in accordance with the guidelines of the National Health System of Italy. The university degrees enjoy the common feature of being directly qualifying for the profession. Since 2001, these degrees have been grouped into four distinct classes (Nursing and Midwives Health Professions, Health Professions of rehabilitation, Technical Health Professions, Health Professions for the prevention).

The School of Medicine of the University of Genoa offers training programs in twenty health professions; some of the programs are available at different venues across the Liguria Region. This complex organization, which provides lecture hall education at eight training centers, has fostered the development of distance courses, thanks to the availability of AulaWeb, the Moodle-based platform of the University of Genoa. Our Faculty, which in the beginning was slow in taking advantage of AulaWeb, has progressed in recent years from using the platform as a mere repository of information, to the experimentation of blended courses, and finally to online learning. These developments has allowed combining the primary urge to ensure common, consistent programs at different premises with the need to control costs, which has been achieved by the reduction in teachers' mobility to the peripheral venues to carry out in person the educational activities.

---

\* Corresponding author: Mobile.: +39 328 4233341  
E-mail address: anna.siri@unige.it

On one hand, all the students of a given course receive the same educational lectures and teaching material for the course; on the other hand, the teachers can devote their time and care to the preparation of lectures and teaching material instead of traveling around the region. Local tutors offer support to students in order to pave the way for course attendance. There is recent evidence that distance learning can contribute to healthcare professionals' base and practice knowledge (Glen, 2006; Moule *et al.*, 2010). Distance learning can take a variety of forms including in nurse and allied health professional education: simulations of clinical scenarios (Tait *et al.*, 2008); internet based discussion boards; and role play (Nelson & Blenkin, 2007). It can also overcome barriers to the learning such as distance or geographical location and provide online communities of practice in circumstances where different factors make it difficult. It can also offer students to communicate ideas and to learn in different ways and can help introverts to take part. Finally, the intrinsic properties to the technologies used in distance learning allow students to experiment with the identity of "professional nurse or technician" in a safe environment where they can make mistakes without damaging patients. In this context, a significant role was played by our ICT offerings.

Online education tools have traditionally been organized and supported through learning management systems (LMSs) or content management systems (CMSs), such as mainly Blackboard and Moodle, because these systems offer opportunities for organization, efficiency, and security (DeSchryver *et al.*, 2009; Lee & McLoughlin, 2010). We chose Moodle as educational portal of all the Schools of our University about ten years ago over several Learning Management System (LMS) with similar features. Since then, Moodle has been seen more as an interactive service than a research project. For this reason our staff focused on its improvements instead of keeping on comparing with other LMS. As a service to the entire campus, the stability is crucial, at least until it is well fitting the teaching requirements. Blackboard, Moodle, and more recently Sakai, are, among many others, LMS plenty of features allowing to achieve the same kind of goals.

Years ago, when our staff has been charged to choose an LMS for the whole campus, Moodle has been chosen for two main reason:

- avoiding a proprietary product that would bind our university to the editorial choices of the manufacturer, that does not happen inside the wide and open Moodle community;
- having a good budget for training teachers in the use of it that was, and still is, a strength point of our staff. Moodle is free of license and the university has all the technical expertise to handle it, so the choice was made.

We don't agree with researchers that have argued that these platforms have generally been used as static repositories of content (Brady *et al.*, 2010; Lee & McLoughlin, 2010; Schroeder *et al.*, 2010; Whitworth & Benson, 2010). This was true at the beginning, but things are gradually changing also with the help of training for teachers themselves. At that time, Moodle (version 9.4) was far less advanced than it is now, but it was selected because of its large distribution, growing popularity in the academic world, and its easy availability as an open-source platform. We believed that these factors could ensure continuity to the project and provide an opportunity to achieve goals consistent with our educational requirements, which in fact occurred. Both quantitative and qualitative growth in the use of Moodle, especially in the medical field, has been slow but steady. The turning point from the previous ICT tools, which were merely of side support to classroom lectures, was the availability of the new features of Moodle 2, a breakthrough in distance education through its effective and timely mentoring functions.

## **2. Participative design as a planning strategy**

### *2.1 The design*

As mentioned in the previous section, the need to implement online learning was determined by several considerations including the following:

- the limited number of human resources in the scientific areas not covered by National Health Service personnel (such as basic science);
- the request of some teachers to identify teaching modalities that could allow simultaneous coverage of several sites with a single lecture to constrain costs but to ensure the same quality of education as that delivered in the past;



- the need to reduce educational costs, which largely depend on the number of peripheral venues for teaching activities.

In accordance with the Faculty of each course and the individual teachers responsible for any given subject, the coordinating committee of the Health Professions first identified three courses to be delivered experimentally in online mode, two non-medical (Sociology and Anthropology) and one in the health science area (Epidemiology). An “ad hoc” working group made up of teachers in the field, technical experts in e-learning and in the health education design, was convened to realize the project. The project was implemented through the non-traditional strategy of participative design (Hagen et al., 2012; Nicholas, 2012; Hagen, 2010; Palloff & Pratt, 2007). It followed a constructivist approach whereby the product does not originate by the view that the expert has on how it should be; in contrast, knowledge is shared and the project is built through the interchange of all players.

The end-user involvement in the design is therefore targeted to the following:

- improve the design, and increase knowledge in the process of project analysis;
- ensure realistic expectations of end users, thereby reducing resistance to change;
- help to increase democracy in education, providing students the right to take part in decisions that have an impact on their learning.

Experts in the subjects, employed locally by the public health scheme, were involved to define the scope of the training because of their long teaching experience and professional practice. Some students of advanced training courses (Master of Science in Health Professions) took part in the definition and implementation of the interactive procedures. Students enrolled in the courses were involved in the development of communication systems reputed more convenient for users themselves, in order to get more effectiveness and make users more aware of the interactive processes. A preliminary but complete development of the technological tools to use was needed to start the experimentation with a view to achieve a positive social environment (Schroeder et al., 2010).

## 2.2 Aim

The present study is focused on gaining a better understanding of health professions students’ perception of the e-learning environment proposed by the School of Medicine.

Based on the objectives outlined above, four questions were formulated. These were:

- 1) Are nursing and allied professions’ students able to apply the skills and knowledge from this program to their work setting?
- 2) Are the instructional design activities in the courses effective?
- 3) Are students satisfied with the online courses?
- 4) Are adequate the student’s support services provided?

## 3. The planning

### 3.1 The organization of content and the delivery modes

Three on-line courses in the fields of Sociology (1 European Credit Transfer and Accumulation System-ECTS points), Anthropology (1 ECTS points) and Epidemiology (ECTS points) scheduled for first-year students of Nursing enrolled in the academic year 2011-12 were offered in the second semester. The program of Sociology and Anthropology was developed in conjunction between the teachers so that the same issues of health interest could be treated consensually from the anthropological and sociological perspectives. The aim was to allow students to follow lectures in an integrated way. The course design for distance learning was supported by the AulaWeb portal, based on Moodle 2 platform.

AulaWeb is easy to use, dynamic, flexible, modular and fully manageable also by the individual teacher. It is the official platform of the University of Genoa and so that it is technically supported by the university computer center staff, both in the construction of educational materials and in the management of virtual classrooms. Round-the-clock access to the course was available, a flexible feature that avoided excess mobility and allowed the students to choose their own timing of study to best suite their personal needs. Teaching was developed mainly on the network, but, in this first

experiment, three meetings were also planned in person at each center. The first meeting concerned the online approach, materials and course organization; the other two meetings concerned specific needs also in teaching methods.

Particular attention was paid to course design and to the balance of hours of training between classroom and distance learning. Our aim was to enhance the scope of both educational approaches, the personal relation of the classroom and the flexibility of distance learning. The first meeting in the classroom was held to break the ice and to create some human interaction with a view to make the remote interaction more profitably. The classroom activities therefore were provided as a preparation for those online. Other in person meetings ensured quality control of online training activities, traced what had been done, and opened the way for reorganization or integration measures, if needed. The structure of distance learning consisted of modules composed of educational material (video lectures, slides, material details), of tutorials/self-assessment tests, and insights. In distance learning, it is crucial to subdivide the content in small conceptual units that are easily manageable by the learners. For this reason, the three courses were structured in lectures, scheduled for a given study timing. The time that the student required to complete his or her tasks and to study the individual educational materials was computed. Average time estimates are a weak variable. Some participants will spend less time than expected, for instance because they are already familiar with the topic or because they are particularly at ease with the content; on the contrary, other students will require extra time. In this experimental phase, no definite indication has been given of the average time needed for each module, but this feature will be implemented next year because we believe students should be enabled to better manage the time they spend to accomplish their tasks and to understand the level of details required in dealing with the materials. No specific time scale for the different modules was set, but a regular sequence of study was mandatory in order to proceed from one module to the following one. In traditional education, personal communication between teacher and student provides the opportunity to verify the level of learning of the contents. In distance-learning personal communication was replaced by meetings with tutors and by self-assessment tools useful to monitor the levels of achievement. Production of educational materials and online course design followed the principle of self-consistency (consistency, finiteness, clarity, comprehensiveness), which is particularly important for distance learning. In this context, learners have to rely mostly on their own; despite access to new tools of communication, such as email and forums, they enjoy fewer opportunities to get help from supporting figures (teachers, tutors, secretary office). A technical tutoring service has been activated in order to help students familiarize themselves with the tools of the platform hosting the courses. During course administration, as mentioned above, a first in person session was organized at the opening of the course, in order to provide the audience with a guide to the platform and its functions, and to simulate its key features to the participants. Some tools, provided by Moodle 2, allow tracking students' performance ("catch the mood" function) at a distance. In this experimental phase, it was decided not to use them, leaving the task to report problems, and critical elements of dissatisfaction to the meetings in presence and the forum, enabled on each course. The online discussion forum, a powerful tool for communication and deepening of the content, was activated to foster collaborative learning methodology, based on the theory of learning as a social process. A tutor was identified for each distance course in order to monitor messages in the forums and provide timely answers, possibly after discussion with teachers. The learning objectives of these courses did not concern only transfer of content competencies, but also the ability to learn through group interaction and online education. As a result, careful monitoring of participation and interaction was put in place using both quantitative and qualitative methods. Quantitative analysis is a simple task for the AulaWeb portal, which automatically records the data related to access for all users and makes them available to the analysis of the evaluator. The main aspects under consideration being the following numbers of: accesses to the platform; accesses to each course; accesses to the discussion forum; postings in the discussion forum; contributions sent by e-mail. The qualitative analysis of participation, of each participant and of the whole group, was achieved through analysis of messaging in terms of interaction variables, such as nature of the communication flows (student/teacher, student/tutor, student/student); presence of statements concerning group cohesion; and links between messages. Analysis of interaction in the classroom in the three scheduled meetings was also taken into account. Activities were certified in an in-person meeting, as defined by the syllabus and by the academic regulations of the courses of the Health Professions. Any course examination requires separate exams covering each of the fields included in the integrated course, no matter if lectures were given in the traditional format or online. Therefore, no testing of online evaluation was carried out.

### 3.2 *The new features in Moodle 2*

Today, Moodle is an Open Source Course Management System widespread in educational field because it allows conducting fully online courses (with online dynamic web sites supporting teaching and communities of practice) as well as simply support to enhance face-to-face courses (blended learning). It is presently available in 70 languages and used by about 65 million registered users. Moodle was planned and developed on the basis of a philosophy that tries to combine up-to-date training methodologies with collaborative IT tools. The guiding philosophy of this environment is to support a true cognitive and collaborative link between bearer of different experiences and skills recreating for them a real "online learning community". Presently it has come to version 2.5, but the courses we are discussing about have been created in the 2.1 and 2.2 releases. The early experiences of distance learning have been implemented on the version of Moodle 1.9 and have been preceded by an introductory course addressed to teachers of the courses of the Health Professions (Siri & Rui 2011). However the significant change took place in the Academic Year 2011/2012, in conjunction with the installation of two instances of Moodle 2.1 for institutional courses provided on online or blended training and life-long learning. Version-2 Moodle, based on a complete update of the core components, has provided teachers and students with new features that have ensured more flexibility, which is particularly useful in education and specifically in the field of the Health Professions. This has permitted the shift from the initial testing phase to the adoption of online lectures. The aspects of Moodle that had a major effect for the online teaching and learning for the Health Professions include the capabilities of monitoring and evaluation. Distance learning is part of an educational context essentially ruled by lectures of mandatory attendance carried out in the classroom. The main problem concerning the performance of online activities and their integration with other activities carried out in person is basically to determine the relevance of individual student performance. The Completion and Availability Conditioning function offered by Moodle 2 was instrumental for this purpose, which is crucial in the health procession courses. These features have enabled the creation of learning paths that can provide to each student resources and activities that follow his or her progress in the learning path. This has contributed substantially to the completion of our monitoring. The teacher defines the tasks that the student has to fulfil in order to proceed in the syllabus, and can evaluate advancement or identify inactive students. On the other hand, the student has the opportunity to check his educational path and to report intervening technical problems. Each activity has alternative completion criteria, which are activated when required, a feature that opens the way for diverging routes. In particular, in experimental settings, the teacher can define through self-evaluation tests, the qualitative and quantitative conditions that must be met to proceed in the educational program. These variables are set under the supervision of the teacher who has the opportunity to use the most appropriate criteria for the envisioned educational goal; in particular, the logging history that Moodle 2 provides, ensures close verification of each student's advancement and the actual use of each module (resource or activity). In this context, the new report, which enabled teachers and participants to view the status of completion of the single activities and of the whole course, proved to be very useful.

The information is displayed and downloaded for further processing in order to highlight the trend of the students participation, to identify critical issues and to monitor the appreciation and the effectiveness of the measures adopted.

The criteria for completing the whole course were not activated because they require a mandatory final examination. The function, "Conditional availability and completion," was very effective. It was not restricted to allowing the next step only if the preceding step was shown, without detecting "how" the previous step was completed. In contrast, the possibility to include self-assessment test was used to identify how many attempts had been made to answer and what distractors (i.e. incorrect answers in multiple choice test) for each question were mostly selected. This approach was useful to understand the areas in which students were weaker.

## 4. Results and conclusions

This recent online experience offered insights on the quality of the courses, on current features, and on possible improvements. In general, there was considerable satisfaction of the students who were interviewed, when they took the final exam. The students who, according to current regulations, are required to attend all the educational activities of their study program, especially those who are enrolled at peripheral venues, have appreciated the possibility to freely attend at least two courses from home or from the nearest venue. They identified in this innovative offer a more

responsible way to learn, which is self-managed. Course attendance also allowed students to share and discuss the educational material together. The project has been well monitored and evaluated at all levels to increase and establish its credibility. The program dedicates one staff member to coordinate the evaluation procedures and to formulate additional evaluation methods to more completely focus all aspects of the online experience. On-going questionnaires were offered to monitor the progress of the course, in order to gain useful information to allow possible reshaping of some stages of learning. Tracing the paths carried out by the students and recording of on-line intercommunication completed the available data for monitoring the course. These data were useful to solve problems of access, communication and participation, with an eye at redesigning future versions of the project. The survey, regular staff meetings, observing course interactions, and examinations of the listserv by the staff, helped to evaluate the effectiveness of all components of the online program and also to address the four main evaluation questions of the program.

Out of our 987 first-year health profession students, the 81% followed the distance learning courses offered on AulaWeb. The remaining 19% included students who received credit for previous studies and students who decided to take the course at a later time.

The exit survey is sent to all students attending the online courses in the academic year 2011-12 (response rate of 95%). The survey results proved a very high level of student satisfaction. One hundred percent of respondents reported that they - esteem the program very or somewhat worthwhile, that they were satisfied or very satisfied with the program. Moreover, 87% of replies agreed or strongly agreed that the online courses are relevant to the field of health professions. One hundred percent of respondents agreed or strongly agreed that they learned skills that were useful to their future job. For the technology service and support component, students are asked to respond to some statements on a scale from 1-5, strongly agree to strongly disagree. The following statements are included in each course evaluation; "instructions to assist me in developing the required computer skills were sufficient", "adequate technology support was available for this course," and "in general, accessing the course website was easy." Similarly, the curriculum component is evaluated through a combination of the surveys cited above and more informal monitoring by the staff. For each course, students are invited to list what teaching strategies they found useful in terms of increasing knowledge, instructional designers are requested to report new teaching strategies they worked on with faculty members and how successful they were, and faculty are asked what innovative strategies they used in their courses. Some of the techniques that were collected include: group projects to promote collaborative learning, postings on reflections of course content on discussion boards, case study based discussion boards, capstone evaluation assignments like projects or posters, and journaling.

When asked about course strategies, 54.6% of respondents agreed or strongly agreed that group activities contributed to learning of the course material. In addition, 67.9% of respondents reported that Discussion Boards were the most successful instructional activities over readings, group work and chat rooms. All of this feedback is used to inform the program about what pedagogical techniques have been successful.

The Graphs 1, 2, and 3, for the three distance courses, summarize the data from the reports available on the platform. The number of the active students in the various stages of the course is shown together with the activities of each module. Some students complained of lack of high-speed network access for videos. MP3 files of the lectures were then downloaded and handed to the students.

Figure 1 also indicates the trend of material accesses on the different modules and the on-going feedback; the modules that the students considered more difficult and were then the target of reshuffle in the following year.

Students with technical difficulties for access preferred to join other students and to attend in groups with their teacher's authorization of the teacher, even if self-assessment had to be done independently.

Figure 2 shows the students' activities for the Anthropology course; its second module, in particular, has a smaller number of accesses to the video lectures.

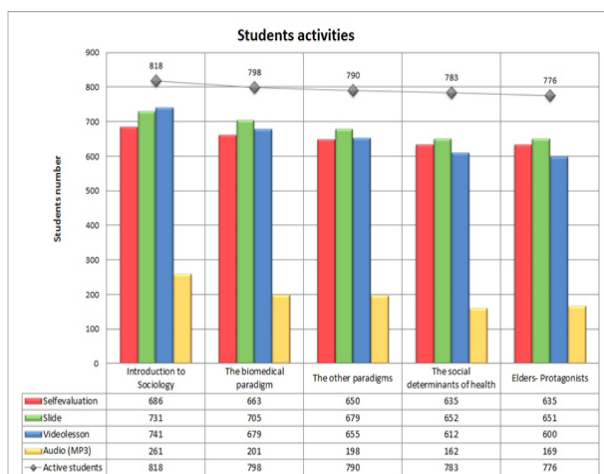


Fig. 1. Activities carried out by students enrolled in "General Sociology"

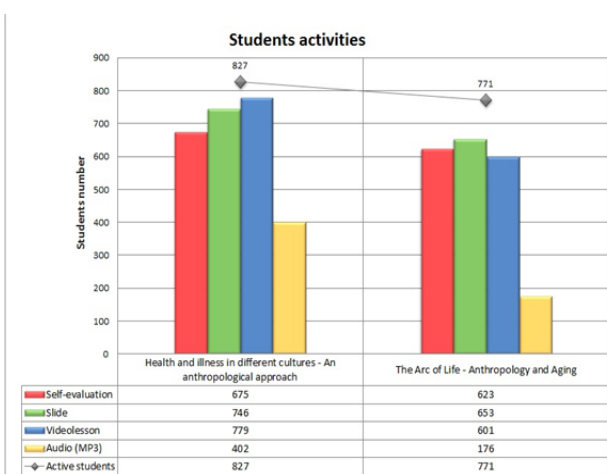


Fig. 2. Activities carried out by students enrolled in "Anthropology"

Same problems were identified for Epidemiology (Figure 3), a course that experienced a drop in video lecture accesses because of difficult in high-speed connections and postponement of the finale exam.

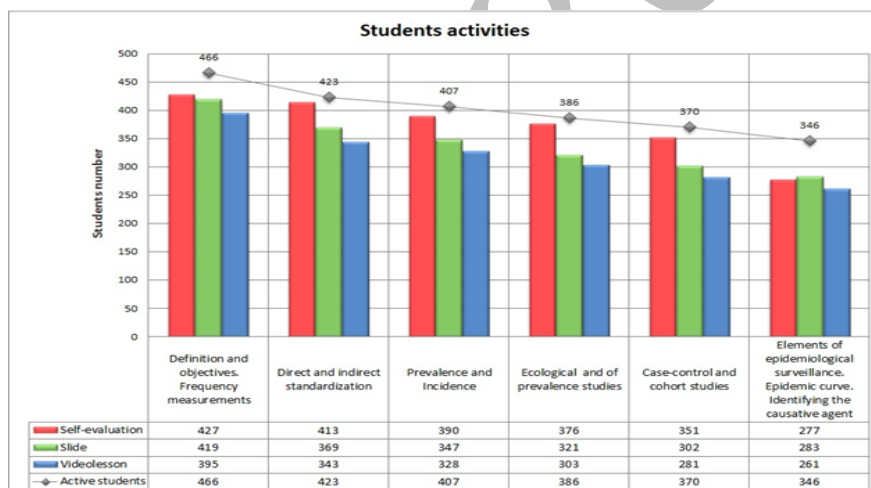


Fig. 3. Activities carried out by students enrolled in the teaching of "Epidemiology".

Participation in self-assessment test has remained high, even in the final steps of the courses, when students were no longer required to access the following chapters, a sign that the tests were perceived by students as a valuable tool to verify their readiness to sit for the final exam. A feedback questionnaire of the courses has been proposed to interested students to complement the Moodle information.

This experiment allowed collection of useful materials in order to make changes and additions to the content offered with the aim to overcome the operational and technical difficulties faced by students. In particular, for the next academic year, some video lectures will be proposed again in shorter format make access easier; additional details were added to some areas considered difficult by the students. The working group is envisioning, on the basis of reports received by tutors and students, upgrade to the FAQ format (with explanatory notes, bibliographical and site link suggestions of learning).

Furthermore, we wish to strengthen the effectiveness and traceability of self-assessment tests by improving feedback provided to the students and the audit trail. The self-assessment tests provide a useful educational tool of self-learning and a valuable tool for an active tutoring, but to really exploit its potential it is necessary that teachers and tutors are properly informed about the features and the best practices for the used modules, in particular “quiz” and “lesson”, along with reports. For this purpose, the School of Medical and Pharmaceutical Sciences is enhancing its duty for supporting the use of Moodle that will closely work with the staff of the university computer center.

For next year it is expected to completely remote this experimentation with the only initial presentation of the course, without the assistance of tutors in presence in each educational pole. Off course, this will lead to a stronger online tutoring. Finally, the evaluation component itself is evaluated and the information collected is used to inform decisions about future evaluation activities.

## References

- Brady, K. P., Holcomb, L.B., & Smith, B.V., 2010. The use of alternative social networking sites in higher educational settings: A case study of the e-Learning benefits of Ning in education. *Journal of Interactive Online Learning*, 9(2), 151–170.
- DeSchrver, M., Mishra, P., Koehler, M., & Francis, A., 2009. Moodle vs. Facebook: Does using Facebook for discussions in an online course enhance perceived social presence and student interaction? In I. Gibson et al. (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference* (pp. 329–336). Chesapeake, VA: AACE.
- Glen, S., & Cox, H., 2006. E-learning in nursing: the context. In *E-learning in Nursing* (Glen S. & Moule P., eds), Palgrave, Basingstoke, pp. 1–19.
- Hagen, P., Collin, P., Metcalf, A., Nicholas, M., Rahilly, K., & Swainston, N., 2012. Participatory Design of evidence-based online youth mental health promotion, prevention, early intervention and treatment. *Young and Well Cooperative Research Centre*, Melbourne.
- Hagen, P. & Robertson, T., 2010. Social technologies: challenges and opportunities for participation. In Bødker, K. et al (Eds.). *Proceedings of the 11th Biennial Participatory Design Conference* (PDC '10) Sydney (pp. 31–40). New York: ACM Press.
- Lee, M.J.W., & McLoughlin, C., 2010. Beyond distance and time constraints: Applying social networking tools and Web 2.0 approaches to distance learning. In G. Veletsianos (Ed.), *Emerging technologies in distance education* (pp. 61–87). Edmonton, AB: Athabasca University Press.
- McKenzie, K., O'Shea, C., McLeod, H. & Begg, M., 2008. An evaluation of the effectiveness of online clinical ‘quandaries’ in promoting effective clinical decision making by trainee clinical psychologists. *Journal of Practice Teaching in Social Work and Health*; 8: 2, 7–24.
- Moule, P., Ward, R. & Lockyer, L., 2010. Nursing and healthcare students’ experiences and use of e-learning in higher education. *Journal of Advanced Nursing*, 66(12), 2785–2795.
- Nelson, D.L., Blenkin, C., 2007. The power of online role-play simulations: technology in nursing education. *International Journal of Nursing Education Scholarship*; 4: 1.
- Nicholas, M., Hagen, P., Rahilly K., & Swainston, N., 2012. Using participatory design methods to engage the uninterested, in: Halskov, K. et al (eds) PDC 2012 Embracing New Territories of Participation, Proceedings of the 12th Participatory Design Conference, August 12–16, 2012, Roskilde University, Denmark, New York: ACM Press.
- Palloff, R.M. & Pratt, K., 2007. *Building on line Learning Communities: Effective Strategies for the Virtual Classroom*. Jossey Bass Higher and Adult Education.
- Schroeder, A., Minocha, S., & Schneider, C., 2010. The strengths, weaknesses, opportunities and threats of using social software in higher and further education teaching and learning. *Journal of Computer Assisted Learning*, 26(3), 159–174.
- Siri, A. & Rui, M., 2011. Il progetto AulaWeb & Teaching Tools: un corso pilota per docenti delle Professioni sanitarie. *VIII Congresso Nazionale della Società Italiana di e-Learning*, Università di Modena e Reggio, Reggio Emilia, 14–16 settembre 2011, pp. 793–798, ISBN: 9788895994765.
- Sweeney, N.M., Saarmann, L., Flagg, J., Seidman, R., 2008. The keys to successful online continuing education programs for nurses. *The Journal of Continuing Education in Nursing*; 39: 1, 12–18.
- Tait, M., Tait, D., Thornton, F., Edwards, M., 2008. Development and evaluation of a critical care e-learning scenario. *Nurse Education Today*; 28: 8, 971–981.
- Whitworth, A., & Benson, A., 2010. Learning, design, and emergence: Two cases of Moodle in distance education. In G. Veletsianos (Ed.), *Emerging technologies in distance education* (pp. 195–213). Edmonton, AB: Athabasca University Press.

INTE 2014

# Do we know what is important when establishing new business?

Hanák Róbert<sup>a\*</sup>

<sup>a</sup>*Institute of Experimental Psychology, Slovak Academy of Sciences, Dúbravská cesta 9, 84104 Bratislava, Slovakia*

---

## Abstract

Most of new businesses fail to succeed and one of the main reasons is inferior knowledge about business characteristics (like profitability) and their predictive validity when analyzing and setting initial business plan. Four groups (students without experience, students with administrative experience, managers with less than 12 years of experience and managers with more than 12 years of experience) were tested for their knowledge about predictive validity of business characteristics (profitability, price, etc.). This knowledge is not taught at Slovakian business universities, but it is expected that it will be acquired by practice. Although with rising practical experience, knowledge about predictive validity also rose, the comparison of all groups showed no significant difference. In four most predictive business characteristics (profitability, payback period, potential sales, and size of investment) we also did not find significant difference. Therefore, we conclude that years in business have positive effects on knowledge, though not sufficiently enough. Special care has to be invested to teach students and practicing managers what is important and what not.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* Experts; novices; predictive validity, business plan

---

## Predictive validity of business cues

Establishing new successful business is not easy task and most of new businesses will bankrupt before reaching maturity. Bankruptcy is for owner costly in money, time, effort, psychical stress and brings also many other negative effects. It is also costly for all other stakeholders, such as banks, national state, business partners, customers and employees, leaving debts and broken relationships. Therefore, if we were able to downsize level of bankruptcy of new business, all involved parties would significantly benefit. Managing and establishing new company is similar with managing IT businesses, which means careful and exact processes together with perfect knowledge to avoid failing project (Bodiš, 2009, Černý 2013, Hamranová, 2013).

There are many reasons causing new established business to bankrupt, but in this article we will concentrate only on one of them. Knowledge about product and its place in business environment together with knowledge about business processes are crucial. This knowledge could be defined and transformed into specific characteristics like profitability, payment time, potential market, existing competition and many others. Canadian Invention Assistance Program (IAP) since 1982 to 2000 investigated more than 13 000 business projects and successful ratio and specified business characteristics by which any business project could be characterized. They identified 37 business characteristics and for our research we selected 25 of them. Of course, different business characteristics have different effect at business performance. Some are highly influential and others are minor or negligible. Their

---

\* Corresponding author. Tel.: +421-02-5477562.  
E-mail address: robohanak@gmail.com



relationship with future success is demonstrated with their predicative validity. Predictive validity for our 25 selected specific business characteristics is listed in Table 1 (Åstebro, Elhedhli, 2006). As we can see in Table 1, each of these characteristics has, in fact, different predictive validity for business success. Whereas profitability is crucial for future success and has highest predictive validity, demand predictability has much lesser impact.

Table 1. Business characteristics and their predictive validity as correlation with success of the company (Åstebro, Elhedhli, 2006)

<u>Business characteristics, cues</u>	<u>Predictive validity of cues</u>
Profitability	0.64
Payback Period	0.55
Potential Sales	0.54
Size of Investment	0.50
Development Risk	0.47
Function	0.45
Functional Performance	0.41
Appearance	0.39
Protection	0.36
Research and Development	0.35
Price	0.32
Tooling Cost	0.28
Existing Competition	0.24
Distribution	0.24
Durability	0.23
Marketing Research	0.22
Product Line Potential	0.19
Dependence	0.19
Service	0.18
Duration of Demand	0.16
Demand Predictability	0.16
Legality	0.14
Potential Market	0.12
Environmental Impact	0.11
New Competition	0.09

Before starting business, rational potential entrepreneur has to know perspectives of his or her new business. She or he has to analyze all characteristics of the product and its status in business environment (Jankelová, Mišúnová Hudáková, Mišún, 2013). In Slovakia, predictive validities of these cues are mostly unknown for managers or business students. In university management education students do not have any courses where they could be informed about specific values of predictive validity for certain business characteristics. When we think about this upsetting status, we realize that future entrepreneurs rely on their intuition instead of knowledge based on thorough deliberation and analysis. On one hand, intuition cannot be taken only as negative -- in fact, in many business or life situations it has positive effect compared to rational, analytical behavior (Čavojová, 2013). On the other hand, this is that type of situation, where relying on intuition could be very misleading with bad consequences (Ballová Mikušková, 2013). There are many ways how to induce intuition and one of them is limiting the time available for judgment and decision. In time stress respondents have to rely on their intuition, because there is no time for behaving rationally and analytically.

It is frequently expected that when coming to praxis former student will learn everything, what he or she has not learned in formal education. It is also presumed that knowledge what is crucial and what has minor or minimal effect on business success comes with experience. In other words, that working in field "real" business environment will lead to acquisition of this knowledge.

Research concerning experts came to conclusion that experts (beside many other things) differ from novices in their knowledge of factors which influence final exam. Experts know better what is important, what "works" and what not, they are better aware of single weights of specific factors and rules under which are they implemented. We found (Hanák, Sirota, Juanchich, 2013) that personal managers know better which selection methods (interview, cognitive test and others) have better predictive validity than others.

Therefore, the aim of this study is to test if managers differ from students in their knowledge about predictive validity of business cues. In other words, does the real business practice measured by years in field "teach" what characteristics are important in business and what have minor role?

## Method

### *Participants and procedure*

151 participants (55 men) took part in the study ( $M_{age} = 31.34$  years,  $SD = 9.45$ ). They were divided according their working experience into four groups. By forming four groups we tried to measure difference made by working years in business and financial experience. First group ( $n = 38$ ) was formed from students (external student of Slovak business college) who had no practical experience and never have been in business ( $M_{age} = 24.53$  years,  $SD = 5.54$ ). This group could be labeled as *naïve group* and has 0 years of experience. Second group ( $n = 59$ ) was formed from students who had experience as administrative workers, but had no experience in finance or management ( $M_{age} = 31.25$  years,  $SD = 8.23$ ). They have  $M_{years} = 9.21$ ,  $SD_{years} = 7.01$  years of experience. Last two groups were formed from people with financial and managerial experience. In general, they spent 12 years in business managing and working with finance. We used mean split method and divided them into two groups. Therefore the third group ( $n = 25$ ,  $M_{age} = 29.82$  years,  $SD = 5.06$ ) was less experienced ( $M_{years} = 5.84$ ,  $SD_{years} = 2.42$ ) compared to the fourth group. The fourth group ( $n = 26$ ,  $M_{age} = 43.15$  years,  $SD = 9.36$ ) had most extensive business experience ( $M_{years} = 20.73$ ,  $SD_{years} = 6.79$ ), mostly closely connected with finance and therefore we will label this group as *experts*. By comparing first group (naïve) and last group (experts) we expect to find the largest differences and this comparison will be important part of our analysis. In second and third group we expect rise of knowledge about predictive validity and they are viewed as steps from novice to expert group.

## Procedure and measures

Respondents were asked to rate business plan which was described by 25 characteristics (Table 1) in two conditions. These were selected from original 37 business characteristics. We selected first 10 with highest predictive validity, then 9 with lowest levels of predictive validity plus remaining 6 from middle which were chosen randomly. We wanted most extreme characteristics in terms of predictive validity, which means those which well predict and those which poorly.

In time stress condition they had 3 minutes for completing the task. In the second condition, without time stress, they had no time constraints. Business characteristic were presented in form of table with listed words. Each word represented one business characteristics. Content behind these words was hidden so they did not see value of characteristics, only label (for example profitability). If they wanted to know how profitability really was (content), they had to assign weight of profitability and write it in an empty cell. After writing specific percentage weight the content showed up. It was usually one or two sentences describing status or level of specific business characteristics. For example, for new competition it was written: "Product will not face any existing competition". They had to divide 100 points to all 25 characteristics according to their best knowledge.

Each business characteristics has different predictive validity (see Table 1) and we ranked them accordingly and divided them into two groups. The first group comprised of the cues with the highest predictive validity (first 12 cues from Table 1); the second group comprised of the cues with low predictive validity (last 13 cues from the Table 1). Then we calculated sum of weights which they assigned to the first 12 most predictive characteristics and to the last 13 less non-predictive characteristics. Based on these sums we made our calculations.

## Results

### Time stress condition

All groups together ( $n=151$ ) assigned slightly higher weight to the predictive characteristics ( $M = 53.97$ ;  $SD = 13.32$ ) than to non-predictive characteristics ( $M = 46.04$ ;  $SD = 13.39$ ). More specific data are in the tables below (Table 3 and 4).

Table 2. Sum of Mean weight for predictive characteristics in condition of time stress.

Group	Mean	SD
Students without experience	53.05	14.71
Students with administrative experience	52.66	15.27
Managers and accountants with less than 12 years in business	51.11	15.08
Managers and accountants with more than 12 years in business	56.92	16.06

Table 3. Sum of Mean weight for non-predictive characteristics in condition of time stress.

Group	Mean	SD
Students without experience	44.66	12.58
Students with administrative experience	46.36	10.46

Managers and accountants with less than 12 years in business	51.75	16.12
Managers and accountants with more than 12 years in business	41.19	15.59

Although experts allocated more weight to predictive characteristics than novices the difference were not significant  $F(3,147) = .719$ ;  $p = .542$ . The same could be said about non- predictive characteristics where  $F(3,147) = .750$ ;  $p = .524$ . Four business characteristics with highest productivity (profitability, payback period, potential sales, and size of investment) were tested between groups. We found no significant differences between groups.

Students and managers with more than 12 years in business were the two extreme groups. We analyzed, whether they differed in each of all 25 business characteristics weight estimation. There were no significant differences, but for one of them, *Potential Market*, where professionals allocated more ( $M = 9.85$ ;  $SD = 6.94$ ) weight to it than students ( $M = 5.45$ ;  $SD = 6.08$ ;  $t(62) = -2.68$ ;  $p = 0.009$ ). Also, to *Payback Period* professionals allocated more ( $M = 6.5$ ;  $SD = 6.31$ ) weight than students ( $M = 3.92$ ;  $SD = 4.93$ ), but this difference did not reach significance level( $t(64) = -.183$ ;  $p = 0.072$ ).

#### *No time stress condition*

All groups together ( $n=151$ ) assigned slightly higher weight to the predictive characteristics ( $M = 53.97$ ;  $SD = 13.32$ ) than to non-predictive characteristics ( $M = 46.49$ ;  $SD = 15.14$ ).

Table 3. Sum of Mean weight for predictive characteristics in condition without time stress.

Group	Mean	SD
Students without experience	55.5	12.55
Students with administrative experience	53.75	10.41
Managers and accountants with less than 12 years in business	48.25	15.94
Managers and accountants with more than 12 years in business	58.42	15.63

Homogeneity test showed that data were not distributed normally, as in time stress condition, therefore, non-parametric tests were used. Krusal-Wallis test showed that there is no significant difference among these four groups,  $H(3) = 3.79$ ,  $p = .285$ .

Table 4. Sum of Mean weight for non-predictive characteristics in condition without time stress.

Group	Mean	SD
Students without experience	46.6	14.59
Students with administrative experience	46.75	15.36
Managers and accountants with less than 12 years in business	48.83	14.85
Managers and accountants with more than 12 years in business	43.08	16.06

Krusal-Wallis test showed that there is no significant difference among these four groups,  $H(3) = 4.35$ ,  $p = .225$ . In condition without time stress comparison of students and experts showed minimal differences (as was the case in time stress condition). Again, students significantly differed from experts only in *Potential Market*, to which experts allocated more ( $M = 8.85$ ;  $SD = 6.1$ ) weight than students ( $M = 6.16$ ;  $SD = 4.52$ ;  $t(62) = -2.028$ ;  $p = 0.047$ ). They differed significantly also in *Legality*, to which professionals allocated less weight ( $M = 1.69$ ;  $SD = 2.78$ ) than students ( $M = 5.11$ ;  $SD = 5.79$ ;  $U(64) = 295.5$ ;  $p = 0.005$ ).

By comparing allocated weight in two conditions we found that respondents acted in all groups differently but in fact differences between them were minor scale. Students changed their mind about *Price* by lowering their percentage value from  $M = 13.55$  in time stress to  $M = 11.5$  without time stress,  $t(37) = 2.27$ ,  $p = 0.027$ , which was principally wrong decision because of its low predictive validity. Experts, managers with more than 12 years in field, changed their mind about *Distribution*, to which they assigned more value without time stress  $M = 3.19$  from  $M = 1.62$  in time stress,  $t(37) = -2.82$ ,  $p = 0.031$ .

#### 4. Discussion

Results showed that knowledge about predictive validity is on miserable level in all tested groups. Students, who had no practical managerial or financial experience and without any course about business establishing, are not significantly different from any other group who has experience in business. In fact, experts with long years in field are at the same level of knowledge than students. Comparison of mean allocated weight for predictive business characteristics with non-predictive for all respondents shows that people do not know what is very important and what has minimal effect on business success. Without this knowledge it does not matter if respondents work in intuitive condition (time stress) or rational condition (without time stress), final results are similarly bad, which was supported by comparing the changes in two conditions.

When examining extreme groups (students and experts) we found only one significant difference from all 25 business characteristics. It was *Potential market*, which has one of the lowest levels of predictive validity. Still worse, experts allocated more weight than students, to non-predictive business characteristics, where they should do the exact opposite. The same could be said about *Duration of Demand*, where experts also do the exact opposite. *Payback Period* was close to significance and experts allocated more weight to this highly predictive business characteristic than students.

This absence of knowledge about predictive validity for specific business characteristic could be one of the major reasons for such high level of failure when establishing new business. When people do not know what is important, they do not allocate their time, resources and effort to domains where they are needed the most and follow false and unimportant goals and activities.

#### Acknowledgements

This work is part of the research project of Centre of Excellence of Slovak Academy of Sciences "Centre for strategic analyses" (CESTA III/2/2011).

## References

- Ástebro T., Elhedhli, S. (2006) "The Effectiveness of Simple Decision Heuristics : A Case Study of Experts ' Forecasts of the Commercial Success of Early-Stage Ventures," *Manage. Sci.*, vol. 52, no. 3, pp. 395–409.
- Ballová Mikušková, E., (2013). "Intuícia:dobrý sluha, zlý pán?" In. Hanák, R., Ballová Mikušková, E., Čavojová, V. (Eds.) *Rozhodovanie a usudzovanie IV*. Bratislava: Ústav experimentálnej psychológie SAV, 34-47.
- Bodiš, M. (2009) *Popísanie dôležitých kritérií a ukazovateľov výberu informačného systému podniku*  
In Vytvorenie databázy a modelu rozhodovacích kritérií na výber informačného systému pre malé a stredné podniky. Bratislava : Vydavateľstvo EKONÓM.
- Čavojová, V. (2013) "O racionalite intuície". In. Hanák, R., Ballová Mikušková, E., Čavojová, V. (Eds.) *Rozhodovanie a usudzovanie IV*. Bratislava: Ústav experimentálnej psychológie SAV, 11-33.
- Černým M. (2013) *Podpora transformačného procesu pomocou ERP systémov = Support of the transformation process using ERP systems* .In Majtán M., Markovič P. (Eds.) *Ekonomika, financie a manažment podniku VII. zborník vedeckých statí pri príležitosti Týždňa vedy a techniky = Ökonomik, Finanzen und Management von Unternehmen VII. : das Sammelbuch der Wissenschaftlichen Beiträge zur Woche der Wissenschaft und Technik = Economy, finance and management of company VII*. Bratislava : Vydavateľstvo EKONÓM, p. 1-15
- Hamranová , A. (2013). *Aspekty implementácie Business Intelligence v slovenských podnikoch*. EKONÓM Bratislava.
- Hanák, R., Sirota, M., & Juanchich, M. (2013). Experts use compensatory strategies more often than novices in hiring decisions. *Studia Psychologica*, 55(4).
- Mišún, J., Jankelová, N., & Mišúnová Hudáková, I. (2013). Význam strategického rozhodovania v mikropodnikoch a veľmi malých podnikoch na príklade Slovenskej republiky. *Ekonomický časopis*, (07), 737-756.

# Does intelligence predict academic achievement? Two case studies

Vladimíra Čavojová<sup>a\*</sup>, Eva Ballová Mikušková<sup>a</sup>

<sup>a</sup>*Department of Pedagogical and School Psychology, Constantine the Philosopher University,  
Dražovská cesta 4, 94901 Nitra, Slovakia*

---

## Abstract

The aim in this paper was to explore the cognitive abilities of students of pedagogical faculty and their relationship with academic achievement and whether their cognitive abilities are related more to the traditional didactic test (reflecting learned, crystallized abilities) or to the measure of tacit knowledge (extra-class low-effort activities that help to promote academic achievement). Paper presents two case studies using the same measure of cognitive abilities (Vienna matrix test) and tacit knowledge (participation in extra course activities), but at two different courses using different final exam tests. The results show only weak correlations between cognitive abilities and final evaluation in the given courses. Tacit knowledge served as better predictor of academic achievement and we found gender differences in strategies for enhancing academic achievement. The results are discussed in terms of difference between optimal and typical performance.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* intelligence; academic achievement; tacit knowledge; college exams

---

## Intelligence as predictor of school achievement

Despite many controversies and debates regarding what intelligence tests actually measure and to what extent is it practical (Stanovich, 2009; Sternberg, Wagner, & Ree, 1993), there is a prevailing agreement that general intelligence (or g factor) predicts many achievements also outside the school realm (Gottfredson, 1997), such as unemployment, income, extra-marital pregnancies, divorce, crime, etc.

School achievement can be defined as demonstrated knowledge required for fulfillment of content of educational standards. This definition is reflected in operationalized academic achievement by overall score from various standardized didactic test (e.g. SAT, LSAT, GMAT, etc.). Often the most frequently used operationalization of academic achievement is the final grade from majoring subjects or the average score from these subjects. On the other hand, we can define academic achievement more broadly as consent between requirements of school and performance, personality and development of the student. In other words, to be successful in school a student does not need to fulfill only academic standards (to pass the tests, etc.), but also to be able to present his or her knowledge adequately, to form relationships with teacher and classmates, to engage in activities that would compensate for his or her underperformance, etc. This is the kind of intelligence termed practical intelligence for school, which refers to the individual's understanding of, and ability to respond appropriately to, demands of school environment (Williams, Blythe, White, Gardner, & Sternberg, 2002).

This broader view is reflected also in Sternberg's conception of successful intelligence (Sternberg, 1999, 2003), which consists of three components: academic, creative and practical intelligence. Practical intelligence is often reflected in tacit knowledge, i.e. knowledge that one uses without being explicitly aware of possessing such knowledge, or to follow the implicit rules in a given environment, i.e. set of procedural-knowledge skills that are

---

\* Corresponding author. Tel.: 421 037 6408 220.

E-mail address: vkavojova@ukf.sk

relevant to their adaptation to real-world environment (Cianciolo et al., 2006; Sternberg et al., 2000; Williams et al., 2002).

#### *Academic, practical intelligence and academic achievement*

Due to many concerns about generality of *g* factor (general intelligence) and constricting the general processes to just academic intelligence (Sternberg, Castejón, Prieto, Hautamäki, & Grigorenko, 2001), quite straightforward relationship between academic achievement and academic intelligence should be expected. Fagan and Holland (2009) used culture-fair test of new knowledge (as indicator of intelligence in broad sense of processing ability to acquire new knowledge) and it showed moderate correlations with measures of academic achievement (brief SAT scores and class exam scores). The studies examining practical intelligence and its relationship to academic intelligence, academic achievement or some real-life outcomes show inconsistent results. Practical intelligence predicted adaptive functioning better than academic intelligence (Grigorenko & Sternberg, 2001). In the study from 2001 Sternberg, Nokes, et al. (2001) found no or weakly negative correlations between tacit knowledge (measure of practical intelligence) and academic intelligence and achievement. They suggest that reason for these results is that time spent developing academic skills takes time necessary to develop tacit knowledge, which is considered as more important in a given community of Kenyan village. In the Turkish setting, Ekinci (2014) found that especially grades from mathematics, social science and science were related to analytical (academic) intelligence, and partly also to creative and practical intelligence, with correlations of moderate level. In Slovakia, Halama and Tomková (2005) analyzed relationships between verbal intelligence and school grades and they found that verbal-logical thinking is the strongest predictor of a academic achievement.

However, our previous studies with school children (Malá & Čavojská, 2009) found no relationship between school achievement of children and their cognitive abilities measured by Woodcock-Johnson tests of cognitive abilities (WJ IE) and we did not find evidence for practical intelligence of Roma pupils (Čavojská & Belovičová, 2010). In our previous studies we examined academic and practical intelligence in school children from minority population. In this study we were interested if the same concepts can be applied to college students, who are considered as more “prominent” population and higher cognitive abilities are expected.

#### *The aim of the paper*

Intelligence is cognitive ability that carries strong evaluative connotations and is linked with several positive outcomes (Gottfredson, 1997; Sternberg, 2003b). However, it is often the case that we wonder that some educated person does not show excess of intelligent behaviour (not to mention rational behaviour). Therefore, our main aim in this paper was to explore the cognitive abilities of students of pedagogical faculty (future teachers) and their relationship with academic achievement. In other words, are the future teachers role models showing high level of cognitive abilities and academic achievement? And our secondary concern was whether their cognitive abilities are related more to the traditional didactic test (reflecting learned, crystallized abilities) or to the measure of tacit knowledge (extra-class low-effort activities that help to promote academic achievement)?

#### **Methods: Study 1: Social psychology**

##### *Participants and procedure*

A total of 256 participants took part in the study. The participants were all students at a pedagogical faculty of large university in Slovakia who attended the course of Social Psychology as a requirement for their training of future teachers of various approbations. The pool of participants consisted of students attending the course during two semesters. We labelled them Sample 2013 (N=81) and Sample 2014 (N=175). As a voluntary option to receive



extra credits for the final exam, they were offered to participate in various experiments and surveys via internet survey survio.com, where we collected data about their cognitive abilities.

## Measures

Participants completed a cognitive abilities measure via survio.com and their study achievement was assessed by the scores in their final exam test.

### 2.2.1 Cognitive ability: Vienna matrix test (VMT)

VMT is based on the classical Raven's test of progressive matrices – two items are from Standard Progressive Matrices and 1 from Advanced Progressive Matrices constructed by Raven. It consists of 24 items in increasing difficulty and is time-limited (25 minutes). Every task contains picture matrix 3x3 with the missing picture in the third row. The task of the participant is to fill in correctly one of the eight possibilities. The essence of the test is to find out the pattern and the test contains several different patterns of rules (distribution of symbols in the task, adding up the symbols, increasing or decreasing the number of symbols or combination of more principles). The VMT shows high correlations with Intelligence Structure Test and the authors conclude that it reflects reliably general cognitive factor. The test is supposed to be culture-fair as it is based on figural content. We used Czech adaptation by Klose, Černochová, and Král published by Testcentrum in 2002. The mean IQ score for our sample (N=136) was 101.21 (SD=17.25).

### 2.2.1 Study achievement

Study achievement consisted of three variables:

(1) Participants had to take test for final exam, which consisted of 20 multiple-choice questions from the main issues of Social Psychology. Test came in 6 versions (A,B,C,D,E,F) and multiple-choice format was designed so that for some of the questions more than 1 correct answer was possible. Participant could receive 2 points for fully correct answer (choosing all the correct options and not choosing any of the incorrect options) and 1 point for partially correct answer (choosing at least one of the correct options), so the maximum total score was 40 points for the test. Mean score from the test was 21 points (SD=6.3).

(2) Participants had opportunity to take part in five different experiments and surveys in the course of the semester and receive extra points (2 for each study), so the maximum of points they could receive was 10. This represented a measure of tacit knowledge in a sense that we predicted that students thinking more about their study results would take the chance to “secure” better study results.

(3) Total score reflecting sum of obligatory final exam and voluntary participation in experiments. The scale for assigning evaluation according to total scores during the semester was made available at the beginning of the course. In Slovakia, we use five point grading system to indicate school achievement. Letters that are used for evaluation in the third level of education were recoded into numbers so that the higher score reflected better evaluation.

## Results

In the Table 1 we present descriptive statistics for the students taking exams in Social Psychology during the two semesters – they are labeled by the year in which they attended the course (2013 for winter term and 2014 for summer term). We can see that the two samples substantially differed in all three studied variables Sample 2013 scored significantly lower in the final test ( $t=-6.661$ ,  $p<.001$ ) and also their overall evaluation was significantly lower ( $t=-3.535$ ,  $p<.001$ ). On the other hand, their score in intelligence test was significantly higher ( $t=3.757$ ,  $p<.001$ ).

Table 1 Descriptive statistics for two samples of students attending the course of Social Psychology in 2013 and 2014

	2013 (N=81)			2014 (N=175)		
	Mean	Median	Std. Deviation	Mean	Median	Std. Deviation
Final exam	17.46	17	5.12	22.66	22	6.1
Tacit knowledge	3.40	3	2.49	2.51	2	4.11
Final evaluation	1.45	1	1.36	2.09	2	1.35
IQ (VMT)	107.65	110	15.71	96.83	98	16.96

Because of these differences we performed correlation analysis separately for the two samples. The results in Table 2 showed moderate correlation between IQ and final evaluation in the 2013 Sample, but no such relationship was observable in 2014 Sample.

Table 2 Correlations between intelligence and study achievement measures

rok			IQ (VMT)	Final exam	Tacit knowledge	Final evaluation
2013	IQ (VMT)	r	1	0.245	0.125	.274*
		p		0.071	0.364	0.043
	Final exam	r	0.245	1	0.182	.890**
		p	0.071		0.105	<.001
	Tacit knowledge	r	0.125	0.182	1	.507**
		p	0.364	0.105		<.001
	Final evaluation	r	.274*	.890**	.507**	1
		p	0.043	<.001	<.001	
2014	IQ (VMT)	r	1	0.094	-0.101	0.155
		p		0.406	0.371	0.175
	Final exam	r	0.094	1	-0.078	.586**
		p	0.406		0.307	0
	Tacit knowledge	r	-0.101	-0.078	1	.321**
		p	0.371	0.307		0

Final evaluation	r	0.155	.586**	.321**	1
	p	0.175	<.001	<.001	

Regression analysis showed that intelligence can be used as predictor of final evaluation in 2013 Sample (St.  $\beta=.273$ ,  $t=2.072$ ,  $p=.043$ ), but it explained only 5.7% of total variance. However, when used together with measure of tacit knowledge, tacit knowledge showed as better predictor for final evaluation for both samples: in 2013 Sample St.  $\beta=.403$ ,  $t=3.209$ ,  $p=.002$  and for Sample 2014: St.  $\beta=.247$ ,  $t=2.227$ ,  $p=.029$ . Tacit knowledge predicted 14.7% of total variance in 2013 Sample, but only 5% in 2014 Sample, but in both cases it was much higher than intelligence could predict.

Finally, we examined gender differences, although there was large discrepancy between the number of men and women in the sample. Moreover, we present gender differences only for the 2014 Sample, because we did not collect data for gender in the 2013 Sample. We found that there was no difference in IQ ( $t=1.009$ ,  $p=.316$ ) and final evaluation ( $t=-.531$ ,  $p=.596$ ), but there was difference in both test score ( $t=2.427$ ,  $p=.016$ ) and tacit knowledge ( $t=-3.839$ ,  $p<.001$ ) – while men scored significantly higher (24.25) than women (21.89) in the final test, women scored significantly higher in tacit knowledge (.85 vs. 3.31).

## Discussion

Our main finding from the Study 1 was relationship between intelligence and academic achievement only in the sample with the higher intelligence. However, first, it is important to discuss revealed differences between the two samples – why the 2013 sample scored so low in the test and why they showed higher intelligence? First consideration is the size of the sample – Sample 2013 was smaller, therefore it was more likely to be biased. The next consideration is the way of administration of both measures of intelligence and academic achievement. Sample 2013 volunteered for intelligence testing, which was administered in group by the two authors of the study and they received (anonymous) feedback about their intelligence score, while Sample 2014 did intelligence testing as a part of larger battery of cognitive abilities and attitudes measures through the internet and it was not made explicit that it was intelligence testing. (They were told that their reasoning skills are being tested and they could ask for feedback about their level of intelligence). This can represent difference between optimal performance (Sample 2013) and typical performance (Sample 2014) (Stanovich, 2009, 2011). Also, there were differences in preparation for the test from the side of a teacher (albeit unconscious) – although the test the both samples took was the same, it was constructed at the end of the term for Sample 2013 so the teacher could not stress beforehand the issues she knew would occur in the final exam. On the other hand, because the test was already constructed, she could stress some problematic issues during the next term for the 2014 Sample. These two methodological pitfalls of the Study 1 disable to make generalizations, but on the other hand, they highlight the importance of instruction (stressing optimal performance) and experimenter effect. They also serve as support of claim that lack of relationships between critical thinking tasks and intelligence are due to differences in optimal vs. typical performance (Stanovich, 2011).

Making salient the need for optimal performance probably caused better results in intelligence score and together with higher difficulty of the test (because they were not told beforehand the issues they have to concentrate mostly, so they needed to study according to their estimate what is considered the most important issue to appear on the test) – these are probably the two most important factors behind the correlation between intelligence and academic achievement.

Quite of interest is also, that despite no differences in intelligence, men had better ability to estimate the important issues that would appear on the test, while women undertook more “secure” way be ensuring extra points by engaging in extra course activities and thus compensating their lower test scores.

## Methods: Study 2: General Psychology and Ontogenetic Psychology

Study 2 had the same design and the same research questions as Study 1, but we examined relationship between intelligence and academic achievement in the different course – General Psychology and Ontogenetic Psychology. This subject is mandatory for all future teachers – not only of different majors but also for future teachers in kindergartens and elementary schools.

### *Participants and procedure*

A total of 425 participants took part in the study (86% women; age ranged from 19.83; SD=2.73). The participants were all students at a pedagogical faculty of large university in Slovakia who attended the course of General Psychology and Ontogenetic Psychology as a requirement for their training as future teachers of various approbations. As a voluntary option to receive extra credits for the final exam, they were offered to participate in various experiments and surveys via internet survey survio.com, where we collected data about their cognitive abilities.

### *Measures*

Participants completed the same measures as in Study 1: measure of cognitive abilities was administered in group session by both authors of the study and their study achievement was assessed by the scores in their final exam test.

#### *2.2.1 Cognitive ability: Vienna matrix test (VMT)*

Participants completed VMT (for more details see Study 1) and the mean IQ score for our sample (N=425) was 106.92 (SD=13.67).

#### *2.2.1 Academic achievement*

Study achievement consisted of three variables:

(1) Participants had to take test for final exam, which consisted of 30 multiple-choice questions from the main issues of General Psychology and Ontogenetic Psychology. Test came in 3 versions (A, B, C). 15 questions with multiple-choice format were designed so that for some of the questions more than 1 correct answer was possible. Participant could receive 1 point for fully correct answer (choosing all the correct options and not choosing any of the incorrect options) and from 0.8 point (choosing one incorrect options or not choosing one correct answer) to 0.2 point (choosing four incorrect options or not choosing four correct answers) for partially correct answers. Next 15 questions had true-false format and participants could receive 1 point for correct answer. The maximum total score was 30 points for the test. Mean score from the test was 19.38 points (SD=4.18).

(2) Participants had opportunity to take part in four different experiments and surveys in the course of the semester and receive extra points (2 points for three study and 3 points for one study), so the maximum of points they could receive was 9. This represented a measure of tacit knowledge in a sense that we predicted that students thinking more about their study results would take the chance to “secure” better study results.

(3) Total score reflecting sum of obligatory final exam and voluntary participation in experiments. The scale for assigning evaluation according to total scores during the semester was made available at the beginning of the course. In Slovakia, we use five point grading system to indicate school achievement. Letters used for evaluation in the third level of education was recoded into numbers so that the higher score reflected better evaluation.

## Results

In the Table 3 we can see descriptive results for scores from final exams, tacit knowledge, final evaluation and intelligence.

Table 3 Descriptive statistics for students attending the course of General Psychology and Ontogenetic Psychology

	N=425		
	Mean	Median	Std. Deviation
Final exam	19.37	19.6	4.18
Tacit knowledge	6.55	7	2.51
Final evaluation	3.28	3	1.48
IQ (VMT)	106.92	107	13.67

The results of correlational analysis (Table 4) show weak correlations of intelligence with tacit knowledge and final evaluation, but not with the final test.

Table 4 Correlations between intelligence and study achievement measures

		IQ (VMT)	(1) Final exam	(2) Tacit knowledge	(3) Final evaluation
IQ (VMT)	r	1	0.069	0.118*	0.102*
	p		0.154	0.015	0.036
(1) Final exam	r	0.069	1	0.054	.749**
	p	0.154		0.266	0.000
(2) Tacit knowledge	r	<b>0.118*</b>	0.054	1	.275**
	p	0.015	0.266		0.000
(3) Final evaluation	r	<b>0.102*</b>	.749**	.275**	1
	p	0.036	<.001	<.001	

Regression analysis showed that intelligence can be used as predictor (St.  $\beta=.102$ ,  $t=2.108$ ,  $p=.036$ ), but it explained only 0.8% of total variance. Again, when used together with measure of tacit knowledge, tacit knowledge showed as better predictor for final evaluation (St.  $\beta=.275$ ,  $t=5.873$ ,  $p=.000$ ). Tacit knowledge predicted 7.3% of total variance, what is higher than intelligence could predict.

Again, we explored also gender differences and we found that women scored significantly higher ( $N = 364$ ;  $M = 3.37$ ,  $SD = 1.47$ ) than men ( $N = 61$ ;  $M = 2.74$ ;  $SD = 1.41$ ) in the final evaluation ( $t = -3.109$ ,  $p = .002$ ), i.e. women received better final grades from the course than men.

## Discussion

We found relationship between intelligence and academic achievement, as in the Sample 2013 from Study 1, maybe because of the same conditions of VMT administration. So these findings also support assumption that lack of relationships between critical thinking tasks and intelligence are due to differences in optimal vs. typical performance (Stanovich, 2011).

## General discussion and conclusion

The main aim in this paper was to explore the cognitive abilities of students of pedagogical faculty (future teachers) and their relationship with academic achievement. We found, somewhat disappointingly, that our future teachers are not prime examples of high level cognitive abilities. Their intelligence is average, at best, and it was disturbing to find so many examples of low level intelligence at the college level of education. It also seems that both tests (for Social Psychology, also for General Psychology and Ontogenetic Psychology) were quite demanding for students – in average they received only half of the possible points. For most of them it was necessary to participate in the extra course surveys just to collect enough points to pass the final exam. Therefore, it is quite difficult to conceptualize participating in extra course surveys as measure of tacit knowledge – we would need, at least, to distinguish those who participated during the semester from those, who participated just after they failed the final test.

On the other hand, we found that participating in voluntary extra-course activities (whether conceptualized as tacit knowledge or not) is better predictor of academic achievement. Our results also suggest different strategies for academic achievement for men and women and the importance of offering students a choice, how to enhance their academic achievement. Nevertheless, our results mainly reveal the rather unfortunate state of cognitive abilities of our future teachers and should be taken into account during the entrance exams and demands we place on future teachers.

## Acknowledgements

This work was supported by Slovak grant agency of Ministry of Education VEGA 2/0064/13 "Decision making of experts: Using intuition for solution of strategic tasks" awarded to Vladimíra Čavojová.

## References

- Cianciolo, A. T., Grigorenko, E. L., Jarvin, L., Gil, G., Drebot, M. E., & Sternberg, R. J. (2006). Practical intelligence and tacit knowledge: Advancements in the measurement of developing expertise. *Learning and Individual Differences*, 16(3), 235–253. doi:10.1016/j.lindif.2006.04.002
- Čavojová, V., & Belovičová, Z. (2010). Nakoľko praktická je "Praktická inteligencia"? In *Kognitívny portrét človeka* (pp. 122–142). Bratislava: Ústav experimentálnej psychológie SAV.
- Ekinci, B. (2014). The relationships among Sternberg's triarchic abilities, Gardner's multiple intelligences, and academic achievement. *Social Behavior and Personality*, 42(4), 625–634.
- Fagan, J. F., & Holland, C. R. (2009). Intelligence Culture-fair prediction of academic achievement. *Intelligence*, 37(1), 62–67. doi:10.1016/j.intell.2008.07.004
- Gottfredson, L. S. (1997). Why g Matters: The Complexity of Everyday Life. *Intelligence*, 24(1).
- Grigorenko, E. L., & Sternberg, R. J. (2001). Analytical, creative, and practical intelligence as predictors of self-reported adaptive functioning: a case study in Russia. *Intelligence*, 29.
- Halama, P., & Tomková, E. (2005). Subtesty intelligenčného testu IST-70 ako prediktory školského výkonu v rôznych typoch stredných škôl. In I. Sarmány-Schuller & M. Bratská (Eds.), *Psychológia pre život - alebo ako je potrebná metafoia* (pp. 511–515). Bratislava: Stimul.
- Klose, J., Černochová, D., & Král, P. (2002). *Videňský maticový test*. Praha: Testcentrum.
- Malá, I., & Čavojová, V. (2009). Vzťah praktickej a akademickej inteligencie ku školskému výkonu rómskych a nerómskych detí. In I. Sarmány-Schuller & M. Bratská (Eds.), *Premeny psychológie v európskom priestore : 27. Psychologické dni* (pp. 432–436). Bratislava: Stimul.
- Stanovich, K. E. (2009). *What Intelligence Tests Miss. The Psychology of Rational Thought*. New Haven, CT: Yale University Press.
- Stanovich, K. E. (2011). *Rationality and the Reflective Mind*. New York: Oxford University Press.
- Sternberg, R. J. (1999). A Triarchic Approach to the Understanding and Assessment of Intelligence in Multicultural Populations, 37(2), 145–159.
- Sternberg, R. J. (2003a). A Broad View of Intelligence The Theory of Successful Intelligence, 55(3), 139–154. doi:10.1037/1061-4087.55.3.139
- Sternberg, R. J. (2003b). Intelligence: can one have too much of a good thing? In E. C. Chang & L. J. Sanna (Eds.), *Virtue, vice, and personality: The complexity of behavior* (pp. 39–51). Washington, DC, US: American Psychological Association.
- Sternberg, R. J., Castejón, J. L., Prieto, M. D., Hautamäki, J., & Grigorenko, E. L. (2001). Confirmatory Factor Analysis of the Sternberg Triarchic Abilities Test in Three International Samples: An Empirical Test of the Triarchic Theory of Intelligence. *European Journal of Psychological Assessment*, 17(1), 1–16.

- Sternberg, R. J., Forsythe, G. B., Hedlund, J., Horvath, J. A., Wagner, R. ., Williams, W. M., ... Grigorenko, E. L. (2000). *Practical intelligence in everyday life*. New York: Cambridge University Press.
- Sternberg, R. J., Nokes, C., Geissler, P. W., Prince, R., Okatcha, F., Bundy, D. A., & Grigorenko, E. L. (2001). The relationship between academic and practical intelligence: a case study in Kenya. *Intelligence*, 29, 401 – 418.
- Sternberg, R. J., Wagner, R. K., & Ree, M. (1993). The g-ocentric View of Intelligence and Job Performance Is Wrong, (June 1992), 86–89.
- Williams, W. M., Blythe, T., White, N., Gardner, H., & Sternberg, R. J. (2002). Practical Intelligence for School : Developing Metacognitive Sources of Achievement in Adolescence, 210, 162–210. doi:10.1006/drev.2002.0544

# Dyslexia: an educational project in the sound and music scope

Anna Maria Ferrone\*, Stefano Olivi\*\*

*\*Conservatorio Statale di Musica "G. Rossini", Pesaro, e Università degli Studi "G. d'Annunzio", Pescara, Italia*

*\*\*Istituto Comprensivo "Marchetti", Senigallia, Italia*

---

## Abstract

The project is split in eleven different units, one after the other following different difficulties levels. They can be used both for education and support, if several cases of dyslexia are present in a class. In this aforementioned circumstance, times of action will be different according to the personal difficulties of each subject (student). The course is based on the "problem solving" technique. The letters of the alphabet, revised in more passages, will be materialized/understood by the child in more ways: from attentive and concentrated listening to both vocal and gestural proposals, they will be first understood by the child through movements of his body and then materialized by the child using different materials. Reading and writing will be the final step of the process.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* dyslexia; educational project; mental image; sound scope

---

## Introduction

The protocol is divided in:

1. Evaluation survey of sound reception: applied screening which will support the set used to identify the subject affected by learning disability; it is divided in:
  - sheets for the students
  - sheets for the expert with the correct operations
  - instructions for the expert and operating notes
  - tab for the complete record of the score for every subject
  - a CD including all the tracks for the process can be requested contacting the publisher DIENNE.

\* Corresponding author. Tel.: +0-000-000-0000

E-mail address: camerlengo-ferrone@libero.it

2. Building up the educational project "reading, writing and dyslexia in the sound and music scope"

## Clarifications

Leaving out the description of the meaning of the term "dyslexia", accepting the one proposed by doctor, psychologists and experts, we identify both the screening and the operational intervention as actions devised within the sound and music scope and not like a therapy evaluated in the medical and pharmacological area.

In our research we might suppose that the actions (attributed to the linguistic and sign practice) follow the same path of the operations that we used, related to the discovery and assimilation of sound, determining the passage to more complex mental processes, leaving behind the field of natural history of psyche to enter the one of historical formation of behavior.



The operation cannot be conducted in a single and repetitive elementary memorization, but resolved into an indirect action where the relationship between stimulus (sound – language) and sign (writing) can be intimately known and assimilated through a process of integrating facts where the child practically with his own body, voice or other objects, identifies the validity and comprehensibility of the meaning of what there is to learn and then to transcribe.

The observation of a series of activities related to the process in question let us note, in this regard, more details and reflections, first of all we understand that the operation, referring to the assumption of sign-writing is certainly the result of a complex and historical process mental and behavioral process, prolonged and "modulated" in time, following the laws of evolution of the human psyche. The meaning of what we just expressed focuses, particularly, around the sign product meant not much like the fact that the operations may be created or invented by children or transmitted as rules by adults, but are organized in a series of situations and references which are not signs. Quite the contrary: they become signs after several transformations and indirect actions, of a qualitative-interpretative nature, intermediaries and conditioning, each time, the last stage reached.

And here, in the educational and housing process undertaken, the first sound that reaches our sensory apparatus (thanks to hearing) is going to be revisited in vocal and gestural interpretation, not separated from those fundamental qualities and characteristics which are actually underlined and consolidated in other forms of language that, through our body and a series of actions called "transformatives", subsequently organize themselves permanently in our memory.

In the process, from an initial phenomenological and natural contact to an external mediation (structured in the creation of more forms and situations, possibly concrete and appropriate to the original subject), a second transformation of the sound object in question is realized, now intended in more ideas or mental images (internal this time), appropriated by the intervention of memory.

In this operation, called "introjection", the passage from verbalization to the sign corresponding to it, in the specific moment of writing, the sound, intended as one with its meaning, will be understood and made his own by the subject, almost in some other form or manner.

The codes, expressed in various languages, will be highlighted by the child while his superior psychic functions will reorganize the previous operations, elaborated again in a continuum of episodes not separated from each other.

The screening (step 1 of the process) proposes 11 steps, which are necessary to the expert as an act of information about the skills and "hearing" characteristics (revealed in advance or already present) of the subject, to be verified prior to operative and supporting interventions which will extended and administered in a later moment.

Substantively on the identification of a "spacial" sound that the event perceived mentally determines into the subject; on the comparison of multiple items or situations with similar or opposite characteristics; on the discovery of the meaning of quantity, related to the number of events, many or few, contained, for both cases, in a same period of time; on the ability to test more "melodic phrases" structured into uniform, circular or fragmented and disjointed forms; on the possibility of verifying the characteristics of height, intensity and timbre of the sound.

Finally, on the chance to interpret what is perceived, both free and vocally, through the production of more sounds with the letters of the alphabet, which, as already established in the operative part, will then be sought, assimilated and appropriated. A final table finish this test, indicating an overall score obtained by the pupil on his auditory – behavioral skills. The result will then be processed by the operator who will be able to approach the student with more attention and accuracy.

### **Hypothetical formulation of process (Educational operative units)**

#### *Experience of the "auditive minute"*

- a) The child stresses and perfects the auditory act;
- b) The child revisits what is perceived through the technique of vocal imitation and not;
- c) The child draws, creating his own graphic language, as perceived and described anew. He will try to represent the sounds in question, in a sign that (it is assumed) will represent pertinently in relation to

what he perceived.

### *Sign analysis*

In our previous experience, structured like a game, the child is immediately involved in a "sound atmosphere" where, for example, through the perception of his breathing and heartbeat, he himself becomes sound event. This moment, longer or shorter depending on the age of the subject, will feature a series of episodes that will be placed in succession to emerge now more with sound than with the action or description of the source that has generated and determined it. The sign used, associated with each perceived sound, will rebuild the situation or sound story while living it. Finally, in respect of what has occurred, it will describe, in the best conditions, features, all creating the same event and not the source of reference. Of course, the signs will be many and varied, even if, for most of them (even with variables), it will be used the same tools that, translated into symbols, will rebuild those basic graphic elements shown in the lines, dots and various surfaces.

### *Extrapolation of sign's constants and variables*

The child will closely observe the latter by associating, with a good guide, for each one, more segments and particularity, assimilating and enriching them in the description of numerous attributes verbally noticeable in the lexicon of literary language in question.

### *Construction of constants and variables with actions*

From a visual approach we will start the construction of motor-gestural elements previously emerged through the use of your own body. In this case the child will internalize what it is being created meanwhile, feeling through the movement and, especially, through the muscles, the angularity (if present), softness, size, rigidity and anything else of the sign structure so far recorded locally and graphically.

### *Construction of the element with materials*

The gestures recorded here, will be subsequently reshaped in the construction and use of particular materials such as, for example, clay, also of different color. The hands, interpreted in the continuum of the previous action, but this time in a more detached way from the body, create the object in question (as further mental representation) which will reconfirm those features previously extracted and highlighted by the material used.

### *Graphic presentation of the elements, according to standards for sounds-objects of the Italian language*

This unit will now go to the graphic description "of the object-letter" describing it both in capital and italics letters.

### *Link between sign-sound and vocal performance*

In the graphic description of the signs used for the letters of the alphabet, the child vocally produce the corresponding sound, practicing reading thanks to the passage of the same letters in different situations from those shown in uppercase and lowercase, for example, distinguishing with precision in the categories of the italics and the capitals.

### *Sign and sensory representation of letters and/or syllables related to the sounds previously considered*

In this case, through particular exercises, the children will create with their own bodies those letters of the alphabet which, specifically and vocally (related to the objects in question each time indicated) they highlighted. The letters will be modeled with plasticine or similar material to be recognized by the child, with his eyes closed, through touching.

### *Intertwining of the elements involved determining the reconstruction of the letters of the alphabet*

From the union of the segments mentioned above, thanks to the guidance of the teacher, we will recompose all the specific letters of the alphabet that, during a test, will be recognized by the children with eyes closed and, each time, pronounced.

### *"Building up" words*

With more letters the child will create, with the help from a teacher, from time to time, more words representing those things and situations of his own experience or other onomatopoeic terms. This allows the teacher, later on, to show images which the child will be able to recognize immediately and easily. With more letters the child will create, from time to time, more words, thus determining short phrases first, then move on to other more structured long periods, divided into primary and secondary.

### *Identification of more poetic texts, composed by famous Italian writers, already at their disposal, initially short ones (possibly belonging to children's literature), or even created by the students*

For this unit we suggest to the reader to check "Percorso didattico pedagogico relativo all'educazione alla voce ed al canto" from the book "Percorsi didattici musicali e d'integrazione scolastica in ambito musicoterapeutico" by Anna Maria Ferrone (published by SO.SE.M.M. – now DIENNE, Trivento), thereby producing more words and phrases that relate to the content you want to emphasize. For brevity we denote therefore the use of recitative manner mentioned therein, emphasizing the classical, syllabic, of content declamation, accompanied by choral and vocal sound.

### *Reading and writing exercises to consolidate what has been recently learned*

This unit must be interpreted as the final moment of the path traced here, meant, finally, with the conscious learning acquisition, aimed in the practice assumption (faster this time) of writing, reading and dictation of the literary "alphabetic code".

## **References**

- Ferrone, A.M. (2003). *Percorsi didattici musicali e d'integrazione scolastica in ambito musicale terapeutico*. SO.SE.M.M. edizioni (ora DIENNE edizioni).
- Ferrone, A.M & Olivi, S. (2011). *L'elemento sonoro quale processo interdisciplinare nella scuola primaria in ambito didattico educativo (1° volume)*. DIENNE edizioni.

# "Exploratory" and "descriptive" aspects of environmental psychology course within the interior design education

Meryem YALÇIN<sup>1</sup>

TOBB Economy and Technology University; Fine Arts, Design and Architecture Faculty; Interior Architecture and Environmental Design,  
Söğütözü cad. No:43, 06560 Söğütözü/Ankara; Phone: +903122924560; e-posta; myalcin@etu.edu.tr

---

## Abstract

Identifying human attachment to the environment by developing different degrees, spatial ranges and dimensions, this study aims to further the growing body of knowledge about the discipline of Environmental Psychology within the process of interior design solving problems. Environmental Psychology provides an analytic point of view up on the existing built environment with a rich and diverse set of quantitative indicators for characterizing spaces in many ways that are potentially relevant to a variety of psychological responses, including choosing routes while locomotion, orientation and disorientation, spatial knowledge acquisition, perceived spaciousness, privacy and social interaction, stress and fear, and aesthetic judgments (Kolb, 1984). Experimental Learning Theory defines learning as "the process whereby knowledge is created through the transformation of experience". This study makes the emphasis on "exploratory" and "descriptive" aspects of the Environmental Psychology within the real life context, providing comprehensive information to be inferred and issued in a complementary manner in interior design education. In such a way that; viable physical environment, social organization and norms, characteristics of people objectives are to determinants empirically whether, and how the use of experience and practices can improve design problem-solving by both novice and expert designers. In this context, this study presents applied samples and outcomes of course works of case-based instruction and its description development to be applied as medium synthesizing and/or assimilating with various observations for new idea generation process of design.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords: 1. Environmental Psychology, 2. Exploratory and Descriptive, 3. Design Education.*

---

## 1. Introduction

Environmental psychology is that branch of psychology that studies the relationship between people and the socio-physical features of the built and natural environment, in order to enhance human wellbeing and to improve human-environment relations. It emerged as an autonomous field of scientific inquiry at the end of the 1950s and during the 1960s. Environmental psychology is the study of the impact of the physical environment on people and the impact of people on the physical environment. It is an area of applied psychology, although a substantial portion of the research is devoted to theoretical and methodological development. A research problem in environmental psychology has three facets: the molar environment, the psychological characteristics of persons (or groups), and the intra-person psychological processes. Major research focuses include acquisition, representation, and use of spatial and non-spatial knowledge in environmental choice. In this context, the course of Environmental Psychology covers subjects such as perception, cognition, personal space, privacy, territoriality, crowding, way finding and spatial orientation and aims to improve students' knowledge about human behaviour, people and their interaction with the environment (interior/exterior). Examination of the interrelationship between environments and human behaviour is among the objectives of the course. Definition of the terms including environment, natural environment, social settings, built environments, learning environments and informational environments helps to explore and define design parameters affecting humans interaction with their social and physical environment. *Experimental Learning Theory* defines learning as "the process whereby knowledge is created through the transformation of experience".

This study makes the emphasis on "**exploratory**" and "**descriptive**" aspects of the Environmental Psychology within the real life context, providing comprehensive information to be inferred and issued in a complementary manner in interior design education. In such a way that; viable *physical environment, social organization and norms, characteristics of people* objectives are to determinants empirically whether, and how the use of experience and practices can improve design problem-solving by both novice and expert designers.

## **2. The course of environmental psychology within the design education**

In design education, learning and teaching methods aim to balance the creative process with a critical awareness of more objective criteria in the development of a proposition. Each design outcome tends to be unique, non-repetitive and immanent in its conception and development (Demirbas, Demirkan, 2007; 2003) . The rationale of the curriculum has to enable the students to build up a model that will guide them to understand and apply the knowledge, skills, process and theories of design and to provide a balanced synthesis between the artistic, technological and humane aspects of the profession (Demirbas, Demirkan, 2007; 2003). For this reason, design students have to identify and cognize these circumstances. Although the studies classify different learning types and/or styles in different ways, their aims and approaches are similar. Felder (1996) claims that since the instructional approaches around the cycle of learning models are similar, it is not important, which learning style instrument has been chosen. Among the various learning style theories, Kolb's (1984: 41) ELT that defines learning as "the process whereby knowledge is created through the transformation of experience. [and in which] Knowledge results from the combination of grasping and transforming experience" was chosen to underpin this study. ELT suggests that learning is a cycle that begins with experience, continues with reflection and later leads to action, that becomes a concrete experience for reflection (Kolb, 1984). In the Experiential Learning Model, there are four phases of the learning cycle, namely concrete experience (CE), reflective observation (RO), abstract conceptualization (AC) and active experimentation (AE) (Demirbas, Demirkan, 2007; 2003; Boyatzis, Mainemelis, 1999).

### **2. 1. David Kolb's Learning Style Inventory**

In 1971 David Kolb developed the Learning Style Inventory (LSI) to assess individual learning styles. While individuals tested on the LSI show many different patterns of scores, research on the instrument has identified four statistically prevalent learning styles -- Diverging, Assimilating, Converging, and Accommodating.

*Diverging:* The Diverging style's dominant learning abilities are Concrete Experience (CE) and Reflective Observation (RO). Research shows that they are interested in people, tend to be imaginative and emotional, have broad cultural interests, and tend to specialize in the arts. In formal learning situations, people with the Diverging style prefer to work in groups, listening with an open mind and receiving personalized feedback.

*Assimilating:* The Assimilating style's dominant learning abilities are Abstract Conceptualization (AC) and Reflective Observation (RO). Individuals with an Assimilating style are less focused on people and more interested in ideas and abstract concepts. Generally, people with this style find it more important that a theory have logical soundness than practical value.

*Converging:* The Converging style's dominant learning abilities are Abstract Conceptualization (AC) and Active Experimentation (AE). They have the ability to solve problems and make decisions based on finding solutions to questions or problems. Individuals with a Converging learning style prefer to deal with technical tasks and problems rather than with social issues and interpersonal issues.

*Accommodating:* The Accommodating style's dominant learning abilities are Concrete Experience (CE) and Active Experimentation (AE). They enjoy carrying out plans and involving themselves in new and challenging experiences. Their tendency may be to act on "gut" feelings rather than on logical analysis. In solving problems, individuals with an Accommodating learning style rely more heavily on people for information than on their own technical analysis (Kolb, Boyatzis, Mainemelis, 1999).

Students with different learning style perform differently depending on the examination format. Therefore, different

assessment strategies are required for measuring overall performance of students. When all courses across the design curriculum are taken as a whole, it is possible to propose that all learning styles should be considered in design education. Since it is claimed that design studio is the combination of all other courses in design education. Interior design needs to develop various types of criticism of the interior environment. Implicit, exploratory, or interpretive criticism (Demirbas, Demirkan, 2007; 2003; Boyatzis, Mainemelis, 1999). The purpose of this type of criticism will be to explain the meaning and structure of the environment to enhance the experiential qualities of the visitor or user, resulting in greater societal appreciation of the benefits gained from qualified interior design and increasing the value of the interior designer. This style of criticizing provides subtle point of abstract student learning in design education.

### 3. The course of environmental psychology and student projects

Inherently, the course of 'Environmental Psychology' provides Interior Architectural students the accumulation of knowledge to understand and criticize humans responses within their environment and assessing human ware interior design projects. This course help student to examine the following issues;

- Introduction: space, human behaviour, design,
- Scope of environmental psychology: history, theories, research methods,
- History of environmental psychology: human evolution and adaptation to the environment,
- Theories and research methods: Barker, Maslow, observation, interview, simulation,
- Human behaviour: fundamental processes, Environmental Attitudes, Appraisals and Assessments,
- Spatial behaviour: elements of environmental perception, legibility, orientation, way finding,
- Cognitive process: perception and cognition, cognitive mapping, information processing,
- Privacy, territoriality, density, crowding, control,
- Socio-economic aspects: status, wealth, age, gender,
- Cultural aspects: gender, age, country, cultural background,
- Technological aspects: virtual environments, interpretation of information transportation, new materials,
- Design aspects: impact of human need on design, impact of design on human behaviour,
- Future implication (Bozdayı, 2004).

The design projects discussed in this paper helped students understand the cultural, social, economic, and political realities of societies and the ways in which these issues impact design. While previous studies have discussed and illustrated the significance of integrating global issues and divers issues in the design process in different socio-demographic settings. This paper illustrates global design issues having examined by student through existing spatial design in different functional settings. Additionally, students are helping to address design problems specific to these parameters.

As mentioned these issues helps to develop a point of view and interdisciplinary multi dimensional recognition how a design problem is handled. And this accumulation of knowledge is processed on various interior spaces like hospital rooms, restaurants, hotel rooms, preschools etc... by students. handling parallel functional solutions in divers psycho-social settings provide them to realize and recognise how diverse design perspectives are introduced, and abstract inclusion, contribution, and transformational issues of demographic elements are concretized. The projects, outcomes and impacts on students taken this course are as following:

### 3. 1. Student Project's held within the course of Environmental Psychology

Drawn up on the knowledge of human-environmental interaction, this study offers discussions and analyses which were examined by 83 junior interior architecture and environmental design students and 38 other departments' students of the 2011/2012 Summer, 2012/2013 Autumn and 2012/2013 Summer semesters from the course of 'İÇT 307 Environmental Psychology' at TOBB ETU located in Ankara, Turkey. In the context of viable *physical environment, social organization and norms, characteristics of people* objectives which are the determinants empirically whether, and how the use of experience and practices can improve design problem-solving by both novice and expert designers. In this context, this study presents applied samples and outcomes of course works of case-based instruction and its description development to be applied as medium synthesizing and/or assimilating in different human-environment setting within various observations for new idea generation process of design. Connected with these issues consecutive cultural variables have examined as following.

In such a way that aspects of interior design, expands their parameters beyond style, function, objects, spaces, and finishes which are **"Exploratory" and "Descriptive" aspects**. These are describing a dynamic systems view of interior design, incorporating criteria that warrant consideration when designing spaces for both living systems, as defined by human activity, and artefacts (Davey, 2008; Rapoport, 2001; Gür, 1996; Gürkaynak, 1996). Besides; human imagination, expression, and the interrelations within and among global the means of modelling the natural, social, and the values and histories underlying societies globalism, a comprehensive consideration of events, actions and consequences, is affecting the interior design profession whether interpreting clients needs, designing and planning diverse spaces, specifying final version, or constructing the interior built environment (Bozdayı, 2004; Gustafson, 2001; Bell, Fisher, Baum, Greene, 1996; Hasell, Scott, 1996). These are also identifiers of a comprehensive approach so that abstract thought and images may be directed beyond specific application, and generalizable theories become a possibility. In this respect most significant student works are described and summarized as following;

3. 1. 1. Hospital, Delivery room: Students identified especially in the new born rooms mothers draws very much attention to interior design and decorations to attract people. Student have experienced here how interesting people can react in some special cases such as; mother considers appearance of the room before or besides health consequences which is actually more important.



Images 1-2. Delivery room of the Medicana Hospital, Ankara Turkey, Sample of a student work for the spatial reflection of the contemporary expectations and requirements of new mother.



Images 3-4. Medicana Hospital, a very luxurious delivery room.



Images 5-8, Delivery rooms in Europe and Turkey.

3. 1. 2. Restaurants: Students who have studied the restaurants have examined and compared traditional and contemporary popular restaurants. They have identified traditional features are interpreted in terms of contemporary requirements and expectations and besides new popular ones tries to catch a continuity in Institutional Identity. They found out even ethical or franchising restaurant image or spatial identity varies in terms of socio-economic parameters. On the other hand Traditional restaurants had to adapt new condition and its spatial reflections are recognised by students.





Images 9-10. Uludağ restaurant, a traditional restaurant with a contemporary attempts.



Images 11-14. Washington Restaurant (Yalçın, 2011).



Images 15-16. Tike Restaurant in Panora Mall, Ankara (Yalçın, 2008).



Images 17-18. Scene of the dining hall of Panora Mall (Yalçın, 2008).



Images 19-20. Ethnical samples of Italian 'Pastarito' and Mexican 'Cantina Mariachi' restaurants in Panora Mall, Ankara (Yalçın, 2008).

3. 1. 3. Doğramacızade Ali Paşa Mosque: granted by Doğramacı Foundation in Ankara, is inaugurated for community use in September 2008, in Bilkent, Ankara. The mosque has a unique architectural style in such that the Architect differentiates classical understanding of mosque image by his eclectic imitation with an aim of bringing more quality to the classical model. This structure is not only a mosque, the worship building is planned to serve for Christian and Jewish uses as well. The complex houses multi-functional facilities including concert, conference and exhibition uses. With its exclusive architecture, technology and respect towards different beliefs and religions, the structure brings a new understanding to the Mosque typology. All these features makes this structure valuable and comprehensive for assessing different cultures, functions and design solutions at once for students .



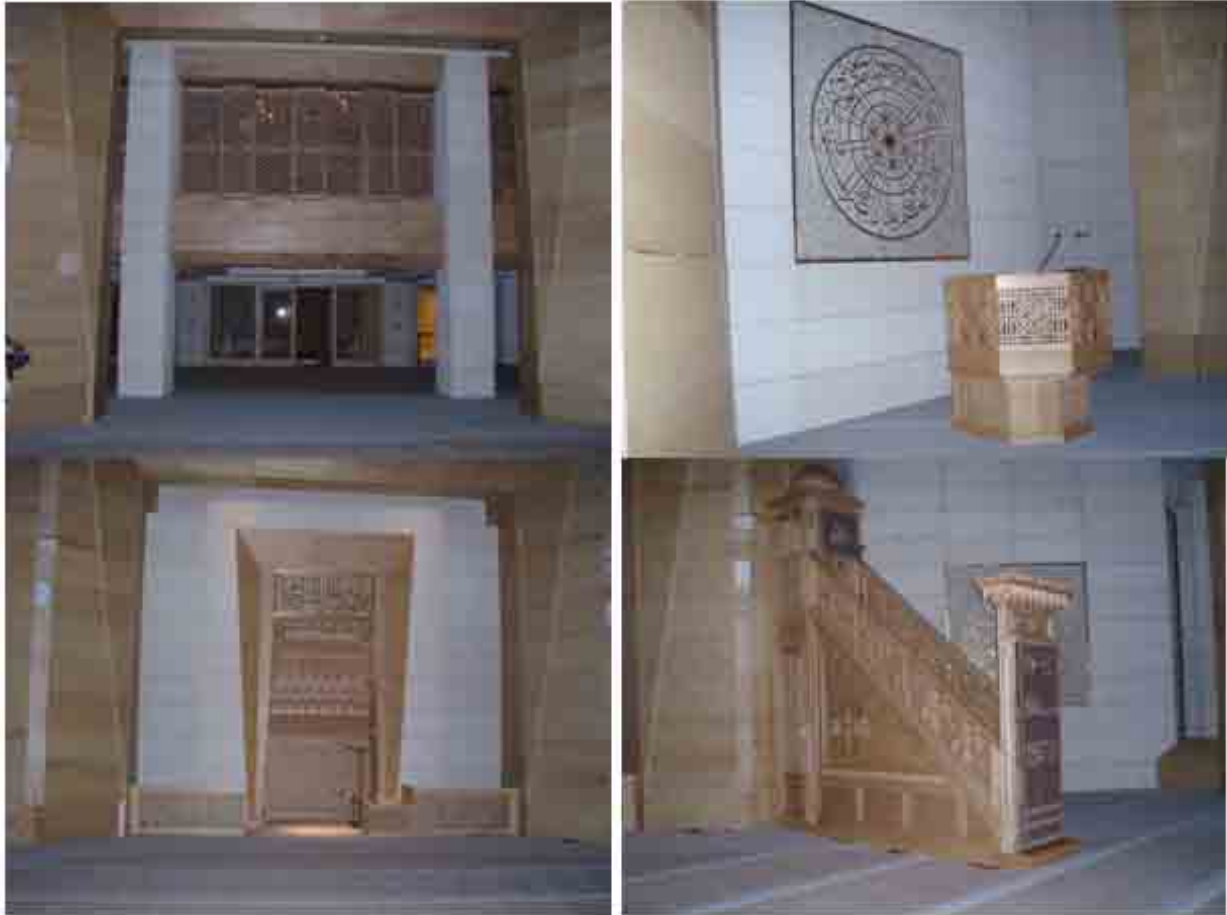
Images 21-22. Doğramacızade Ali Paşa Cami, Exterior view



Images 22-25. Doğramacızade Ali Paşa Mosque, Entrance door, window detail, shoe cases, and praying corners of the Muslims.



Images 26 -27. Doğramacızade Ali Paşa Mosque, Dome detail and its interior atmosphere



Images 28-31. Doğramacızade Ali Paşa Mosque, general atmosphere and stages where the imam makes his speeches.

On the other hand, If the value of an interior environment is to be defined by its effectiveness, serviceability, affordability, beauty, satisfaction, and delight and if the designer's work is to demonstrate how all of these contribute to productivity and environmental satisfaction, then what are some of the questions that need to be addressed to get at these issues in accordance with the psycho-social circumstances (Davey, 2008, Gustafson, 2001, Fransson, Gearling, 1999; Kostof, 1995), critical reviews of interior environments should be analyzed according to the following items to the design problem:

- The relationship between the design program and the end users' perception and evaluation;
- The facility's contribution to supporting the values of the end users;
- The facility's contribution to promoting the quality of life of the users;
- The manner in which the design solution addresses contextual issues, such as economic, historic, environmental impact, political, and social, within a global context;
- The manner in which aesthetic issues reflected in the design solution address performance issues (e.g., social, physical, psychological, economical, flexibility), contextual issues, and issues of social relevance;
- The manner in which the totality of the whole environment evokes emotions of satisfaction and delight for its end users; And, in addressing the above issues, how the design solution reflects evidence of originality (Asojo, 2001).

## 2. 2. Findings and Discussion

The process of conducting this type of research, and the role that the behavioural scientist can play in the translation of subsequent information for use by the designer, is consistently dealt with throughout the document. Environmental programming is developed as the common area of interest that would draw the researcher and designer into meaningful interaction.

As result the findings of students; this study explores the human-environmental issues definition through elements have concretized abstract element in their mind which is a systematic inquiry in to international, educational, and design literature revealed recurring issues that impacts the interior design problem and, therefore, interior design education. Identification of these issues allowed student to identify subtle issues which include space identity, contemporary and social reflection of spatial items, interdisciplinary elements, international concerns, technology integration, and scholarship activities. (Knieling, Othengrafen, 2009; Khaslavsky, 1998; Dickson, White, 1997; Proshansky, 1978; Proshansky and Fabian, 1987; Proshansky *et al.*, 1979, 1983, 1995). Psycho-Social factors affecting people, directing spatial design and identity that student were asked to establish their analysis providing **"Exploratory" and "Descriptive" aspects** to the design problem. These descriptive indicators in different psycho-social settings that student found out are as following;

- **Spatial Identity:** Institutional identity, concept, spatial image, design perspective, function
- **Economical Factors:** Material, budget, costumers, spatial identity, function.
- **Physical Factors:** Spatial requirements, materials, location, space organization, function, openings, climatic.
- **Social Factors:** Human expectations and requirements, conceptual design, function, spatial allocation of environment(Bozdayı, 2004; Bell, Fisher, Baum, Greene,1996),

This analytic study showed the instructors that students gets a deeper understanding and tangible knowledge as the result this method. It provided a process-way of thinking during which the many elements, issues, possibilities, and constraints of interior design knowledge are integrated.

### 3. Conclusion

To sum up people develop affective relationships in various contextual index with their environment deeply and in layered functionalities. These relationships provide not only emotional and psychological affordances, but also cognitive and social affordances which satisfy sense of place, integrate and enable engagement (Davey, 2008; Zimmerman, Stumpf, 2004; Rapoport, 2001). As mentioned before configuring environmental design criteria's for the end-user covers many aspects such as socio-economic items, values, beliefs, social environment, physical setting, aesthetic, location etc. Within the human-environment interaction (Gür, 1996).

There is presently limited body of literature comprising "environmental psychology" as a tool of description atmospheric interior design solution. There are, however, many theoretical approaches from related fields that have application to the field of interior design. Program must provide learning experiences that address diverse perspective and approach to thinking and problem solving (viewing design with awareness and respect for demographic and psycho-social differences of people; understanding issues that affect the interior environment; understanding the implications of conducting the practice of design within a world market).

As mentioned deeply in the previous sections students have examined spatial reflections; different psycho-social items in the identical functional interior environmental settings; under the headings of *Spatial Identity, Economical Factors, Physical Factors and Social Factors*. (Zimmerman, Stumpf, 2004; Fransson, Gearling, 1999).

### References

- Bechtel, R. B., (1997), *Environment & Behavior An Introduction*.  
 Bell, P., Fisher, J., Baum, A., Greene, T., (1996), *Environmental Psychology*, Ft. Worth, TX: Holt, Rinehart&Winston.  
 Boyer, E. t., & Mitgang, L. (1996). Building Community, "A New Future for Architecture Education and Practice". Princeton, New Jersey: The Carnegie Foundation for the Advancement of Teaching.  
 Bozdayı, A. M., (2004)" *İç Mekan ve İnsan*." Hacettepe Publications.  
 Davey, J., (2008), "Educating Design Intuition: a Survey of Problem Solving Methods used in Architecture and Interior Design



- Studios*", Online Journal of Workforce Education and Development Volume III, Issue 1, College of Applied Sciences, Southern Illinois University Carbondale. Dickson, A., W., White, A., C. (1997). "Interior Design Criticism: Developing a Culture of Reverence for the Interior Environment", Interior Design Educators Council, Journal of Interior Design 23(1): 4-10.
- Fransson, N., Gearling, T., (1999), "Environmental Concerns: Conceptual Definitions, Measurements Methods, and Research Findings" Journal of Environmental Psychology 19, 369-383.
- Gustafson, P., (2001), "Meanings of Place: Everyday Experience and Theoretical Conceptualization" Journal of Environmental Psychology 21, 5-16.
- Gür, Ş., Ö., (1996). "Mekân Örgütlenmesi"
- Gürkaynak, İ. (1988). "Çevresel Psikoloji: Doğası, Tarihçesi, Yöntemleri". Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi, 21(1)1-9.
- Hasell, M. J., & Scott, S. (1996). "Interior design visionaries", 1-14.
- Kolb, A. Y., & Kolb, D. A. (2005). *Learning styles and learning spaces: enhancing experiential learning in higher education*. Academy of Management Learning and Education, 4, pp193-212.
- Kolb, D., Boyatzis, R. E., Mainemelis, C., (1999), "Experiential Learning Theory: Previous Research and New Directions". Department of Organizational Behavior Weatherhead School of Management Case Western Reserve University, pp. 1-40.
- Kolb, 1984 D.A. Kolb Experiential learning: *Experience as the source of learning and development* Prentice Hall, Englewood Cliffs, NJ (1984)
- Kolb, 1999 D.A. Kolb Learning style inventory. Version Hay/McBer, Boston.
- Proshansky, H. M. (1978) The city and self-identity, *Environment and Behaviour*, 10, 147-169.
- Proshansky, H. M., Fabian, A. F. and Kaminoff, R. (1983) "Place identity: physical world socialization of the self", Journal of Environmental Psychology, 3, 57-83.
- Proshansky, H. M., Fabian, A. F. and Kaminoff, R. (1995) "Place identity: physical world socialization of the self", In: D. Canter (Ed.), *Readings in Environmental Psychology. Given Places Meaning*. London: Academic Press.
- Rapoport, A. (2000), "Culture, Architecture and Design", Locke Science Publishing Company, Inc.
- Yalçın, M., (2008) "The Determiners in Identity Formation of the Dining Spaces within the Context of Human-Environment Interaction" Master's Thesis, Hacettepe University, Ankara.
- Yin, R. K. (1994). "Case Study Research: Design and Methods" (2nd edn.). Thousand Oaks, CA: Sage.
- Zimmerman, D. & Stumpf, K. (2004). "Taking the lead in collaborative international interior design education: Finding the common ground between disciplines". IDEC International Conference Proceedings, 31 -32.

# 8<sup>th</sup> Grade students' attitude towards technology

İsmail Yazar, Kerim Karabacak<sup>1</sup>

<sup>1</sup>*Sakarya University Faculty of Education, Sakarya, Turkey*

---

## Abstract

The aim of this study is to investigate eighth graders' attitude towards technology by gender, type of school (state and private), type of preferred high school, and technological devices owned. The study was carried out with 300 eighth graders in Büyükçekmece town of İstanbul during 2013-2014 education and instruction year. "Technology Attitude Scale" was administered to participants. Study data were analyzed by using SPSS 18. It was found out that there is a significant difference between types of school the students attend in relation with the "Negativeness of Technology" subscale only, whereas gender made a significant difference across the scale as well as three subscales except for "Contribution and Importance of Technology". Students' overall attitude towards technology, disadvantages of technology and their tendency to technology showed a significant difference according to the type of high school for which the students prepare. Such difference was in support of the participants preparing for science high schools. In addition, it was seen that those having technological devices had higher attitude scores than the others. Specifically, significant difference was found between those having and not having tablets in the second subscale, which is "Disadvantages of Technology".

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* Middle school students, Technology, Attitude, Technology Attitude

---

## 1.Introduction

Technology as one of the essential needs of today's people has been a prominent factor shaping our lives. Today technology is so influential that technology is defined as an area covering all of the social and economic activities and organizations envisaging putting into practice of technical knowledge (Erdemir, Bakırcı & Eyduran, 2009). Human beings have applied to technology in relation with almost any activity of them and improved it in parallel with certain needs and experiences. Thanks to the technology, individuals and societies could be stronger in the face of phenomena and happenings, and their life became easier (Şemsettin & Odabaşı, 2004).

It goes without saying that technology plays an important role in our life. Its definition is given by contemporary dictionary of Turkish Language Society as a collection of tools and equipment developed by human beings to control and change their material environment and knowledge regarding them. In public opinion held by Pearson (2006) in the United States in 2004, 1000 adults were asked about the immediate association of technology in their mind. 68 % of the participants mentioned computer, 5 % electronics, and 2 % mentioned internet. It was seen that consciousness about technology has not been raised yet (Oktay & Çakır, 2012).

Almost embedded in human life, increased technology use is involved in many areas including communication, which also speeded use of technology in education (Altun, 2011). Technology has played an effective role for improvement in education (Akkoyunlu, 2002). It is known that all societies primarily including developed countries struggle to provide high quality education for their members by using the technology. Turkey is not an exception in that struggles towards improving education and instruction processes with computer and computer-based technology are increasingly ongoing (MEB, 2005). Interacting with each other, education and technology are quite important in today's education system. Despite the fact that all of the educational problems cannot be solved with technology alone, it is known that any instruction approach lacking technological support affects achievement negatively; thus, using technology and computers in today's education (Erdemir, Bakırcı &

Eyduran, 2009; Çelik ve Kahyaoğlu, 2003) has been compulsory. Reasons for using computers in education are listed as reinforcing learning, helping learners form their own knowledge, motivating learners and increasing flexibility of curriculum (Hançer & Tüzemen, 2008).

Devices such as computer, internet, mobile phones and television occupy a considerable place in our lives, and thus the large amount of time we spend on them implies the importance of technology for our life (Bacanak, Karamustafaoğlu & Köse, 2003; Aydoğan, 2013). Today some students constantly use various technological devices such as computer, internet, tablets, video, CD's and mobile phones. It is likely that challenges will emerge unless educational institutions and teachers can improve students' skills for using existing technological devices and raise consciousness of using them properly (Aksoy, 2003; Reiner, 2009). Thus, a big task falls to teachers for adapting technology to education because the attitude towards technology raised by teachers, their efforts to use technology and skills of using it will inevitably affect students' using of technology and their attitude regarding it (Oktay & Çakır, 2012). Research shows that those investing more time and effort on using of technology and computers in education have positive self-confidence and efficacy (Rugayah, Hashim&Wan, 2004 cited by Erdemir, Bakırcı & Eyduran, 2009).

Individuals' information and skills regarding technology are too important to ignore planning. It is considered that teachers and students as main actors in development and change of societies can change a society's overall view regarding technology (Oktay & Çakır, 2012). It is of top priority to figure out both teachers and students' attitude towards computer so that expected computer use can reach the necessary level and it can be used effectively in the context of education (Altun, 2011). Kenar and Balcı (2012) think that the meaning of technology for students can be understood only if their attitudes can be delineated clearly. As for attitude, they define it as "the state of having a positive opinion regarding a subject or course, enjoying the course or displaying positive affective signs regarding it".

Within the framework of technology and attitude research, there are studies on the importance of using computers and technology in education (Erdemir, Bakırcı & Eyduran, 2009) and attitudes of individuals towards a certain issue (Nuhoğlu, 2008). Most of national and international research shows that attitude is among the most important factors concerned with computer use, and negative attitude towards computers could affect individual motivation and performance in the same way (Altun, 2011).

In their study, Köse and Gezer (2006) suggest that effective and efficient use of computer technology in education have an effect on attitudes of such users as teachers and students; therefore, further studies on attitudes could light the way for those designing and assessing instruction programs. Gür, Özoğlu and Başer (2010) point out that most studies in Turkey were carried out to investigate teachers' attitude towards technology and using of technology in education and stress that they have a positive attitude.

In some of the studies regarding both teachers and students to computer, attitude scales were developed students' attitude towards computer at varying grades. Those attitudes were discussed in connection with several variables (Berberoğlu & Çalıkoğlu, 1991; Tezci, 2010) while some others were carried out in order to investigate the relationships between attitudes towards computer and different situations (Şerefhanoglu, Nakiboğlu & Gür, 2008).

Deniz (2006) in her study "Candidate teachers' attitude towards technology" found out that prospective teachers have a positive attitude towards technology. According to the study, attitudes of candidate teachers of science and mathematics towards technology were better than teachers of social sciences. There was not found any difference between attitudes of candidate teachers by gender. Lastly, previous perceptions of success of candidate teachers about science and mathematics had an influence on their attitude towards technology.

Akdur, Çiçek, Günay and Yıldızbaşı (2011) state that technology should be integrated into education due to the fact that there is a large number of people uneducated about information technologies in Turkey, and both education and economic investment should be made for the young population to facilitate Turkey's being an information society and being elevated to the league of developed countries. Bearing this in mind, it is essential to identify views of eighth graders about the way of using technology to obtain an overview about how to use the technology at their current level and identify their vision of technology in the future as they are in the most crucial grade for shaping their future. Present study is expected to shed light for other researchers on the same matter. The study was carried out with the purpose of identifying perspectives of eighth grade students regarding technology and describing how they perceive technology. Eighth graders were selected for the study since they are close to technology especially due to computers and they are going through the key level before choosing their profession at a contest. Study



participants only included eighth graders among middle school students.

### 1.1 Study Aim:

The aim of this study is to determine attitudes of eighth graders at middle school towards technology. The study attempts to find out answers to the following research questions:

1. Is there any significant difference between attitudes of students towards technology at state and private middle schools?
2. Is there any significant difference between attitudes of middle school students towards technology by gender?
3. Is there any significant difference between attitudes of middle school students towards technology by preferred type of high school?
4. Does attitude of middle school students towards technology vary according to the technological devices owned (tablets, computer, mobile phone)?
5. What are the attitudes of middle school students towards technology like?

## 2. Research Method

This chapter gives an account of research model, study group, data collection instrument, data collection procedures and data analysis.

### 2.1. Research Model

Survey research model was applied in this study since our main aim was to examine middle school eighth grade students' attitude towards information technologies. "Survey research models are the very research approaches that aim to depict a situation that is either in the past or still available. The matter, individual or object that becomes the subject of the research is tried to be identified as is and with their own conditions" (Karasar, 2005).

### 2.2. Population and Sample

Study population comprised of 2956 students attending the eighth grade at middle schools within borders of Büyükçekmece District of İstanbul province during 2013-2014 education and instruction years. Of the students, 491 were at private schools, and the rest 2465 were at state schools. Purposeful sampling method was used, and 300 students from 2 state and 2 private schools participated in this study. However, study data could be obtained from 289 students. Representation rate of the sample was 9,777 %. Participant data are summarized in Table 1 below.

**Table 1.** Demographic data of study group

		f	%
Gender	Female	147	50,9
	Male	142	49,1
	Total	289	100
Type of school	State	157	54,3
	Private	132	45,7
	Total	289	100

### 2.3. Data collection instrument

For collecting data, a Turkish version of the questionnaire of Pupils' Attitudes towards Technology (PATT-TR) was used. Reliability and factorial validity of the Turkish version of PATT were completed by Yurdugül and Aşkar (2008). PATT-USA was originally constructed with 58 items by Dugger and Blame in the United States of America. It has been implemented in more than 25 countries, and usually named after the name of each country. Thus, the

questionnaire was named as PATT-TR in Yurdugül and Aşkar (2008). To investigate the reliability and factorial validity of PATT-TR, Yurdugül and Aşkar (2008) administered the scale to 3308 pupils (10-16 ages) across several provinces of Turkey. According to the results, the Turkish version did not predict the 58 items on 6 sub-constructs of attitude in the original version. In addition it was observed that the two sub-constructs “technology & gender” and “personal prerequisites” didn’t predict the general attitude. As a result, PATT-TR was structured on 24 items and 4 sub-constructs. The four components were identified as “Tendency to Technology”, “Importance of Technology”, “Negativeness of Technology” ve “Technology for all”. It was a 5-point Likert scale (1: Totally disagree, 2: Disagree, 3: Neutral, 4: Agree, 5: Completely Agree). The PATT-TR consists of items under each sub-construct as in Table 2.

Table 2. Items per sub-construct of PATT-TR

Sub-construct	Items	Score range	
		Low	High
Tendency to Technology	<ul style="list-style-type: none"> <li>I will probably choose a profession related with technology.</li> <li>I enjoy journals related with technology</li> <li>If there were a technology club at school, I would definitely join it.</li> <li>I would prefer to have a job related with technology.</li> <li>I should be able to select technology as a school subject.</li> <li>I want to build a career in technology.</li> <li>I like repairing things at home.</li> <li>A profession related with technology would make a brilliant future.</li> </ul>	8	40
Negativeness of Technology	<ul style="list-style-type: none"> <li>Using technology mitigates welfare of a country.</li> <li>It would be boring to work on technology.</li> <li>Technology causes large scale unemployment.</li> <li>Most of the jobs related with technology are boring.</li> <li>I find machines boring.</li> <li>We should use technology less because it causes pollution.</li> <li>Hobbies related with technology would be boring.</li> </ul>	7	35
Importance of Technology	<ul style="list-style-type: none"> <li>Technology is useful for our future.</li> <li>Technology helps things function better.</li> <li>Technology is so important in life.</li> <li>Everybody needs technology.</li> <li>Technology is harmful than useful.</li> <li>Technology is the subject of the future.</li> </ul>	6	30
Technology for All	<ul style="list-style-type: none"> <li>Technology should be offered as a subject for all students.</li> <li>Everybody can read about technology.</li> <li>Everybody can get a job on technology.</li> </ul>	3	15

Study data and Cronbach Alpha coefficients calculated from the scale as well as comments related with reliability of the scale (Kayış, 2008: 405) are given in Table 3.

Table 3. Reliability coefficients of the scale

Sub-construct	Cronbach Alpha Coefficient	Comment
Tendency to Technology	,870	Highly reliable
Negativeness of Technology	,734	Quite reliable
Importance of Technology	,786	Quite reliable
Technology for All	,711	Quite reliable
Overall	,875	Highly reliable

#### 2.4. Collecting Data

In this study, data were collected by the researcher administering the questionnaire in four schools after obtaining permission of the district directorate of national education.

## 2.5. Analyzing data

Study data were analyzed by using SPSS 18. 11 of the questionnaire forms collected from 300 eighth grade students were not used for analysis because of uniform rating throughout the whole scale or leaving of almost all items unanswered. Percentage and frequency analysis were applied to the personal data obtained from the questionnaire. In addition, independent t-test was used to find out if there is significant difference within the study group by gender, type of school (state or private) and technological devices owned. t-test is used for examining significance of the difference between means of two unrelated samples (Büyüköztürk, 2008). Besides, one-way variance analysis was used to investigate if there is significant difference between students' attitudes towards technology according to the profession and high school they want to choose. Such variance analysis is used to test if difference between means of two or more unrelated samples is significantly bigger than zero (Büyüköztürk, 2008). Significance level was determined against " $p < .05$ ".

## 3. Findings

As a result of statistical analysis of the study data, following findings were obtained with regard to each sub-problem.

### 3.1. Findings regarding sub-problem of "Is there any significant difference between attitudes of students towards technology at state and private middle schools?"

Table 4 displays t-test results of students' attitude towards technology by school type.

Table 4. t-test results of students' attitude towards technology by school type

	School type	N	$\bar{X}$	S	sd	t	p
Tendency to Technology	State	157	23,76	6,86	287	,637	,524
	Private	132	24,31	7,70			
Negativeness of Technology	State	157	24,36	4,98	287	3,025	,003*
	Private	132	26,15	5,03			
Importance of Technology	State	157	21,96	4,49	287	,771	,441
	Private	132	22,36	4,31			
Technology for All	State	157	21,96	2,82	287	,430	,668
	Private	132	22,36	3,02			
Overall	State	157	79,35	13,42	287	1,708	,089
	Private	132	82,24	15,28			

\* $p < 0,05$

According to Table 4, type of school plays a significant role on middle school students' attitude towards technology only in relation with "Negativeness of Technology" sub-construct at significance level of " $p < 0,05$ " ( $t = 3,025$ ,  $p = 0,03$ ). Means of the groups on this dimension show that students in private schools ( $\bar{X} = 26,15$ ) have a higher score than those in state schools ( $\bar{X} = 24,36$ ) about negativeness of technology. On the other hand, no significant difference was reported between state and private schools regarding tendency to technology ( $t = 0,637$ ,  $p = 0,523$ ), importance of technology ( $t = 0,771$ ,  $p = 0,441$ ) and technology for all ( $t = 0,430$ ,  $p = 0,668$ ). Overall results show that there is no significant difference between students' attitude towards technology by type of school they attend ( $t = 1,708$  and  $p = 0,89$ ).

### 3.2. Findings regarding sub-problem of "Is there any significant difference between attitudes of middle school students towards technology by gender?"

t-test results of students' attitude towards technology by gender are given in Table 5.

**Table 5.** t-test results of students' attitude towards technology by gender

	Cinsiyet	N	$\bar{X}$	S	sd	t	p
Tendency to Technology	Female	147	21,63	6,57	287	-5,998	,000*
	Male	142	26,47	7,11			
Negativeness of Technology	Female	147	24,13	4,66	287	-3,653	,000*
	Male	142	26,27	5,28			
Importance of Technology	Female	147	21,68	3,58	287	-1,804	,072
	Male	142	22,61	5,09			
Technology for All	Female	147	8,95	2,86	287	-2,211	,028*
	Male	142	9,71	2,92			
Overall	Female	147	76,42	12,56	287	-5,368	,000*
	Male	142	85,07	14,78			

\*p&lt;0,05

As seen in the table, there is a significant difference in both overall scale ( $t(287) = -5,368$ ,  $p=0,000$ ) and three sub-constructs according to gender. Overall scale shows that males ( $\bar{X}=85,07$ ) have higher average scores than females ( $\bar{X}=76,42$ ). Tendency to Technology yielded values of " $t=-5,998$ " and  $p=0,00$ ", which indicates a significant difference between male and female students. In this sub-construct, average attitude score of females was found as "21,63", but males had "26, 47". So, it could be said males have a higher tendency to technology than females. Also in Negativeness of Technology, values of " $t=-3,653$  and  $p=0,000$ " indicate presence of a significant difference by gender. According to the scores, males ( $\bar{X}=26,27$ ) have a higher negative attitude towards technology than females ( $\bar{X}=24,13$ ). In relation with the sub-construct of Technology for All, the difference between males and females was found significant at significance level of " $p<0,05$ " ( $t=2,211$  and  $p=0,028$ ). Mean/average values in the table show that males' attitude towards technology for all ( $\bar{X}=9,71$ ) is higher than females ( $\bar{X}=8,95$ ). Lastly, there was not found significant difference by gender in the sub-construct of Importance of Technology ( $t=1,804$  and  $p=0,72$ ).

### 3.3. Findings regarding sub-problem of "Is there any significant difference between attitudes of middle school students towards technology by preferred type of high school?"

**Table 6.** One-way Variance Analysis Results by Preferred Type of High School

	Source of variance	Sum of squares	sd	Average of square	F	p	Significant Difference
Tendency to Technology	Between Groups	511,984	4	127,996	2,484	,044*	Anatolian H.S.- Science H.S.
	Within Groups	14631,960	284	51,521			
	Total	15143,945	288				
Negativeness of Technology	Between Groups	399,272	4	99,818	4,030	,003*	Anatolian H.S.- Science H.S.- Vocational H.S.
	Within Groups	7034,638	284	24,770			
	Total	7433,910	288				
Importance of Technology	Between Groups	155,152	4	38,788	2,022	,091	-
	Within Groups	5446,745	284	19,179			
	Total	5601,896	288				

Technology for All	Between Groups	27,843	4	6,691			
	Within Groups	2411,929	284	8,493	,820	,514	-
	Total	2439,772	288				
Overall	Between Groups	2243,296	4	560,824			Anatolian H.S.-
	Within Groups	57070,130	284	200,951	2,791	,027*	Science H.S.
	Total	59313,426	288				

\*p<0,05

In Table 6, significant difference exists between attitudes of students in overall scale ( $F(4, 284)=2, 791$  and  $p=0,027$ ); tendency to technology ( $F(4, 284)=2,484$  and  $p=0,044$ ) and negativeness of technology ( $F(4,284)=4,03$  and  $p=0,003$ ) depending on the type of high school they want to attend. To put it another way, students' overall attitudes regarding technology, tendency to technology and negativeness of technology differ significantly according to the type of high school they prefer. Also Scheffe test was applied in order to find what types of preferred high school cause significant difference between units. Scheffe test results show that in overall scale the students preparing for science high schools ( $\bar{X} = 84,13$ ,  $S=16,66$ ) have a higher positive attitude towards technology than those preparing for Anatolian high schools ( $\bar{X} =78,86$ ,  $S=13,13$ ). As for Tendency to Technology, significant difference was found between science high schools ( $\bar{X} = 25,42$ ,  $S= 7,80$ ) and Anatolian high schools ( $\bar{X} =22,88$ ,  $S=6,67$ ). Regarding Negativeness of Technology, those preparing for science high schools ( $\bar{X} =26,67$ ,  $S=5,55$ ) were found to have a higher positive attitude towards technology than those preferring Anatolian high schools ( $\bar{X} =24,69$ ,  $S=4,60$ ) and vocational high schools ( $X=23,03$ ,  $S=4,81$ ). Under sub-constructs of Importance of Technology ( $F= 2,022$ ,  $p=0,091$ ) and Technology for All ( $F= 0,820$ ,  $p=0,514$ ), the difference between type of preferred high schools was not found significant at “ $p<0,05$ ”.

### 3.4. Findings regarding sub-problem of “Does attitude of middle school students towards technology vary according to the technological devices owned (tablets, computer, mobile phone)?”

t-test results of students' attitudes towards technology by technological devices owned are given in Table 7.

Table 7. t-test results of students' attitudes towards technology by technological devices owned

	Technological devices	Owned	N	X	S	sd	t	p
Tendency to Technology	Computer	Yes	202	23,64	7,26	287	1,324	,186
		No	87	24,87	7,18			
	Tablet	Yes	145	24,20	7,68	287	,437	,662
		No	144	23,82	6,80			
	Mobile Phone	Yes	237	23,89	7,09	287	,575	,565
		No	52	24,53	7,98			
Negativeness of Technology	Computer	Yes	202	24,95	4,88	287	1,206	,229
		No	87	25,73	5,48			
	Tablet	Yes	145	25,80	4,94	287	2,070	,039*
		No	144	24,56	5,15			
	Mobile Phone	Yes	237	25,30	4,96	287	,835	,404
		No	52	24,65	5,60			
Importance of Technology	Bilgisayar	Yes	202	22,37	4,24	287	1,358	,175
		No	87	21,60	4,75			
	Tablet	Yes	145	22,57	4,11	287	1,684	,093
		No	144	21,70	4,66			
			298					

Technology for All	Mobile Phone	Yes	237	22,29	4,22	287	1,201	,231
		No	52	21,48	5,18			
	Computer	Yes	202	9,43	2,82	287	,951	,342
		No	87	9,08	3,09			
	Tablet	Yes	145	9,48	2,83	287	,943	,346
		No	144	9,16	2,98			
	Mobile Phone	Yes	237	9,44	2,77	287	1,428	,154
		No	52	8,80	3,45			
Overall	Computer	Yes	202	80,40	14,62	287	,485	,628
		No	87	81,29	13,76			
	Tablet	Yes	145	82,66	14,67	287	1,662	,098
		No	144	79,27	13,93			
	Mobile Phone	Yes	237	80,93	14,11	287	,662	,509
		No	52	79,48	15,46			

\*p<0,05

t-test was applied in order to find out the effect of technological devices owned by students on their attitude towards technology, and results of the test are given in Table 7. It is understood that there is a significant difference between attitudes of students having tablets and those not having tablets ( $t=2,070$  and  $p=0,039$ ) only under “Negativeness of Technology”. There was found no significant difference between students depending on their technological devices in overall scale or other sub-constructs at significance level of “ $p<0,05$ ”.

### 3.5. Findings regarding sub-problem of “What are the attitudes of middle school students towards technology like?”

Table 8. Descriptive Statistics for Middle School Students' Attitude towards Technology

	N	$\bar{X}$	ss	V%
Tendency to Technology	289	24,014	7,251	30,197
Negativeness of Technology	289	25,187	5,081	20,172
Importance of Technology	289	22,150	4,410	19,915
Technology for All	289	9,329	2,911	31,200
Total	289	80,675	14,351	17,789

Table 8 displays descriptive statistical data regarding attitudes of 289 students of eighth grade towards technology. For tendency to technology, the mean/average was calculated as ( $\bar{X}$ ) “24,014”, standard deviation (ss) 7,251 and dependent variance coefficient/bağıl değişim katsayısı was found to be (V%) “30,197”. Considering the lower (8) and upper limits (40) for this dimension, it seems that students have a tendency to technology at medium level. Dependent variance coefficient above “25 %” indicates the lack of consensus on this aspect of attitude towards technology. In other words, it could be suggested that students' views on this aspect are different from the average obtained. In relation to negativeness of technology, average was found as “25,187”, standard deviation as “5,081” and dependent variance coefficient was found as “20,172”. As lower and upper limits in this sub-scale are (7) and (35), respectively, the students' negative attitude towards technology was found slightly higher than medium level in this study. Also since dependent variance coefficient was below “25%”, it seems that there is consensus among students on this aspect. Regarding importance of technology, the average was calculated as “22,150”, standard deviation “4,410” and dependent variance coefficient as “19,915”. In the range of minimum (“6”) and maximum (“30”) scores on this sub-scale, the students could be said to have a positive attitude towards importance of technology. It seems from dependent variance coefficient that there is agreement among students on this issue. As for the sub-construct of Technology for All, average was found as “9,329”, standard deviation “14,351” and dependent variance coefficient as “31,200”. Thinking the lowest and highest scores on this dimension as “3” and “15”, respectively, it could be suggested that the students' attitude is at medium level. Due to the dependent variance coefficient above 25 %, the students are not compliant with the average/öğrencilerin ortalamadan dağılım gösterdikleri görülmektedir. To put another way, the students seem to be lacking consensus about the issue. As for

the overall score obtained from the scale, average was “80,675”, standard deviation was “14,352” and dependent variance coefficient was “17,789”. Minimum score on overall scale is 24 and maximum is “120”; thus, it could be said that students have a positive attitude towards technology. Also it was understood from dependent variance coefficient that the students do not vary from the average much.

#### 4. Conclusions and discussion

Following conclusions were drawn from present study:

- No significant difference was observed between middle school students’ attitudes towards technology depending of preferred high school. However, those attending private school obtained higher scores from both sub-constructs and overall scale, which could be said to be significant.
- Middle school students’ attitude towards technology differs significantly by gender in overall scale as well as sub-constructs such as Tendency to Technology, Negativeness of Technology and Technology for All. In general, males obtained higher average scores than females in the study. This result is similar to Altun and others (2007) and Altun (2011). Besides, in their study on second grade students Şererfhanoglu and others (2008) found no significant difference between students’ attitude towards technology by gender. Also Oktay and Çakır (2012) found higher averages for females than males in their study about elementary teachers’ attitude towards technology.
- In the study, students’ scores regarding attitude towards technology showed significant difference by type of preferred high school in overall scale besides sub-constructs one and two. In other words, students’ overall attitude towards technology, their tendency to technology and negativeness of technology are found to be significantly related with type of preferred high school. In overall scale and first and second sub-construct, those preparing for science high schools obtained higher attitude scores than those preparing for Anatolian high schools. Likewise, in sub-construct two, the students studying for science high schools were found to have a more positive attitude towards technology than those preparing for Anatolian high schools and vocational high schools.
- It was found out that ownership of technological devices resulted in higher scores in both overall scale and sub-constructs; however, significant difference was identified between those having and not having a table under “Negativeness of Technology” only. The students who own tablets have a more negative attitude than those not having tablets. On the other hand, there was found no significant difference between students depending on their ownership of computer or mobile phone.
- Generally speaking, it can be said students’ attitude towards use of technology is high in this study. This result is supportive of Aydoğan’s (2013) findings. Specifically in sub-constructs, students’ attitude was found at medium level regarding tendency to technology and technology for all, while it could be regarded high for negativeness of technology and importance of technology.

#### 5. Recommendations

In today’s information and technology age, it is necessary to improve attitudes towards technology of young people who are going to shape our future. In this context, following recommendations can be made in the light of our findings:

- Considering the fact that there is difference, small albeit, between students at private and state schools, computer and internet facilities should be made more available at state schools, and educational investments should be increased so that technological deficiency should be made up at such schools. In this way, the gap between two types of schools can be narrowed. As discussed by Çelik and Kahyaoğlu (2003), potential learning environments employing computers should be introduced, and students should be encouraged to use them for both in-class and out-of-class learning activities.
- Attitude of females towards use of technology was found lower than males in both overall scale and sub-constructs. Specific studies can be carried out with girls to decrease the difference.
- Owing to the fact that the students preparing for Anatolian and vocational high schools have a lower

attitude towards technology than those preparing for science high schools, both teachers and administrators in such schools can implement certain programs to improve their attitude.

- There should be more studies available for integrating instruction programs with computer, and such materials should be provided for teachers' use.
- Departing from the fact that students cannot develop a positive attitude towards using technology in a classroom environment where teachers do not use it, teachers should be supported with training, seminars and courses so that they can use technology more efficiently.
- This study was implemented with eighth grade students in middle schools only in one district. It can be duplicated in other districts for different grade levels to identify students' attitude towards technology. In addition, other studies can be carried out in a way to also involve parents as one of the most important stakeholders of education and instruction process. As an example, studies can be carried out for identifying parents' attitude and measures to be taken for increasing the use of technology.

## References

- Akdur, T.E., Bilici, A., Çiçek, H., Günday, Ö. Ve Yıldızbaşı, A. (2011). *Eğitimde Fatih Projesinin Sağlaması Öngörülen Fayda Ve Sosyal Etkileri*, International computer & Technologies Symposium, Elazığ (22-24 Mayıs).
- Akkoyunlu, B. (2002). Educational technology In Turkey: Past, Present and future. *Educational Media International*, 39(2), 165-174.
- Aksoy, H. H. (2003). Uluslararası Karşılaştırma Ölçütlerinin Kullanımı Ve Türkiye. *Eğitim Bilim Toplum*, 1(1), 51-60.
- Altun, T. (2011). İlköğretim Öğrencilerinin Bilgisayara Yönelik Tutumlarının İncelenmesi: Trabzon İli Örneği. *Turkish Journal Of Computer and mathematics education*, Vol.2 No.1, 69-86.
- Altun, T., Yiğit, N. Ve Alev, N. (2007). *İlköğretim Fen Bilgisi Öğretmen Adaylarının Bilgisayar Destekli Fen Öğretimine Karşı Tutumları*, 1. Ulusal İlköğretim Kongresi, Ankara (15 – 17 Kasım).
- Aydoğan, D. (2013). İlköğretim 8. Sınıf Öğrencilerinin Bilişim Teknolojilerine Yönelik Tutumlarının İncelenmesi. *Iğdır Üniversitesi Sosyal Bilimler Dergisi*, Sayı: 4, 109-129.
- Bacanak, A., Karamustafaoğlu, O. Ve Köse, S. (2003). Yeni Bir Bakış: Eğitimde Teknoloji Okuryazarlığı. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, 14, 191-196.
- Berberoglu, G., Ve Çalıkoğlu, G. (1991) Türkçe Bilgisayar Tutum Ölçeğinin Yapı Geçerliliği. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi*, 24(2), Ss.841-845.
- Büyüköztürk, Ş. (2008). *Veri Analizi El Kitabı, İstatistik, Araştırma Deseni SPSS Uygulamaları Ve Yorum*, 9. Baskı, Ankara: Pegem-Akademik.
- Çelik, H.C. Ve Kahyaoglu, M. (2007). İlköğretim Öğretmen Adaylarının Teknolojiye Yönelik Tutumlarının Kümeleme Analizi, *Türk Eğitim Bilimleri Dergisi*, 5(4), 571-586
- Erdemir, N., Bakırcı, H. Ve Eydoğan, E. (2009). Öğretmen Adaylarının Eğitimde Teknolojiyi Kullanabilme Özgüvenlerinin Tespiti. *Türk Fen Eğitimi Dergisi*, Yıl 6, Sayı 3, Sf: 99-108
- Gür, B. S., Özoglu, M. Ve Başer, T. (2010). *Okullarda Bilgisayar Teknolojisi Kullanımı Ve Karşılaşılan Sorunlar*, 9. Ulusal Sınıf Öğretmenliği Eğitimi Sempozyumu, Elazığ (20-22 Mayıs).
- Hançer, A.H. Ve Tüzemen, A.T. (2008). A Research On The Effects Of Computer Assisted Science Teaching World Applied. *Sciences journal*, 4 (2): 199-205.
- Karasar, N. (2005). *Bilimsel Araştırma Yöntemi*. Ankara: Nobel Yayın Dağıtım.
- Kayış, A. (2008). Güvenlik Analizi, *SPSS Uygulamalı Çok Değişkenli İstatistik Teknikleri*, Ed. Şeref Kalaycı, Ankara: Baran Ofset, S. 404-409
- Kenar, İ. Ve Balci, M. (2012). İlköğretim 4. Ve 5. Sınıf Öğrencileri İçin Teknolojiye Yönelik Tutum Ölçeğinin Geliştirilmesi. *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi*, Sayı 33, Sf: 303-314
- Köse, S. Ve Gezer, K. (2006). *Buldan (Denizli) İlçesi Lise Öğrencilerinin Bilgisayara Yönelik Tutumları*, Buldan Sempozyumu, Pamukkale (24-26 Kasım).
- MEB (Milli Eğitim Bakanlığı) (2005). İlköğretim Programı, Ankara: MEB Yayınları
- Nuhoğlu, H. (2008). İlköğretim Fen Ve Teknoloji Dersine Yönelik Bir Tutum Ölçeğinin Geliştirilmesi. *İlköğretim Online*, 7(3), 627-639. [Online]: <http://ilkogretim-online.org.tr>
- Oktay, S. Ve Çakır, R. (2012). *İlköğretim Öğretmenlerinin Teknoloji Kullanımları Ve Teknolojiye Yönelik Tutumları Arasındaki İlişkinin İncelenmesi*, X. Ulusal Fen Ve Matematik Eğitimi Kongresi, Niğde (27-30 Haziran).
- Reiner, M. (2009). Sensory cues, Visualization And Physics Learning, *International Journal Of Science Education*, 31(3), 343-364.
- Şemseddin, G. Ve Odabaşı, F. (2004). Bilgi Çağında Öğretmen Adaylarının Eğitimde Öğretim Teknolojileri Ve Materyal Geliştirme Dersinin Önemi. *The Turkish Online Journal Of Educational Technology*, 3(1).
- Şerefhanoglu, H., Nakiboğlu, C. Ve Gür, H. (2008). İlköğretim İkinci Kademe Öğrencilerinin Bilgisayara Yönelik Tutumlarının Çeşitli Değişkenler Açısından İncelenmesi: Balıkesir Örneği, *İlköğretim Online*, 7 (3), 785-799.
- Tezci, E. (2010) Attitude sand knowledge Level Of Teachers İn ICT Use: The Case Of Turkish Teachers. *International Journal Of Human Sciences* [Online]. 7:2. <http://www.insanbilimleri.com/en>
- Yurdugül, H. Ve Aşkar, P. (2008). Öğrencilerin Teknolojiye Yönelik Tutum Ölçeği Faktör Yapılarının İncelenmesi: Türkiye Örneği. *İlköğretim Online*, 7(2), 288-309. 88-309, 2008. [Online]: <http://ilkogretim-online.org.tr>



INTE 2014

# Early identification of reading problems: preliminary study with students of 1st grade

Simone Aparecida Capellini<sup>a</sup>; Alexandra Beatriz Portes de Cerqueira César<sup>a</sup>; Giseli Donadon Germano <sup>a\*</sup>

<sup>a</sup>Investigation of Learning Disabilities Laboratory of Speech and Hearing Sciences Department of São Paulo State University "Júlio de Mesquita Filho" - UNESP - Marília - São Paulo - Brazil. Avenue Hygino Muzzi Filho, 737, Postal Code: 17.525-000, Marília-São Paulo-Brazil.

---

## Abstract

This study aimed to elaborate a procedure for early identification reading problems and to identify predictive variables for students of 1st grade. 206 students aged 6:0 to 7:11 years old were assessed by a procedure developed, contemplated with seven cognitive-language skills (knowledge of the alphabet, phonological awareness, working memory, rapid automatic naming, visual attention, reading words and non-words, understanding of words and phrases from pictures). The results showed statistically significant differences, showing that all students had lower performance comparing obtained with expected score in all skills. After regression analysis, the predictive variables were reading words, working memory and phonological awareness.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* Learning Difficulties. Early Identification. Assessment.

---

## Introduction

Dyslexia is a neurologically-based specific learning difficulty that interferes with the acquisition and processing of language that is not caused by a lack of intelligence or opportunities for learning. It is characterized by difficulties in reading, spelling and/or writing that typically result from a deficit in the phonological component of language (Lyon, Shaywitz & Shaywitz, 2003). Fawcett, Lee and Nicolson (2014) referred that there is now considerable evidence throughout the school years that the earlier literacy-related problems are identified, the more effective, and the more cost-effective, interventions are likely to be. The skills with which a child enters school are highly predictive of future progress. Consequently, preschool has been identified as a key period to ensure that children enter school ready to learn to read. Early and accurate identification of children at risk for dyslexia is critical for the prevention of reading deficits within a response to intervention framework. Response to instruction/intervention (RTI) is assessed by universal screening and/or progress-monitoring measures. All children participate in periodic universal screening to identify children who are potentially at-risk for dyslexia. Those who "fail" universal screening receive supplemental instruction (Catts, Nielsen, Bridges, Liu & Bontempo, 2013). Based on this, this study aimed to elaborate a procedure for early identification reading problems and to identify predictive variables for students of 1st grade.

## 2. Method

The Research Ethics Committee of the institution of origin approved this study, protocol number 0663/2013.

### 2.1 Participants

---

\* Corresponding author. Tel.: +55-14-98146-0373.  
E-mail address: giseliger@yahoo.com.br

The participants in this study were 206 kindergarten children from a medium-sized school district aged 6:0 to 7:11 years old, both genders, from a public school of Marília (State of São Paulo, Brazil). All participants were administered a battery of screening measures at the beginning of the semester and progress-monitoring measures across the year.

## 2.2 Materials

The Early Identification of Reading Problems Protocol was composed of seven cognitive-linguistic skills divided into subtests:

- A) Knowledge of the alphabet: the letters of the alphabet were presented to students and asking to identify the letter name and the sound value of each letter presented;
- B) Phonological Awareness: consisting of the following subtests:
  - Rhyme production: 20 words were presented aurally and asked to student to say a word that ended with the same sound.
  - Identification of rhyme: 20 groups of 3 words were presented aurally to students and asked him to identify the words that end with the same sound.
  - Syllabic segmentation: 21 words (two with syllables, three syllables and four) were presented auditorily to students and requested that he separated them by syllables
  - Production of words from a given phoneme: a phoneme were presented to the student and asked him to say a word that starts with the same sound.
  - Synthesis Phonemic: 21 words were presented separated by auditory sounds and asked him to say the word formed.
  - Analysis Phonemic: 21 words were presented aurally and asked him to say the sounds of each letter of the words presented.
  - Identification of initial sound: 21 words were presented aurally and asked the student to say the initial sound of the first letter of each word presented.
- C) Working memory: 24 non-words were presented aurally and asked to repeat as he understood.
- D) Rapid naming Speed: seven figures sequences of colored drawings (car, ball, duck, and house key) were presented to and requested him to perform quick naming. Time was measured in seconds.
- E) Visual attention: 10 color pictures were presented and asked to identify between two words, which corresponded to the figures.
- F) Reading words and non-words: 40 words (20 words and 20 non-words) were presented visually and asked to perform the reading aloud
- G) Comprehension of sentences from picture: 20 incomplete sentences with illustrative figures were presented to the school and requested that he would observe the figures and to complete the sentences.

## 3. Results

Performance of the participants on each experimental task is provided in Table 1

Table 1. Performance of the students (N=206) on Early Identification of Reading Problems Protocol

Tasks (/maximum score)	Mean	SD
Knowledge of the alphabet (/23)	21,09	2,720
Rhyme production (/20)	6,98	5,602
Identification of rhyme (/20)	12,22	5,952
Syllabic segmentation (/21)	19,69	2,888
Production of words from a given phoneme(/21)	17,42	4,363
Synthesis Phonemic (/21)	2,08	4,154
Analysis Phonemic (/21)	2,58	4,700
Identification of initial from a given phoneme (/21)	7,53	6,973
Working memory (/24)	20,16	3,200
Visual attention (/10)	9,19	1,472

Reading words and non-words (/40)	22,99	15,396
Comprehension of sentences from pictures (/20)	17,46	3,565
Rapid naming Speed (in seconds)	39,75	7,786

The results showed in Table 1 showed that the students had lower performance in subtests of Rhyme production, Synthesis Phonemic, Analysis Phonemic and Identification of initial from a given phoneme, when compared with the total score expected. Phonological deficits have been demonstrated in three broad areas, such as phonological awareness, retrieval of phonological codes from long-term memory (rapid automatized naming) and verbal short-term memory. Moreover, several prospective longitudinal studies have suggested a causal link between sensitivity to the phonological structure of words and later progress in reading acquisition (Boets, Wouters, Wieringen, & Ghesquière, 2007) although this relation is probably reciprocal.

A correlation analysis was carried out on the measures of on Early Identification of Reading Problems Protocol for the whole population. We computed a principal components analysis with varimax rotation on performance for the tasks. The analysis revealed a three-factor solution. The first factor (called the lexical factor hereafter) accounted for 24,26% of the variance and received high loading from the tasks of Knowledge of the Alphabet, Rhyme production, Identification of rhyme, Syllabic segmentation, Production of words from a given phoneme, Working memory, Visual attention and Reading words and non-words. The second “phonological” factor that received 18,9% from the tasks of Production of words from a given phoneme, Synthesis Phonemic, Analysis Phonemic, and Identification of initial from a given phoneme. The third factor was named “visual” and accounted for 10,05% of variance, from the tasks of Knowledge of the alphabet, Comprehension of sentences from pictures and Rapid naming Speed (Table 2).

Table 2: Rotated factor loadings of the PCA for the visual and phonological subtests.

	Component		
	Lexical	Phonological	Visual
Knowledge of the alphabet	0,420		0,597
Rhyme production	0,519		
Identification of rhyme	0,693		
Syllabic segmentation	0,598		
Production of words from a given phoneme	0,495	0,491	
Synthesis Phonemic		0,696	
Analysis Phonemic		0,654	
Identification of initial from a given phoneme		0,757	
Working memory	0,471		
Visual attention	0,75		
Reading words and non-words	0,774		
Comprehension of sentences from pictures			0,736
Rapid naming Speed			0,437

In this study, the performance of the students from 1<sup>st</sup> grade in Early Identification of Reading Problems Protocol showed an multiple components deficits that might be related with the phonological awareness deficits but also has sowed a lexical and visual influence.

The predominant cognitive explanation of dyslexia is that it arises from a phonological deficit affecting the processing of speech sounds in words. Phonological awareness is closely associated with the process of reading acquisition, regardless of the language degree of consistency between orthographic and phonological mappings (Duncan *et al.*, 2013). Phonological awareness refers to the ability to identify and manipulate phonological units as

syllables or phonemes. The development of phonological awareness enables the child to understand the alphabetic principle and acquire the mappings between graphemes and phonemes, thus playing an important role in the development of decoding skills at the beginning of literacy acquisition. Phonological awareness further contributes to the establishment of word specific knowledge and thus modulates reading acquisition all along primary school (Share, 2004). The role of the unit specific to reading-letter-knowledge is widely agreed to be crucial. Introducing phonemic awareness with the help of letters is known to be more effective among dyslexic children than mere oral practice, as documented by the meta-analyses of the treatment data. Spontaneous learning of the names of letters is also known to strongly predict reading acquisition very well and also among children with a genetic risk of dyslexia (Elbro, Borstrom, & Petersen, 1998).

Accordingly, many studies showed that phonological awareness is a concurrent and longitudinal predictor of reading skills, in both opaque and transparent orthographies. Vaessen *et al.*, (2010) showed that phonological awareness substantially contributed to reading fluency in European Portuguese.

However, in Portuguese as in most transparent languages than English (Bosse & Valdois, 2009) the contribution of phonological awareness to reading fluency was stronger at the beginning of reading development, then declined with reading expertise.

Although developmental dyslexia is classically interpreted as resulting from a core phonological deficit, visual and visual attention processing deficits have also been reported in children with specific reading acquisition disorders. Difficulties in processing multiple element configurations has been well documented in developmental dyslexia. These difficulties might reflect deficits in the allocation of attention across the distinct visual elements that compose a global shape (Bosse & Valdois, 2009).

Results of this study provide support for the use of an RTI model in the early identification of dyslexia. Our preliminary findings showed that universal screening at the beginning 1<sup>st</sup> grade can identify children at risk for dyslexia with an acceptable level of accuracy. Several of the measures we used already have widespread use in others screening batteries referred by the literature (Catts *et al.*, 2013, Bosse & Valdois, 2009). Our findings also support an additional principle of RTI; that is, measures of growth in response to instruction provide useful information for forecasting reading outcomes.

## References

- Van der Geer, J., Hanraads, J. A. J., & Lupton, R. A. (2000). The art of writing a scientific article. *Journal of Science Communication*, 163, 51–59.
- Strunk, W., Jr., & White, E. B. (1979). *The elements of style* (3rd ed.). New York: MacMillan.
- Mettam, G. R., & Adams, L. B. (1999). How to prepare an electronic version of your article. In B. S. Jones & R. Z. Smith (Eds.), *Introduction to the electronic age* (pp. 281–304). New York: E-Publishing Inc.
- Fachinger, J., den Exter, M., Grambow, B., Holgerson, S., Landesmann, C., Titov, M., et al. (2004). Behavior of spent HTR fuel elements in aquatic phases of repository host rock formations, 2nd International Topical Meeting on High Temperature Reactor Technology. Beijing, China, paper #B08.
- Fachinger, J. (2006). Behavior of HTR fuel elements in aquatic phases of repository host rock formations. *Nuclear Engineering & Design*, 236, 54.
- Boets, B., Wouters, J., Wieringen, A., & Ghesquière (2007). Auditory processing, speech perception and phonological ability in pre-school children at high-risk for dyslexia: A longitudinal study of the auditory temporal processing theory. *Neuropsychologia*, 45, 1608–1620.
- Catts, H.W., Nielsen, D.C., Bridges, M.S., Liu, Y.S & Bontempo, E. (2013). Early Identification of Reading Disabilities Within a RTI Framework. *Journal of Learning Disabilities* <http://ldx.sagepub.com/content/early/2013/08/14/0022219413498115>
- Elbro, C., Borstrom, L., & Petersen, D. K. (1998). Predicting dyslexia from kindergarten. The importance of distinctness of phonological representations of lexical items. *Reading Research Quarterly*, 33, 36-60.
- Lyon, G.R., Shaywitz, S.E., Shaywitz, B.A. (2003). Defining dyslexia, comorbidity, teachers' knowledge of language and reading a definition of dyslexia. *Annals of Dyslexia*, 53, 1-14.

# East meets west: the reader response theory in thriller fictions

Mohd Nazri Latiff Azmi\*

Sultan Zainal Abidin University, 21300 Kuala Terengganu, Malaysia

*Mohd Nur Shafiq Muhammad Farza*

*Sultan Zainal Abidin University, 21300 Kuala Terengganu, Malaysia*

*Mairas Abd Rahman Sultan Zainal Abidin University, 21300 Kuala Terengganu, Malaysia*

---

## Abstract

This comparative literature study focuses on the elements of Reader Response Theory (RRT) in thriller fictions between two outstanding American and Malaysian novelists, Sidney Sheldon and Ramlee Awang Murshid. Sheldon, one of the most famous American authors who wrote a lot of magnificent novels, whereas Ramlee is an established thriller fiction novelist in Malaysia. According to International Thriller Writers, a thriller is characterized by "the sudden rush of emotions, the excitement, and sense of suspense, apprehension, and exhilaration that drive the narrative, sometimes subtly with peaks and lulls, sometimes at a constant, breakneck pace." Therefore, this qualitative study aims to find the similarities and differences of both popular novelists from the view of RRT and how they managed to attract readers. From other point of views, the study also stresses on the elements of the concepts of "meaning" and "truth" in their literary works, in which are the main attractions to their avid readers and followers. Based on the findings, it is obvious that both authors implement different styles and figurative language to capture reader's thriller mood, in which it is extremely successful.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* Reader Response Theory; Literature; Thriller Fictions

---

## Introduction

According to Harvey Chapman, a freelance writer, in his article 'Three Types of Novels', novels can be categorized in three main categories which are Genre fiction, the most popular variety of fiction. It can be divided into categories such as mysteries, thrillers, and romances. Next is Literary novels which are generally far less commercial than genre ones - but only generally. Lastly, the Mainstream fiction, sits more or less halfway between the other two. In fact, it is often defined in terms of how it differs to literary and genre novels. The best definition of mainstream fiction, though, is that it is a category in its own right. Meanwhile, Reader Response Theory encompasses various approaches to literature that explore and seek to explain the diversity (and often divergence) of readers' responses to literary works (Ross, 1998). In RRT, the role of a reader not only in giving meaning to the text but also considered the reader as a scholar who had the right and duty to stand in judgment on the text. All in all, RRT focuses on how and why a reader responds to a specific text in a specific manner and RRT also embraces the idea that one text can mean something vastly different to each reader. This theory has make literature to become more interesting to be read and analyzed.

As general, we can grab the idea that literature is related with words, sentence and emotion. According to Malaysian national laureate, Shahnnon Ahmad, he defined novel as "using background setting such as time, place, occupations, being together with nature and surroundings, the ideas were brought alive to be revamped into a

---

\* Corresponding author. Tel.: 6096687995; fax: 6096687844.

E-mail address: mohdnazri@unisza.edu.my

complete story, given ups and down events as known as plots, brought up by what we called as characters and sometimes both of these are complex. That is what we called as novel” (Ganakumaran, 2007). While Rozlan Mohamed Noor (2009), stated that novel is a type of long composition that illustrates fictional characters that involves in chains of events in certain place and time settings. While it in much simpler form, short story, it has same function but focus primarily on one single conflict or problem that must be solve quickly.

### **Statement of Problem**

Thriller novels in Malaysia nowadays have become popular as they go in line with other genre novels. There are demands for this genre novels as the readers are interested either Malay thriller novels or English thriller novels. But, the number for Malay thriller novels is not as much as English thriller novels. And so far, the only well-known Malay thriller novel writer is Ramlee Awang Murshid while for the English thriller writers, there are quite a lot of them, for this purpose of study only Sheldo’s novels will take into consideration due to time constraints and the researcher’s choice. Other than that, the demand for English thriller novels is also much higher than the Malay. Therefore, the problem that was examined in this research was to investigate the differences between Malay thriller novels and English thriller novels and why there are differences. This research is also aim to investigate the characteristics of both genre novels. The study is not only focused on the linguistic elements of the novels but also the elements of culture and sociolinguistics from the views of east and west.

### **Purpose of study**

This qualitative research is specifically to investigate the differences between Malay thriller novels and English thriller novels which representing eat and west, identify the characteristics of both thriller novels and find out the style and language used by both thriller novel writers and the causes of the varieties. The researchers uses the Reader Response Theory approach in analyzing the novels and present in in qualitative design based on the matrix of the theory. The researchers will analyze these four novels based on one of the literature analysis theories which is Reader Response Theory or also known as Reader Response Theory (RRT) . The RRT is not a subjective, impressionistic free-for-all, nor a legitimizing of all half-baked, arbitrary, personal comments on literary works. Instead, it is a school of criticism which emerged in the 1970s, focused on finding meaning in the act of reading itself and examining the ways individual readers or communities of readers experience texts. (Delahoyde, 2011). While Supryia and (1998) stated that reader-response criticism encompasses various approaches to literature that explore and seek to explain the diversity (and often divergence) of readers' responses to literary works.

### **Literature Review**

According to Pradl (1996), the major purpose of learning literature is for enjoyment; without that, it is unlikely that readers will achieve any secondary benefits from a literary work. Recognizing that literary enjoyment leads to the development of an educated imagination and there is no single meaning or right interpretation of a literary work and this recognizing that such resources cannot provide adequate background information to deal adequately with sensitive issues. Sometimes people need to learn back what we were taught to make sure that our consideration of the world is more comprehensive, more multicultural, and gender-fair.

The thriller definition can be derived from many perspectives. According to Cyprus (2000) in her article entitled ‘What is thriller fiction?’ Thriller fiction is basically any type of short story, play, teleplay, film or novel that is suspenseful in its nature. The thriller genre includes many sub-genres, such as crime, spy, legal, medical and

psychological. Thrillers typically involve a hero or heroine battling a villain or villains in order to achieve a goal, either to rescue someone or find the truth about something.

### **Discussion and Findings**

In this research, the researchers will analyze these four novels based on one of the literature analysis theories which is Reader Response Theory not a subjective, impressionistic free-for-all, nor a legitimizing of all half-baked, arbitrary, personal comments on literary works. Instead, it is a school of criticism which emerged in the 1970s, focused on finding meaning in the act of reading itself and examining the ways individual readers or communities of readers experience text (Delahoyde, 2011). While Murfin and Ray (1998), stated that reader-response criticism encompasses various approaches to literature that explore and seek to explain the diversity (and often divergence) of readers' responses to literary works.

This theory was initiated by Stanley Fish in 1960 and still being discussed until today. McManus (1998), stated that in the reader-response critical approach, the primary focus falls on the reader and the process of reading rather than on the author or the text. She did also mention the theoretical assumptions which the literary text possesses no fixed and final meaning or value; there is no one "correct" meaning. Literary meaning and value are 'transactional' and 'dialogic', created by the interaction of the reader and the text.

There are several aspects that the researchers qualitatively analyze for this study. The first aspect is the main theme for these novels. Theme can be explained as the central idea or ideas explored by a literary work (Wiehardt, 1998). Next aspect is the moral value which can be found from for all four novels. While another aspect is language used in these four novels. Lastly, style used by the writers in their novels.

### **Thriller Novels from West**

Cyprus (2000) mentioned that thrillers typically involve a hero or heroine battling a villain or villains in order to achieve a goal, rescue someone or find the truth about something. A fast pace, exciting plot and a building up of tension are the key requirements of riveting thriller fiction. Like the mystery genre, the audience of thrillers should be always being left wondering what will happen next. Different from mystery fiction, the reader or viewer may know exactly who the murderer or villain is, and maybe even right from the beginning of the story. In thriller fiction, the antagonist may be extremely evil, such as in a horror film, but still in most cases this villain is not supernatural. Rather, the villains fit with their sub-genres, such as a seemingly soulless or remorseless lawyer in legal thriller fiction. The plot revolves around a battle between the villain and the hero of the story. Since the pace must be fast in thrillers to keep the story exciting for readers or viewers, the action in this type of genre is often nonstop.

Thrillers also may or may not contain a lot of physical action such as car chases, fights and the like. Unlike action-adventure, the tone of thrillers is usually more poignant, psychological or even melodramatic in that the excitement can be emotional rather than physical. For instance, in a crime thriller, the villain may be a murderer playing a "cat and mouse" game with the hero who is the police detective trying to catch him. A certain tension can often be felt when watching film or television thriller fiction. Similarly, readers of a well-written thriller novel may feel unable to put the book down due to anticipation about wanting to know what will happen next in the plot. For example, in a medical thriller, doctors may be battling the effects of a plague released by bio-terrorists to stop the virus from spreading before it's too late and people die. In some especially suspenseful thriller fiction, there are several plot twists that totally change what viewers may expect to occur before a resolved ending takes place.



Fox (2000) New York Times journalist, mentioned that Mr. Sheldon was considered a master storyteller whose novels were known for their meticulous research, swift pacing, lush settings and cliffhanging chapters. A Sidney Sheldon novel typically and usually contains one or many more, of these ingredients: shockingly beautiful women, square-jawed heroes and fiendish villains; fame, fortune and intrigue; penthouses, villas and the jet travel these entail; plutonium, diamonds and a touch of botulism; rape, sodomy, murder and suicide; mysterious accidents and mysterious disappearances; an heiress or two; skeletons in lavishly appointed closets; shadowy international cartels, communists and lawyers; globe-trotting ambassadors, supermodels and very bad dogs; forced marriages and amnesia; naked ambition and nakedness in general and a great deal of vengeance. In an interview on September 29, 1997, Sidney was asked about how he made his books irresistible.

### **Thriller Novels from East**

Muhd Nasruddin Dasuki (2000), a Malay writer, in his article, 'Ciri-Ciri Yang Perlu Ada Dalam Novel Thriller' (Characteristics of Thriller Novels) stated that there are several aspects that a Malay thriller novel should have. Among them are mystery, suspense, and fast pacing storyline. He added more that mystery is like a must for the novel of this genre. Mystery is like a magnet to attract the readers to find out what will happen next. There are a lot of incidents that would create mystery such as killings, kidnappings, robberies and others. The main key is how the writer writes up the whole story. Next aspect which is mentioned in his article is suspense, also important as without it, there is no mystery. Every event in the story would create curiosity among the readers and this curiosity that would lead the reader to read until the last chapter to answer their questions. Nasruddin also highlighted the last aspect as fast pacing storyline. Reading the thriller fiction should lead the readers to fast pacing mystery story rather than melancholic. The story technique must be fast and the wording must not be too long to read. It should be short, precise but full with contents. The duration of storyline must also not take a very long time. Usually it will take time within hours or few days.

Hajah Farhana Tarmudi (2013) stated in her article, 'Watak novel menjelma' (The appearance of character in novels) that Ramlee has his own unique style in creating his masterpiece to attract the reader interest to go on with the next chapter after another. Ramlee has a vast knowledge and experience in using story telling techniques in film scripts and drama as he used to produce script for radio drama from 1986 to 1993. So, he applied this knowledge and experience into producing his own novels. Other than that, for the introduction part for each novel, a story with suspense element will be used or 'bomb' technique to attract the reader's interest. Other than that, he also added motivational value in each of his masterpiece. She added more; Ramlee also interested in John Grisham's books entitled "The Testament and The Firm" and also likes to read newspapers every day. All 24 of his novels are full with facts that related with the plot of his stories to invite the readers to think and not only just to read.

### **Multiple Personality Disorder (MPD)**

Since RRT allows for inferences and insights by the reader and accepts that a reader's background knowledge and experiences impact his/her interpretation of a text, the researchers found that the element of Multiple Personality Disorder (MPD) is very obvious and important practiced by both novelists. Although there are arguments and discussion among the experts on what is the actual cause of this disorder, these two writers create their own specific causes for their characters. As in Sidney's novel, after Ashley Patterson was released by the court from the murder crime as she was diagnosed with MPD, she was admitted to the Connecticut Psychiatric Hospital. There, the cause of her 'illness' was found. She was diagnosed as having trauma during her early childhood, which is a sexual and emotional abuse by her father during she was 8 years old. In the novel, page 304, it was illustrated that Ashley saw a vision, a fragment of her past event when she saw her father lifting a young girl. It caused her to hysterical then after this, her second alter personality emerged and told the true story of how she and Alette was born. This type of MPD cause used by Sidney is coherent with what Kimball Johnson MD mentioned which is it cause by severe trauma during early childhood, usually extreme, repetitive physical, sexual, or emotional abuse.

While for Ramlee, he used amnesia or lost memory as the cause of Multiple Personality Disorder occurrence in his main character which is Norman. Differ from Ashley who undergo an intensive care of complete rehabilitation, Norman did get psychiatric help but Dr Asmah only manage to deduce that Norman had amnesia because he did not remember anything from his past and he did not continue his therapy session. Norman only know the truth about himself when he met all his alter personalities as stated in page 409, as if he was dreaming, one by one his personality came, starting from Amran, the actual main character that 'lost' inside himself, Bogart, Norman and Carlos. They explained their origin throughout his life. Then somehow, these personalities that appeared as video image, combined and slipped into his physical body resulting a complete identity of who they are. A young boy who originally as named Amran, become himself once again but with the additional characters from his personalities.

## Conclusion

Sheldon did not clearly stated the starting of his chapter as a flashback. He also just put a paragraph and italic fonts. This is his favourite style. From the reader's view, he might want his readers to guess on their own and explore themselves about the story inside his novels.

While for the Malay writer, Ramlee Awang Murshid, he uses a clear cut flashback in these two of his novels. For example, in his 'Mandatori' novel, in the first chapter, he inserted the date, the day and the place and give illusion as it today. But, the researcher found out that even though he uses this technique which will create a boring feeling, he kept bringing the readers to today's settings, then suddenly flashback in the past and then back to the future where the current setting. He might also go for future time setting. For example, in 'Mandatori', as mentioned above, he started at the first chapter as today, which is present, then second chapter, 13 years ago, the third chapter, different date but mentioned as today while on the fourth chapter, suddenly he started with this sentence, '25 tahun, selepas hari ini...' which meaning as '25 years, after today...'.

However, both of the writers, Sheldon and Ramlee Awang Murshid, shared another style in writings; which is both of them use factual information in their novels. Firstly Sidney Sheldon, in his novel 'Tell Me Your Dreams' is full with information on Multiple Personality Disorder and the views from the experts in the field. Even at the earlier before the first page, he did wrote, 'This is a work of fiction based on actual cases.' Another proof that he uses factual information is when Dr Salem made a statement about MPD. This was clearly not a fictional statement.

To conclude all, both Ramlee Awang Murshid and Sidney Sheldon share a lot of similarities. In term of theme of their novels, among four of their novels, two share a same theme which are 'Tell Me Your Dreams' and 'Mandatori'. two of their novels share a same single theme which is about Multiple Personality Disorder (MPD). While for the moral values of love and justice, 'Nothing Last Forever', and 'Fiksyen 302' share the similarities. Reader Response Theory allows for a reader to respond differently to a text each and every time he/she reads the text. The other similarities that Sidney Sheldon and Ramlee Awang Murshid shared are both of them used flashback in their novels, used detailed description and applied factual information.

Whereas, for the differences that Sidney and Ramlee have is both of these writers were influence by their culture and religious belief in their places. Sidney Sheldon with Western culture while Ramlee was more towards East culture, specifically, Islamic culture. The other significant different was Sidney Sheldon tends to use woman as his main characters and he also somehow have a great respect over woman and female. He also seems want to change the perception on women as they are not weak, dependent on man and also especially, they are not solely the sexual objects for men. This correlates with the interview with Sidney Sheldon which he looks upon the female and women. While for Ramlee Awang Murshid, he seems prefer to use motivational advices in his novels and Islamic messages. This also support the way he get inspiration, which is trough praying and Doa. All in all, east and west can meet and share their literary ideas and produce a better piece of literature.

## References

- Bassnett, Susan (1993). *Comparative Literature: A Critical Introduction*. Oxford: Blackwell Publishers.
- Chow, Rey (1995) . 'In the Name of Comparative Literature'. *Comparative Literature in the Age of Multiculturalism*. Ed. Charles Bernheimer. Baltimore, London: Johns Hopkins UP, pp 107-116.
- Colin Falck (1999), *Myth, Truth and Literature: Towards a True post-Modernism* (Cambridge: Cambridge UP, PP. XV +173.
- Das, B.K. (2000), *Comparative Literature (Essays in Honour of Professor M.Q. Khan)*, New Delhi: Atlantic Publishers and Distributers, pp. 1-7 and 159-165.
- DiYanni, Robert (2008). *Literature Approaches to Fiction, Poetry, and Drama*. 2nd ed. Boston: McGraw Hill.
- Elliot, R., (1990). Encouraging Reader-Response to Literature in ESL Situation. *ELT Journal*, 44(3): 191-198.
- Ganakumaran Subramaniam (2007) *Approaches for Teaching Literature: Theory and Practice*. Petaling Jaya: Sasbadi Sdn.Bhd.
- Gilroy, M. & B. Parkinson (1997).Teaching Literature in a Foreign Language. *Language Teaching*, 29: 213-225.
- Greene, Roland (2005). 'Their Generation'. *Comparative Literature in the Age of Multiculturalism*. Ed. Charles Bernheimer. Baltimore, London: Johns Hopkins UP, pp 143-154. Print.
- Lazar, G., (2003). *Literature and Language teaching*. Glasgow: Cambridge University Press.
- Oster, J., (2009) "Seeing with different eyes: Another View of Literature in the ESL Class". *TESOL Quarterly*, 23: 85-103.
- Ross Murfin and Supryia M. Ray (1998). *The Bedford Glossary of Critical and Literary Terms*, Bedford Books.

# Educating film audience through social cognitive theory reciprocal model

Rosmawati Mohd. Rasit<sup>a1\*</sup>, Salasiah Hanin Hamjah<sup>a</sup>, Siti Rugayah Tibek<sup>a</sup>, Fariza Md. Sham<sup>a,b</sup>, Muhamad Faisal Ashaari<sup>a</sup>, Muhammad Adib Samsudin<sup>a</sup> & 'Adawiyah Ismail<sup>a</sup>

<sup>a</sup>Faculty of Islamic Studies, Universiti Kebangsaan Malaysia, 43600 Bangi Selangor, Malaysia

<sup>b</sup>Institute Islam Hadhari, Universiti Kebangsaan Malaysia

---

## Abstract

The aim of this research is to determine the relationship between the reciprocal model factor of the Social Cognitive Theory and the level of film exposure among the audience. 1028 respondents from among adolescent film audience are selected through stratified random sampling. This research employs a cross-sectional survey method through the distribution of questionnaires as research instrument. The data obtained is analysed by using Pearson Correlation test and Multiple Regression test. Research results find that there exists a significant relation between independent and dependent variables. Further, personal and environment factors are significant predictive factors of film exposure among the audience.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** Film audience, influence, Reciprocal model, Social Cognitive Theory, prosocial behaviour

---

## Introduction

The audience is an important element in the field of mass media which contributes to the success of a media product. The change in attitude of the audience from passive to active makes the audience a selective entity with the power to determine their own choice of media (Garamone, 1984; Jensen dan Rosengren, 1990; Clifford, 2005; Mastura, 2005). According to Mastura (2005), new technology evolution such as radio, film and television, internet TV, mobile TV and internet, has created various kinds of audiences such as film audience, television audience and so on.

A film audience which chooses to watch a film have their own varied notions of the film frequently associated with an option display of different film themes and genre. Films of such genres mostly achieve the level of box office hit and become the adulation and phenomenon of local film audience. Frequently, the showing of popular episodes and dialogue, fashion and main characters themselves become their idolized icons. This shows the role played by films as motion and talking pictures to be an easy influence on the audience in comparison to other kinds of media. This is admitted by Sujiah (2009) who states that whether the audience absorbs the positive or negative elements of what they view is beyond anyone's control. According to Bandura (2001) an audience exposed to mass media such as television and films will obtain the values and standards through imitation of others'

---

\* Corresponding author. Tel. : +603-89215359; fax +603-89213152  
E-mail address : rosmawati@ukm.edu.my

behaviour. Thus, what is displayed in films influences audience understanding concerning an issue or phenomenon which occurs around them.

### **Purpose of Research**

The Social Cognitive Theory (SCT) highlights psychological change from media effect through the reciprocal model factor. The reciprocal interaction concept of SCT contributes to behavioural change in an individual who directly exposes himself to film media. This research discusses three key factors which have a triadic reciprocal relationship, namely, personal factor, environmental factor and behavioural factor which operate and interact as determinants influencing each other. The aim of this research is to determine the relationship between the reciprocal model factor of the Social Cognitive Theory (SCT) and the level of film exposure among the audience. This research also studies these three factors as contributing to the level of film exposure among the audience.

### **Literature Review**

Mastura (2005) is of the opinion that an audience has a vast array of characters. Audience character is regarded as very important to the media industry, particularly to the media practitioner or code producer (producer, director and others). This group will attempt to identify the element to determine what should be produced and what will fulfill audience preferences or taste. Audience background, gender and ethnic groups are the main factors in contributing to differences in ways of understanding and interpreting media text messages which will ultimately influence the pattern and effect from viewing (McQuail, 2000). Hakemulder (2007) explains the ability of a film audience to interpret the text of a film work. This is supported by researches on films (Ellis, 2001; Derne and Jadwin, 2000; Abdul Wahab, 2003) which agree that a film may communicate with an audience through screened text. Episodes in a film also depict the experiences which may be understood by the audience. Hence, a film may communicate emotions through audience identification with the experience of the character acted.

Damico (2007) stated that films have a unique influences on individuals. Some adolescent groups thought that violence and sexual elements that they watched from the television were for entertainment purposes only. Damico (2007) also talked about the effects of media including films that influenced teens on how to socialize, dress up and make a decision. The social cognitive theory besides explaining on the learning concept and modeling of the environment (Bandura 1996; Bandura 1989), individuals and people around them will also be linked to the same influence and effects of the media (O'Rourke 2006; Bandura 2004; Bandura 2001). Message from the media is one factor that creates the learning and observing process. A person can monitor and another person's behaviour and practice the same behaviour to their daily life (Severin & Tankard 2010; Miller 2005).

It can be understood that a film audience is an important component as a contributory factor to the success of a film. Messages obtained from viewing films will influence and cause changes and effects on ways of thinking and short-term or even long-term behaviour. Hence, the film audience is an important decoder in the delivery process of mass communication information regarding the film screened. Most of film viewers today are active in assigning meanings, interpreting and evaluating a film according to different perceptions. This builds up a paradigm of audience views on films and reality of life obtainable from films.

### **Research Theory**

Basically, Bandura's Social Cognitive Theory (SCT) discusses social behavioural changes based on the interaction concept of reciprocal determinism (Bandura, 1978; Bandura, 1986; Bandura, 2001). There are three key factors which have a reciprocal relationship, namely, personal, environment and behaviour factors (Diagram 1) (Bandura, 1978; Bandura, 1986; Bandura, 2001) which operate and interact as determinant factors and influence one another.

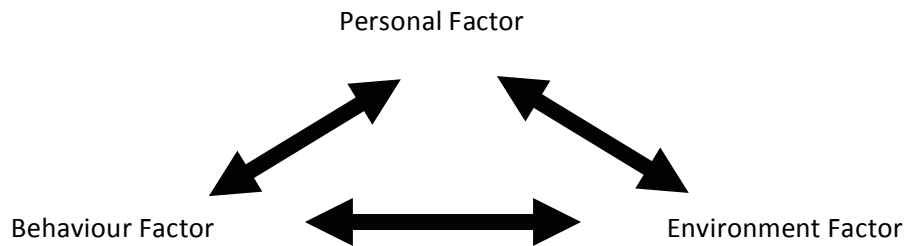


Fig. 1. Albert Bandura's Social Cognitive Theory Reciprocal Model

According to Bandura (1986), behaviour is shaped through a reinforcement of social context. This shows that people can think and arrange their own behaviour and not influenced by the environment. The surrounding factors did not cause any changes in behaviour only because the personal and environment factors are interrelated.

Bandura (1986 & 2001) explains the personal factor which covers cognition, emotions, perceptions, notions as well as internal knowledge which affect self-efficacy as an intervening factor of behaviour. The environment factor shapes the interaction involving the source of model representation and social norms of the community which may influence other people. The behaviour factor includes all actions, choice of decisions and verbal expressions of an individual through his skills and practice (Bandura, 2001; Antley, 2010). Bandura (1986) argues that cognition plays a role in determining the level of self-efficacy and shapes individual behaviour which may control the environment. Likewise, environment may also have an influence on behaviour formation.

Understanding behaviour formation in SCT is directly related to personal, environment and behaviour factors. The reciprocal model is the basic principle in the analysis of psychosocial phenomena in the development of human behaviour. As example, an individual's behaviour may be determined by controlling the environment factor. Similarly, behaviour may be controlled by the strength of environmental influence (Antley, 2010; Bandura, 2001). This explains relationship as a factor which affects interaction among the three determinant factors in behaviour formation. The personal factor of an individual is closely related with the cognitive process which may influence his own behaviour.

Man does not only master the skill of experience sourced from direct information based purely on the level of his self-efficacy but there are also expectations acquired from vicarious experience (Bandura, 1977). Hence, even though the SCT is generally related to human behaviour, Bandura also connects this theory with the theory of media effects. Bandura (2001) states that children and adults also acquire the attitudes, emotions, perceptions as well as new styles through media modeling. SCT explains how children acquire new behaviour from viewing media character on the screen (Wilson, 2008).

In SCT, man learns through role models. By the concept of role model a human becomes an example and learning to do something is by looking and imitating someone else. This theory also explains that someone may also learn not to do something by looking at some other's behaviour (Severin & Tankard, 2010). Identification is a mechanism by which the audience experience and interpret what they went through if what they viewed also happened in their own lives (Basil, 1996) (in Cohen, 2001) and Maccoby & Wilson, 1957) (in Barker, 2005). The audience feel that they are close to the characters and understand what had been acted out, particularly involving emotions such as episodes of stress from suffering, drama or crisis, as if the audience feel and understand the characters.

## Research Methodology

This study is designed using a cross-sectional survey through stratified random sampling procedure. Five public universities at the Klang Valley (UPM, UIA, UM, UKM and UiTM) with six programmes offered media, communication and films were chosen as the location to choose the samples randomly. There are 1028 respondents have been chosen by using the stratified random sampling technique by taking care sampling frame that is heterogenous from the overall population of 3324. Researcher used respondents randomly from each layer where all elements in the population were put aside according to the sampling location. 1028 respondents comprising of adolescent film audience with a background in media and communications at a public institution of higher learning in Malaysia are selected for this research. The size of the research sample accords with the suggestions of Cohen et al. (2007) using a 95% level of confidence with 5% confidence intervals. The sample size determination is referring to the Cohen et al. Sampling Size Table (2007). It was done one by one with involving six research different locations. After the total for each sample for each location was determined, systematic random sampling was used as the second sampling technique to choose respondents from each sub-group involved.

Chua (2006) and Neuman (2006) explained that the quality of research is depending on the samples. The findings obtained from the correct value of research samples through probability sampling could be generalised to the whole population. Good samples are samples that could represent variables from the population (Noraini, 2010; Gray, 2009). Hence, this study took into account samples that could be generalised to the whole population.

Six enumerators have been chosen and trained to help in distributing the questionnaires quickly and efficiently. The enumerators were chosen based on the suitability of the location. Therefore, six locations covering five public institutions need six different enumerators.

Data is collected through distribution of questionnaires and analysed by Pearson Correlation and Multiple Regression tests using SPSS 21.0 software.

## Research Findings and Discussion

### Demographic Profile

There were 1028 respondents involved in this study (Table 1) where 30.4 percent were from male respondents and 69.9 percent were female respondents. The age ranged from 19 until 24 years old. There were altogether 45.3 percent respondents were within the age 21 to 22 years old and 35.6 percent were in between 19 to 20 years old. 19.1 percent were those who are within 23 to 24 years old. As for the total respondents based on location, UiTM Shah Alam had the highest of 33.4 percent, followed by UiTM Puncak Perdana with 23.3 percent. Based on the population, respondents from UM had the lowest with 4.3 percent with only 44 students chosen as samples.

Table 1. Frequency Distribution and Respondents Demographic Percentage (n=1028)

Respondents Demography		Frequency	Percentage
Gender	Male	313	30.4
	Female	715	69.9
Age	19-20 years	366	35.6
	21-22 years	466	43.3
	23-24 years	196	19.1
Mean = 1.8346			
Standard Deviation = .72101			
Universities	UM	44	4.3

UPM	132	12.8
UKM	134	13.0
UIA	135	13.1
UiTM Shah Alam	343	33.4
UiTM Puncak Perdana	240	23.3

## Hypothesis Testing

Hypothesis 1: There is a relationship between personal factor, environment factor and behaviour factor with the level of film exposure among the audience.

Research results (Table 1) show that there is a moderately strong positive relationship between the personal factor ( $r = 0.413$ ,  $p = 0.00$ ) and film exposure. In addition, there is also a positive but weak relationship between the environment factor ( $r = 0.321$ ,  $p = 0.00$ ) and behaviour factor ( $r = 0.288$ ,  $p = 0.00$ ) with film exposure. This means that film exposure has a relationship with the SCT reciprocal model. Research results show that the SCT reciprocal model may play a role in the dependent variable, film exposure. A significant positive relationship between the personal factor, environment factor and behaviour factor proves that the SCT is a media effect theory which has an effect on the level of film exposure among the audience.

Research results show the importance of educating the film audience by the proven relationship of the SCT reciprocal model. The media message is a factor which influences and creates a learning and observation process. A person may observe the behaviour of an individual involved in media and put it into practice in his life (Severin & Tankard, 2010; Miller, 2005).

Table 1. Correlation Coefficient between Reciprocal Model Factors

Variable	Personal Factor	Environment Factor	Behaviour Factor	Film Exposure
Personal Factor	1.00 (0.00)			
Environment Factor	0.612 (0.00)	1.00 (0.00)		
Behaviour Factor	0.388 (0.00)	0.481 (0.00)	1.00 (0.00)	
Film Exposure	0.413 (0.00)	0.321 (0.00)	0.288 (0.00)	1.00 (0.00)

\*\* Correlation is significant at the 0.01 level (2-tailed)

Thus, if the individual is always exposed to excessive media influence, the tendency to accept whatever from the media is high. In associating SCT with film media influence, Bandura (2004) discusses behavioural change through the social model. According to Bandura (2001), learning through the media is a new style of learning behaviour. Media may have an influence because the construction of human social reality depends much on what is directly viewed, seen and read from their experiences. Therefore, this research accepts the stated hypothesis and it can be reported that the three reciprocal models factors have a relationship with film exposure.

This means that for the personal factor, if an individual has a good assumption and knowledge of a film, then his level of exposure to that film becomes increasingly higher. Likewise, the environment factor, which takes into account the model representation and existing social norms in a local community, may influence the way of choosing to view a film. This is because if the acting in a film is by an actor he finds interesting, then the desire to watch the film becomes increasingly higher. As for the behaviour factor, the higher the action and desire of the audience to watch it, the higher the film exposure. Thus, this reciprocal model explains the triadic relationship of the three determinant factors which may shape behaviour.



Hypothesis 2: Personal factor, environment factor and behaviour factor are predictive factors which influence the level of film exposure among an audience.

Regression analysis in this research determines the predictive factors of film exposure among an audience. Table 2 shows the reciprocal model of Social Cognitive Theory as a contributory factor to adolescent audience who expose themselves to films they view. Research results find that the personal and behaviour factors contribute 18.9 % variance to film exposure, whereas hypothesis test of the environment factor shows it is insignificant to film exposure.

Table 2. Regression Analysis of Film Exposure based on Reciprocal Model Factor.

Model	Regression		
	$\beta$	t	$p$
Personal Factor	0.355	11.644	0.000
Environment Factor	0.057	1.522	0.128
Behaviour Model	0.150	4.935	0.000
1	$\Delta R^2=0.170$		
2	$\Delta R^2=0.189$		
		F=120.348	$p=0.000$

Based on research results, two predictive factors, i.e., personal and behaviour factors contribute significantly. This means that both these factors of the Reciprocal Model also increase the level of film exposure among the audience. Further, the multiple regression test which uses the stepwise method significantly shows that the personal factor contributes 17 % variance ( $\Delta R^2=0.170$ ) to film exposure. This shows that the audience's personal factor ( $\beta=0.355$ ,  $p=0.000$ ) is the main predictor in the SCT Reciprocal Model factor which influences film viewing exposure among respondents.

From the above Beta value, the behaviour factor contributes only a little to the level of film exposure ( $\beta=0.057$ ,  $p=0.000$ ). This means that the behaviour factor is not the best factor which may be linked to film exposure, that is, almost 2% variance only. In other words, there are other factors not discussed in this research which are the main predictive factors influencing the level of film exposure.

Hence, research results show that the individual personal factor closely related to the cognitive process may influence the behaviour of the individual himself. Learning through observation, the individual is able to think and evaluate a behaviour which he wishes to learn and imitate through the processes of paying attention, remembering, replication and motivation. However, motivation and reinforcement are not the only factors which may determine making a decision. Decision-making also depends on the behaviour of the audience themselves.

This can be seen when an individual also learns from modeling found within the sphere of his environment such as parents, family members, peers as well as artistes and celebrities who attract his attention (Bandura, 2001; Bandura, 1978; Bandura & Jeffery, 1973). Nevertheless, a high self-efficacy (Bandura, 2005; Bandura, 1994; Bandura, 1977) within the individual also plays a role in controlling the environment factor. This means that even though the individual is in a less impressive environment, it is possible to produce good behaviour uninfluenced by the environment factor if his self-efficacy is high.

The results of the partial correlation test and the multiple regression test show that there is a relationship and significant contribution of predictive factors which enable the researcher to accept the hypothesis stated. This means that this research contributes to the relationship between the independent variables and the dependent variables. The partial correlation test conducted contributes as a prediction in forming a research hypothesis which may explain the phenomena occurring through the relationship between the research variables. This argument rests on the opinion of Noraini (2010) who states that even though correlation study cannot be used to determine the

causes, it is still important to be conducted to predict and explain if a consistent relationship exists between the variables.

## Conclusion

As a Social Cognitive Theory construct which promotes observational learning, the contribution of learning through observation corresponds with the function of film as a medium which may affect the audience. Hence, the viewer learns through what he observes from everything he is shown, directly and indirectly. This will affect changes in the film audience, whether in terms of cognitive, affective or even behaviour.

This research contributes to the discovery of research variables which may be associated with the Social Cognitive Theory. The research variables used are the reciprocal model factor comprising of the personal, environment and behaviour factors as independent variables, and film exposure as a dependent variable. Research results show a significant relationship between independent variables and dependent variables. Further, the personal and environment factors are significant predictive factors to film exposure among the audience. These findings succeed in strengthening the Social Cognitive Theory framework which relates this theory to research on media effects.

The findings of the research see that there are significant relationship between the independent and dependent variables. The findings manage to strengthen the theoretical framework used-social cognitive theory (Bandura 1986) that links the theory with some media effects. Other than that, this research strengthens the points about social cognitive theory through media towards positive behavior like some previous research conducted by Udompim & Singhal (1999) and Dumova (2006).

## Acknowledgements

This research was partially supported by the Fundamental Research Grant Scheme of Ministry of Higher Education Malaysia and Universiti Kebangsaan Malaysia (UKM) (FRGS/2/2013/SSI03/UKM/03/1).

## References

- Abdul Wahab Hamzah. (2003). Audience: Attitude and hope of Malaysian film audience. In. Ramli Mohamed (ed.). *Cinema and Viewing in Malaysia*, p. 83-100.
- Antley, Mark W. (2010). Toward a metatheoretical integration of developmental paradigms. *Integral Review*, Vol.6, No.3: 1-15.
- Bandura, Albert. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychology Review*, Vol. 84, No.2: 191-215.
- Bandura, Albert. (1978). The self system in reciprocal determinism. *American Psychologist*, Vol.33, No.4: 344-358.
- Bandura, Albert. (1986). Social foundations of thought and action: *A social cognitive theory*. New Jersey: Prentice-Hall.
- Bandura, Albert. (1989). Social Cognitive Theory. In. Vasta, R. (Ed.), *Annals of Child Development*, Vol.6, 1-60. Greenwich, CT: JAI Press.
- Bandura, Albert. (1994). Self-efficacy. Dlm. V. S. Ramachaudran (Ed.), *Encyclopedia of human behavior* 4, p. 71-81. New York: Academic Press.
- Bandura, Albert. (1996). Social Cognitive Theory of Human Development. In. Husen, T. & Postlethwaite, T.N. (Eds.), *International Encyclopedia of Education*, Ed. Ke-2, 5513-5518. Oxford: Pergamon Press.
- Bandura, Albert. (2001). Social cognitive theory of mass communications. Dlm. Bryant, J. dan Zillman, D. (Ed.). *Media effects: Advances in theory and research*. Ed. Ke-2, hlm. 121-153. New Jersey: Lawrence Erlbaum.
- Bandura, Albert. (2004). Social Cognitive Theory for Personal and Social Change by Enabling Media. In. Singhal, Arvind., Cody, Michael J., Rogers, Everett M. and Sabido, Miguel. (Eds.), *Entertainment-education and social change*. (Hlm. 75-96). New Jersey: Lawrence Erlbaum Associates, Inc.
- Bandura, Albert. (2005). The evolution of social cognitive theory. Dlm. Smith, K.G. & Hitt, M.A. (Ed.). *Great minds in management*. Hlm. 9-35. Oxford: Oxford University Press.
- Bandura, Albert. & Jeffery, Robert W. (1973). Role of symbolic coding and rehearsal processes in observational learning. *Journal of Personality and Social Psychology*, Vol.26, No.1: 122-130.

- Barker, Martin J. (2005). The lord of the rings and identification: a critical encounter. *European Journal of Communication*, 20 (3), hlm. 353-378. doi:10.1177/0267323105055262
- Clifford, Reginal. (2005). Engaging the audience: The social imaginary of the novela. *Television New Media* 6: 360-369.
- Cohen, Jonathan. (2001). Defining identification: a theoretical look at the identification of audiences with media character. *Mass Communication and Society*, 4 (3), hlm. 245-264.
- Damico, A., & Fuller H. (2007). High School Students' Perceptions on Potential Links Between Media and Health Behaviors. *Studies in Media & Information Literacy Education*, 7(2). Retrieved from <http://www.utpress.utoronto.ca/journal/ejournals/simile>
- Derne, Steve and Jadwin, Lisa. (2000). Male Hindi Filmgoers' gaze: An Ethnographic Interpretation. *Contributions to Indian Sociology* 34 (2): 243-268.
- Ellis, Robert. (2001). Movies and Meaning. *The Expository Times* 112: 304-308.
- Garramone, Gina M. (1984). Audience motivation effects: More evidence. *Communication research* 11: 79-96.
- Hakemulder, Jemeijan. (2007). Tracing foregrounding in responses to film. *Language and Literature* 16: 125-139.
- O'Rorke, Kevin. (2006). Social learning theory and mass communication. *ABEA Journal*, Vol.25, 71-74. Retrieved from <http://journal.azbea.org/v25/v25v22n2.pdf>
- Jensen, Klaus Bruhn dan Rosengren, Karl Erik. (1990). *European Journal of Communication* 5: 207-238.
- Mastura Muhammad. (2005). Audience: Concept, theory, uses and gratifications. *Malaysia Screen Journal* (2).
- McQuail, Dennis. (2000). *Audience Analysis*. London: Sage Publications.
- Miller, Katherine. (2005). *Communication Theories Perspective, Processes and Contexts*, 2<sup>nd</sup> Ed. New York: McGraw-Hill Companies. Inc.
- Severin, Werner J. & Tankard, Jr. James W. (2010). *Communication theories origins, methods and uses in the mass media*. New York: Pearson.
- Sujiah Salleh (2009). Application of Islamic culture and the arts in drama and film. *Multaqa Culture and Islamic Art*, 16 May.
- Wilson, Barbara J. (2008). Media and children's aggression, fear and altruism. *Journal Children and Electronic Media* Vol.18 No.1: 87-118.

# Education and communication in health as strategies for accomplishment of the universal access to health in Uberaba

Rosane A.S. Martins<sup>a</sup>; Claudia H. Julião<sup>b</sup>, Marta R. Farinelli<sup>b</sup>,  
Aline F. Bessa<sup>c</sup>, Aline C. P. Maríngolo<sup>c</sup>, Brendda C.A Nolasco<sup>c</sup>,  
Camila B. Ribeiro<sup>c</sup>, Daniel S. Basilio<sup>c</sup>, Nairana A. N. Gomes<sup>c</sup>,  
Renata R. Severino<sup>c</sup>, Tainara P. Costa<sup>c\*</sup>

<sup>a</sup> CAPES scholarship from Case nº BEX 10943-13-7, Federal University of Triângulo Mineiro. Social Work Department, 38022-190, Uberaba, Minas Gerais, Brazil.

<sup>b</sup>Federal University of Triângulo Mineiro. Social Work Department, 38100-000, Uberaba, Minas Gerais, Brazil.

<sup>c</sup>Federal University of Triângulo Mineiro. Social Work Course, 38100-000, Uberaba, Minas Gerais, Brazil.

---

## Abstract

In the period from February 2013 to April 2014, it was developed the project “Communication, Education and Social Mobilization in health field, in the city of Uberaba/Brazil: knowing resources and committing rights, by professors and students of the Social Work Graduation Course at Federal University of Triângulo Mineiro - Universidade Federal do Triângulo Mineiro, funded by the Minas Gerais State Research Foundation – Fapemig. Aiming to expand and implement the universal access to the Unified Health System (SUS) in Uberaba the following actions were performed: mapping of the demands of users and health professionals in the field of health education and communication, along with the 16 units of primary health care; creation of 60 radio programmes about SUS and the right to health and workshops on humanization for receptionists and managers of health units. From the survey, it was noted ignorance of the needs of health service users and lack of investment in health teams training in the context of education and communication in health, specialized language used by professionals with health users and fragility in conveying information that consider local and regional demands. Health education actions carried out by the project provided humanized and articulate dialogue between public policies and their users, users and teamwork and transmission on the services and social rights. Actions of health education and communication carried out by the project provided a humanized and articulated dialogue between public policies and their users, users and teamwork. The quality and the way these actions were processed were determinant to the materialization of health policy as universal right to citizens.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* Health education; health communication; health policies; social rights.

---

## Introduction

This paper aims at presenting an experiment of the extension project in interface with the research entitled

---

\* Corresponding author. Tel.: +351-21-91747-7593.  
E-mail address: drarosane.martins@gmail.com

“Communication, Education and Social Mobilization in Health in the city of Uberaba-Minas Gerais: knowing resources and committing rights”.

It is a project funded by the Minas Gerais State Research Foundation – FAPEMIG, developed by professors and academics of the Social Work Graduation Course at Federal University of Triângulo Mineiro - Universidade Federal do Triângulo Mineiro. This paper aims at analyzing the contributions of the health education and communication activities performed with the population and health professionals, as strategies for accomplishment of the access to health policy in Uberaba/Brazil.

The promulgation of the Constitution of the Federative Republic of Brazil, in 1988, seeks to strengthen citizenship by ensuring social rights previously ignored by the State. Health is recognized and defined by law as a universal right, expressed in article 196 of the Constitution: “health is everyone's right and duty of the State, guaranteed by social and economic policies aimed at reducing the risk of disease and other aggravations and universal and equal access to actions and services for its promotion, protection and recovery”.

The Constitution of 1988 signals an important milestone in the redefinition of social policies in Brazil, especially in the field of public health, with the proposal of the creation of the unified, integral and gratuitous system, named Unified Health System-UHS - Sistema Único de Saúde-SUS.

In this context, the concept of health is not the absence of disease anymore and turns to be a new and expanded health perspective with emphasis on the actions of attention to the promotion and protection of health aimed at improving the quality of life of the population.

In this way, Brazil ratifies the affirmation of the Declaration of Alma-Ata recognizing that:

health is a State of physical, mental and social well-being. Health is a fundamental human right, and that the attainment of the highest possible level of health is the most important world social goal whose realization requires the action of many other social and economic sectors. (Ministry of Health, 2002, online)(our translation)

The Organic Health Law (Law No. 8080/90) stipulates in its article 7 ° the creation of SUS establishing democratic principles in the context of health policy, based on the universality of access, integrality and equity of care, having as main guidelines of management decentralization, hierarchization and the regionalization of the services offer, and still, the commitment to the efficaciousness of the interventions and the complementarity of the private sector with a view to a participatory management.

In this sense, UHS/SUS represents a major breakthrough in terms of health policy in the world, but users of this system still face many barriers to access to health in an integral and universal way, that is, to facilitate the execution of legally guaranteed rights.

Bravo (2009) emphasizes in his studies that, despite advances in public health policy with regard to the universality of the right to health, numerous factors affect its strengthening and consolidation as social policy.

With the adoption of the neoliberal policy, mainly from 1990, and present until today, it is noted the intervention of the minimum State articulated with the privatist medical assistance model, with a view to reducing spending, especially in the social area and the expansion of health privatization, transferring, again, the responsibility for the Brazilian population.

Despite barriers in the health sector, HUS/SUS is considered one of the most advanced health policies, because it is a public proposal of democratic right to health which points to social justice. Therefore, it is necessary to fight for its effective implementation in defense of the guarantee of a public, universal, free, integral and quality public health, aiming at the right to access to health for everybody without distinction.

In order to overcome the challenges posed by this daily experience by users, professionals and managers of HUS/SUS, health education and communication in health have been identified as alternatives which may be used to guide, promote and, above all, contribute to the implementation of the rights of Brazilian health system users. Thus, this article seeks to emphasize education and communication as strategies for accomplishment of the users ' rights, with a view to promoting quality and access to health services.

## **2. Health education and communication in the context of the Unified Health System in Brazil: universal access in question**

Since long education and health communication establishes an intense relationship with health policies: from advertisements to existing projects. Currently, health communication has gained more strength, because health policy defends the discourse of popular participation and social control.

When speaking of education in health, from the understanding that the educational process consists of knowledge and skills that a subject exchange with another with the goal of developing reflections fostering changes in behavior. Given this, health education plays an important role as regards health as a universal right. Health education is a social practice, whose process contributes to the formation of critical consciousness of the people about their health problems, from their reality, and stimulates the search for solutions and organization for individual and collective action (FUNASA, 2007, p. 19). (our translation)

Through health education it is possible to elaborate strategies that mobilize the population to participate directly in the decision-making processes that involve health policy, in health councils, conferences, and other spaces for discussion, in order to fight for access to health as a universal right and with quality, in line with the principles and guidelines of the Unified Health System.

In this way, health education commits itself to the defense of a Unified Health System for everybody and that it can be directed to meet the demands of its users, with regard to health promotion, in the perspective of totality, as a way of perceiving the user in its completeness, considering cultural, social, economic and political aspects and not only as a person who needs care. For this, it is necessary to establish a dialogue with the user population in a horizontal shape and, in this sense health communication stands out, which has the role of promoting the approximation of users with health services and professionals.

It is important to emphasize that health communication must use clear, simple language, without using technical terms, be made in a humanized form, promoting acceptance, qualified listening and the strengthening of bonds in order to promote the role of users as regards health as a right.

Health services and the formulation of strategies for the protection, promotion and prevention in health fit together in a complex service system, which, according to the law 8080/90, assist the user in an integral and continuous way, whether in primary care services (basic health units/UBS), either in secondary care (Emergency unit in health/UPA (hospitals) and Regional Health Unit/URS) or tertiary (hospitals).

Basic attention, object of studies and activities of the project "Communication, education and social mobilization in health field in the city of Uberaba-MG", is the "gateway" of users to health services in Brazil. It acts from the perspective of public health, health promotion and the prevention of risks and harms to the health conditions of the population, in order to create and strengthen strategies that are closest to the users and their families.

In the light of these notes, through the actions of this project we sought to meet communication strategies and health education in primary care network in Uberaba/MG.

## **3. Health education and health communication in the context of the Unified Health System in Brazil: universal access in question.**

Since long education and health communication establishes an intense relationship with health policies: from advertisements to existing projects. Currently, health communication has gained more strength, because health policy defends the discourse of popular participation and social control.

When speaking of education in health, from the understanding that the educational process consists of knowledge and skills that a subject exchange with another with the goal of developing reflections fostering changes in behavior. Given this, health education plays an important role as regards health as a universal right. Health education is a social practice, whose process contributes to the formation of critical consciousness of the people about their health problems, from their reality, and stimulates the search for solutions and organization for individual and collective action (FUNASA, 2007). (our translation)

Through health education it is possible to elaborate strategies that mobilize the population to participate

directly in the decision-making processes that involve health policy, in health councils, conferences, and other spaces for discussion, in order to fight for access to health as a universal right and with quality, in line with the principles and guidelines of the Unified Health System.

In this way, health education commits itself to the defense of a Unified Health System for everybody and that it can be directed to meet the demands of its users, with regard to health promotion, in the perspective of totality, as a way of perceiving the user in its completeness, considering cultural, social, economic and political aspects and not only as a person who needs care. For this, it is necessary to establish a dialogue with the user population in a horizontal shape and, in this sense health communication stands out, which has the role of promoting the approximation of users with health services and professionals.

It is important to emphasize that health communication must use clear, simple language, without using technical terms, be made in a humanized form, promoting acceptance, qualified listening and the strengthening of bonds in order to promote the role of users as regards health as a right.

Health services and the formulation of strategies for the protection, promotion and prevention in health fit together in a complex service system, which, according to the law 8080/90, assist the user in an integral and continuous way, whether in primary care services (basic health units/UBS), either in secondary care (Emergency unit in health/UPA (hospitals) and Regional Health Unit/URS) or tertiary (hospitals).

Basic attention, object of studies and activities of the project "Communication, education and social mobilization in health field in the city of Uberaba-MG", is the "gateway" of users to health services in Brazil. It acts from the perspective of public health, health promotion and the prevention of risks and harms to the health conditions of the population, in order to create and strengthen strategies that are closest to the users and their families.

In the light of these notes, through the actions of this project we sought to meet communication strategies and health education in primary care network in Uberaba/MG.

#### **4. Communication and education in health in the basic attention network in Uberaba/MG: knowing the resources.**

The first step of this project was to conduct a survey of bibliographic references, documentary research and mapping of the services that comprise the basic attention to health in the city of Uberaba, Minas Gerais, Brazil. Uberaba is a city from Minas Gerais State, in Brazil. It is located in Triângulo Mineiro Region, belonging to the mesoregion of Triângulo Mineiro and Alto Paranaíba and the microregion of the same name. The city has a population of 289.376, according to data from IBGE, 2010.

For data collection it was used a form guide and interview with the managers of health units that make up the attention network. From data analysis it was noticed that the services provided by the basic attention network in the municipality are linked to general practitioner care, Pediatrics, Gynecology and dentistry. Such a reality is due to the fact that these are the most popular services for the population.

In relation to the actions of promotion and prevention in health it was highlighted that the activities developed are centered in specific campaigns proposed by the Ministry of health and others related to regional and local reality and health education group, carried out by Family Health multiprofessional teams.

Regarding the dissemination of services provided to the population, it was identified the Community Health Agent-ACS as the main articulator of the information among the health services and population, and, also, it was highlighted the use of posters, pamphlets, brochures and publicity in media. Health agents must have the "ability to participate in the promotion of health, in its area, through development of an educational work, stimulus to communitarian participation and intersection work, aiming at quality of life." (Brazil, 1999) (our translation)

Thus, it should be noted that the primary health care in the municipality has fulfilled the requirements of its services offer. With regard to promotion and prevention actions it was identified that educational activities occupy an important space in everyday dynamics of teams. With regard to the dissemination of health services, one of the challenges facing teams is to expand the breadth of information reach and how to approach the population, resulting in the strengthening of primary care and the effectiveness of rights to health.

Information obtained in this first stage of the project, associated with the studies carried out by the members that make up the project, allowed the elaboration of 30 radio programs scripts, which are being served through the College Radio to Uberaba and other 27 municipalities that makes up the Southern Triangle region. The goal of such programs is socializing information on matters related to the Unified Health System – UHS/SUS, national Humanization policy and Health Pact to expand access of population who use health policy to the services available in its municipality. Other 30 radio programmes are still being produced.

For radio programmes elaboration academics were divided into subgroups, under professor guidance, and each of the subgroups vouched for producing programs for a particular subject, among which stand out: principles and guidelines of the SUS, commissions and competencies of HUS/SUS, domiciliary hospitalization, services available in the basic attention, among others. To give greater objectivity it was used data collected by the Ministry of health about the number of assistance made by SUS, investments in programs and projects in the context of health promotion in the country. Then the actors involved discussed the construction of such programs: the language, the way, communication among other components, with a view to dialogue and give impact on the policy on population health care.

The recording process of these programs was conducted on College Radio of UFTM. For the project to be identified over the time by the citizens/radio listeners, the programs followed a template, starting with a "jingle" and ending with the phrase: "Social Services: meeting resources, effecting rights". The accomplishment of this extension activity, health communication, is one of the strategies identified for the implementation of the right to health, in the basic attention in the city of Uberaba and region.

Another action taken by the team refers to the I Seminar on health communication, education and Social Mobilization, which took place in December 5, 2013. The event aimed to democratize knowledge about education and Health Communication, involving health professionals of Uberaba and 27 municipalities in the macro region.

This meeting was significant, with the participation of 288 people among students and health professionals, who debated the importance of communication in health, fostering discussion on the challenges in the quest for effectiveness of health as a social right. At the end of the event people attending the Seminar indicated interest for later thematic enhancements for humanization and reception at health services, health communication.

In the first quarter of 2014, after contacts with the Municipal Health Secretariat, workshops on improvement about Health Humanization were carried out, having as target audience professionals who make up the "front line" of the care, i.e. the staff/receptionists, as well as managers of the basic health units.

In the first workshop there was the participation of approximately 47 people. It was noticed that the methodology used, i.e. participatory and dialogical provided learning through exchange of experiences, of interdependence among the various actors, mutual growth focusing the discussion on health policy, social participation and the humanization in healthcare.

## **5. Final Considerations**

From the studies carried out, it appears that, in Brazil, the current conception of health policy, understood as a right, stems from a long process of transformations, in which it is highlighted some legal landmarks, like the Federal Constitution (1988) and the regulation of the Organic Health Law (Law 8080/90) that sets forth the principles, guidelines, the management approach among other significant elements of HUS/SUS.

Despite representing significant progress, SUS still presents several weaknesses in ensuring the implementation of the right to health. In this context, education and health communication become important and necessary tools in order to strengthen health while population's right and responsibility of the State.

The democratization of access to information about health policy and cross-cutting issues contributes to the population to improve their quality of life through health promotion and disease prevention as well as participate more effectively in the formulation and implementation of health policies that meet their real needs.

When developing the actions of the project: "Communication, education and Social Mobilization in Health field in the city of Uberaba/Brazil: knowing resources and effecting rights," it was noted that the health care provided to population is accomplished through the network of primary health care in fragmentary form, contributing in an incipient way with efficaciousness of citizens demands. Part of this difficulty stems from the absence of investments in qualified training of health teams, with regard to communication and health education



with the use of a not very accessible language, precariousness in conveying information which they consider the demands of the population. Although there is concern and actions with a focus on educational processes for professionals in the public health context, these are held in an unsystematic and focalist way, damaging the collective sharing among health workers and users of the system to meet real demands.

From the actions carried out such as the radio programs, the seminary, the studies and search, the inquiry and the workshops it was verified that the project has provided the humanized dialogue, accessibility to the information and the knowledge for the understanding of the rights to the health, procedures of health both for the users of the health services and for the health workers.

## 6. References

- BRASIL (1999). Ministério da Saúde. Coordenação Geral de Desenvolvimento de Recursos Humanos para o SUSSPS/MS. Coordenação de Atenção Básica/SAS/MS. Diretrizes para elaboração de programas de qualificação e requalificação dos Agentes Comunitários de Saúde. Brasília,.
- BRASIL (1996). , Ministério da Saúde. Lei Orgânica da Saúde. Lei n. 8.080/90 e Lei 8.142/90. Diário Oficial da União, Brasília .
- BRASIL (2007). Fundação Nacional de Saúde. Diretrizes de educação em saúde visando à promoção da saúde: documento base - documento I/Fundação Nacional de Saúde - Brasília: Funasa
- BRAVO, MIS & PEREIRA,PAP (2009). Política social e Democracia. 5ª ed. São Paulo: Cortez.

### Web

[http://www.planalto.gov.br/civil\\_03/constituicao/constituicao.htm](http://www.planalto.gov.br/civil_03/constituicao/constituicao.htm)  
[www.bvsmms.saude.gov.br/bvs/publicacoes/cartas\\_promocao.pdf](http://www.bvsmms.saude.gov.br/bvs/publicacoes/cartas_promocao.pdf)  
<http://www.ibge.gov.br/home>

..

# Education for structural change and innovativeness of the economy in Latvia

Viktorija Šipilova<sup>a\*</sup>

<sup>a</sup> Institute of Social Research, Daugavpils University, Parades str. 1, LV-5401, Daugavpils, Latvia

---

## Abstract

Education has to support structural change for providing a contribution to the entrepreneurship and strengthening the labour markets through the development of innovative framework in economy. This is required by the tendencies of a modern economy and the increasing competition. However, the reaction of labour markets in Latvia at this moment on changes in the sectoral composition of economy could be characterized as weakly expressed and thus does not correspond with the aims to develop innovative economy. Human capital is recognized as one of the main resources in Latvia, therefore efforts should be directed to the increasing the quality of this resource, which is such important for developing the innovative economy. Education, in turn, is a main tool for achieving high quality for human capital. Taking into account the above mentioned, the article examines the issue on how education contributes to supporting the structural change and bringing Latvia closer to the innovative framework.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* education; structural change; innovative economy; Latvia.

---

## Introduction

The sectoral composition of economy as well as specialization (based on employment data) spread among the Latvian regions indicates on successful activities within low technology manufacturing sectors. This contributes to the economic progress in Latvia, but at the same time do not provide stimulus for development of innovativeness required by the increasing competition at the external markets. Despite the fact that innovative enterprises can be found in each sector and specialization on traditional sectors can provide success (Janger et al. 2011), the economic structure is defined as more beneficiary if its activities mostly is based on knowledge, provide positive externalities and occurs in technology-driven and high skill intensive sectors (Janger et al. 2011). The extent in which the Latvian economy could be named innovative can be evaluated through the structural change. The research results indicate that although in limited extend, but the Latvian economy gradually is coming closer to the innovativeness through the structural change what is confirmed by the increase in employment in high-technology manufacturing sector (Jermolajeva, Šipilova 2014). Thus, possibility how to increase the innovativeness could be based on structural change in the sectoral composition of economy in favour to high-technology manufacturing sectors. One of the most important factors necessary for starting and stimulating the development of innovativeness through the structural change is adequately qualified workforce and its updating. On the other hand, it is difficult to balance the necessity of the economy in the long-term (structural change towards high-technology manufacturing sector) and interests of workforce in a short-term (possibilities provided by the sectors of 'wellbeing' concept) (Šipilova 2014a, Šipilova

---

\* Corresponding author. Tel.: 00-000-000-0000  
E-mail address: sipilova.viktorija@inbox.lv

2014b). In other words, the most important issue is to create interest and assurance of workforce in potential of high-technology manufacturing sectors for achieving the equality in perception of sectors of 'wellbeing' concept and sectors 'desirable' for structural change.

The concept of dualism at labour market in general means that some sectors are more attractive for workforce than others measured them by average wage and possibilities to gain job and reach career growth (Doeringer, Piore 1971; Hudson 2007). In turn, the term 'desirable' structural change in the economy can be explained depending on country's aims but in accordance with trends in global economy. 'Desirable' structural change in case of Latvia (in accordance with the strategy „Europe 2020” and national development plans) means necessity to reallocate resources in favour to high-technology manufacturing sectors. This article tries to evaluate the aspects crucial for understanding the interest and ability of workforce to participate in such structural change. Thus the interest of the research is based on the following issues:

- (1) understanding of the level of attractiveness of the high-technology manufacturing sectors for workforce,
- (2) evaluation of the possible interest of potential workforce to gain such education which can be necessary in the high-technology manufacturing.

At this moment interaction among workforce and education in Latvia could be characterized as weak and changes in the sectoral composition of economy and labour market weakly impact the choice of individuals in the fields of education (Šipilova 2013). The labour market in Latvia can be characterized by the following aspects:

- (1) lack of qualified workforce showed by necessity to master investments of European funds,
- (2) concentration of specialists in Riga region and region's specialization mostly in services (both high technology as well as oriented on domestic market),
- (3) the forecasts do not indicate on necessity of specialists in high-technology manufacturing sector till 2020, but specify the lack of tourism professionals, professionals in quality management systems, paramedical staff, nurses, other social science professionals and low-skilled workers (LR LM 2007).

The above mentioned tendencies made the issue on education crucial for structural change as a tool for stimulating innovativeness. Moreover, it seems that existing sectoral composition of economy and forecasts at labour market in Latvia could make individuals careful in evaluation of high-technology manufacturing sectors and perception of them as sectors of 'wellbeing'.

The article is organized as follows: the second section consider research background and the experience of academic literature in individuals choice of education within modern trends in economy, the third section contain evaluation of attractiveness of high-technology manufacturing sectors for workforce and its possible interest in such fields of education which are welcomed in high-technology manufacturing in Latvia, the fourth section presents conclusions.

## **Background of Research and the Experience of Academic Literature**

Long-term experience indicates that transformation of production technology for achieving productivity growth is not enough without highly-qualified workforce (Ueshima, Funaba, Inoki 2006). Therefore for reaching excellence in manufacturing at national levels so-called production-based education is required (Ilyas, Semiawan 2012). Some authors examine relation between new technologies and educational skills and highlight that investments in new technologies provide not only changes in the sectoral composition of economy but in labour demand also (see for example, Ueshima, Funaba, Inoki 2006).

Education choice although is related to the conditions of uncertainty and risks. This is topical due to the fact that investments in education not always guarantee involvement in labour market (Maiolo, Cortini, Zuffo 2013). Research findings indicate that risks associated with education choice seriously affect the decision of individuals, because of issues on returns (Hogan, Walker 2007). The possibility to gain negative returns to education (Hogan, Walker 2007) or necessity to accept such positions which are below individual's ability and competences (Maiolo, Cortini, Zuffo 2013) can hinder the choice in favour to certain fields of education or change the object of a choice.

Research findings indicate that quality of decision-making process have impact on choice implementation and its quality, although opinions about linkage differ among theoretical and empirical studies (Germejs, Verschueren 2007). Higher education is considered as factor stimulating innovativeness. Usually the choice in favour to higher

education is accompanied by evaluation of possibilities to combine education with work or to stop the educational process. The stimulus for choosing to participate in higher education can be provided from the policy simulations and financial support of students (Flannery, O'Donoghue 2013). On the other hand, now the sector of high education finds the changes and the customer (students, parents, society) become the most important factor defining the role and content of higher education as well as requiring differentiation and quality (Vrontis, Thrassou, Melanthiou 2007).

Moreover, the above mentioned makes the sectors of 'wellbeing' concept more attractive than sectors 'desirable' for structural change. Author pointed out the issue on possible mismatch between sectors of 'wellbeing' concept and sectors 'desirable' for structural change (Šipilova 2014a). Research findings on labour market's dualism (Doeringer 1971, Hudson 2007) and recent trends in global economy included into the development strategies (for example, the strategy "Europe 2020") (European Commission 2010) were the basis for author's understanding and further research. 'Wellbeing' concept means avoiding of possible risk to participate in the labour market into the sectors with relatively low wages and minimal career opportunities. However some research findings indicate that higher risk encourages individuals to accumulate more human capital (Hogan, Walker 2007).

On the other hand, society meets phenomena over-education, when individuals reached education and competencies through the investments in human capital which could be defined as excessive for the current job position (Maiolo, Cortini, Zuffo 2013) or possibilities offered by the labour market. Moreover over-education can be chosen by individuals as a strategy with expectations to improve job conditions in the future (Maiolo, Cortini, Zuffo 2013). In any case the choice of education and over-education strategy is dependent on understanding and perception by individuals the more prospective sectors for wellbeing. This, in turn, can create situation when sectors 'desirable' for structural change (for example, high-technology manufacturing) do not coincide with sectors of 'wellbeing' concept.

The experience of academic literature highlights the importance and necessity of well-educated and highly-qualified workforce. In turn, the readiness of the potential workforce to make choice in favour to fields of education required for working at high-technology manufacturing sector can be limited by such factor as possible mismatch between sectors of 'wellbeing' concept and sectors 'desirable' for structural change. The active support, differentiation and quality of high education as well as convergence between perception of sectors of 'wellbeing' concept and sectors 'desirable' for structural change can increase the interest of potential workforce to be involved into the fields of education necessary for working in high-technology manufacturing sector.

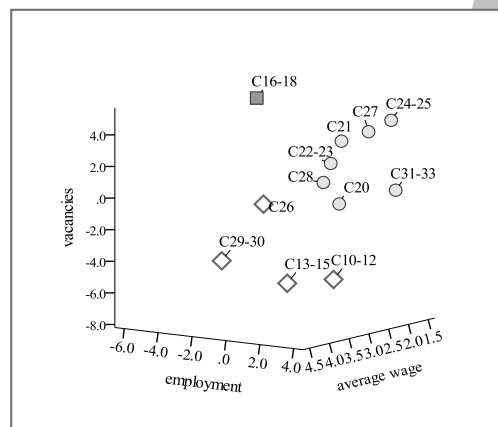
## **Data, Methodology and the Logic of Research**

The article is organized in the framework of understanding that structural change in the sectoral composition of economy in Latvia in favour to high-technology manufacturing sectors is necessary for increasing the innovativeness and that workforce is crucial factor in such process. Although this can be limited due to possible mismatch in perception of sectors of 'wellbeing concept' and sectors 'desirable' for structural change.

Such differences in understanding can hinder development of innovativeness and stimulate low interest of potential workforce in fields of education necessary for high-technology manufacturing sector. The article considers the level of attractiveness of the high-technology manufacturing sectors for workforce and possible interest of potential workforce to gain such education which can be necessary in the high-technology manufacturing. The research take into account high technology manufacturing sectors (Eurostat 2014) and fields of education necessary for working in high-technology manufacturing. The article focuses on manufacturing as main driving force towards innovativeness (European Commission 2010). The attractiveness of the sectors is measured by the data on employment level, vacancies and average wage. The potential workforce is presented by the data on new enrollees and graduates from the Central Statistical Bureau of Latvia. This article tries to evaluate the aspects crucial for understanding the interest and ability of workforce to participate in structural change 'desirable' for stimulating the innovativeness in Latvia.

## Research Results

The composition of manufacturing sector in Latvia presents high dominance of low technology manufacturing sectors (producing food, wood, textiles *etc.*) In turn, the decision to increase the share of high-technology manufacturing as driving force for long-term growth and stimulus for innovativeness is welcomed in development plans and strategies (for example, the strategy “Europe 2020”) (European Commission 2010). Thus, the question about qualified workforce necessary for development and functionality of these sectors is topical, but at the same time it is linked with the issue on uncertainty because of possible mismatch among sectors of ‘wellbeing’ concept and sectors ‘desirable’ for structural change. The definition of sectors of ‘wellbeing’ concept is relative because it is difficult to measure career opportunities for individuals, but such indicators as average wage, dynamics of employment level and vacancies can characterize each sector and provide information for separation of sectors tended to be associated with wellbeing. These indicators among others in a bigger extent can impact the choice of potential workforce in favour to certain fields in education necessary for working at high-technology manufacturing sector. These indicators by manufacturing sectors are illustrated at the Figure 1 (see Figure 1).



C10-12 - Manufacture of food products; beverages and tobacco products; C13-15 - Manufacture of textiles, wearing apparel, leather and related products; C16-18 - Manufacture of wood, paper, printing and reproduction; C20 - Manufacture of chemicals and chemical products; C21- Manufacture of basic pharmaceutical products and pharmaceutical preparations; C22-23 - Manufacture of rubber and plastic products and other non-metallic mineral products; C24-25 - Manufacture of basic metals and fabricated metal products, except machinery and equipment; C26 - Manufacture of computer, electronic and optical products; C27 - Manufacture of electrical equipment; C28 - Manufacture of machinery and equipment n.e.c.; C29-30 - Manufacture of motor vehicles, trailers, semi-trailers and of other transport equipment; C31-33 - Manufacture of furniture; jewellery, musical instruments, toys; repair and installation of machinery and equipment

Fig. 1. Possible (simplified) measurement of attractiveness of manufacturing sector for potential workforce: changes in the employment level, vacancies and average wages in manufacturing sectors in Latvia, 2005 to 2012

Source: author's calculations based on data from the Central Statistical Bureau of Latvia 2014 a, c, d

Author's calculations (see Figure 1) indicate that during the period from 2005 to 2012:

- (1) the changes in the average wage were positive and this indicator has increased twice in all manufacturing sectors, moreover some sectors as “Manufacture of machinery and equipment n.e.c.” (C28) and “Manufacture of motor vehicles, trailers, semi-trailers and of other transport equipment” (C29-30) have higher increase (however it should be taken into account that the previous level of average wage differs among sectors),
- (2) employment level has decreased or increased minimally in all manufacturing sectors (except “Manufacture of basic metals and fabricated metal products, except machinery and equipment” (C24-25) and “Manufacture of furniture; jewellery, musical instruments, toys; repair and installation of machinery

- and equipment” (C31-33) where moderate increase was observed),
- (3) vacancies has decreased significantly or increased minimally (except “Manufacture of basic metals and fabricated metal products, except machinery and equipment” (C24-25) and “Manufacture of electrical equipment” (C27) where moderate increase was observed).

As the statistical data and author’s calculations present the high technology manufacturing sectors can offer higher wages, but possibility to find job is minimal because of relatively stable employment level and decrease in employment (depending on sector) and low amount of vacancies in Latvia (see Figure 1).

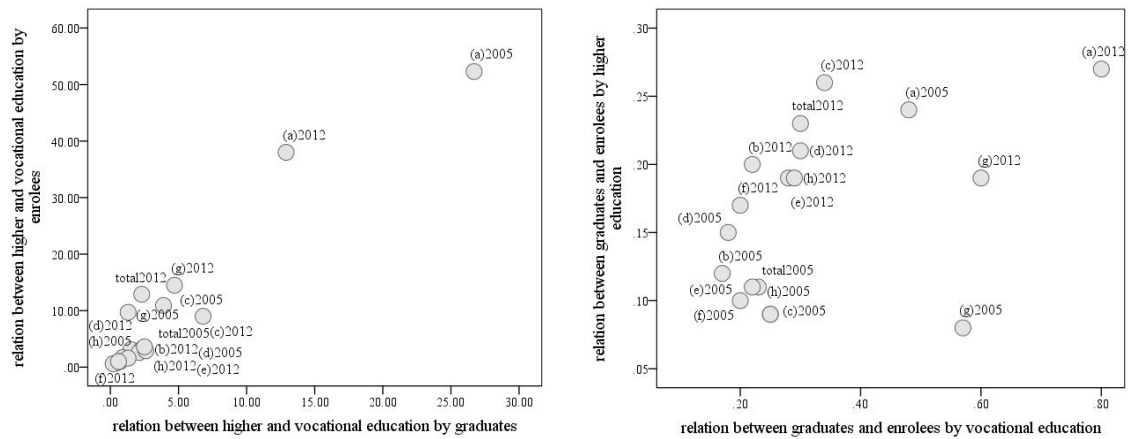
The data on Figure 1 allow classifying manufacturing sectors into three groups (see Figure 1):

- 1) “raising average wage” - sectors with significant decrease in employment level, moderate decrease in vacancies and relatively high increase in average wage - “Manufacture of food products; beverages and tobacco products” (C10-12), “Manufacture of textiles, wearing apparel, leather and related products” (C13-15), “Manufacture of computer, electronic and optical products” (C26), “Manufacture of motor vehicles, trailers, semi-trailers and of other transport equipment” (C29-30);
- 2) “raising employment and average wage” - sector which offers increase in employment sector with high increase in employment level, raising of average wage, but decrease in vacancies - “Manufacture of wood, paper, printing and reproduction” (C16-18);
- 3) “relative stability in employment level, raising in average wage and moderate raising in vacancies” - sectors with minimal decrease or increase in employment level, moderate increase in average wage and minimal increase in vacancies “Manufacture of chemicals and chemical products” (C20), “Manufacture of basic pharmaceutical products and pharmaceutical preparations” (C21), “Manufacture of rubber and plastic products and other non-metallic mineral products” (C22-23), “Manufacture of basic metals and fabricated metal products, except machinery and equipment” (C24-25), “Manufacture of electrical equipment” (C27), “Manufacture of machinery and equipment n.e.c.” (C28), “Manufacture of furniture; jewellery, musical instruments, toys; repair and installation of machinery and equipment” (C31-33).

Such classification show that high-technology manufacturing sectors do not form separate group what indicate on relative similarity by possibilities to offer wellbeing conditions what also makes the issue of evaluation of possible interest to gain education in the fields of education necessary at high-technology manufacturing sector topical.

The interest of potential workforce can be measured by amount of enrolees and graduates and relation among these indicators by higher and vocational education (only in those fields of education which are necessary at the labour market in high-technology manufacturing sectors marked at the Figure 2 with letters (d), (e), (g)). The first negative tendency indicate that amount of enrolees is in much times bigger than amount of graduates during relatively long period of time (see Figure 2 a, b). Second, the amount of enrolees as well as amount of graduates in vocational education is bigger than in higher education what indicate on lack of potential workforce necessary for high-technology manufacturing. Comparison of situation in 2005 and 2012 present improvements but the tendencies of the previous period of time still are topical what indicate on possible insufficient interest of potential workforce as well as on possible lack of specialists.

The data on Figure 3 present results of possible evaluation of linkage and interaction between education necessary for working at high-technology manufacturing labour market and reaction of potential workforce on changes at this labour market (see Figure 3). The education is measured by number of graduates and enrolees at vocational and higher education in the fields of education “natural sciences, mathematics and information technologies”, “engineering, manufacturing and construction”, “health and welfare” and labour market is measured by employment level, vacancies and average wage. The logic of measurement and its results are presented at the Figure 3 and show the force of linkage between each of five indicators (see Figure 3).



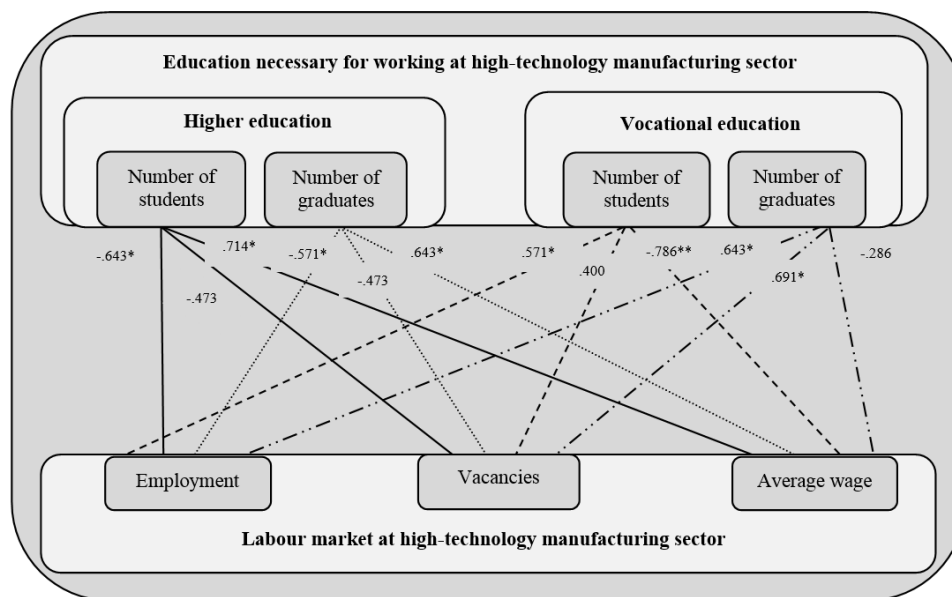
(a) Relation between higher and vocational education by enrolees and graduates, 2005 and 2012

(b) Relation between graduates and enrolees by vocational and higher education, 2005 and 2012

(a) – education; (b) – humanities and art; (c) – social sciences, business and law, (d) – natural sciences, mathematics and information technologies, (e) – engineering, manufacturing and construction, (f) – agriculture, (g) – health and welfare, (h) - services

Fig. 2. (a) Relation between higher and vocational education by enrolees and graduates, 2005 and 2012; (b) Relation between graduates and enrolees by vocational and higher education, 2005 and 2012.

Source: author's calculations based on data from the Central Statistical Bureau of Latvia 2014 b, e, f



\*\*. Correlation is significant at the 0.01 level  
\*. Correlation is significant at the 0.05 level

Fig. 3. Linkage, interaction among education and labour market at high-technology manufacturing sector and reaction of potential workforce on changes at labour market within high-technology manufacturing sector (Kendall's nonparametric correlation coefficients)

Author suppose that employment level, vacancies and average wage can impact interest of students to choice certain fields of education and ability to graduate. Author's calculations indicate that average wage is the most important indicator that impacts the number of students and graduates both in vocational and higher education. The issue on vacancies has significant linkage only with number of graduates in vocational education. Employment level within high-technology manufacturing sector is both significant for individuals involved in a higher and vocational education systems.

In general, author can conclude that linkage among education and labour market within high-technology manufacturing sector exists and is strong. Average wage is the most important indicator affected the choice of individuals as well as their ability to stay in education system. In turn, vacancies are the factor that impact individuals in lesser extent. The data calculated highlight the dominance of 'wellbeing' concept over the understanding of 'desirable' structural change what makes the process of preparing and updating of workforce necessary for high-technology manufacturing sector more complicated due to possible lack of necessary interest of workforce. However, the increase in graduates in higher education in the fields of education necessary for working in high-technology manufacturing (see Figure 2 a, b) can indicate on gradual convergence between understanding of sectors of 'wellbeing' concept and sectors 'desirable' for structural change.

## Conclusion

Education is crucial for structural change and innovativeness. This due to the fact that structural change can be considered as a tool for stimulating innovativeness. Structural change in the sectoral composition of economy in Latvia in favour to high-technology manufacturing sectors is important factor for increasing the innovativeness and highly-qualified workforce is significant factor in such process. Although this process can be limited due to possible mismatch in perception of sectors of 'wellbeing concept' and sectors 'desirable' for structural change by existing and potential workforce, because it is difficult to balance the necessity of the economy in the long-term (structural change towards high-technology manufacturing sector) and interests of workforce in a short-term (possibilities provided by the sectors of 'wellbeing' concept). Moreover, it seems that existing sectoral composition of economy and forecasts at labour market in Latvia could make individuals careful in evaluation of high-technology manufacturing sectors and perception of them as sectors of 'wellbeing'.

Author's evaluation show that although the interest of potential workforce as well as amount of specialists with qualification in certain fields of education is not enough the average wage is the most important indicator that impacts the number of students and graduates both in vocational and higher education necessary for working in high technology manufacturing sector. In general, the linkage among education and labour market within high-technology manufacturing sector exists and is strong. However, the data calculated highlight the dominance of 'wellbeing' concept over the understanding of 'desirable' structural change what makes the process of preparing and updating of workforce necessary for high-technology manufacturing sector more complicated. It should be noted that despite this, the increase in graduates in higher education in the fields of education necessary for working in high-technology manufacturing stimulates gradual convergence between understanding of sectors of 'wellbeing' concept and sectors 'desirable' for structural change.

## Acknowledgements

This work has been supported by the European Social Fund within the project "Support for the implementation of doctoral studies at Daugavpils University, 2nd stage"  
Agreement Nr. 2012/004/1DP/1.1.2.1.2/11/IPIA/VIAA/011



## References

- Central Statistical Bureau of Latvia. (2014a). Average Monthly Wages and Salaries by Kind of Activity (in Euro). Available: [http://data.csb.gov.lv/Selection.aspx?px\\_path=Sociala\\_Ikgad%C4%93jie%20statistikas%20dati\\_Darba%20samaksa&px\\_tableid=DS0020\\_euro.px&px\\_language=en&px\\_db=Sociala&rxid=cdbc978c-22b0-416a-aacc-aa650d3e2ce0](http://data.csb.gov.lv/Selection.aspx?px_path=Sociala_Ikgad%C4%93jie%20statistikas%20dati_Darba%20samaksa&px_tableid=DS0020_euro.px&px_language=en&px_db=Sociala&rxid=cdbc978c-22b0-416a-aacc-aa650d3e2ce0)
- Central Statistical Bureau of Latvia. (2014b). Graduates with Degree or Qualification in Higher Education Institutions and Colleges by Education Thematic Groups. Available: [http://data.csb.gov.lv/Selection.aspx?px\\_path=Sociala\\_Ikgad%C4%93jie%20statistikas%20dati\\_Izgl%C4%ABt%C4%ABba%20un%20zin%C4%ABvas%20darbviestas%20apmaks%C4%81tais%20darba%20laiks&px\\_tableid=jvs0040g.px&px\\_language=en&px\\_db=Sociala&rxid=cdbc978c-22b0-416a-aacc-aa650d3e2ce0](http://data.csb.gov.lv/Selection.aspx?px_path=Sociala_Ikgad%C4%93jie%20statistikas%20dati_Izgl%C4%ABt%C4%ABba%20un%20zin%C4%ABvas%20darbviestas%20apmaks%C4%81tais%20darba%20laiks&px_tableid=jvs0040g.px&px_language=en&px_db=Sociala&rxid=cdbc978c-22b0-416a-aacc-aa650d3e2ce0)
- Central Statistical Bureau of Latvia. (2014c). Employment in Latvian regions and cities 2000-2012, NACE rev. 2.
- Central Statistical Bureau of Latvia. (2014d). Job Vacancies by Kind of Economic Activity on Average per Year. Available: [http://data.csb.gov.lv/Selection.aspx?px\\_path=Sociala\\_Ikgad%C4%93jie%20statistikas%20dati\\_Aiz%C5%86emt%C4%81s%20un%20br%C4%ABvas%20darbviestas%20apmaks%C4%81tais%20darba%20laiks&px\\_tableid=jvs0040g.px&px\\_language=en&px\\_db=Sociala&rxid=cdbc978c-22b0-416a-aacc-aa650d3e2ce0](http://data.csb.gov.lv/Selection.aspx?px_path=Sociala_Ikgad%C4%93jie%20statistikas%20dati_Aiz%C5%86emt%C4%81s%20un%20br%C4%ABvas%20darbviestas%20apmaks%C4%81tais%20darba%20laiks&px_tableid=jvs0040g.px&px_language=en&px_db=Sociala&rxid=cdbc978c-22b0-416a-aacc-aa650d3e2ce0)
- Central Statistical Bureau of Latvia. (2014e). New Enrolees in Higher Education Institutions and Colleges by Education Thematic Groups. Available: [http://data.csb.gov.lv/Selection.aspx?px\\_path=Sociala\\_Ikgad%C4%93jie%20statistikas%20dati\\_Izgl%C4%ABt%C4%ABba%20un%20zin%C4%81tne&px\\_tableid=IZ0280.px&px\\_language=en&px\\_db=Sociala&rxid=cdbc978c-22b0-416a-aacc-aa650d3e2ce0](http://data.csb.gov.lv/Selection.aspx?px_path=Sociala_Ikgad%C4%93jie%20statistikas%20dati_Izgl%C4%ABt%C4%ABba%20un%20zin%C4%81tne&px_tableid=IZ0280.px&px_language=en&px_db=Sociala&rxid=cdbc978c-22b0-416a-aacc-aa650d3e2ce0)
- Central Statistical Bureau of Latvia. (2014f). Students of Vocational Schools by Education Thematic Groups. Available: [http://data.csb.gov.lv/Selection.aspx?px\\_path=Sociala\\_Ikgad%C4%93jie%20statistikas%20dati\\_Izgl%C4%ABt%C4%ABba%20un%20zin%C4%81tne&px\\_tableid=IZ0230.px&px\\_language=en&px\\_db=Sociala&rxid=cdbc978c-22b0-416a-aacc-aa650d3e2ce0](http://data.csb.gov.lv/Selection.aspx?px_path=Sociala_Ikgad%C4%93jie%20statistikas%20dati_Izgl%C4%ABt%C4%ABba%20un%20zin%C4%81tne&px_tableid=IZ0230.px&px_language=en&px_db=Sociala&rxid=cdbc978c-22b0-416a-aacc-aa650d3e2ce0)
- Doeringer, P.B., Piore, M.J. (1971). *Internal Labor Markets and Manpower Analysis*. D.C. Heath and Company, Lexington, MA.
- European Commission (2010). Communication from the Commission. Europe 2020. A strategy for smart, sustainable and inclusive growth. Available: <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:EN:PDF>
- Eurostat (2014). Eurostat indicators of High-tech industry and knowledge-intensive services, January 2014. Annex 3 – High-tech aggregation by NACE Rev. 2. Available: [http://epp.eurostat.ec.europa.eu/cache/ITY\\_SDDS/Annexes/htec\\_esms\\_an3.pdf](http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/Annexes/htec_esms_an3.pdf)
- Flannery, D., O'Donoghue, C. (2013). The demand for higher education: A static structural approach accounting for individual heterogeneity and nesting patterns. *Economics of Education Review*, 34, 243-257.
- Germejs, V., Verschueren, K. (2007). High school students' career decision-making process: Consequences for choice implementation in higher education. *Journal of Vocational Education*, 70, 223-241.
- Hogan, V., Walker, I. (2007). Education choice under uncertainty: Implications for public policy. *Labour Economics*, 14, 894-912.
- Hudson, K. (2007). The new labor market segmentation: Labor market dualism in the new economy. *Social Science Research*, 36, 286-312.
- Ilyas, I.P., Semiawan, T. (2012). Production-Based Education (PBE): The Future Perspective of Education on Manufacturing Excellent. *Procedia-Social and Behavioral Sciences*, 52, 5-14.
- Janger, J. (coordinator), Holzl, W., Kaniovski, S., Kutsam, J., Peneder, M., Reinstaller, A., Sieber, S., Stadler, I., Unterlass, F. (Research Assistance) Guttmann, D., Hranayai, K., Langer, I., Neppi, E., Sokoll, E. (Scientific Advisors) Hollenstein, V., Weresa M. (2011). Structural Change and the Competitiveness of EU Member States. Final Report CR 2011. Available: [http://ec.europa.eu/enterprise/policies/industrialcompetitiveness/documents/files/structural\\_change\\_en.pdf](http://ec.europa.eu/enterprise/policies/industrialcompetitiveness/documents/files/structural_change_en.pdf)
- Jermolajeva, E., Špilova, V. (2014). Understanding an Innovativeness of the Latvian Economy through the Structural Change. Unpublished.
- LR LM. (2007). Detalizēts darbaspeka un darba tirgus pētījums tautsaimniecības sektoros. Available: [http://www.lm.gov.lv/upload/darba\\_tirgus/darba\\_tirgus/petijumi/darbaspeka\\_darba\\_tirgus.pdf](http://www.lm.gov.lv/upload/darba_tirgus/darba_tirgus/petijumi/darbaspeka_darba_tirgus.pdf) (In Latvian).
- Maiolo, M.E., Cortini, M., Zuffo, R.G. (2013). Education or Employment? The Challenging Choice of Today's Youth. *Procedia-Social and Behavioral Sciences*, 84, 298-302.
- Špilova, V. (2014a). Does Education Contribute to 'Desirable' Structural Change in Labour Market in Latvia? Experience of Regional Policy and searching of Innovative Trends. *Virtual presentation during the 6<sup>th</sup> International Conference EDULEARN 2014*, Barcelona-Spain, July 7-July 9, 2014.
- Špilova, V. (2013). Human Capital, Education and the Labor Market: Evaluation of Interaction in Latvia. *Procedia-Social and Behavioral Sciences*, 106, 1384-1392.
- Špilova, V. (2014b). Regional Policy as Indicator of Readiness for Structural Change. The Case of Latvia. *Poster presentation during the 4<sup>th</sup> International Conference on Humanities and Social Sciences 2014*, Budva-Montenegro, May 31-June 1, 2014.
- Ueshima, Y., Funaba, T., Inoki, T. (2006). New technology and demand for educated workers: The experience of Japanese manufacturing in the era of high-speed growth. *Journal of Japanese and International economies*, 20, 50-76.
- Vrontis, D., Thrassou, A., Melanthiou, Y. (2007). A contemporary higher education student-choice model for developed countries. *Journal of Business Research*, 60, 979-989.

# Education issues in a totalitarian state (case of Albania)

Anila Mullahi\*, Jostina Dhimitri

*Department of Literature, Faculty of History and Philology, University of Tirana, Tirana 11215, Albania*

*Department of Geography, Faculty of History and Philology, University of Tirana, Tirana 11215, Albania*

---

## Abstract

The political changes that happened in Albania after the World War II were followed by changes in every direction. One of the areas which had substantial changes was the field of education. Education underwent a complete new organization getting completely alienated. In continuity of the private property ceased to exist, public education became fully subsidized and fully controlled by the state.

Education Reform Law decided that Marxist-Leninist was the only obligated principle for all school texts. The Communist Party tried to educate children with hate for bourgeois culture traditions that come from foreign country. The school lost her freedom and her functions. She became a politic supplement.

School was considered an institution that does not accept any kind of diversity. In the center of teaching is not the student, on the contrary, he was in a complete limited position and predetermined. At school, was not taken into consideration the variability of students in origin, psychological, intellect, heritage, environment and context, but they are looked upon like a group in military uniform.

In many didactic manuals it is said that it does not exist only one way to teach others. In the education that was developed in the communist regime was not accepted the multi-methodology, but it was talked only of a literary method, rigid and obligated for all.

Mono-methodology consisted of a teaching that was centered on the teacher who decides all the time for everything without ever getting into consideration the thoughts or the opinions of the students. The classes had total lack of interaction between students and teachers. This ideological platform impacted badly the school level, gaps in taking scientific knowledge and preparing independent students, capable to take independent decision.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* History; education; communism; regime; school;

---

\* Corresponding author. Tel.: 00355695593089.

E-mail address: anilamullahi@gmail.com

The political changes that happened in Albania after the World War II were followed by changes in every direction. One of the areas which had substantial changes was the field of education. Education underwent a complete new organization getting completely alienated. In continuity of the private property ceased to exist, public education became fully subsidized and fully controlled by the state. The education system is in control of totalitarian state, and all children were under control of state.

After the Communist party took the government priority was given to the education.

1. First thing they opened many schools for children and adults who were analphabetic. In September 1949, the government voted a law requiring all people between the age of twelve and forty who could not read to attend classes in reading and writing.

2. Second they organized the structure of schools to be a vital part of their society socialism concept.

In 1946 Education Reform Law decided that Marxist-Leninist was the only obligated principle for all school texts. Every text in school, in each level, reflected the Communist ideology. The Communist Party tried to educate children with hate for bourgeois culture traditions that come from foreign country.

Official statistics indicated that the regime made considerable progress in education. Illiteracy had been virtually eliminated by the late 1980s. From a total enrollment of less than 60,000 students at all levels in 1939, the number of students in all levels in 1987 was more than 750,000; also, there were more than 40,000 teachers in Albania. About 47 percent of all students were female. The proportion of eighth-grade graduates who continued with some type of secondary education increased from 39 percent in 1980 to 73 percent in 1990, with no village reporting a figure below 56 percent.

Beyond the information provided by official way she lost her freedom and her functions. She became a politic supplement. Schools, as all the other institutions in a totalitarian regime were submitted to a total pressure, control and total lack of democracy.

School was considered an institution that does not accept any kind of diversity. In the center of teaching is not the student, on the contrary, he was in a complete limited position and predetermined. At school, was not taken into consideration the variability of students in origin, nor in the life patterns, psychological, intellect, heritage, intelligence, environment and context, gift, personality, practice, but they are looked upon like a group in military uniform.

In many didactic manuals it is said that it does not exist only one way to teach others. In the education that was developed in the communist regime was not accepted the multi-methodology, but it was talked only of a literary method, rigid and obligated for all.

Mono-methodology consisted of a teaching that was centered on the teacher who decides all the time for everything without ever getting into consideration the thoughts or the opinions of the students. The classes had total lack of interaction between students and teachers.

Education as each institution in a totalitarian regime was the result of centralized decisions, rigid standardization and centralized control.

The education system, however, cannot be denied that needs planning and specialist that take care to plan a plan that is very productive. "The most famous theorists of learning process focus also in the role of planning in the learning

process. This is the primary role of the strategists and especially, to those who plan for latter as they do not have the experience and expertise that possess the old planners (Wilson, K. G; 1997).

But in the case of schools during the communist regime it was not talked for planning of such kind, but for extreme control and restrictions. School was always under the control of the party. Constantly it was analyzed the way in which the schools "followed the path of the Party" and the line of Marxism in its performance.

The methods used were such that the relation between the teacher and the student was not collective, interactive but individual. Even the way how the knowledge was controlled was very centralized. They were coordinated mainly in two types of classes, the first hours for explaining (lecturing), where the teacher talks all the time and the students keep silent, the second hour is when teacher exercised control especially to individuals that were distracted to the class and not taking into consideration the emotions of students who must respond in front of all the class, while all the other students others are completely passive. This method is considered the least efficient and valuable for teaching. The professor of University of Indiana, Reigeluth (Reigeluth, C. M. 1983), expresses his conviction that: "We need a new paradigm (model) of theoretical learning. The new paradigm has to be focused on the modification of teaching that promotes the student initiative and responsibility, teamwork, mental skills, cognitive skills and diversity ".

The teaching methodology it was not at all elastic. The technique that was used resembled in a way the theory of BF theory Skinner (Skinner B.F; 1957), called the stimulus-response theory, which is based on the repetition of an action many times. This lead to a non-productive learning, but learning by heart (memorizing).

All teaching system was built on rigid and stereotyped methods. The student had no right to select and transform the information. He bases the learning process relying on a cognitive structure (schema, mental models), not being able to "go beyond the given information". (Bruner, J. S. 1973)

Repeatedly it was emphasized the fact that schools was preparing the students for the reality that waited for them. Thus school relates with the social development. Even Jerome Bruner (Bruner, J. S. 1971), in examining learning, searching the facts and the connections between them, went beyond cognitive development scheme, including even the importance of social and cultural aspects of learning and the application of rules. In totalitarian states it is not spoken about the relation between social aspect that is understood in Brunner but about a relation in political sense. Preparation and the linking of education with the social aspect it means school concept in service of politics. A school that indoctrinates students to make them ready so later they become members on the politics of the sole party.

The school, instead of a knowledge and culture source it becomes a politicized institution that induces in mandatory ways certain political views, the sole party. The knowledge that the school offers to the students it aims the indoctrination of students leaving out the target of providing with knowledge and offering behavior patterns in the service of society (Nikolla, A.; 2013).

The political govern that was decided in Albania after '44, like any other authoritarian govern, used the school as a tool to control the masses. The relation of school with politics was a relation of dependence and submission. School was completely politicized and not at all independent.

Under the guise of high valuation for the education it was asked to give a great importance to its development by providing financial support for the opening of many schools.

At first the Albanian education system was a bad copy of the Soviet system. Many textbooks used in schools, were translations of textbooks from Soviet Union. Russian language was the only foreign language permitted in School. In 1960, Albanian communist party (Albanian Labor Party) cut the relations with Soviet Union the education system

was re-organized. The importance of communist regime was for pupils and students to become “educated” with the elements of ideological, communist moral and military education.

In the first 8 years of the education (elementary), that were mandatory, once in a week, the students directed by the teacher had the one that was called political information. In complete absurd way, in these days’ students read political articles from newspapers and teachers explained their meaning. In high school, as part of the general education program, one of the main subjects was called "Marxism". In this subject the students learn the ideologies. This course was an open propaganda to realize what was called ideological education. Repeatedly it was stated that the school intends for students to have a sound education and communist ideology.

In high school part of program, in the last year, was another subject called “military”, where students learn how to use the arms against the enemy. One slogan of the time was “All the people are soldiers”.

All the texts were completely indoctrinated and were filled with praise for the dictator and the totalitarianism was presented as a terrestrial paradise. Especially literature and philosophy were the subjects through it were achieved indoctrination. In school it was taught only literature of socialist realism. These literary works had a form that provoked the public emotions, with much pathos and positive energy. With subjects and complete simple narrative, that mythologized some new ideals, which were repeated and were depicted as eternal such as collectivity, mythologizing of sacrifices during the war, all the power of the leader, the Party as the source of life etc. The walls of schools and classrooms were filled with political slogans where was praised the party and the leader.

Literature is often seen as one of the most efficient ways to synthesize ideas, predefined values, selected ideologies, often becoming the object of discussion for its unique nature and the relation that creates with the historic – life period. For this reason the entire literature of the tradition that was written by people who had not the same political ideas have or had as essential the freedom of individual and the creation of Democratic governs, disappeared from school textbooks.

In education, as in every other aspect, there was no relative thought. Ideas were predetermined as were the position and attitude that teachers and students had to have. Universities, since they were separated by the universities of the world, often provided knowledge that was old. University was not considered as a scientific studies center, but they were only teaching institutions. In 1960, the universities education was expanded. The number of students doubled. Although repeatedly it was stated that the school was open, free and everyone had the right to pursue education at all levels, this was not true. Those who "had a bad biography" or "a stain on the biography" had no right to pursue university education. With bad biographies were all the students that were from families that had different political views from the ruling party, or that emanated from rich families. In this way universities education was limited and not at all opened.

The education system was divided in four general categories: preschool, elementary school, high school and university studies. Apart this it was created even another school that was called the School of the Part, an institution where took part the ones that got prepared to be leaders of the party.

The study in the institutes of higher education is organized in fulltime schooling for younger students and part-time for adults. All graduate students were obligated to serve a probationary period of nine months in industrial production and three months in military. The school in the totalitarian was completely in service of the govern politics, so all his content was submitted to the Marxist – Leninist point view.

This ideological platform impacted badly the school level, gaps in taking scientific knowledge and preparing independent students, capable to take independent decision.

## References

- Bruner, J. S. (1973). *Beyond the information Given: Studies in psychology* Psychology of Knoing, Norton & Company incorporated
- Bruner, J. S. (1971) *The Relevance of Education*, New York: Norton.
- Nikolla, A. (2013) Njeriu i ri shqiptar mes moralit komunist dhe krizës se tranzicionit , *Onufri*.
- Reigeluth, C. M. (1983). Meaningfulness and Instruction: Relating What Is Being Learned to What a Student Knows. *Instructional Science*, v12 n3 p197-218
- Skinner B.F. (1957). *Verbal behavior*. New York: *Appleton-Century-Crofts*;
- Wilson, K. G. (1997). Science and Treatment Development: Lessons from the history of behavior therapy. *Behavior Therapy*, 28

# Education of employees and investment climate of the region: the view of the heads of enterprises

Alina OHOTINA<sup>\*a</sup>, Olga LAVRINENKO<sup>b</sup>

<sup>a</sup> Daugavpils University, Faculty of Social Sciences, Daugavpils, Latvia

<sup>b</sup> Daugavpils University, Faculty of Social Sciences, Daugavpils, Latvia

---

## Abstract

The investment climate is influenced by different factors: political, economic, social, juridical, ecological, etc. In the modern fast-changing technological world the favourable character of region's investment climate to the great extent depends on the quality of labour resources and investment in human capital that is ensured by formal education and continuous rise of person's professional level. In last decades, information-educational factors, namely, scholarship and the ability to use knowledge as an economic advantage became the key component of the investment climate. Primarily these factors significantly form the potential of enterprises and the potential of the region in general.

The aim of the present article is to define how the heads of enterprises evaluate the significance of employees' education in circumstances of external environment factors' influence (which in its turn characterizes the investment climate) on the example of enterprises in Eastern Latvia.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of Sakarya University.

Keywords: investment climate; education of employees.

---

## Introduction

The investment climate is influenced by different factors: political, economic, social, juridical, ecological, etc. In the modern fast-changing technological world the favourable character of region's investment climate to the great extent depends on the quality of labour resources and investments in human capital that is ensured by formal education and continuous rise of person's professional level. In last decades, information-educational factors, namely scholarship, the ability to use knowledge as an economic advantage became the key component of investment climate. Primarily these factors significantly form the potential of enterprises and the potential of the region (country) in general (A.V. Loginova, 2009).

The basis of the postindustrial economy is knowledge, the widespread use of new technologies and escalation of occupational mobility, due to which the role of human capital is actualized. Developed human capital is a prerequisite for successful business development. Businesses need creative and reliable people (Egle, E. 2010).

Education of employees is the foundation of wealth and prosperity (Drucker, 1993; J.Hope and T.Hope 1997; Bozbura, 2007) and a key factor in the success of enterprises in the long run (Stewart, 2001; L.W. Tat, and H.Stewart, 2007). Thus, using education of employees effectively, you can gain a competitive advantage that will ensure sustainable development of the company (Nonaka, 1998; J. Storey, and E.Barnett, 2000). In connection with this, now a significant element of potential of the enterprise along with labour productivity is a skill of managers to adequately respond to changing environmental conditions of the enterprise, investing in the education and development of the competences of employees. According to some authors, investment in education of employees gives a return close to the rate of return of investment in tangible assets.

The aim of the research is to define how the heads of enterprises evaluate the significance of employees' education under the influence of various factors of the investment climate of the region. Information base of the

---

\* Corresponding author. Tel.: +37129868004.

E-mail address: alina.ohotina@du.lv

research is based on a survey of heads of enterprises in the region in Eastern Latvia - Latgale, conducted by the authors in 2012.

## Methodology

According to the World Bank, the investment climate is a set of local factors that shape opportunities and incentives for firms to invest productively, create jobs and expand the scope of activities (World Development Report, 2004). In this research not all the factors affecting the investment climate were covered, namely, the economic situation in the country; demographic situation in the country; policy of the state; science, technology and engineering; international relations, consumers, legislation.

The investment climate characterizes the external environment of the enterprise. In turn, the company's competitiveness must withstand the pressure of the negative effects of certain components of the investment climate. Given the rapid and frequent changes in the external conditions of functioning of enterprises, we can say that the development of the system of employees' education in the company determines not only the success in its growth, but also its survival.

Education of employees is a consciously undertaken activity aimed at improving of employees' abilities required to perform the work at the moment or at the development of employees' potential required to perform work in the future (Organization of training and continuing professional education. Ed. A.Ya.Kibanov 2014). Today, education of employees acquires special significance and becomes an essential condition for the successful operation of any enterprise.

The survey of heads and specialists of enterprises was chosen as a method of collecting primary data for the study of knowledge management in small and medium enterprises in the region. The survey was conducted in June 2013 in Eastern Latvia (Latgale). The region includes Balvi, Daugavpils, Kraslava, Ludza, Prejli, Rezekne districts and two cities of republican subordination - Daugavpils and Rezekne. The area of the region is 14,500 square kilometres. Population density - 14 people per square kilometre. 292,6 thousand people live in Latgale.

The survey involved 104 enterprises in the region related by the main criterion - the workforce - to small and medium businesses. The survey was conducted on a stratified sample. The main stratifying parameters are industry affiliation (production, trade, services, etc.) and geographic location in the region. Survey parameters in relative terms differ from the regional parameters of the general aggregate in total by less than 3%. The maximum sampling error is less than 3%, with a 95% confidence level. The surveyed enterprises as respondents were represented by business leaders - 35%, middle managers (business units) - 19%, primary heads (workplaces) - 8%, specialists - 35%, and other workers - 3%. Respondents' average length of service at the enterprise is 3.1 years. Mean duration of activity of the enterprises on the market is 3.5 years. Most of the surveyed companies (65%) are limited liability companies. Other enterprises are individual merchants (30%) and societies with full responsibility (5%). The total turnover of 73% of companies surveyed does not exceed 2 million EUR, the total turnover of 12% of companies does not exceed 10 million EUR, and the total turnover of 15% does not exceed 43 million EUR. The share of equity in small and medium-sized businesses in the Latgale region of Latvia was 82% on average. There is one personal computer per 3-4 employees, on average.

## Results

The research evaluated the impact of investment climate factors on a scale of 1 to 5:

Table 1. Average rating of impact of investment climate factors in Latgale

Factor	Mean
Impact of the economic situation in the country	4,3
Influence of demographic situation in the country	2,6
Influence of government policy	3,3
Influence of technological factors	2,8
Impact of international relations	2,2
Effect of potential consumers	4,1
Effect of legislation	3,3



Note: 1 - the strongest influence, 5 - the weakest  
Source: authors' calculations in the program SPSS

According to the heads of small and medium-sized businesses in Latgale, among environmental factors the companies to the greatest extent are affected by the economic situation in the country - the average value on the five point scale is 4.3; then by consumers - 4.1; government policy and legislation - 3.3 points; below the average the impact of science and technology development and international relations were estimated, respectively, 2.8 and 2.2 points (Table 1).

Further, leaders of enterprises were asked to rate the importance of various aspects characterizing education of personnel on a scale of 1 to 5:

Table 2. Average rating of various aspects of personnel' education in the enterprise

Aspects	Mean
knowledge is a crucial criterion in selecting employees	2,7
before the experienced employee leaves our company, every effort is made to ensure that the knowledge acquired by the person would be passed on to others or documented	2,6
our company has developed a special retention policy for experienced and competent workers	3,1
our company promotes knowledge sharing	2,7
our company stimulates the production of knowledge	2,9
in our company knowledge sharing is one of the criteria for evaluating an employee	3,3
our employees regularly attend courses, seminars and other events to improve the skills in order to get new knowledge	3,1
in our company experienced employees often help new or less experienced employees	1,9
our company invests in employee training	3,1
Note: 1- very important aspect, 5 – the less important aspect	
Source: authors' calculations in the program SPSS	

As it was found, leaders believe that the most important aspects of employees' education are: knowledge sharing - the average value on the five point scale is 3.3; skills development courses, seminars, and other events, the contribution of investment in employee training and further retention of experienced and competent employees in the company - 3,1 (Table 2).

## Correlation

As correlation analysis showed, heads of small and medium-sized enterprises in Latgale believe that the impact of various factors of the investment climate in the region can be adjusted through education and competencies of employees.

It was found that the stronger the economic situation effects the company in the region, the more is the need, according to heads of small and medium-sized businesses, to value and retain skilled employees in the company ( $r$  (Spearman) = 0,420,  $p < 0,01$ ), to stimulate production of new knowledge ( $r$  (Spearman) = 0,337,  $p < 0,01$ ), to stimulate knowledge exchange ( $r$  (Spearman) = 0,336,  $p < 0,01$ ), to encouraged visiting courses, seminars ( $r$  (Spearman) = 0,412,  $p < 0,01$ ), to invest company money in the training of employees ( $r$  (Spearman) = 0,386,  $p < 0,01$ ), to invest company money in the expert advice ( $r$  (Spearman) = 0,272,  $p < 0,01$ ).

Business executives believe that the demographic situation in the country cannot be fought by improving employees' education (Spearman coefficients of correlation of this indicator are negative or 0) and the policy of the state can be opposed only by considering knowledge as a very important criterion in the selection of personnel ( $r$  (Spearman) = 0,221,  $p < 0,01$ ) and transferring of expertise from employees, who terminated the employment relationship with the company, to other workers ( $r$  (Spearman) = 0,195,  $p < 0,01$ ).

Heads of enterprises greatly underestimated the impact of various aspects of employees' education to such factor of the investment climate as the development of new technologies (either coefficients of correlation are negative, or a linear relationship is not observed). Heads of enterprises suppose that international relations can be

improved only through the transfer of knowledge from more experienced employees to new or less experienced employees ( $r$  (Spearman) = 0,403,  $p < 0,01$ ).

Heads of enterprises believe that only regular attendance of courses and seminars by employees guarantees success in collaboration with consumers ( $r$  (Spearman) = 0,233,  $p < 0,01$ ). And to resist the rapidly changing legislation and improve the competitiveness of the company is possible when experienced workers help less experienced ( $r$  (Spearman) = 0,250,  $p < 0,01$ ) and when knowledge is considered as a very important criterion in the selection of personnel ( $r$  (Spearman) = 0,262,  $p < 0,01$ ).

## Conclusions

The important role of education in improving the investment climate in the region and the company's competitiveness are stipulated, firstly, by the changing role of information in society and each individual company, where information becomes a strategic resource as other traditional material and energy resources. Effective management of all areas of activity depends on the ability to use and give the consumer the necessary information, which is one of the factors increasing the capacity of both businesses, and the region and the country as a whole. Secondly, the role of education in improving the investment climate is mediated by the emergence of demand for specialists who can efficiently manage strategic information and convert this information into knowledge and who can constantly learn and adapt to new factors of the ever-changing business environment.

As international experience shows, nowadays education of employees and continuous improvement of their competencies play a key role in the competitiveness of the company. These factors largely shape the potential of enterprises, but, as shown by our study, heads of small and medium-sized enterprises in Latgale underestimate the impact of education and competences of employees on the factors of the investment climate in the region. A particularly negative aspect is the fact that business leaders do not understand the importance of employees' education in adapting to new technologies. This result is confirmed by a number of other researches - managers are not interested in cooperation with scientific institutions, as well as in the services and ongoing activities they provide.

Business leaders must understand that the education system affects all members of the organization as well as themselves and, in turn, has a positive effect on the competitiveness of the company. Skills development should take place continuously with varying regularity of learning for each category of employees. Education of employees is a component of the company's success and the feedback of business leaders to rapidly changing environmental factors, such as the adoption of new legislation, new technologies of production of goods or services, new computer programs, etc.



Eiropas Sociālā fonda projekts  
„Atbalsts Daugavpils Universitātes doktora studiju īstenošanai, 2. kārtā”  
Vienošanās Nr. 2012/0004/1DP/1.1.2.1.2/11/PIA/VIAA/011

## References

- Bozbura, T. (2007). Knowledge Management Practices in Turkish SME's. *Journal of Enterprise Information Management*, Vol. 20, No. 2, 209-221.
- Drucker, P. (1993). *Post-Capitalist Society*, Butterworth-Heinemann, Oxford.
- Egle, E. (2010). Cilvēkresursu plānošanas un novērtēšanas metodes mazam un vidējam uzņēmumam. Rīga: Latvijas Darba devēju konfederācija, 2010, 6. lpp.

- Hope, J. and Hope T. (1997). *Competing in the Third Wave*. Harvard Business School, Boston.
- Loginova A.V. (2009). Influence of education over competitiveness of economic systems. *Problems of modern economics*, 2 (30).
- Nonaka, I. (1998). The Knowledge Creating Company. *Harvard Business Review on Knowledge Management*, 25-30.
- Organization of training and continuing professional education. (2014). Ed. A.Ya.Kibanov. SPB: Prospect.
- Stewart, T. (2001). *The Wealth of Knowledge: Intellectual Capital and the Twenty-First Century Organization*, Doubleday, Random House Inc., U.S.A.
- Storey, J. and Barnett, E. (2000). Knowledge management initiatives: learning from failure. *Journal of Knowledge Management*, Vol. 4, No. 2, 145-156.
- Tat, L. W. and Stewart, H. (2007). Knowledge Management in the Malaysian Aerospace Industry. *Journal of Knowledge Management*, Vol. 11, No. 1, 143-151.
- Where is the Wealth of Nations: Measuring Capital for the 21st Century (2006). The World Bank, Washington DC.
- World Development Report 2005 (2004): A Better Investment Climate for Everyone*. The International Bank for Reconstruction and Development. The World Bank, 2.

# Education of students and graduates of technical schools for contemporary requirements of practice

Zuzana Chodasová<sup>a</sup>, Zuzana Tekulová<sup>b</sup>, Lýdia Hľušková<sup>c</sup>, Slavomíra Jánčová<sup>d</sup>

<sup>a</sup>Slovak University of Technology in Bratislava, Institut of Management, Vazovová 5, 812 31 Bratislava, Slovakia

<sup>b</sup>Slovak University of Technology in Bratislava, Faculty of Mechanical Engineering, Nám.slobody 17, 812 31 Bratislava, Slovakia

<sup>c</sup>Spolaudit s.r.o., Slovenských partizánov 1131/51, Považská Bystrica, Slovakia

<sup>d</sup>SLM - Banská Bystrica, Hviezdoslavová 31, 97401 Banská Bystrica, Slovakia

---

## Abstract

The education is a process during which a person acquires and develops new knowledge, skills, abilities and attitudes. Therefore an educational unit shall be capable to adapt itself to the labour market conditions promptly. The present article calls attention to the importance of the economical education not only of the students and graduates of high technical schools that are expected to function as quality specialists in practice, but also to the significance of an enterprise education. The educational preparation of the technical schools students and graduates shall flexibly respond to the current necessities of practice. As the education is a permanent process, it is necessary to transfer it into the enterprise education system, as the key factor in increasing labour productivity.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** education process, controller, technical schools, field of education

---

\* Corresponding author. Tel.: +421 2 57 296 585.  
E-mail address: zuzana.tekulova@stuba.sk

## Introduction

In our modern times full of technologies, it is necessary to assure the flexibility of an enterprise, in order to keep pace with the general development. The new technologies are just those issues that are very closely connected not only with the education and training of the employees but also with the training of the high schools first-rate graduates. The more new technologies and well trained and competent workers capable to use them are to the disposal of an enterprise, the better is its position on a market. Currently, any competition advantage of an enterprise is highly appreciated. Therefore, the companies strive for making use of various means and ways to gain such advantages. One of the fundamental requirements of the entrepreneurial entities is the flexibility enabling them to respond promptly to the market requirements. The new requirements imply the necessity to adopt new approaches in order to be well competitive in the global environment. Under such a situation, when the entrepreneurial environment is changing continually, the managers are forced to take decisions within the real time, based on the true and complete information. The quick change in conditions even in the near environment of a company puts an enormous emphasis also on the work of technical specialists. The decisions of the enterprise specialists shall be not only prompt but also effective. Of course, the technician needs also the adequate, accurate and early economic

information. Slovakia, upon its entry in the European Union cannot stop its development at halfway point. It is inevitable that also the participants in the educational and business processes are well aware of the above mentioned matters of fact, and improve their activities constantly. In this manner a quality graduate - specialist will be well prepared for practice and capable to continue in increasing his knowledge (Larson, R., 2000).

The business process is a complex process of interdisciplinary and dynamic character, in which various economic, political, technical, sociological, legal and many other aspects shall be taken into account, as they may bring rather high risks. In order to reduce the risk in the management field, it is desirable to focus the educational preparation of the future technician at high school for the acquirement of adequate economic knowledge and for its appropriate transfer from high schools and universities into the practice. The entrepreneurial unit disposing with quality labour force will be then able to develop their activities more successfully and to sustain its position on the market.

### **Education of employees for the purpose of enhancing the enterprise competitiveness**

The enterprise education is the process performed and controlled by the enterprise itself. It consists of the external or internal education. The intra-plant education is organized by the enterprise in its own educational facility or just at the workplace. The education out of the enterprise, i.e. external education is performed upon an order, mostly in the specialized education centre, or in a school (Amstrong M. 2001).

In this case, the enterprise education is the systematic process concerning the changes in the labour behaviour, in the knowledge and skills levels, including the motivation of employees, decreasing the difference between subjective and objective qualification. Under the term subjective qualification the set of abilities, habits, skills and attitudes acquired during the life is understood, with the potential possibility to use them for the performance of the specified activity (Ormrod, J. E., 2006). In contrast to the objective qualification understood as the labour qualification, it means the requirement on the qualification of a workman. These requirements result out of the complexity, character and technicality of work. The enterprise education differentiates particularly the following spheres:

- field of education,
- field of qualification,
- field of development (Tokarčíková, E., 2011).

Now, the content of an enterprise education shall be as follows:

- the education within the scope of an adaptation process and the preparation of employees for performing the specified works,
- qualification enhancement (postgraduate courses, extension of the professional skills in the respective branch of the employee),
- re-qualification (re-training, formation of the working capabilities of the employee so that he is able to cope with the requirements of the new profession); professional rehabilitation (re-integration of persons that due their current health condition cannot carry out their previous jobs),
- qualification increasing.

The main purpose of the enterprise educational process is the harmonization of the employees' s qualification structure with the current performances requirements. Within the scope of this view, the enterprise education is one of the decisive strategic personnel processes: in the successful enterprises it is related with the processes of the human resources planning, recruiting and selection of people, with their forming and allocation to particular positions, evaluation and remuneration of personnel, and with their external mobility ( Standage, M., Duda, J. L., & Ntoumanis, N. 2005)).

The survey of basic information concerning the possibilities how the education may contribute to the specified personnel activity, and the information about the personnel activities that the enterprise education program may utilise are specified in the Table 1.

Table 1. Mutual relation of the enterprise education and other personnel activities

Search for the employees	←	Education possibility is motivated in the processes of deciding	←
	→	Supply of persons for education	→
Recruitment and allocation of manpower	←	Possibility to recruit the non fully qualified workers	←
	→	The suitable selection may reduce the necessity of education	→
Orientation, adaptation	←	Enhance the adaptation and training processes	←
	→	A quick training- in enables the subsequent education	→
Personal development planning	←	Enables the achievement of the optimal level of qualification	←
	→	Assures the individual, targeted education	→
Performance evaluation	←	Helps to achieve better job performances	←
	→	Presupposition for specification of the educational necessities and efficiency	→
Remuneration	←	Additional education may favourable affect the salaries	←
	→	The possibility of a higher earning motivates the ambitions to achieve the higher education	→
Working conditions and relations	←	The qualified employee participates on issues and there are not so much problems related with him	←
	→	The good working conditions initiate the interest of people in remaining in the enterprise and in qualification increasing	→

Enterprise education

The personnel managers shall have an adequate survey on necessities, defaults and aims of the company. Nevertheless, they cannot foresee the complex world trends. Therefore, the co-operation with other specialists that are involved also in other spheres and human resources, and that can respond to the **principal questions concerning the education** is necessary:

- What to educate?
- Whom to educate?
- Why to educate?
- When to educate?

The managers themselves shall be interested in the educational process, as they could better connect the theory with practice, and thus help to apply the learning subject matter at the workplace. One of the methodical measures that may be helpful at improving the situation also in the personal activities in the enterprise unit and make it more transparent is the controlling that becomes to be a consultative utility for the management. The controlling persons – controllers are assisting the managers when improving their inner processes and management systems.

The enterprise controlling is highly qualified consultancy measure for managers; due to the above mentioned aspects, these positions cannot be combined. The requirements on the people working within the controlling are very high (Ďurišová, M.,2012). They should have good analytical abilities. Sometimes a great mistake occurs in the enterprises, when the positions of controller and manager are swapped, because each of these functions contains its own work-related duties mutually interrelated.

The controller is the employee of the controlling. Thanks to his experiences and knowledge, he arranges the trouble-free functioning of the information flow in the enterprise. The manager and the controller should co-operate closely. Finally, when looking at the tasks of the controlling and at its mission, we shall understand that not only the economically educated persons should be involved in the controlling, but also the technically oriented specialists that should get these knowledge already during their studies at the high school. In Slovakia, we may already find the enterprise units that consider the controlling as the substantiated function; nevertheless there is a number of enterprises that are not interested in the controlling, or they are cumulating it with the function of a manager, as they

are not acquainted with its advantages (Kucharčíková, A. ,2014).

The requirements put on a controller reflect the requirements related with the work position and the scope of employment. The controller is a person having under his hand projects, bookkeeping, accounts, tax issues, enterprise bookings – it means the complete information flow. The manager should not consider the controller as his rival but by contraries, he should take him as a partner; however the controlling should become a way of thinking of all the managers. In order to be able to fulfil all the respective duties, the controller shall meet at least the following qualifications as specified in the Fig.1.

An enterprise that does not develop new systems, processes, products and services for its customers is not able to resist the competitive pressures. The same presupposition is valid also for people. The development of the employees means changing and adapting to the changed situation and to the influence of various forces. Therefore, in order to prevent the stagnation of the staff, also the people must adapt to the changed conditions, it means, their abilities and skills are to be constantly developed (Bontis N., 2001).

### **Eduction of the technical students for positions of controllers**

At present times, when the companies are looking for the optimum ways of the work organisation and for new approaches that would contribute to the more effective running of the enterprise, the usage of controllers is one of possible measures how to increase the enterprise management effectiveness. In order to achieve the situation, when controllers are able to work independently on a high quality level and to contribute by their activities to the proper functioning of the information flows in an enterprise, they need to be prepared for the field of their operation already within their study program. The well prepared graduate is a great benefit for the practice, where he may develop the acquired theoretical knowledge right in his position. This is a way, how the university education, but even the enterprise education may contribute to training up a well erudite specialist. The approach to the education that is based on the competencies is very useful. Especially, its high effectiveness in cases of analysing requirements and needs of the staff development seems to be very important (Kucharčíková, A. ,2008).

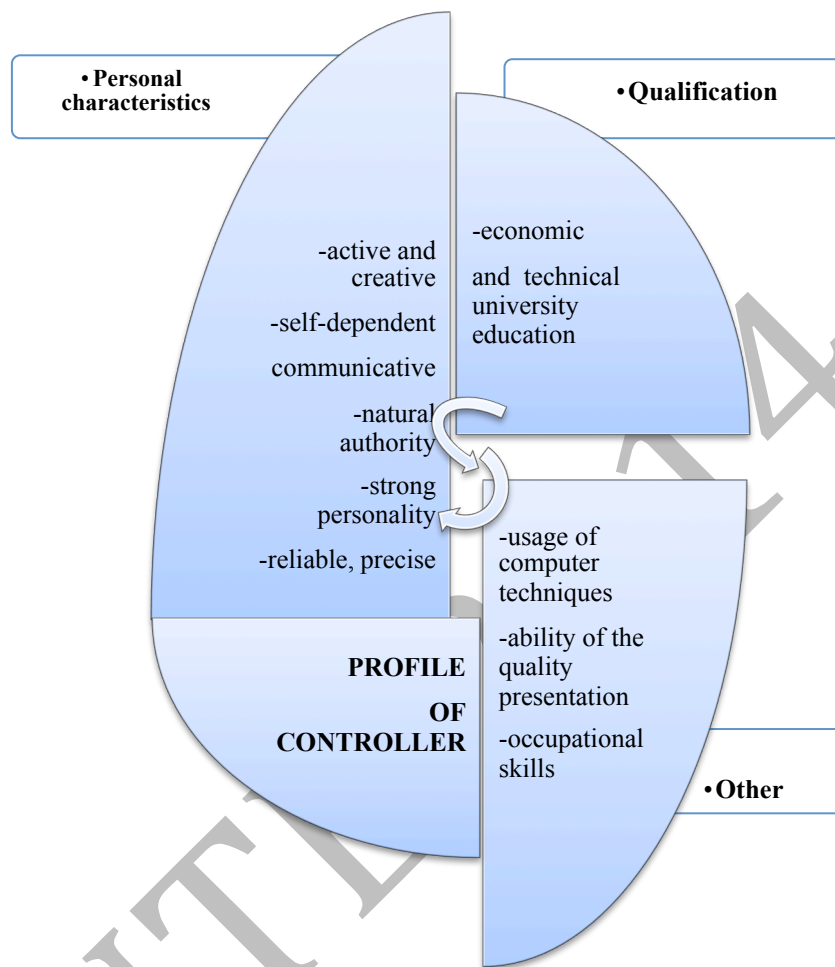


Fig. 1. Profile of controller

The education as a form of the personality development is a process of acquiring and mastering knowledge from various spheres of human cognition. Exactly, the enterprise education represents an important part of the personnel management activities. This type of education is the measure for synchronisation of the constantly changing exigencies on the work activities, qualification and behaviour of people in order to achieve the goals specified in the elaborated enterprise strategy. In addition, it is an instrument for the achieving the higher level of the people satisfaction when performing their activities (Ferreira, M., Cardoso, A. P., & Abrantes, J. L. 2011).

The system of the enterprise education is a continuous cycle based on the enterprise strategy and on the agreed enterprise education strategy. The essential aim of the enterprise education strategy is to provide the employees with a possibility of a steady enlargement and innovation of their theoretical knowledge scope and structure, with the



possibility to acquire specific skills for the particular job position, and to create good conditions for the execution of their personal development plans as far as the individual possibilities and their personality are concerned. The principal target of the enterprise education system is to increase the abilities of the staff to achieve the required goals in a more effective manner - it means their higher efficiency, resulting in a higher competitiveness, prosperity and fulfilment of the company's strategy aims (Kajanová, J., 2010). The enterprise education is not a short time process; on the contrary, an effective education means a long-time process that may be performed in the following phases:

- identification and analyze of needs and definition of the education process targets,
- education planning,
- performance of the education process,
- evaluation of the education results.

The analyze of the learning needs is based on gathering information about the current status of knowledge, abilities and skills of the people, about the performance level of individual employees, teams and the enterprise as a whole, followed by the comparison of findings with the required level. The analyze result shall demonstrate the gaps in performance level that should be eliminated, while focusing those that may be corrected by a further education – a suitable educational program shall be proposed. Just the above mentioned phases are decisive for the running of learning activities process itself and for the learning effectiveness in the future cycles of the enterprise staff education (Klučka, J., 2011).

#### **4. Enterprise education and its evaluation**

The purpose of the enterprise education process is to find competent employees for all the required job positions within the given company in a sufficient volume and qualification, in due time and for adequate costs. The first step shall be the process of personnel planning both from the quantitative and qualitative aspects. The target oriented selections of job applicants represent the selection and development of employees in accordance with the needs of a company (Vodák, J., Kucharčíková, A., 2007). The individual care provided for all the employees within the framework of rights and obligations resulting out of the employment relationship and legal stipulations is the integral part of the process focused to contribute to the employees satisfaction. The enterprise education process shall contain not only the elaboration of the learning procedures and their implementation, but also the evaluation of tools and techniques used for motivating and satisfying the employees (Honey, P., & Mumford, A., 2000).

The education process shall be assessed after accomplishment of the planned learning hours and practical part of the latest training. The evaluation of the acquired professional qualification level shall be carried out according to the currently valid working procedure. Every employee taking part in the training process shall be assessed regularly in order to keep his run of qualification acquisition under review. The evaluation shall be carried out in form of a personal discussion taking 60-90 minutes. The following aspects are evaluated:

- Level of the acquired professional knowledge on the scale 0 – 100 points of every qualification measure separately, including “practice on-the-job”, i.e. the practical part in the training centre.
- Capabilities beyond the scope of the given profession, skills within the range of 0-10 points.
- The possibility for a future management position is also observed.
- Recommendation of the employee's future orientation.

The participants at the interview are the evaluated person and at least two assessors. The evaluation is carried out without any prejudice, observing the principles of the factual and positive dialogue. The interview is concluded by the mutual harmonization of results agreed by the assessors.

The evaluated person shall receive a feed-back, as a rule immediately after the evaluation, but no later than within 3 working days.

##### **The acquired knowledge is evaluated as follows:**

The degrees for the evaluation of the professional knowledge:

- **0 %** - the employee does not have any knowledge or skills in the particular theme/field, nor has acquired them during the training;

- **25 %** - the employee understands the issue only on a low level, he understands only the basic concepts, his attitude to the topic is just the one-sided view, he does not take any decisions, and does not use a possibility to acquire new knowledge;

- **50 %** - the employee is capable to prove average understanding of the given issue, he has knowledge of the basic and superior concepts, he is able to search for alternative solutions and to propose ways of solution, he takes individual decisions;

- **75 %** - the employee is proving high understanding of the issue, he has good survey about the concepts, he can answer even more exigent questions, he makes use of the free time for acquainting new knowledge, his attitude to the technical topics and concepts is evident, the accomplished professional qualification means a gain for him, he is able to specify other fields, in which he could develop his qualification in future;

- **100 %** - the employee is identified with the issue, he mastered the concepts, procedures, strategies, he may serve as an ideal for his colleagues in gaining new knowledge, he is able to take individual decisions and the responsibility for them.

Based on this evaluation, the summary note shall be calculated for all the qualification measures. The summary note is calculated by weighted-average method. Every qualification measure has its significance allocated according to its importance.

If the note is in the range of:

- **0 – 49,9 %** the employee did not gain sufficient knowledge, and his further stay in the qualification program should be considered;
- **50 – 64,99 %** the employee gained the required knowledge for the given qualification stage;
- **65 – 100 %** the employee gained the knowledge required for the higher qualification stage.

The corrective actions shall be imposed in cases, when the employee did not explain sufficiently a part of the presented knowledge and the assessors agreed that a corrective action might help to increase his knowledge level. The checking of the corrective actions shall be carried out in the following evaluation interview.

Should the enterprise not suppose the continuation of the employment relationship with a person for future, it shall not put the costly investments into the given human capital at all. Those people that gained the specific human capital will be more useful for the given enterprise than anywhere else. If the other circumstances do not change, there will be higher tendency that they remain at their current employer. The personnel turnover will decrease, and the long-term employment will support the growth of the productivity of the human capital specific for the enterprise (Tekulová, Z., Chodasová, Z., 2012).

## 5. Conclusion

Any entrepreneurial unit will be prosperous only then, when it manages to gather, interconnect, put into motion and permanently use human, material, financial and information resources. The human resources are the most valuable ones, as they put into motion other resources and determine their usage. The human resources are the most valuable resources for an enterprise, nevertheless also the most expensive ones. They are decisive for the quality of products, processes and systems, and for the enterprise competitiveness as well (Chodasová, Z., Jacková, A., 2011). The nowadays needs of praxis are changing the style of the job live globally - they emphasise the importance of education, creativity, communication and co-operation. However, they are related with a number of problems, because they require high expenses for the research and development and they are burdened by risks. The analysis of the praxis showed that the larger part of the innovative projects is not complete due to fact that the managers and the project engineers do not use the new methods and techniques of the innovations management sufficiently, they are relying more on their intuition than on knowledge. Also therefore, this article is focused on the controllers that should help to decrease risks related with the realisation of the innovative changes required not only by the practice, but even already by new ways of the university education as well (Chodasová, Z 2008).

According to the theory of the human capital, the enterprises on the work market possessing a general human capital that can be used at any job position or in any company, are not motivated to invest into the human capital in

form of education, as there is a risk that the employee switches to another company taking with him his knowledge and skills acquired by learning and training at the preceding employer. Thus the investment into the general human capital becomes ineffective; nevertheless, the enterprise has a potential advantage resulting out of the fact that an employee of higher value of his capital brings benefits to his employer in form of higher labour productivity and finally, he contributes to the higher effectiveness of the enterprise. However, there is a problem in case of a mental work, when such a contribution is difficult to be quantified. In any case, when the employer wants to prevent the leaving of an educated person and to assure the return of investment related with his training, he shall motivate him to remain at his enterprise. The employee himself has reasons to bring into effect this investment for increasing his general human capital, as his competitiveness on the labour market is enhanced, and he may get higher salary at a potential employer.

## Acknowledgements

This post was created as part of application of project 1/1056/12, Slovak University of Technology in Bratislava

## References

- Armstrong M. (2001). *A Handbook of Human Resource Management Practice*, London 2012
- Bontis N. (2001). Assessing knowledge assets: a review of the models used to measure intellectual capital. *IJMR* 2001
- Đurišová, M. (2012). Process model of managerial functions applied in business performance. *Economics and management spectrum* no. 1/2012, Volume VI. Žilina Faculty of Operation and Economics of Transport and Communications, University of Žilina, 2012, pp.7 – 12.
- Ferreira, M., Cardoso, A. P., & Abrantes, J. L. (2011). Motivation and Relationship of the Student with the School as Factors Involved in the Perceived Learning. *International Conference on Education and Educational Psychology (ICEEPSY 2011)*, *Procedia - Social and Behavioral Sciences* 29 (2011) pp. 1707 – 1714.
- Hilmar J. Volmuth. (2001). Controlling a new management tool, *Profess Praha* 2008
- Honey, P., & Mumford, A. (2000). *The learning styles helper's guide*. Maidenhead: Peter Honey Publications Ltd.
- Chodasová, Z. (2008). Modern management methods in development organizations. *First international science conference „Knowledge society“*. Knowledge society institute, Sozopol 3.-5.9.2008, Bulgaria, pp. 47-48.
- Chodasová, Z. (2005). Asset of Modern Management Methods in Development Process, *Vadyba management*, Univerzity Vilnius 2005, pp. 13-20, Nr. 1 (9) (2005)
- Chodasová, Z., Jacková, A. (2011). Innovative forms of education at universities to develop knowledge student, *Proceedings How to successfully do business in the border regions of south-eastern Moravia, VI. International Conference Kunovice,, 2011, European Polytechnic Institute Kunovice 2011*, pp. 99-102
- Kajanová, J. (2010). The Education of managers in cost. In: *Proceedings of interdisciplinary scientific colloquium "Current Issues of social sciences and humanities '09, Bratislava: Publishing House of STU, 2010*. pp. 149-154
- Klučka, J. (2011). *Business, business risk and crisis management*, EDIS University of Žilina, Žilina 2011
- Kucharčíková, A. (2008). Business Education as Investment in Human Capital in Organizations. *Journal of Information, Control and Management Systems*, no 2/2008, Faculty of Management Science and Informatics, University of Žilina, Žilina, pp. 71-75.
- Kucharčíková, A. (2014). Investment in Human Capital as the Source of Economic Growth, *Periodica Polytechnica., Social and Management Sciences*, 22 (1) 2014., pp. 77- 82.
- Larson, R. (2000). Toward a psychology of positive youth development. *American Psychologist*, Vol. 55, No.1, 170-183.
- Ormrod, J. E. (2006). *How Motivation Affects Learning and Behavior*, Pearson Allyn Bacon Prentice Hall, 2006, <http://www.education.com/reference/article/motivation-affects-learning-behavior/>
- Standage, M., Duda, J. L., & Ntoumanis, N. (2005). A test of self-determination theory in school physical education. *British Journal of Educational Psychology*, 75, pp. 411-433.
- Tokarčíková, E. (2011). Influence of social networking for enterprise's activities. *Periodica polytechnica Office. Social and Management Sciences* 19/1 (2011), pp. 37-41, Hungary.
- Tekulová, Z., Chodasová, Z. (2012). Controlling the capital structure in a company. In: *Scientific proceedings 2012: Faculty of Mechanical Engineering, STU in Bratislava, Slovak University of Technology in Bratislava*, pp.189-196
- Vodák, J., Kucharčíková, A. (2007). Effective education of employees, *Grada Praha* 2007, pp. 212,

# Education policies during Ataturk period

Birsen UNAL\*

Selcuk University, Ataturk Principles and Revolution History Department, Konya, Turkey

---

## Abstract

Within the years of World War I, national struggle period begins after the occupations in Ottoman Empire and considering those years, some points can be highlighted as important factors that help preparing the necessary environment. Since Atatürk was the leader of National struggle, he was able to make necessary adjustments during those hard years and the foundation period of Turkish Republic. One of those arrangements (reforms) was in the field of education.

As education system in Ottoman Empire was away from nationalism and was generally under the influence of religion, it was incomplete in terms of quality and quantity. For this reason, Atatürk presented a contemporary and national system which meets the needs of the state and the public.

In this study, we will examine the process how education was rescued from the property of not meeting the needs of the state and became national and modern. We will discuss Atatürk's nationalism idea reflected on the innovations in the field of education. We will witness the rapid development of our nation's modernization period thanks to the nationalization of education.

**Key Words:** Education, Education Policy, Ataturk Period

---

## Introduction

In the late periods of Ottoman State reform movements and Western opinion entered in our society necessary importance was not given to education and teaching and education consciousness was not achieved.

The social function of education is to provide development and sustainability of societies by raising qualified persons with scientific methods. It is possible to transfer cultural accumulations via education by building drastic, steady bridges between generations. Not realizing this event has become one of the greatest factors leading to the state's collapse (Aslan1989).

The traditional education which could not fulfill the needs of era and society, blocked every types of developments closing its door to scientific mindset as well. In this regard, the education and teaching methods obstruct creativity, its working method only based on rote learning kept students from having constructive and creative characteristics (Özodaşık 1999).

## Atatürk's Opinions About Education

The fundamentals Atatürk determined on education appeared during his own educational life. Atatürk stated that truths of education must be based on scientific fundamentals getting rid of superstitions on every occasion.

*“The aim of education, the basics of education, the quality of education are great. If the followed way is a wrong one on this issue and this way drives nation into breakdown, does the crime belong to the leading ones rather than the wretched public who is virtuous, good-tempered, unselfish, follows the way and trusts in persons responsible for them (Koçer 1981)”*

---

\* Corresponding author. Tel.: +90-332-2232544  
E-mail address: bunal@selcuk.edu.tr

Atatürk himself experienced various and opposite education methods in his student life, observed how these affected students and young persons and also saw what results the traditional education methods performed over centuries gave. The methods which he saw to be applied in schools, are as follows:

- methods partly based on freedom as well as oppressive methods
- partly active, rational, experimental, effective methods as well as passive, mobile and rote learning methods.

After his experiences, observations and studies, Atatürk made one of the most important identifications in Turkish education history. This was associated with the education-teaching methods. *"I am of opinion that education and discipline methods followed until now are the most important factor in our nation's regression history.(Akyüz 1995)"*

Every time Atatürk suggested that there was a common illiteracy in society, release and development would be possible when destroying this and spreading science, education in society. According to him, the fault in lack of information is not the public's, results from the old methods applied without understanding Turkish characteristics, and these ones cause the public remained lack of information.

To be an independent state in changing world conditions for a Turkish society, it is necessary to step in great and radical, social change and improvement with all parts including city-dwellers, peasants, intellectual, illiterate ones, women and men for a Turkish society. Atatürk wanted to adapt this social change into the modern civilization without breaking language, religion, traditions and history and to make it as a creative power in order to live for the Turkish society as an independent state (Koçer 1992). We can understand this from his words: *"Gentlemen, the most realistic guides, the real guiding principles are education, science for everything, for materiality, for morality, for success in the world. Except for education, science it is a blindness, illiteracy, error to search for guides (Yağcı 2007)"*

Atatürk believed that education must contain practical, useful information. He determined the main goal of education was to create an information society. And in this respect, he realized the education work.

*"The keystone of our education is to destroy lack of information. If it is not destroyed, we are in the same place. If we want to have a real escape, firstly we must destroy this, lack of information with all our strength, all our ambitions (Akkutay 2006)."*

#### **Education Policies Performed in Atatürk's Period**

Atatürk did not wait for an appropriate time in order to make his opinions about education come true. Even he took many steps for education in the worst conditions to catch time, to have a modern civilization. Within the years of the Independence War he tried to achieve it in every occasion.

There was a rate of 7 % of literate persons in our country during the Independence War when the struggle for independence was given. This rate was 10% for men, 4% for women. Only 15% of the persons knowing how to read knows how to write. About 90% of the population studies in villages and there were not any schools and teachers in villages more than 90%. Almost all the peasant population did not know how to read and write. Throughout the country there were 1241 students in 23 high schools and 2558 students in 20 vocational technical (secondary-high school) schools. Even though there were 18.000 madrasah students registered, only 10% of them (1.800) kept on their learning. Some applications in madrasah caused misuse by the students and families. The ones registered in madrasah did their jobs such as klutziness, greengrocer, butchery, etc. but they do not go to madrasah. Because they were not conscripted, did not give any taxes as long as they were registered in madrasah (Adem 2006).

----- The lowness in the percentage of the people who can read and write, making use of the missings in education, and the fact that the country was strggling in war accelerated Atatürk to make attempts. Moreover, Atatürk gave more importance in education and educators in order to convince the people in Anatolia for independence war and to encourage the Ankara government to be with him. In the hard periods of the war Atatürk was interested in the situations of teachers who could not take their salary, wrote to the Education Authorities and

provinces. He organized Anatolian teachers, made an opening speech of the meeting in an Education Congress held for them (Ergun 1997).

In that congress Atatürk himself made a call for teachers and educators for the release of Turkish nation, laid emphasis on their duties.

Even though there were not any opportunities to put the decisions made in the congress into effect due to the war, this congress had a significant and meaningful place in Turkish education history.

Educational reforms were started with the new arrangement of the system and renewal process of the system was analyzed by scientists. Analyses involved dimensions such as schools, school systems, teaching programs, teacher training, staff policies and new-establishment of the ministry organization.

Atatürk adapted education as an attractive power, a locomotive in total development of Turkish nation. "It is such an education that makes a nation live as a free, independent, glorious and noble society, or that drives into slavery and poverty." With this word, Atatürk indicated that the main objective of education was to protect Turkey's national presence, future.

*"Our great case is strengthen our presence as the most civilized nation with the best welfare.*

*This is a dynamical ideal of the great Turkish nation with drastic revolutions in opinions but not only in institutions. To achieve this ideal in the shortest time, we must follow opinions and movements all together. In this attempt success is only possible with a legal plan and working in a rationalist way. Therefore, not leaving even one citizen who does not know reading-writing; bringing technical staff required by all development wars and new roof of the country; creating persons and institutions that can understand, tell and convey the ideology of country cases between generations ; hereby presenting these important principles in the shortest time are the great and serious duties and responsibilities undertaken by the Ministry of National Education. Always keeping my distinguishing principals active in minds of Turkish youth and conscience of Turkish nation is a mainly duty which belongs to our universities and schools (Par- Önen 1987)."*

Atatürk's understanding of national education has the aim of creating and developing a teaching staff that lets our nation have a modern civilization in the shortest, the most correct and the largest way (Gürses 1994).

Atatürk took his most important step of the national education towards his opinions that is the establishment of Law on Unification of Education. Thus, a national education away from regional effects and bilateral applications was established.

Madrasahs were closed. After madrasahs were closed, imam hatip (religious) schools were opened. Instead of Madrasah Süleymaniye, a School of Theology was set up in İstanbul Ottoman University.

Military high schools were converted to high schools. Education became obligatory for female and male children. Under the Constitution of Turkish Republic dated 1924, the provision (article 87) 'the primary school in education became obligatory and free in state schools for all Turkish people' was included (Ergun 1997).

The Third Heyet-i İlmiye (Education Committee) meeting held in 1926 made contributions to perform educational mobilization of Republic with scientific methods (Yücel 1994).

One of the vital factors the New Turkish State protects is our culture. Atatürk stated that our culture has its own characteristics and aspects like the others. It is necessary to understand these values concerning the Turkish nation well and to raise defense consciousness against every kinds of opposing views.

Atatürk crowned our national culture with education. He believed that only education makes National Culture possible have a level of modern civilization. In his speech;

*"Education which lets a nation live as a free, independent, glorious, noble and great society or leaves it in slavery and poverty."* saying he emphasized that our armies' victory will be sustainable with education, culture and civilization.

The Law Concerning the Educational Organization was put into effect on April 3, 1926. Thus, both organization relating to education was encouraged and teaching was pledged as a profession, the Board of Education and Discipline was created as a board of experts in the Ministry of National Education. With the same law, the "Public Discipline Bureau" was established as a provincial, public education unit (Karakütük 2006).

The regulation issued for public classes, public conferences in 1927 gave the function for equipping the ones who could not have any education, fell behind or could not have any learning stage they want due to various reasons with

basic citizenship information a Republic citizen must know, strengthening national culture and ideal to the Public Classes. 64.302 citizens benefited from 3304 public classes opened in the 1927- 1928 academic year (Geray 1978).

At the beginning of the year 1928, the transition attempts to the Latin letters started step by step. TBMM enacted the law of usage of international numbers. Atatürk laid stress on the importance of Latin letters in his speeches.

On November 1, 1928, the writing law was accepted in the first discussion of the third term of TBMM. The nation welcomed this law well. This was a desire for having a new, easy writing, learning reading-writing and saving themselves from illiteracy.

On November 3, 1928, it came into effect. The old writing could be used until June 1930 at the latest (Ergun 1996).

With the enactment of new letters, national schools were established before the head teacher 'Atatürk' on November 24, 1928. National schools were opened for the nation to read and write New Turkish letters easily and let a vast majority of people be literate (Geray 1978).

Between the 1927- 28 academic year the Village Teaching Schools were opened. As the other schools were for 5 years, this school was for 3 years. The ones who graduated from this school, were given a home and a garden near the school in the village.

On April 10, 1929 the students were sent abroad owing to the state to raising high-qualified human power necessary for our country. Many numbers of students were taken to Germany, France and other European countries to train teachers in sciences of foreign language, history, geography, mathematics, art, music and physical education, as well as engineers in technical fields (Karagözoğlu 1994).

On February 19, 1932 the Public Houses were established to spread revolutions, enroot them, develop public in terms of social, cultural aspects. The houses were opened by CHP. The establishment basics were determined by CHP. Also, its managers were chosen by CHP. The public houses work in nine branches held for public classes, courses, bookshelves, publication, peasantry, language and writing, history and museum, social aid, sports, presentation, game, fine arts (Karakütük 2006).

On April 12, 1931 Turkish Historical Society was established and on July 12, 1932 Turkish Language Society was established in order to make researches about Turkish history and language and to carry out the scientific projects accordingly (karagözoğlu, 1994).

In 1934 Atatürk suggested that intelligent sergeants be appointed as "educators" in villages after being subjected to short-term courses (Koçer 1967). This application started in 1936. 80 young persons from the Mürvet Plain villages in Ankara, who did their military services, were included in this Course for Educators during 8 months. The educators trained for villages were always controlled by the Minister and Auditors. The course books and programs were prepared for the Courses of Educators, on June 11, 1937 'the Law of Village Educators' was passed. According to this law, educators would be trained for guiding villagers in agricultural works as well as education and teaching in villages incapable for their total population. These training courses of village educators were opened in various places until 1946, and they gave courses to 8.675 educators.

The two village teaching school was opened in İzmir Kızılcıllu and Eskişehir-Mahmudiye in 1937 to train teachers for villages with high population (population more than 400). The first name of these schools was "Village Education Dormitory". These involved the ones leaving village primary schools for 3 years, then a secondary school education of 3 years was given to the mentioned ones after completing a primary school education of 5 years. Both courses and some crafts and agricultural works were given in practice as well.

In 1938 peasant girls and women started to be taken to the department of training educators (Ergun 2006).

### **Conclusion**

In Ottoman Empire, education has fulfilled all things with various reforms during the Atatürk's period instead of the education understanding which is quantitatively limited and qualitatively incomplete, cannot respond to necessities of time and save public from illiteracy. Educational studies presented a new understanding and application. Theories and applications became more consistent.

When examining these as follows:

- With the Law of Unification on Education, education was in hand of state management
- Closing madrasah, understanding of bilateral education was removed
- Bringing foreign schools under control, state authority was presented in education
- Female-male education became obligatory
- Instead of religious courses, science-social courses were given
- Schools were opened in accordance with certain groups of ages and their numbers were increased
- Opening Schools such as Military, Vocational, Art Schools each type of educational needs was met
- Opening universities high education was provided
- Opening village institutes teacher needs were fulfilled
- With the alphabet reform, our language and education based on religion became national
- Opening Public Rooms, almost all persons from 7 to 70 learned to read and write
- Opening Public Houses, the public was informed in various fields
- Opening Turkish History Institution, our history belonging to the Ottoman State became national
- Opening Turkish Language Institution our pure Turkish was protected and became scientific language.

As understood from Mustafa Kemal Atatürk's sentence "*Our great case is strengthen our presence as the most civilized nation with the best welfare.*", the New Turkish State was expected to be notable states of era protecting our national values through education. This was also succeeded in. Each steps taken for education glorified our national identity and state.

## References

- Adem, Mahmut (2006), "*Cumhuriyet Dönemi Eğitim Politikaları (1923- 2006)*", Atatürk Döneminden Günümüze Cumhuriyet'in Eğitim Felsefesi ve Uygulamaları Sempozyumu Bildirileri (16- 17 Mart 2006), Ankara: Gazi Üniversitesi Rektörlüğü.
- Akkutay, Ülker (2006), "*Atatürk'ün Milli Devlet ve Milli Eğitim Görüşü*", Atatürk Döneminden Günümüze Cumhuriyet'in Eğitim Felsefesi ve Uygulamaları Sempozyumu Bildirileri (16- 17 Mart 2006), Ankara: Gazi Üniversitesi Rektörlüğü.
- Akyüz, Yahya (1995), "*Atatürk ve Eğitim*", Ankara: Atatürk Araştırma Merkezi Yayınları.
- Aslan, Ensar (1989), *Atatürkçü Düşünce Sisteminde Türk Eğitimi*, Diyarbakır: Dicle Üniversitesi Atatürk Araştırmaları Merkezi Yayınları.
- Ergün, Mustafa (1996), *II. Meşrutiyet Devrinde Eğitim Hareketleri (1908- 1914)*, Ankara: Ocak Yayınları.
- Ergün, Mustafa (1997), *Atatürk Devri Türk Eğitimi*, Ankara: Ocak Yayınları.
- Ergun, Mustafa (2006), "*Atatürk Döneminde Öğretmen Yetiştirme*". Atatürk Döneminden Günümüze Cumhuriyet'in Eğitim Felsefesi ve Uygulamaları Sempozyumu Bildirileri, 16- 17 Mart 2006, Ankara.
- Geray, Cevat( 1978), *Halk Eğitimi*, Genişletilmiş 2. Baskı, Ankara: İmaj Yayıncılık.
- Gürses, Hilmi (1994) "*Atatürk ve Milli Eğitim*", 1. Uluslar arası Atatürk Sempozyumu Açılış Konuşmaları Bildirileri (21- 23 Eylül 1987), Ankara: Atatürk Araştırma Merkezi.
- Karakütük, Kasım (2006), "*Cumhuriyet'in İlk Yıllarında Kırsal Türkiye'de Eğitimin Durumu ve Eğitim Seferberlikleri*", Atatürk Döneminden Günümüze Cumhuriyet'in Eğitim Felsefesi ve Uygulamaları Sempozyumu Bildirileri 16- 17 Mart 2006, Ankara: Gazi Üniversitesi Rektörlüğü.
- Karagözoğlu, Galip (1994), "*Atatürk'ün Eğitim Savaşı*" 1. Uluslararası Atatürk Sempozyumu Açılış Konuşmaları Bildirileri 21- 23 Eylül 1987, Ankara: Atatürk Araştırma Merkezi.
- Koçer, Hasan Ali (1967), *Türkiye'de Öğretmen Yetiştirme Problemi*, Ankara: Milli Eğitim Bakanlığı Yayınları.
- Koçer, Hasan Ali (1981), "*Türk Eğitim Tarihinde Atatürk'ün Yeri*", Atatürk Devrimleri ve Eğitim Sempozyumu (9- 10 Nisan), Ankara.
- Koçer, Hasan Ali (1992), *Türkiye'de Modern Eğitimin Doğuşu ve Gelişimi (1773- 1923)*, İstanbul: Milli Eğitim Basımevi.
- Özodaşık, Mustafa (1999), *Cumhuriyet Dönemi Yen Bir Nesil Yetiştirme Çalışmaları (1923- 1950)*, Konya: Çizgi Kitabevi.
- Par, Arif Hikmet- Önen, M.Agah (1981), *Atatürk'ü Anlamak, Doğumunun 100. Yılında İlkeleri, Devrimleri, Düşünceleri*, İstanbul.
- Yağcı, Öner (2007), "*Atatürk'ün Eğitime İlişkin Düşünceleri*", Cumhuriyet'in ilk yıllarından Günümüze Dil Kültür Eğitim, Ankara.
- Yücel, Hasan Ali (1994), *Türkiye'de Orta Öğretim*, İstanbul: Kültür ve Turizm Bakanlığı Yayınları.



# Education Policy of The State of Hatay (1938-1939)

YUSUF KODAZ  
yusufkodaz@selcuk.edu.tr

## Abstract

Founded on September 2, 1938, Hatay State authorized the government to make necessary arrangements to create the infrastructure of the new state. In the period of Hatay State, developments in the field of education in Turkey were followed closely. In the present study, adoption process of Turkey's educational system by Hatay State is examined. Besides, the present study reveals that, these studies were carried coordinately with Turkey in order to form the basis of Hatay's joining Turkey. Moreover, the present study discusses the Turkey's contributions to Hatay State in the field of education.

# Educational process in terms of teaching methods and organizational forms in small schools

Martin Skutil, Klára Havlíčková, Renata Matějčíková<sup>a,b,c\*</sup>

<sup>a, b, c</sup> Faculty of Education, University of Hradec Králové, Rokitského 62, 500 03 Hradec Králové, Czech Republic

---

## Abstract

The paper is based on the current research project aimed at finding the use of teaching methods and organizational forms in primary education. Small schools are an integral component of the education system with a specific approach to pupils. Specificity is determined by the fact that they are mixed-age classes, which require an individualised and differentiated approach from teachers to individual pupils. Within this approach, teachers use different strategies, organizational forms of work and teaching methods in the teaching. The aim of this paper is to analyse and describe the current situation based on the results of the quantitative survey. The fundamental research method was participant observation. The research sample consists of randomly selected teachers of small schools in the area of East Bohemia. The primary outcome introduced in this paper is to describe the current situation in the Czech Republic on the basis of which further research investigations will be implemented.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

**Keywords:** primary education; teaching methods; organisational forms; small schools

---

## Introduction

Teaching method is understood as a structured system of teaching activities for teachers and learning activities for students in order to achieve educational goals. They aren't a decisive factor of teaching, but they are just one element of education learning system, they are tied to the overall concept of teaching, and are only fully functional and effective within that framework.

A small school is a primary school in which at least students of different grades are together in one classroom. If in junior school classes there are less than 15 students per class on average, it is necessary to combine the classes. Small schools exist in municipalities in which the small number of students do not allow separate classes for each of the five grades in junior school to be established.

## Theoretical background

### *Small schools*

Small schools include schools with one, two, three and four combined classes. Currently, the most common type of small school is a school with a combination of two- and three-classes. Combined classes are seen abroad as an important alternative schooling. The term of combined class is essentially a synonymous to the used terms of multigrade class (class with multiple grades), multi-age class, mixed-age class. Classic classes are usually termed as single-grade class or conventional class (Mason & Stimson, 1996; Veenam, 1995). "The combined and classic

---

\* Martin Skutil. Tel.: +420 493 331 344;

E-mail address: martin.skutil@uhk.cz

classes (separated according to grades) don't show any significant differences in learning outcomes achieved by pupils. Although there are some negatives in the case of combined classes" (Průcha, 2001).

Veenman (1997), who has dedicated to the research of combined classes for several years, points out that in quality assessment of combined classes it is not only necessary to follow the data on learning outcomes of students, but also to examine real teaching in specific classes. Teaching in mixed classes is characterised by some positive characteristics:

- pupils spend more time with individual work than pupils in standard classes
- their learning style is more flexible, they are often encouraged to work more independently than in standard classes
- there is no evidence that pupils concentrate less on learning than in standard classes

In recent years a number of significant studies have been published which systematize and evaluate the research on the effects of multigrade classes on student achievement, as well as ones which investigate the processes that contribute to these effects. Veenman's (1996) best-evidence synthesis of research concerning the cognitive and non-cognitive effects of multigrade and multi-age classes was a very thorough and well-documented meta-analysis and a description of a large number of studies (45 of which were concerned with multigrade classes), drawn from a wide range of countries and nations across the world, both developed and developing (Russel, Rowe & Hill, 1998).

#### *Teaching methods and organisational forms*

According to Maňák and Švec (2003), a teaching method represents "a dynamic element" in teaching, which compared with the content and organizational forms changes relatively rapidly and adapts to new circumstances and objectives. The teaching methods, however, are not the decisive determinant of teaching, but only one of the elements of the educational system, and therefore cannot replace the missing content and compensate the indistinct target. On the contrary, they are tied to the overall concept of teaching and only within it are they fully functional and effective. Also Mojžišek (1988) talks about teaching methods in the same way, according to who a teaching method is a teaching specifically didactic activity of the subject and object of teaching, developing the educational profile of a student, while acting educationally, in terms of training and educational objectives and in accordance with teaching and educational principles. It lies in the modification of content, directing the activity of subject and object, organization of the sources of knowledge, techniques and procedures, ensuring fixation or control of knowledge and skills, cognitive attitudes, interests and processes.

The concept of the organizational form of teaching is also seen as the organization of the teaching process, which means creating an environment and the method of organizational activity of teachers and students in the classroom (Kalhous & Obst, 2009). In terms of the definition of this term we follow the procedural aspects (internal conditions, the relationships between the content, the predominant activity of a teacher and pupil associated with the use of methods) and formal aspects (external conditions, i.e. the number of students in the classroom, teaching time, material and the technical equipment of classrooms). All this must be adapted to the set of objectives.

Kalhous & Obst (2009) also points out two aspects that are important for the organization of teaching. The first one is an aspect, "with whom and how" we work. From this perspective it is individual or collective teaching, or individualized teaching, and the extent to which the teacher seeks to promote co-operation among pupils. The second aspect explores the place "where" learning takes place.

### **Methodology of research**

The presented research work is based on a qualitative - quantitative study, whereby the main objective is to describe the current condition (Cohen, Manion & Morrison, 2005). The basic descriptive analysis of the results was used to assess the data.

#### *3.1. The research aims*

As part of the research survey we have set the primary research goal as following:

- To find out which teaching methods and organizational forms are most commonly used by teachers in young primary small schools.

In addition, we have also set secondary goals:

- To determine the frequency of the use of various teaching methods and organizational forms.
- To describe the reasons for the use of various teaching methods and organizational forms from the teachers perspective.
- To analyse the pros and negatives of the use of various teaching methods and organizational forms

### 3.2. The research method

The first part of the research survey consisted of questionnaire and semi-structured conversation through which we gained the necessary data for a pivotal part of the research which was observation.

For the purposes of the research survey, we used structured observation (Kumar, 2005). For recording results, we created our own record sheet, mentioning the identification data regarding the observed group, a list of the various organizational forms and teaching methods as well as time aspects of the occurrence of individual records.

### 3.3. The research group

The interviews were carried out with a set of 8 respondents from various small schools in the Hradec Králové region. The questionnaires were distributed to 98 respondents, 86 were filled, which is 87,7% return. Their main aim was to obtain sufficient material for the preparation of the observation sheet.

Observation, as the principal research method, was implemented on a set of 6 small schools. In total, 16 observations were carried out on the basis of which the research findings are presented. The small schools were randomly selected from the basic set of small schools in the Hradec Králové region.

## Research results

With regard to the maximum extent of the paper, here only the selected results of the implemented research survey are presented. We consider the overview of the used teaching methods and organizational forms in educational practice that provides a comprehensive view of the results obtained, as the most substantial findings.

Table 1. Overview of the methods used in teaching.

Method	Time (minutes)	%
individual work	554	43,5
project method	231	18,2
didactic game	174	13,7
explanation	76	6,0
work with text	70	5,5
work with pictures	68	5,3

production method	38	3,0
experimentation	30	2,4
brainstorming	17	1,3
teaching supported by computer	14	1,1

Table 1 shows that the high prevalence belongs to the method of students' individual work. This is perceived as not too surprising. Small school usually is not homogeneous, so the teacher uses more of a student's independent work in order to better fulfill the lessons. The second most common method is the project method, which also is not surprising. This method provides the ability to effectively combine age-heterogeneous class and engage all pupils in the activities prepared. The third most common method is then didactic game, which is very usual method in working with children of younger age.

On the contrary, it is surprising for us that computer-supported teaching only has minimum occurrence. The causes can be found in the difficulty of document preparation for age-disparate classes as well as in poorer facilities of the small schools, which are usually located in smaller communities, where financial support is usually lower with respect to the number of pupils than in large cities.

Table 2. Overview of the organizational forms used in teaching.

Method	Time (minutes)	%
collective	651	51,2
group	298	23,4
pair	264	20,8
differentiated	59	4,6

Table 2 shows that teachers mostly use the collective way of teaching. This can be considered as an expected result, because in terms of the organization of education process in small schools, this approach is easier for teachers. The second most common organizational form is group teaching. As the current trend in Czech schools is to prefer group forms of work, we do not find this result surprising.

We expected that the individualized form of work, due to the heterogeneity of classes, will significantly compete with other forms. We can find several reasons why this is not true. First, the fact that teachers at the small schools automatically prepare various materials without realizing that it is an element of individualization. The second factor is the way of preparation of materials and activities, so that pupils from second and third class can work together, regardless of the differences in age and current curriculum. In this case, it is possible to identify either mass or group work, but with the implemented elements of individualization.

In relation to teaching methods and organizational forms we were also interested in how teachers perceive the opportunity to improve their professional skills in this area, whether in their view, they have a sufficient amount of information.

Table 3. The possibility of drawing details on new teaching methods and organizational forms

Method	Frequency	%
Yes	57	66,3
Rather yes	25	29,1
Neither yes or no	2	2,3

Rather not	0	0
No	2	2,3

In our opinion the results are very positive. It turns out that 94% of respondents consider the availability of information for further education in the field as sufficient or rather sufficient. In contrast, only 3% of respondents feel there is a lack of information. The result indicates that the information base is rich enough, and that it depends largely on the interest and activity of teachers (and of course on the conditions from the founder and Heads of schools), whether they want to be professionally educated further.

#### 4. Conclusions

From the perspective of teaching methods use in the classroom, we can conclude that in the observed small schools, comprehensive teaching method, namely individual work prevails. In terms of the readiness of students for the future we evaluate this result as positive. Furthermore, our findings show that the lessons are very often based on interview methods, which fully corresponds to the trends of increasing communication skills of young learners.

If we focus on the organizational forms of teaching, teachers mostly organize educational units on mass, where pupils work by their desks. In the case of direct teaching together with the teacher, as well as in individual work. This corresponds with the highest use of a student's independent work, even if we admit that it can also be performed in the centres of activities. The results showed that students often work in groups. In terms of promoting collaboration among students we perceive this fact positively. Pupils at the time work either on the carpet or in groups around the desks, i.e. in the centres of activities.

#### Acknowledgements

This paper was written as part of a specific research project of the Faculty of Education, University of Hradec Králové No. 2107/2014 Analysis of education process from usage of teaching methods point of view.

#### References

- Cohen, L., Manion, L. & Morrison, K. (2005). *Research Methods in Education*. London and New York: RoutledgeFalmer.
- Kalhous, Z. & Ost, O. (2009). *Školní didaktika*. Praha: Portál.
- Kumar, R. (2005). *Research Methodology*. London: SAGE.
- Maňák, J. & Švec, V. (2003). *Výukové metody*. Brno: Paido.
- Mason, D. A. & Stimson, J. (1996). Combination and nongraded classes: Definitions and frequency in twelve states. *Elementary School Journal*, 96, 439-452
- Mojžíšek, L. (1988). *Vyučovací metody*. Praha: SPN.
- Průcha, J. (2001). *Alternativní školy a inovace ve vzdělávání*. Praha: Portál.
- Russell, V. J., Rowe, K. J. & Hill, P. W. (1998). Effects of multigrade classes on student progress in literacy and numeracy: Quantitative evidence and perceptions of teachers and school leaders In: Annual Conference of the Australian Association for Research in Education [online]. *Australian Association for Research in Education* [cit. 2013-01-08]. Available at: <http://www.aare.edu.au/98pap/rus98154.htm>
- Veenman, S. (1995). Cognitive and non-cognitive effects of multigrade and multi-age classes: A best-evidence synthesis. *Review of Educational Research*, 65, 319-81.
- Veenman, S. (1997). Combination classes revisited. *Educational Research and Evaluation*, 3(3), 262-276.

# Educational technology in economics instruction

Ahmet Kara <sup>a\*</sup>

<sup>a</sup> *Istanbul Commerce University, İmrahor Caddesi, No: 90, 34445, İstanbul, Turkey*

---

## Abstract

In this paper, we will show, in the context of a “market equilibria” example, how the use of educational technology associated with system dynamics makes it possible for instructors to teach undergraduate students topics of economic structures/processes involving nonlinearity, stochasticity, non-differentiability and discontinuity. We present three submodels/subcases associated with the example. In the first model, we have continuous and continuously differentiable linear demand and nonlinear supply functions for a good. Each function involves a stochastic term. In the second model, we do not have a continuous and continuously differentiable demand function but only a demand schedule. The supply function is a continuous nonlinear function of price. In the third model, we have interrelated markets for two goods with discontinuous stochastic demand and nonlinear stochastic supply functions. In all cases, we use system dynamics to find, in a very simple and user-friendly manner, the dynamic equilibrium paths and hence dynamic equilibria in the markets in question.

**Key words:** economics instruction, system dynamics, market equilibria

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* economics instruction, system dynamics, market equilibria

---

---

\* Corresponding author. Tel.: +90 533 315 3203; fax: +90212 3207010.  
E-mail address: kara2010@ticaret.edu.tr

## Introduction

In recent decades, information technologies have led to the development of computerized methods that have the potential of revolutionizing the economics instruction. Topics that were once outside the proper boundaries of the undergraduate instruction are now within the reach of even the second year students, thanks to the computerized methods in question. In this paper, we will demonstrate how proper employment of one such method, namely system dynamics, makes it possible for instructors to teach students, in a user friendly manner, topics involving economic structures/processes that are nonlinear, stochastic, non-differentiable and/or discontinuous. The example we will choose is one of the most celebrated ones in economics, namely the example of market equilibrium/equilibria. We will present three sub-models associated with the example.

## The Models

*Model 1:* Consider the market for good A with the following linear demand and nonlinear supply functions.

$$Q_A^D = \alpha_0 + \alpha_1 p_t^A + u_t$$

$$Q_A^S = \beta_0 + \beta_1 p_t^A + \beta_2 p_{t-1}^A + \beta_3 (p_{t-1}^A)^2 + v_t$$

$$Q_A^D = Q_A^S$$

where  $Q_A^D$ ,  $Q_A^S$ ,  $p_t^A$ , and  $p_{t-1}^A$  represent quantity demanded for good A, quantity supplied for good A, and prices of good A at t and t-1 respectively. All prices and quantities are non-negative.  $u_t$  and  $v_t$  are stochastic terms. The last equation is the usual equilibrium condition.

We will model and simulate the equilibrium path in this model with system dynamics which is a computational method for modeling and simulating the behaviour of processes and systems over time.\* In system dynamics terminology, a “stock” (or “level variable”) is the component of the system which increases or decreases over time, and whose behaviour could be captured by differential or difference equations of non-stochastic or stochastic kinds. The rate of change of the stock is called a “flow” (a “rate variable”). By properly identifying stocks, flows, the variables affecting stocks and flows and the feedback mechanism(s) embodied in the relationships among the components of the system, one can simulate the behaviours of the systems or processes such as market processes.

In Model 1, we can take price as a stock/level variable (in the system dynamics sense). The rate of change of price is the flow. Start with an initial price level and, using the market equilibrium condition, find the new price level. Take the difference to find the change in price. Using the equations, create steps of iteration (feedback loop) through which price levels over time are determined. The diagram representing these steps and relations is created in VENSIM and is given in Figure 1. As can be seen from the diagram, “pa - pa old - pa new - change in pa - pa” represents a feedback loop, generating the values of the investigated variables over time.

---

\* For a comprehensive account of system dynamics, see the classic book by Sterman (2000). The books by the inventor of system Dynamics, J. Forrester, who initiated the method at MIT, are highly informative as well (Forrester (1961, 1969).



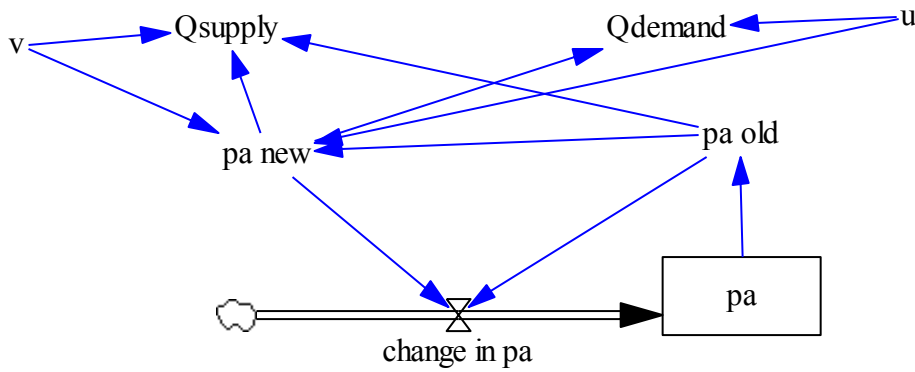


Figure 1. "p old" is the price at t-1 and "p new" is the price at at t.

VENSIM is a freely available, user friendly system dynamics software with which we simulate the path for price and quantity in this model for the following parameter values:\*  $\alpha_0 = 100.$ ,  $\alpha_1 = -4$ ,  $\beta_0 = -20$ ,  $\beta_1 = 2$ ,  $\beta_2 = 0.5$ ,  $\beta_3 = 0.05$ , and "initial pa" = 15.. The stochastic terms are assumed to be normally distributed with zero means and unit variances. The trajectory for "pa" is as follows:

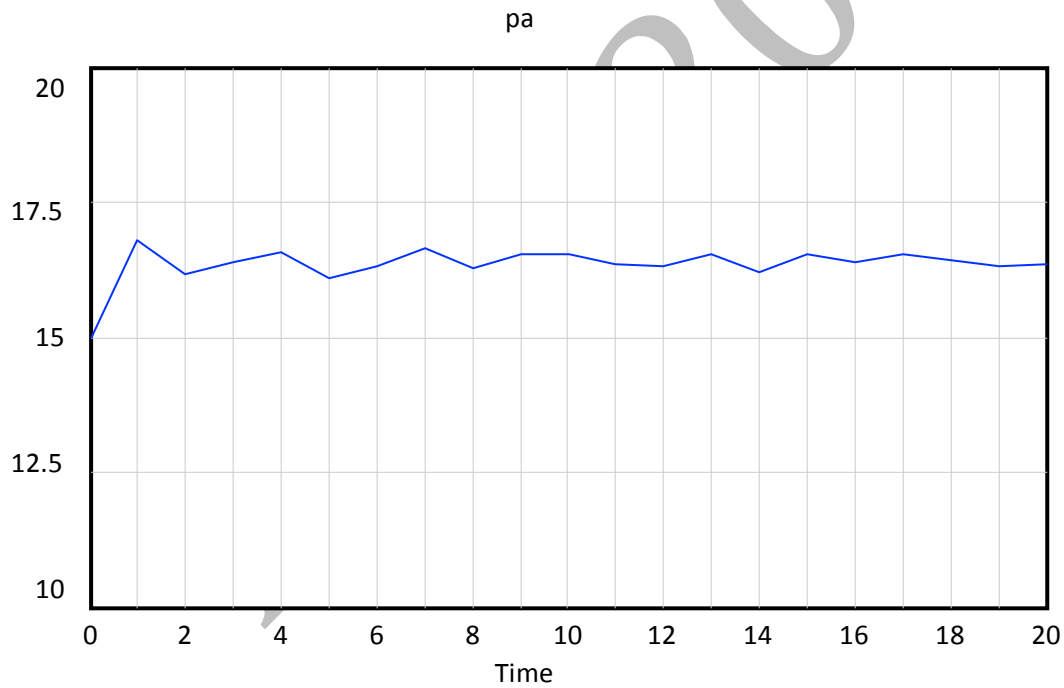


Figure 2.

\* For detailed information about VENSIM, see <http://www.vensim.com>.

In the absence of stochastic terms, the equilibrium price and quantity in the dynamic context would be 16.3941 and 34.4236 respectively.

Without software, the solution of this model would require solving a nonlinear stochastic difference equation, which would not normally be suitable at the undergraduate level. With easy-to-use software and a very simple system dynamics set-up, we can easily solve and simulate the model for any set of parameter values.

In model 1, we used continuous and continuously differentiable demand and supply functions. We will relax this assumption in Model 2.

*Model 2:* Suppose that we have a discontinuous mapping (f) between price and the non-stochastic part of the quantity demanded, which is represented by the demand schedule below (Table 1). The demand-supply set-up for good B is as follows:

$$Q_B^D = f(p_t^B) + u_t^B$$

$$Q_B^S = \beta_0 + \beta_1 p_t^B + \beta_2 (p_t^B)^2 + v_t^B$$

$$p_{t+1}^B - p_t^B = \sigma(Q_B^D - Q_B^S)$$

First and second equations are about demand and supply. The third equation is a dynamic adjustment equation linking price changes (adjustments) to excess demand. This way, we posit, in this example, an explicit adjustment dynamic as opposed to the implicit one embodied in the equilibration process in Model 1. Nevertheless, there is a connection between the two. At the equilibrium,  $Q_B^D = Q_B^S$ , the price adjustments ceases, i.e.,  $p_{t+1}^B - p_t^B = 0$ .

Table 1:

$p_t^B$	$f(p_t^B)$
0	100
4	84
6	75
8	68
10	60
11	54
13	50
18	30
20	23
21	18
23	15

What VENSIM does is to transform, through extrapolation, the discontinuous mapping into a continuous but not continuously differentiable mapping before it proceeds with simulation. The simulation diagram is given in Figure 3.

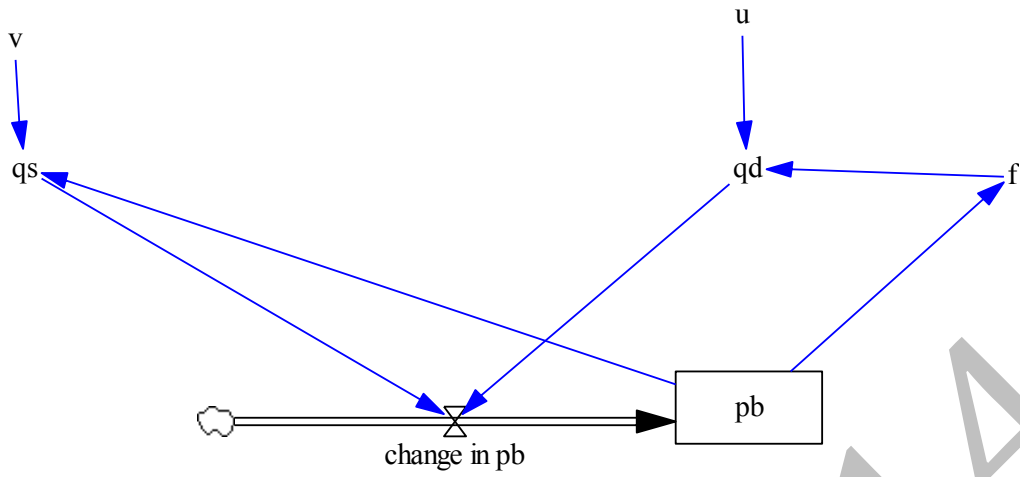


Figure 3.

We choose the following parameter values for simulation:  $\beta_0 = -20$ ,  $\beta_1 = 2$ ,  $\beta_2 = 0.05$ ,  $\sigma = 0.1$ . The simulated trajectory for pb is as follows:

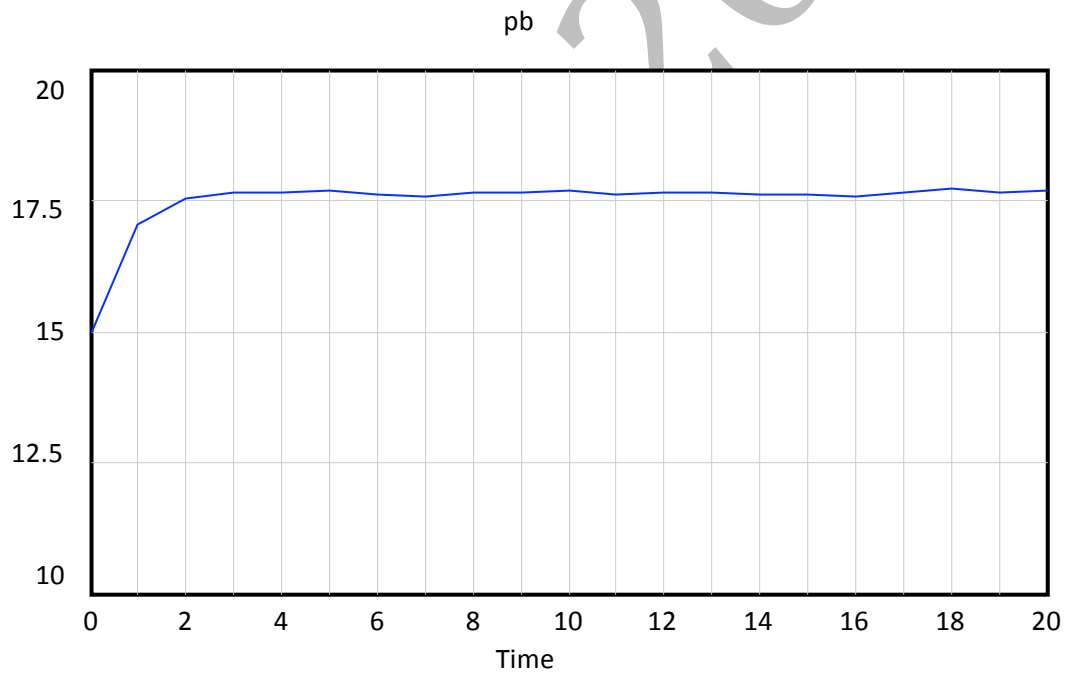


Figure 4.

2.3. Model 3: We will extend the first two models so as to make them interrelated and obtain a simultaneous system of markets. The equations are as follows:

Market for good A:

$$Q_A^D = \gamma_0 + \gamma_1 p_t^A + \gamma_2 p_t^B + u_t^A$$

$$Q_A^S = \delta_0 + \delta_1 p_t^A + \delta_2 p_{t-1}^A + \delta_3 (p_{t-1}^A)^2 + v_t^A$$

$$Q_A^D = Q_A^S$$

Market for good B

$$Q_B^D = f(p_t^B) + g(p_t^A) + u_t^B$$

$$Q_B^S = \beta_0 + \beta_1 p_t^B + \beta_2 (p_t^B)^2 + v_t^B$$

$$p_{t+1}^B - p_t^B = \sigma(Q_B^D - Q_B^S)$$

The quantity demanded of good A depends on the price of good B in a continuous and continuously differentiable manner. However, the quantity of good B depends on the price of good A through a discontinuous mapping ( $g(p_t^A)$ ), which is represented in Table 2 below.

Table 2:  $g(p_t^A)$

$p_t^A$	$g(p_t^A)$
5	0
10	1
15	3
21	6
25	7
35	10
45	12
50	13
60	15
63	16
70	18

The simulation diagram is given in Figure 5.

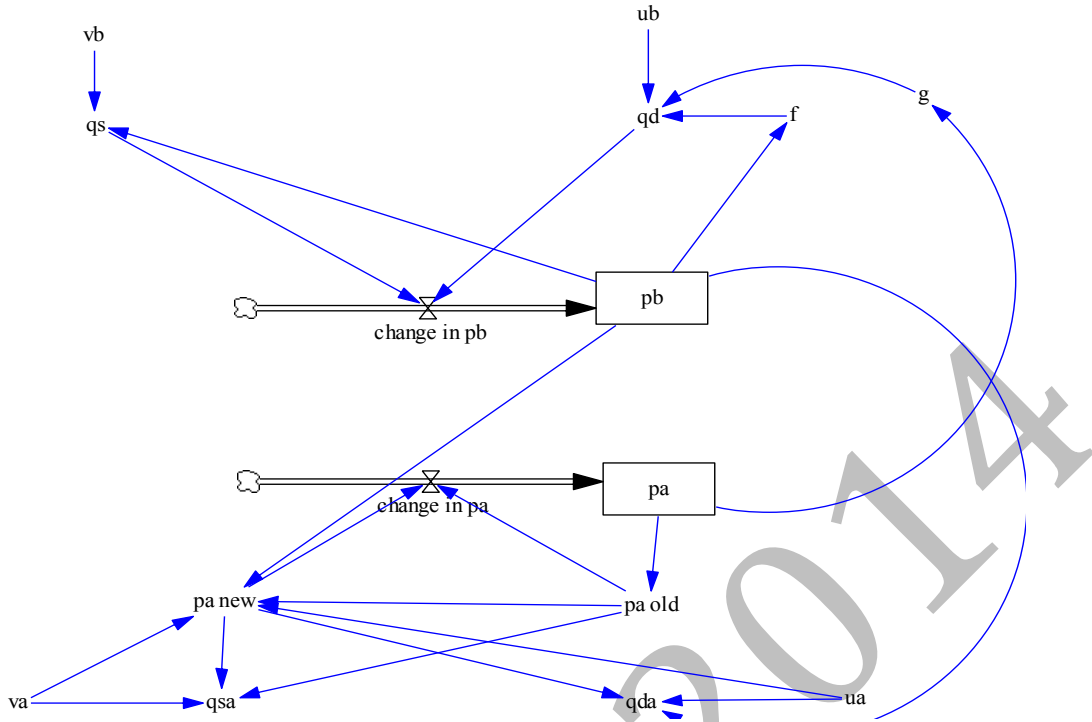


Figure 5.

We choose the following parameter values for simulation:  $\gamma_0 = 100.$ ,  $\gamma_1 = -4$ ,  $\gamma_2 = 0.8$ ,  $\delta_0 = -20$ ,  $\delta_1 = 2$ ,  $\delta_2 = 0.5$ ,  $\delta_3 = 0.1$ , “initial pa” = 10,  $\beta_0 = -20$ ,  $\beta_1 = 2$ ,  $\beta_2 = 0.05$ ,  $\sigma = 0.1$ , “initial pb” = 15. The simulation results are as follows (only graphs will be presented):

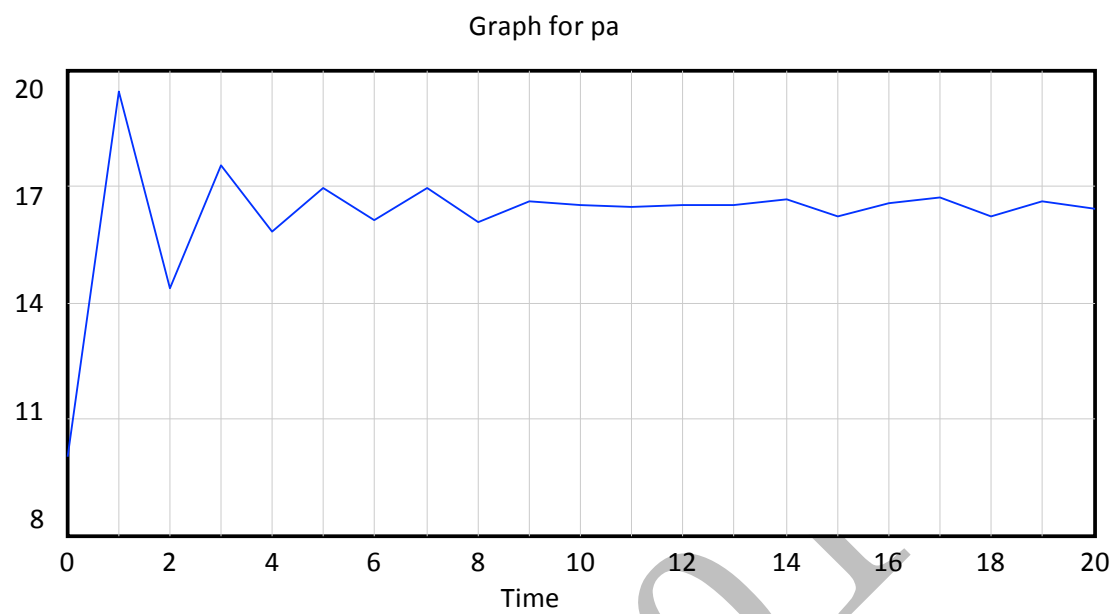


Figure 6

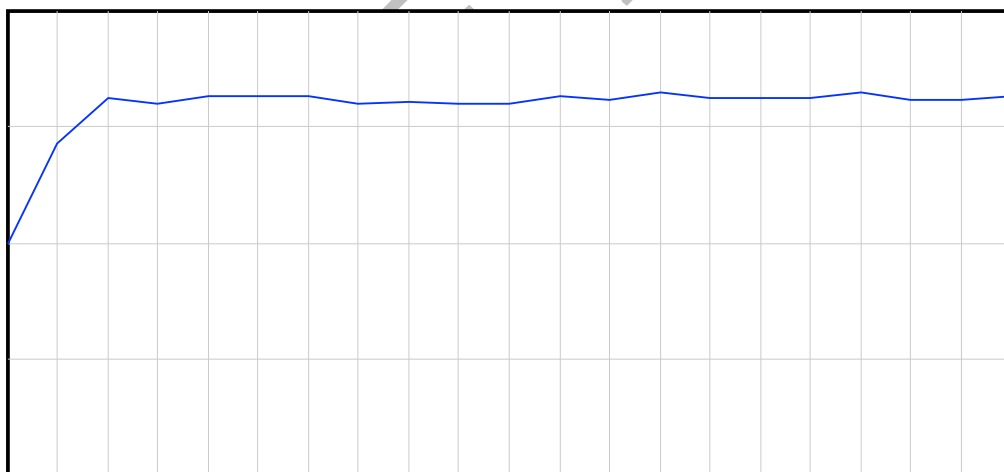


Figure 7

### 3. Concluding Remarks

In this paper, we have demonstrated, with the help of some models associated with a market example, how the proper use of system dynamics enables instructors to teach students dynamic analysis in the presence of nonlinearity, stochasticity, discontinuity and non-differentiability. Solutions to the models above would normally involve solving either a nonlinear stochastic difference equation or a system of nonlinear stochastic difference equations, which may involve discontinuity or non-differentiability. The method of system dynamics makes it possible to obtain numerical solutions to these models without having to analytically solve them. The method could also be used for the numerical solutions of the problems that are analytically intractable. It can be applied to a wide range of topics including issues of strategic interactions and even chaos.\*

### References

- Forrester, Jay W. (1961). *Industrial Dynamics*. Pegasus Communications.  
Forrester, Jay W. (1969). *Urban Dynamics*. Pegasus Communications.  
<http://www.vensim.com>.  
Kunc, M. 2012. "Teaching strategic thinking using system dynamics: lessons from a strategic development course," *System Dynamics Review*, 28 (1), 28-45.

---

\* For an example of the treatment of strategic thinking with system Dynamics, see Kunc (2012).

# Educational Technology, potentials, expectations and challenges

Dr.Hala El Miniawi , AbdulHadi Brenjekjy\*

*Ministry Of Education,Dubai ,UAE  
Canadian University of Dubai*

---

## Abstract

Great advances in technology have opened new horizons in the field of education for teachers and learners. Many up - dated themes have evolved in relation to independent self- learning far learning and implementation of technology in classrooms through smart boards and usage of on- line resources in addition to learners indulgence in social media networking, I Pad learning and many other forms of acquiring knowledge through different channels that minimize the role of teachers or even substitute it completely especially in interactive programs. Many people therefore became advocates of the idea claiming that technology is the language of this age so undoubtedly it should be used primarily in addressing the young generation who understand it well enough without the need for an instructor whose authority in the classroom has worn away. However, many other people deeply believe that technology can never impart the values of disciplines, punctuality and many other life essentials that a teacher can communicate to learners. They claim that learning doesn't only involve receiving information but rather adapting the skills of critical thinking that allow learners to assimilate knowledge and relate it to their own experiences .It is the art of life through perceiving knowledge and it is a job that only teachers can do. In such a struggle for dominance who will survive, the human, the master who invented the machine or his invention? Will the invention surpass its inventor? Will teachers survive the competition with technology? Or is there no conflict at all? In my research I will try to put aside all my favouritism of teachers over machines to try to answer the above questions as transparently as possible through all the means known to me of collecting information, revising the literature related then doing the analysis and evaluation needed to deliver my research results, citing the references I used as objectively as possible.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** *digital divide, generation digital divide*

---

## 1. Introduction

The process of education has passed through many stages of change .As a teacher I have witnessed such changes. Previously as a learner , my teachers were basically confined to the use of the board and the textbooks as their main aids ,illustrations and drawings were used as well but technology had no interference in the process .When I became a teacher I tried to modify my resources and aids in coherence to what was available in the fields .Thus in 2000 ,we as teachers ,were first introduced to the use of computers through the usage of some interactive programs like Tense Buster which aimed at teaching Grammar for grade 12 students in an interactive way .

Then more programs were introduced but still it was applied on a very limited scale and only for few schools and by few teachers .We received training on the basic skills of using computers. In a period of 10 years technology has invaded schools on a wider range and the process was so rapid that I can hardly remember now its steps .Schools were provided with computer labs ,more programs were introduced and teachers had undergone more training on computer skills

---

\* Corresponding author. Tel.: 00971505277685  
E-mail address: [halaelminiawi@hotmail.com](mailto:halaelminiawi@hotmail.com)



### 1.1 .Problem Statement

Technology in education is not an end in itself but rather a means to an end .Yet in many cases and on a wide range in the field of education, the use of technology in the classroom has not been backed up by a change in the teaching strategies .In addition, teachers' attitudes towards technology veered from rejection to adoption and in between many teachers struggle to face the change.

Therefore I find extremely important to expose to light the potentials that technology can provide for teachers, the challenges it creates, and the expectations that awaits all those who are concerned in the process.

### 1.2 .Research Questions

The main focus of the study would be on the great advantages of the implementation of technology in education including the enhancement it provides for teachers yet it would be greatly beneficial to mention the disadvantages of such modern aids with all the challenges they create for teachers and the attitudes of teachers towards educational technology .

Therefore the main questions of the research would be:

1. To what extent can technology enrich the classroom learning environment? What challenges does it create?
2. Can technology replace teachers in the future?
3. What are the perceptions of teachers towards the use of educational technology? Can they cope with the fast progress of modern IT?

### 1.3 Hypothesis

The research aims at exploring the great potentials that modern technology can provide for teachers to enhance their learning environment .Yet educational technology is not an end in itself but rather a means to an end .Thus implementation of technology in education involves planning activities in which technology plays a role along with the learner and the teacher as a moderator Application of the activity is usually followed by practice evaluation and modification. Teachers however should have the positive attitudes towards the use of modern technology along with the needed training to use such facilities.

### 1.4 Research Method

A sample of teachers, students and teachers' trainers would be chosen randomly to be interviewed to answer a set of different questions categorized according to the criteria needed .Interviews with educators and students would be then analyzed backed up by the literature related and the researchers 'own experience and backgrounds..

### 1.5 Historical Background:

Educational Technology is defined as “the practice of facilitating learning and improving performance by using appropriate technological means and resources “ Strauss (March 21, 2013).

Thus we can trace the early use of technology in education to the 16<sup>th</sup> and 17<sup>th</sup> centuries when visual instruction depended upon visual aids, then sound was added and the term audio visual was highlighted as the primary educational device .Till then, silent films and the radio were considered as educational tools till the 1940s when the computer was invented and adapted by many educators on limited scale. In 1980s the development of the microcomputers attracted more attention to this tool in education and finally the Internet created more sophisticated uses that were not limited to learning but rather to all aspects of life.

Therefore, it would be better to refer to educational technology as instructional technology since it includes machines, a system, a method of organization and techniques, all of which were the product of the scientific approach to learning that stressed the importance of putting hands on things and experimenting all theoretical ideas so as to apply science into practice, creating highly technical devices that have changed the world.

Hence educators designed activities that depended on problem solving strategies and in such aspect the computer was used as a micro world for learners to explore and build their own experiences. Later, the digital communication

and networking created the concepts of on-line learning, email and forums which were considered Computer Based Learning CBL or Computer Based Training CBT that provided the chance of self study whereas CMC Computer Mediated Communication enabled students and the instructor to have interaction through distant learning or e tutoring.

In a way the 2000s is considered the Digital Age as referred to in London Review of Education,(2000) “Children and young people are growing up in a vastly changing context. No aspect of their lives is untouched by the digital era which is transforming how they live, relate and learn “

### 1.5 Schools of Thought in Education

Progress of using technology in education was throughout the way backed by development of many philosophies of education such as the Behaviourism, Cognitivism and Constructivism. B.F Skinner started the functional analysis of verbal behaviour which led to great favouritism of the technology of education as a way of increasing the outcome of conventional educational learning by implementing self – teaching programs whereby the studying materials were presented in small increments so as to introduce incorporate programmed learning into the classroom.

The cognitivism which was considered as brain - based learning investigated how memory worked .Noam Chomsky studied information processing and language acquisition .Development of computer science and I.T influenced the Cognitive Science theory which advocated problem – based learning , project and inquiry based research.

The Constructivism thought that learners construct their own meanings from interacting with realities so the job of a teacher was considered as a facilitator whose job was to plan a rich learning environment that allow learners to use their prior knowledge to interact with the new learning situations .

### 2.1 Technology in Education; concepts and benefits: (advantages)

The early use of computers in classes proved to be very successful as it increased learners’ motivations who were able to receive feedback from a patient, non –judgmental machine, thus improving as Whyte mentioned the locus of control and changing it from external to internal. Students’ writings were improved as well by using the word processing which provided spelling and grammar checking tool along with meanings.

“Studies done in "computer intensive" settings found increases in student centre, cooperative and higher order learning, students writing skills, problem solving, and using technology” Regolith, C. (2011).

The great variety of the Internet course materials and tasks facilitated teaching and allowed the chance for differentiated instruction so as to cater for students individual learning styles which in turn elevated the learners’ sense of achievement and consequently their self - esteem.

Nowadays, advancement in technology is creating new possibilities for teachers and students *as Carolyn April, director of industry analysis* Journal explained:

*“Technology’s impact on schools has been significant; advancing how students learn, how teachers teach and how efficiently and effectively educational services can be delivered.”*

He added that the invention of tablets, I Pads and smart boards made a real revolution in the world of education. Therefore we can say that all these electronic devices that provide wireless access to the internet can help teachers remodel their learning environment in which learners may experience real involvement in authentic educational situations, allowing them the chance of independent learning ,and catering for their individual learning styles that make technical aids (such as social networking ,blogs , wikis ,online collaborative tools, media manipulation and distribution tools )a must rather than an option for those flexible teachers who are able to adapt themselves to a fast moving world ,that continues to excel over the limits of potentials to those of high expectations .Such concepts are really concerned with two factors , the teachers attitudes , and availability of technical devices .

Traditional teachers who refuse the change and cling to the traditional ways of lecturing as a means of imparting knowledge to their students may use the simplest forms of technology such as the OHP or the data show for presentation while at the same time they insist on individuality in studying and adherence to text book content delivery. In such a case the learning environment they create will undoubtedly deprive the learners from tremendous benefits that other means of interactive learning may provide. At the contrary, technology has achieved great success in providing better stimulation for learners and better modelling for teachers .

The other factor that matters regarding using technology in education is the availability of the hardware and software such as computers, language labs, internet access and smart boards. In addition providing training and technical support for teachers is considered an important issue when taking the decision to use such technical devices. Technical tools such as Web 2.0 that includes blogs, wikis ,twitter and Google Doc are few examples of programs that allow learners the chance of editing their reports in groups and communicating with their instructors even outside the class room space .

Another advantage of technology would be the open resources that are available on the Internet .Some are free and can provide all the parties involved in the teaching learning process ( administration ,teachers ,learners ) the chance to find resources ,store files and records and share knowledge with other educators in the field .

## 2.2Technology In Education ; challenges and possibilities (disadvantages)

Technology is gaining more and more ground in the field of education, yet some drawbacks bloom at the horizon in reference to many issues that may endanger children growth. According to an article about Childhood in a Digital Age:, London Review of Education,( 2012) children can be negatively influenced by computer based interactive programs as Anna Craft wrote "Their brains are rewarded not for staying on task, but for jumping to the next thing, and the side effects could linger: the worry is we're raising a generation of kids in front of screens whose brains are going to be wired differently."

Such effect can reach teenagers and adults as many researches proved that spending long hours on screens of mobile phones, computers or I Pads can affect attention span and the ability to focus.Digital Divide is another drawback of technology since it represents the gap between those countries and people who have access to computers and the internet and those who don't. Another gap is the generational digital divide that exists between the young generation who have the skills to use the new social networking media so easily thus finding no difficulty in dealing with CBL, and the adults who thrive to acquire and up- date such skills which are completely new to them.

## 3.1 Introduction to the Data Analysis

This research has adapted both qualitative and quantitative methods so as to collect the necessary feedback to answer the important questions the researchers exposed to discussion.A sample of 100 Public High school teachers was chosen from the different Emirates of the UAE .The questionnaire comprised of 20 questions divided into the five domains the main questions cover.

All participants in the research were given a complete explanation of the objectives of the study and they signed consent to participate in the survey.

## 3.2 Analysis of Questionnaire Descriptive Statistics

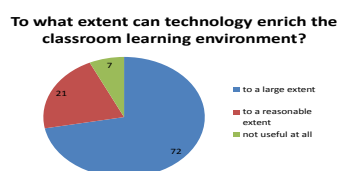
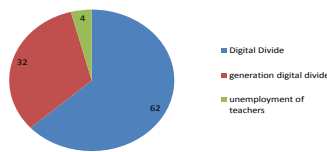


Figure1

To start with, 72% of teachers believed that technology can enrich the learning environment to a great extent taking whereas 21 agreed to the idea to a reasonable extent .Only 7% thought that technology is not useful and can't enrich the learning environment .Such findings reveal the current trend among educators in the field of education that technology with all the options it provides such as smart boards ,IPads ,wikis and other interactive programs that can add to the classroom environment a lot. That is, technologies should be used to keep students active, constructive, collaborative, intentional, complex, contextual, conversational, and reflective Learners integrate new ideas with

prior knowledge in order to make sense or make meaning or reconcile a discrepancy, curiosity, or puzzlement.

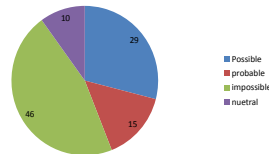
**What challenges does it create?**



**Figure2**

When teachers were asked about the challenges that technology may create in the field of education, 62% thought that the digital divide would be the greatest problem since it constitute a global problem that would deepen the gap between people in the developed countries and the third world ,namely between those who have the financial abilities to provide facilities for each individual and those who strive for the basics .32% of the sample were worried mostly about the generation digital divide between the digital generation and the traditional teachers who own the knowledge but lag behind their students in the field of education . Only 4% were afraid that technology would replace teachers in the future which show a great sense of their own worth in the field of education.

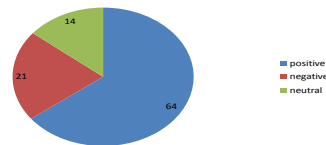
**Can technology replace teachers in the future?**



**Figure3**

To another question about whether technology can replace teachers in the future ,this option seemed impossible for 46% of the sample ,probable for 15%,possible for 29% whereas 10% neutral .

**What are the attitudes of teachers towards the use of educational technology**



**Figure4**

Therefore when teachers were asked about their attitudes towards the implementation of technology in their classes, 64% were quite positive about it while 22% expressed negative attitudes and 14% were neutral.

So it was important to ask teachers whether they would be able to cope with the change towards using technical aids in education .39% were certain that by training teachers would be able to combine knowledge with the technical skills to cope with the modern age concept of teaching and learning , 36% were certain to a certain extent taking into consideration all the challenges that teachers might face which were discussed in earlier chapters .15% of teachers thought that such change would not occur whereas 10% were not sure about such process .

**Can teachers cope with the fast progress of modern IT?**

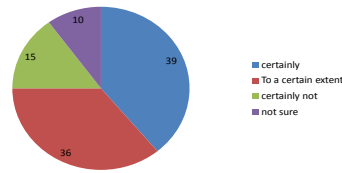


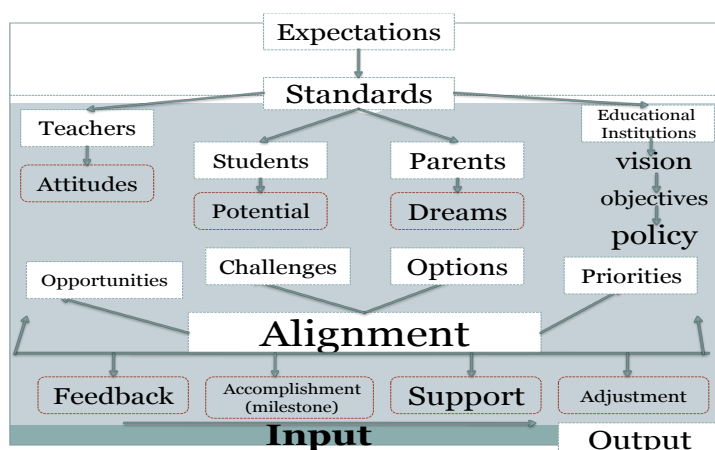
Figure5

### 3.3 What is the future image of education with or without a teacher?

Undoubtedly, technology will continue to pave the way for more facilitated ways of studying for students and more effective means of teaching for teachers .Nevertheless it would be very important to point out that technology consists mainly of machines that cannot operate without man .Hence the human factor will remain the master of the machine and teachers will remain the masons who build the world ,providing inspiration ,motivation and instructions for a generation who are in great need for their guidance in a chaos of opinions ,cultures ,violence and illusions.

#### 4.1 Recommendations

The researchers deeply believe that for the process of implementation of technology in education to be a smooth change that all teachers can carry out, a kind of alignment should be done between the four parties involved in the teaching learning process .The researchers idea is explained in the following chart designed by them in which each party has expectations expressed in the attitudes of teachers , potentials of students ,dreams of parents and a certain vision of the educational institutions that usually mould educational objectives into a policy that provides a framework for all the other three parties to work within . Thus a meeting ground is required for all the four parties to meet and create a kind of compromise of potentials and expectations so that the educational policy would have priorities that might provide teachers with better opportunities to express their opinions and share in the process of educational decision making .Such decisions should meet the students' potentials with the challenges they are supposed to meet creating options for parents to be active parts in the process. Thus the feedback received from teachers would reflect the accomplishments of students, supported by parents so as to provide the educational institutions with the input needed to make the necessary adjustment in a reciprocal way that undoubtedly would achieve more success on all levels. ( see figure below)



## 4.2 Conclusion

The industrial revolution has changed not only the economic aspect of human life but rather the social and educational ones. Since then, machines have played a great role in changing life to the better. When the internet was first introduced, many people were suspicious of its benefits and now they can't do without it. According to John Dewey: "If we teach today as we taught yesterday we rob our children of tomorrow" so teachers can't just stick to their traditional ways of teaching as they are now as always the makers of the nation's future history for which technology is the main backbone. All our life activities nowadays depend on technology and teaching is part of it. Technology can enrich the learning environment with tools that extend the possibilities of communication between teachers and learners, learners and the world. Teachers' positive attitudes towards educational technology can ensure the success of its implementation in classrooms. Henry Hullway said: "One's destiny is never a place but rather a new way of looking at things"

Furthermore, Gandhi left the world a very precious words "You must be the change you want to see in the world" so teachers should be aware of their vital role not only in class but in life as well and they should act accordingly, keeping in mind that "The technology itself is not transformative. It's the school, the pedagogy that is transformative." - Tanya Byron

Hence educational technology as the term implies combines the two elements of machines and the human factor that keeps to education its valuable core of morals, discipline and the art of living.

## References

- EC (2000). Communication from the Commission: E-Learning – Designing "Tejas at Nit" tomorrow's education. Brussels: European Commission.
- Nagy, A. (2005). The Impact of E-Learning, in: Brock, P.A.; Buchholz, A.; Kirsten, Z.; Zarf's, A. (Eds). E-Content: Technologies and Perspectives for the European Market. Berlin: Springer-Verlag, pp. 79–96
- Allen, I. E. and Seaman, J. (2008) Staying the Course: Online Education in the United States, 2008 Needham MA: Sloan Consortium
- Allen, I.E. and Seaman, J. (2003) Sizing the Opportunity: The Quality and Extent of Online Education in the United States, 2002 and 2003 Wellesley, MA: The Sloan Consortium
- Gray, D. E., Ryan, M., Coulon, A. (2004). The Training of Teachers and Trainers: Innovative Practices, Skills and Competencies in the use of eLearning
- Kopf, D. C. (2013). Connectivism: 21st Century's New Learning Theory. *The European Journal of Open, Distance and E-Learning*,

# Educational value of autobiographical writings for self-identity development and orienteering

Gabriella Aleandri<sup>a\*</sup>, Alessia Checchi<sup>b</sup>

<sup>a</sup> Department of Education, Cultural Heritage and Tourism, University of Macerata, Piazzale L. Bertelli, n. 1, Macerata, 62100, Italy

<sup>b</sup> PhD in Human Sciences, University of Macerata, Piazzale L. Bertelli, n. 1, Macerata, 62100, Italy

---

## Abstract

The following paper will report back an implementation of a broader research project based on the acknowledged value in education (and self-education too) of autobiographical writings, as recognized at national and international level, for example by Demetrio, Alberici, Merrill, West, etc. The present section of the research had been performed on a sample consisting of adult immigrants (half male and half female of 20-40 years old) in a class who were attending training courses within a CTP (Permanent Territorial Centre) in Italy. Most of immigrants were from East Europe, South America, Africa and China. So, such class was characterized by heterogeneous histories and experiences which initially may be perceived by the same students as problematic and an obstacle, but that have always been transformed into an opportunity for share and discussions about peculiar differences as a resource and a value both in an intercultural and in educational perspective. An original autobiographical format had been administered to them and it had been considered by participants as very useful for development of self identity, to enhance their own experiences and for a better orienteering too.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* autobiographical writings; self-identity; orienteering; lifelong and lifewide education.

---

## Introduction: immigration and economic crisis

Started years ago, the economic crisis still continues to heavily affect many European countries, "marking the end of a period of extraordinary growth in immigration - which took place mostly in the southern part of the continent - and, in all likelihood, it is poised to become an important turning point in the history of the phenomenon "(Caritas Migrants, 2014:8). We have had in fact, starting in 2012, a strong decrease of migration flows in Europe, but this arrest is smaller than we might have expected, confirming the fact that the phenomenon of migration is still large and consolidated. Italy and Spain have been the most affected countries by immigration in recent years, confirming that the attractiveness of the old continent is in fact still quite high despite the bad economic situation.

To better understand the flow of the migration phenomenon in the world we can point out that this involves more than 232 million people, of whom one-third (70 million) circa in Europe, and the same in Asia (also with 70 million). Therefore, Europe shows itself to be as one of the two continents that welcome most of the migrant population in the world (Caritas Migrantes, 2014).

Only foreigners legally resident in Italy are almost 4.4 million people corresponding to 7.3% of total residents whom are 59,700,000 circa (Istat, 2011 and broadly confirmed by the data of the Immigration Report by Caritas Migrantes, 2013). The resident foreign population increased by more than 334,000 people (8.2% compared to 2012) (Immigration Report by Caritas Migrantes, 2013). About foreign citizens' nationalities, 70% are non-EU citizens and 30% are EU.

---

\* Corresponding author. Tel.: +39-7332585929.

E-mail address: gabriella.aleandri@unimc.it.

3.4 million immigrants are regular taxpayers (representing 8.3% of total taxpayers in Italy) and pay € 43.6 billion in the year to the Italian tax authorities, accounting for 5.4% the total declared income in Italy.

The motivational characteristics that historically move migration flows are numerous, among them employment opportunities and search for new ventures in life have always had a significant importance. A characteristic feature of migration related-work is the character of permanence, but it should be noted that in recent years this indicator has decreased. Taking into consideration the area of the OECD countries, migration flows in permanent entry has decreased by 13 % from 2007 to 2011 (OECD, 2013:19).

The employment crisis that now involves very wide portions of the population of all European countries but also many non-European ones, has had a more significant impact on migrant workers. However, "from some surveys it was found that immigrants would continue the migration experience which occurred also in conditions of unemployment" (Mottura, 2010). "The increased unemployment among migrant workers than Italian ones is dictated by a job insecurity and a weakness of job protection which need new social tools, rather than just blocking the flow" (Caritas Migrantes, 2014:7).

Table 1

LABOUR MARKET		Foreigners	Italians
<b>Employment</b>	Employed	2.334.048	20.564.681
	Employment rates %	60,60	56,40
	Changes % 2008/2012 Employment rates	-6,50	-1,80
	Changes 2008/2012 Employed people	583.079	562.247
<b>Unemployment</b>	Unemployed people	382.672	2.360.954
	Unemployment rates	14,10	10,30
	Changes 2008/2012 Unemployment rates	5,60	3,70
	Changes 2008/2012 Unemployed people	220.981	830.732
Source: Fondazione Moressa, 2012 data.			

The economic crisis has outlined new articulations of the system of inequalities with the increment of the risk in social exclusion for all those social groups in the most vulnerable situations. The recession has important "effects on human mobility on career paths, the ability to saving" (Zanfrini, 2011:96), making worse the conditions of work and life, it heightens the risk of social exclusion for those subjects who had achieved significant elements to accomplish the integration. The crisis discredits, in addition, "the progressive vision of the transition towards better working conditions and, above all, calls into question the idea that the work – regardless of its quality – is the main factor of integration (Chicchi, 2001)" (Carbone, Catarci, Fiorucci, 2012).

According to the "Report on policies against poverty and social exclusion for the years 2011-2012," prepared by the Commission of Social Exclusion Survey (CIES) established pursuant to art. 27 of Law November 8, 2000 n. 328 at the Presidency of the Council of Ministers and currently placed in the Directorate General for inclusion and social policies of the Ministry of Labor and Social Policies, among the most vulnerable and at risk of social exclusion populations groups, there are foreigners, who are most at risk of poverty, suffer home uncomfortableness and they are paid one-third less than Italians. Nationalities who are most affected by material deprivation are Moroccans (32.2% of households in conditions of material deprivation), Tunisians (26.6%) and Indians (25.4%).

What has been said so far seems to confirm that job represents one of the main aspects for own well-being and personal identity and the purpose of active participation in family life, collective and social.

To be able to meet and try to improve the employability of the population (in this research, immigrants), many national and international reports have shown that high levels of education, the acquisition of high skills in a perspective of lifelong and lifewide education and appropriate tools (first of all linguistic) to communicate are



essential and crucial, and policies of each country as well as those of the EU have the task of finding resources and tools to achieve these goals wide-ranging, in-depth and in a short time.

### **The right to lifelong education**

At a time when the right to a dignified job seems to be given up and, at the same time, it becomes increasingly difficult to look for freedom and to find a job also in places far away from their country of birth, it seems appropriate, as well as necessary, starting from defining the principles and values which throughout the time inspired the writing of Human Rights (eg. Art. 26 of The Universal Declaration of Human Rights by UN), including, not least, the right to sociality. As well as in the Italian Constitution – which is also aimed at the promotion of social right – political, educational and pedagogical interventions have the task to pursue the goal of putting everyone in the condition of being able to better exercise their social rights. The first and initial way is to provide the tools to communicate adequately.

Based on these assumptions, the research project of which we will illustrate a report on the following pages, took place in a CTP institution (Permanent Territorial Centre) within a program of literacy and medical education aimed at providing immigrants the skills needed to take information and ask intervention help in cases of emergency.

The CTPs are specific centers of adult education aimed at recovering of compulsory education, where often lots of immigrants have enrolled, also and above all for learning Italian as L2.

It is now widely recognized that “education, designed as lifelong learning, is the new scenario within which to place the needs and aspirations of women and men to continue to learn, to train, to be able to cope with changes in their lives” (Alberici, 2006).

Starting from the reflections of the pioneers of lifelong education such as Lengrand, Suchodolski or Schwartz, education should be considered not only as the attainment of a wealth of knowledge, skills and abilities, but also as the development of the individual, which becomes progressively more and more himself also, if not more, through the various experiences of his own life.

Therefore, lifelong education does not look as a simple extension of traditional education into adulthood or beyond, but a real new pedagogical strategy aimed at enhancing all dimensions of life of individuals, a useful reference framework to address the need for solutions to many and unprecedented challenges in the cultural, social and professional environment, individual life and modern societies.

Therefore, lifelong education doesn't look as a simple extension of traditional education into adulthood or beyond, but a real new pedagogical strategy aimed at enhancing all dimensions of life of individuals, a useful reference framework for address the need for solutions to many and unprecedented challenges in the cultural, social and professional, individual life and modern societies.

“Therefore, with lifelong education we can include all types of education, including initial, pre-school and school education (...) extended along the entire span of life and the various dimensions of a person's life” (Aleandri, 2011: 46).

In this perspective, lifelong learning has to be acknowledged as a life-style that every person should pursue, for this reason it is crucial to educate from an early age to the pleasure of learning.

Of course, the promotion of a culture centered on education throughout life requires commitment and cooperation by all institutions and policy-makers so that we can develop education and training in different contexts of life, as well to develop and encourage lifelong learning as a lifestyle in order to improve quality and promote the growth of each person within a fulfilled knowledge society.

### **Autobiographical writings, identity, guidance**

Initially, immigrants have been attended course to improve more and more in-depth communication skills, in order to be able to better aware and to share each other about one's self and one's own wealth of experience, through autobiographical writing through the stimuli offered by the format.

An original format aimed to stimulate autobiographical writing of adult immigrants has been administered with the goals of developing a sense of identity and guidance.

The autobiographical writing is particularly suitable to rebuild the identity dimension. "What has to do with oral or written description of themselves, of their own world, it is a narrative knowledge among the most important for education" of both young people and adults who will use this expertise gradually improving it (Demetrio, 2002). Building own identity also involves meta-cognitive skills, not only rational. Writing with its slower times of reflection, and therefore deeper than it stimulates, can lead progressively awareness in mainly unconscious areas: "writing, whether it is the outcropping part of ourselves, which manifests the invisible bubbling inside of us, however, it is moving beyond the patterns and rules it provides under the impulses that the unconscious releases or cannot still afford to bring at the awareness" (Demetrio, 2002:12).

The migrant status is a condition of life particularly difficult also from the point of view of the identity. Relationships change, cultural roots should be fed and maintained through memory, language, stories, religious cults or any other structure that will help to continue to be mindful of their roots in a foreign country, in an environment of confrontation, dialogue and recognition of differences, as a starting point for the construction of a multicultural society. To this end, in addition to enhancing the cultural differences, it should be valued and promoted above all the search for what brings us closer, because it is in the feelings, emotions and ways of life to represent them in the narratives and in the knowledge that the encounter with the "other" finds its reasons and its concrete experiences (Demetrio, Favaro, 2004).

The identity starts from the encounter with the other (according to the teachings of Gandhi: "No culture can survive if it attempts to be exclusive"), but also by comparison with one's own self, one's own experienced and lived, until the individual reaches a broader awareness. Individuals will be able to largely overcome all the risks of ethnocentric thinking based on the desire for assimilation of the other or on sense of superiority: we mention for example the work of Todorov about the Spanish conquistadors, according to whom "these two primary figures of otherness are both based on self-centeredness, the identification of their values with the values in general, of the self with the universe: the belief that the world is one" (Todorov, 1997) (De Bortoli, 2005:14).

Regarding immigrants, the population of the host country often has an image of them distorted sometimes by some positive elements, but more often by negative ones. The image is positively characterized when it is conditioned by the socio-economic progression that some of the earliest arrivals were able to accomplish. It is negatively connoted, however, when distorted by the deviant portion of the immigrant population. Moreover, the weight of the deviant portion is not perceived in proportional terms compared to the total number of immigrants but rather according to their absolute value, the number of socially deplorable acts made and the resonance that the media give them.

To correct this kind of distorted perception, a valid mode is to give space and voice to these immigrants, a narrative space that allows them to tell their stories and then to make known their personal histories, their wealth of experience. The autobiographical writing helps in this direction and at the same time allows the subject to reconstruct its identity and through the meeting with the others in an approach aimed at educating community.

From the individual self to the collective self: "certainly we can agree with Bauman (2003) that the community is something already gone down and desired at the same time (missing the community) as a collective and relational space in which to process their anxiety and try to meet their own needs." (De Bortoli, 2005:15).

Contemporary society has also considerably changed in recent years their way of having relationships. "Today you are moving in a hurry, and hurry prevents us from thinking, prioritize, to understand what our needs are, the sense of the situations around us; but hurry and overload of things to do are also an excuse for not thinking, sometimes not to accumulate still pain [...] sometimes to avoid reflecting on their own self due to fear" (Gabrielli, 2006:154).

The time of writing instead is a slow time, it is an appropriate time to reflect, to remember, to pick and choose slowly the most significant episodes and events of own life and therefore more suitable to describe ourselves. It is a time that allows you to more easily reflect over a meta-cognitive level, on own strengths and weaknesses, which allows the subject to raise the level of awareness. Having greater awareness improves the ability to make choices and therefore the ability to guide especially facing a labor market in constant evolution and transformation that requires

subjects to be flexible, to adapt to change and to put to use all the skills that you have, all the resources, including those learned in non-formal and informal settings. Since a long time we agree that one of the most important adults educational need is to re-guide themselves (Alberici et al. 2007) “in the labyrinth of knowledge of experience” (Alberici, Di Rienzo, 2011).

It is therefore beneficial experiencing the paths of biographical writing with thoughtful purpose and guidance in order to support the individuals in a process of progressive development of the capacity for self-guidance. It is worth noting that similar pathways, focusing on the biographical reflection, have been implemented within the European models of recognition, certification and validation of non-formal and informal learning (Di Rienzo, 2010), as well as within laboratorial courses of writing and recognizing the invisible skills, in the university (De Carlo, 2013).

Using narrative method with guidance purposes has long been studied in Italy by Batini; for example, in schools, a biographical approach is proposed in order to prevent school dropout and bullying (Batini, D'Ambrosio, 2008).

This type of approach has come under consideration by also the U.S. scientific research in recent years, but in Italy belongs to a consolidated heritage of doing guidance. By tradition, the guidance in Italy has always had based more on the interview and on the stories (which allow you to bring out more rich personal characteristics of each individual) rather than on the application of aptitudinal tests in an exclusive manner (Evangelista, 2011). At the international level, this approach is called Life design counselling, or even Narrative career counselling and the most distinguished exponents are Savickas, Mary McMahon and Mark Watson. “The life-designing model for career intervention endorses five presuppositions about people and their work lives: contextual possibilities, dynamic processes, non-linear progression, multiple perspectives, and personal patterns. Thinking from these five presuppositions, we have crafted a contextualized model based on the epistemology of social constructionism, particularly recognizing that an individual’s knowledge and identity are the product of social interaction and that meaning is co-constructed through discourse. The life-design framework for counselling implements the theories of self-constructing [Guichard, J. (2005). Life-long self-construction. *International Journal for Educational and Vocational Guidance*, 5, 111–124] and career construction [Savickas, M. L. (2005). The theory and practice of career construction. In S. D. Brown & R. W. Lent (Eds.), *Career development and counselling: putting theory and research to work* (pp. 42–70). Hoboken, NJ: Wiley] that describe vocational behaviour and its development. Thus, the framework is structured to be life-long, holistic, contextual, and preventive.” (Savickas et al. 2009).

The dimension of writing is often intertwined with that of writing production. Emigration, immigration and exile have always been a source of creativity in such direction, especially in the autobiographical sense. Every human being has moved by choice or compulsion from a place, from a story from a society from one language to another, he can rebuild a social context and tries to implement a new plan of life. This intense existential creativity act flows sometimes into writing.

"The literature of migration was founded in 1990 when three books have been published, written by four hands: *Chiamatemi Ali* by Moroccan Mohamed Bouchane, *Immigrato* by the Tunisian Salah Methnani and *Io venditore di elefanti* by the Senegalese Pap Khouma; it follows in 1991 *La promessa di Hamadi* by the Senegalese Saidou Moussa Ba, a kind of “inner journey” through Italy on racial prejudice and social problems. This is called the literature of testimony, born from the need of intellectuals migrants to be heard, to communicate through writing, directly with the Italian public. They consist of texts, often autobiographical, discussing violence and racism, loneliness and integration impossible between immigrants and Italian society" (Argento, conference proceedings).

Within this wide production of migrant writers, we find many of autobiographical kind, as the autobiographical *Aulò. Canto poesia dell'Eritrea* written by author Ribka Sibhatu (when she was still very young she looked for refuting in an area controlled by former guerrillas in order to avoid prison). The text has enriched with poems, tales, legends, recipes from Eritrea. She now lives in Italy and has a degree in Foreign Languages and Literatures. Or *Princesa*, autobiographical novel, which was also made into a movie, written by Fernanda Farias de Albuquerque, co-written with co-author Maurizio Jannelli during a common period spent in prison in Milan. Or *Volevo diventare bianca* written by Algerian Nassera Chohra born in Marseille. The author tells the story of her childhood and adolescence in a poor and degraded neighborhood of Marseille, mainly inhabited by migrant Arab, Chinese and African migrants. During her childhood, she was already very attentive to all the social differences between her and her friends in France, one day discovers the diversity of the color of her skin and does not accept it, because she

identifies it as the cause of all her problems. That is why, before resigning to stay black, she will try in every way to become white.

The writer of Brazilian origin Christiana de Caldas Brito attempts a definition of what makes a writer a migrant: "Writing 'migrant' means rearranging, through writing, a life that seemed to have to scroll through the four walls of the home and that, instead, suffered a detour and moved elsewhere. The literature of migration starts here: the written story of the experiences and emotions present in the act of migrating and settled in a different country. It means to give meaning to arrival and departure. "C. de Caldas Brito sees, however, that "a danger to migrant writers is to remain confined to the issue of migration, linked to the folkloric or exotic forever" (Ellero, 2010:10).

The activity of writing by migrants is not a narcissistic act but a self-determining action necessary to recognize their identity. The immigrant writer "means as a 'self-narrative' a reflection of inner expression that is always open to dialogue and confrontation about human experience, a constant search for truth, far from the 'vast palaces of memory' and turned to the ever-changing present, urgent and imperative, therefore the experience of all men. [...] The immigrant writer was mindful of the first contact with the Italian society as an impact that destroys memory, prohibits sometimes, when we want to reconstruct the chronological narrative, the measured and linear narrative. The immigrant writer, armed with an 'I' more spread than the ocean sea, try, through writing, to never get lost himself in the Italian society as 'the water in the water', and tries to match this explosion of memories, too intense, burning, a constellation of sequences, chronicles, beaches of sweetness where you can be reconciled with the world. And when he repossesses of what is naturally his, he feels himself less bound to what a word is linked to infinity of its possible meanings, and because the immigrant begins to speak Italian babbling, then he feels the need to see his printed words, definitive and indelible. He finally feels the joy of being heard, only he has the impression that saying things only once is not enough, you have to repeat them in different ways to be sure of being understood" (Ellero, 2010:12).

### **The research project**

This research starts from the awareness of the importance of reflecting on methodologies and techniques that will improve own listening, interpersonal and communication skills, starting from the analysis of self, of own story and of any stereotype, even for a poor knowledge of the migratory phenomenon. The scientific production in intercultural field resulted in many years to experiment with different techniques and strategies to define intercultural communication tools that facilitate the understanding of the experiences of migration and the recognition of cultural differences, but also similarities. In this sense, the knowledge of testimony through autobiographical writings format has assumed an increasingly growing importance.

The autobiographical writing helps the adult subject to recollect the most significant moments of his own lives, finding not previously surfaced connections that may become the basis for the construction of new meanings related to his own life experiences. It therefore puts in place an operation of a cognitive nature that is full of deep meaning and connection-even emotional. In the narrative of self we can retrace then the roots of the reciprocal recognition, knowledge of a deeper order, which often is a guarantee of respect for differences, especially in a so strongly multicultural society. The results of the research show that autobiographical writing, and compiling the Format in particular, in subjects amplify the sense of generativity and the desire to talk about, with all the richness of meanings that the experiences in life preserve. From the point of view of education in a multicultural, friendly and able to observe the difference of each society, the exchange of knowledge can help you recognize the differences. This cognitive action should help each person to construct in the minds the intellectual respect of cultural diversity and to overcome resistance, prejudice, every exasperated ethnocentrism, leading to closure against the other. It is about learning to take the other's perspective and to implement procedures for meaningful relationships such as dialogue, listening, acceptance, confrontation.

Amartya Sen (2006) argues strongly that the identities are all mestizo, are a puzzle, a tangle. According to the vision of C. Levi Strauss are the result of multiple and simultaneous stratifications. The uniqueness of identity, without choice, leads to the tragedy of the conflict, or worse ethnic cleansing. We can share what Sen says: "The

main hope of harmony in our troubled world lies [...] in the plurality of our identities, which are interwoven with each other and are refractory to drastic divisions".

The ideas behind the project take the moves from the considerations that abandon their homeland, leave their loved ones, their home, food, habits, languages and communication registers of their native country, as well as losing reference points, social legitimation, a sense of autonomy achieved so far, their identity, are all factors that place the immigrant in a state of uncertainty and disorientation. The delicate balance of emotional, psychological, familial, professional and intellectual resources acquired and conquered in the country of birth are put through a crisis in the "journey of the migrant", undertaken by choice or by necessity. The contact with another reality, another language, another culture is the basis of the need for a new balance to mix two different identities: that of origin and that of the host. This study has, therefore, started from the awareness that immigration in Italy tends increasingly to the final settlement, requiring, therefore, the activation of the educational and training strategies that promote the stable inclusion of foreign nationals.

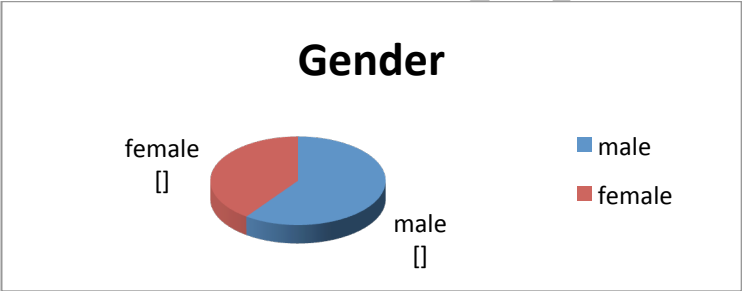
The research project has been divided into three steps: the first is related to autobiographical writing through an original format that had been translated into the languages L1 of immigrants participating. The format has been designed as a tool for evocation of memories and awareness of their own life paths. The second step consists of a literacy course, communication and medical education aimed at health and in cases of emergency, which preceded education moments, socialization moments and intercultural interactional exchanges. Finally, the third step consists of simulations and experiments individual and group.

In this article we report the data of the first step, deferring to other following publications the report the remaining steps of the entire research project.

The sample that participated in the compilation of the Format of autobiographical writing is composed of adult immigrants in Italy enrolled in courses at a CTP in a province of central Italy.

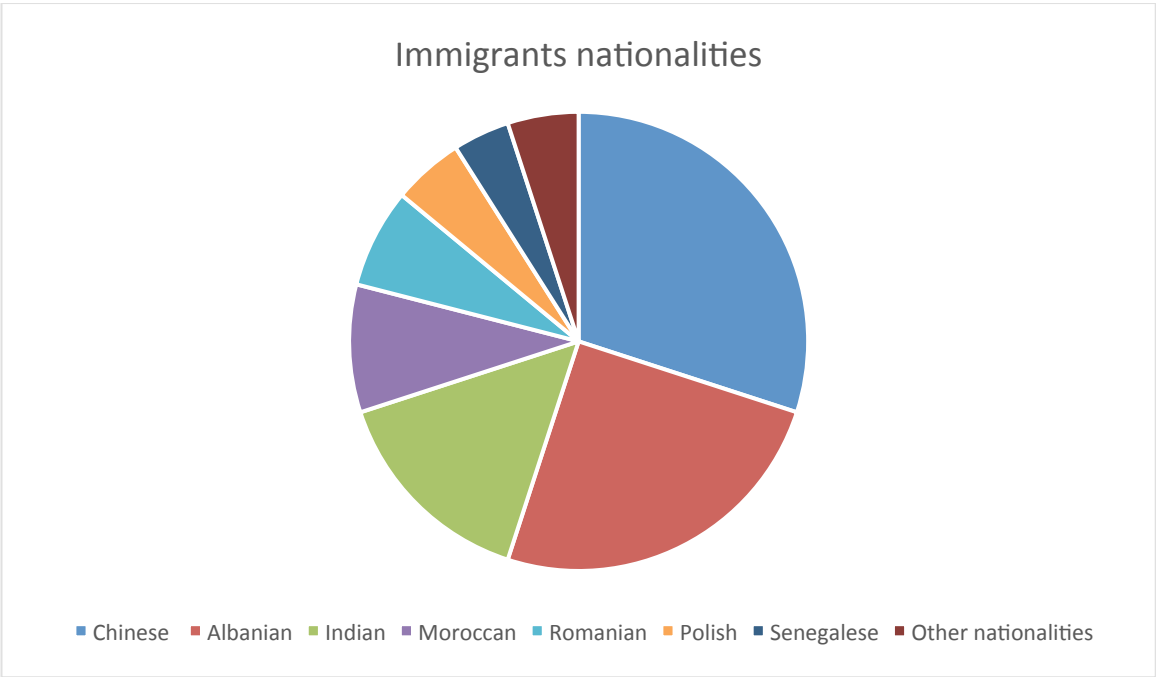
60% are men and 40% women, aged between 20 and 40 years, and they arrived in Italy, on average, since 9 to 18 months.

Chart 1.



The most common nationalities are Chinese, Albanian, Polish, Indian, Moroccan, Romanian, Senegalese.

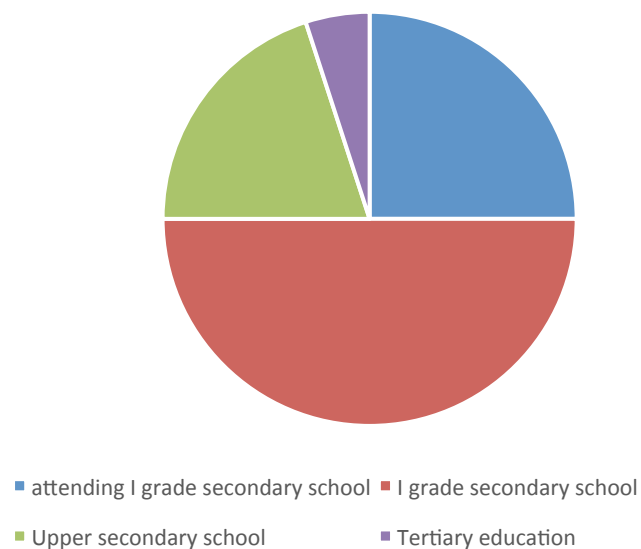
Chart 2.



With regard to education, 25% are attending courses at the CTP in order to achieve the qualification of secondary first grade school degree, 50% already had a secondary first grade level of education, 20% attained a upper secondary school degree and 5% have tertiary education.

Chart 3

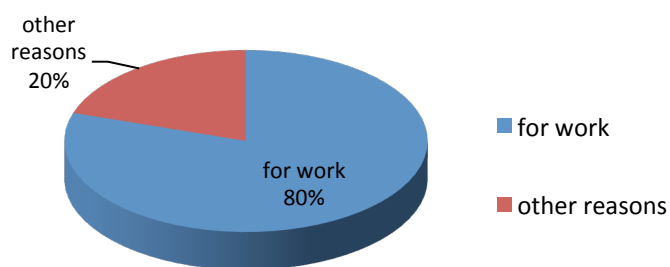
### Educational attainment



About 80% have moved for economic reasons and to look for a job.

Chart 4

### Reason for migration



With regard to employment status, however, are all still either unemployed or employed in seasonal work.

## Methods and results

The research activities have been carried out through using an autobiographical format that allows you to retrace the major experiences within their own life story and the whole activities stimulate the adults to know how to orient themselves in space and time. The format aims to know in depth the life experiences of each stranger adult and, at the same time, to make them aware of their own lives.

For the analysis of the qualitative experimental part of the investigation we used a flexible method, adapted and redesigned, derived from Grounded Theory by Glaser and Strauss (see also Merrill-West, 2009). For the quantitative part we used common methods of statistical analysis in human sciences.

Through 5 temporal cards, the stimuli generated guide the writing and help to remember the emotions, the most significant events, desires, people, places, etc. of the past and help to bring out the present and future planning.

Thus "through the collection of autobiographical writings, we can not only be able to get in depth experience in educational, training, events in which they still, in some way, contributed to the process of growth and development that will continue throughout the entire life span of every single actor of the same format "Words of a lifetime. Words to ... ", but also we can go beyond the individual, to understand the processes of education, social, cultural, economic, political, etc." (Aleandri, 2011, 74).

After administering the format, in the first step the research team read several times the collected material. In the second step they have tried to give an overall sense of the informations in writings to pull out of meaningful units, that is the most important information. In a third phase the most important concepts were transformed into short captions, while keeping the words used by the author of the format. Finally, the team has assigned them labels or conceptual meanings that are essential meanings able to represent the thoughts of the protagonist of the autobiography. At the end of this coding, the interpretations were compared with the authors themselves of the format, having asked the immigrant students themselves to determine whether the short captions were in line with their meanings or not.

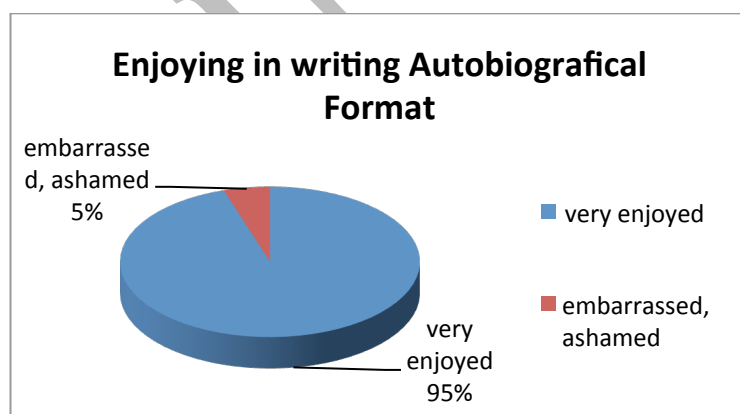
From writings we can argue that leaving their own land was a painful experience especially for those without family in Italy.

Social inclusion was particularly difficult due to states of distress, isolation and discrimination experienced especially by older aged individuals.

Cultural differences emerged among the participants in the format writing refer to religious and civil cults, food, and the role played by the woman.

95% said they have been interested in and have enjoyed the autobiographical writing. On the other hand, only one participant, a woman, stated that he felt ashamed and embarrassed to talk about himself because not common in their culture.

Chart 5.

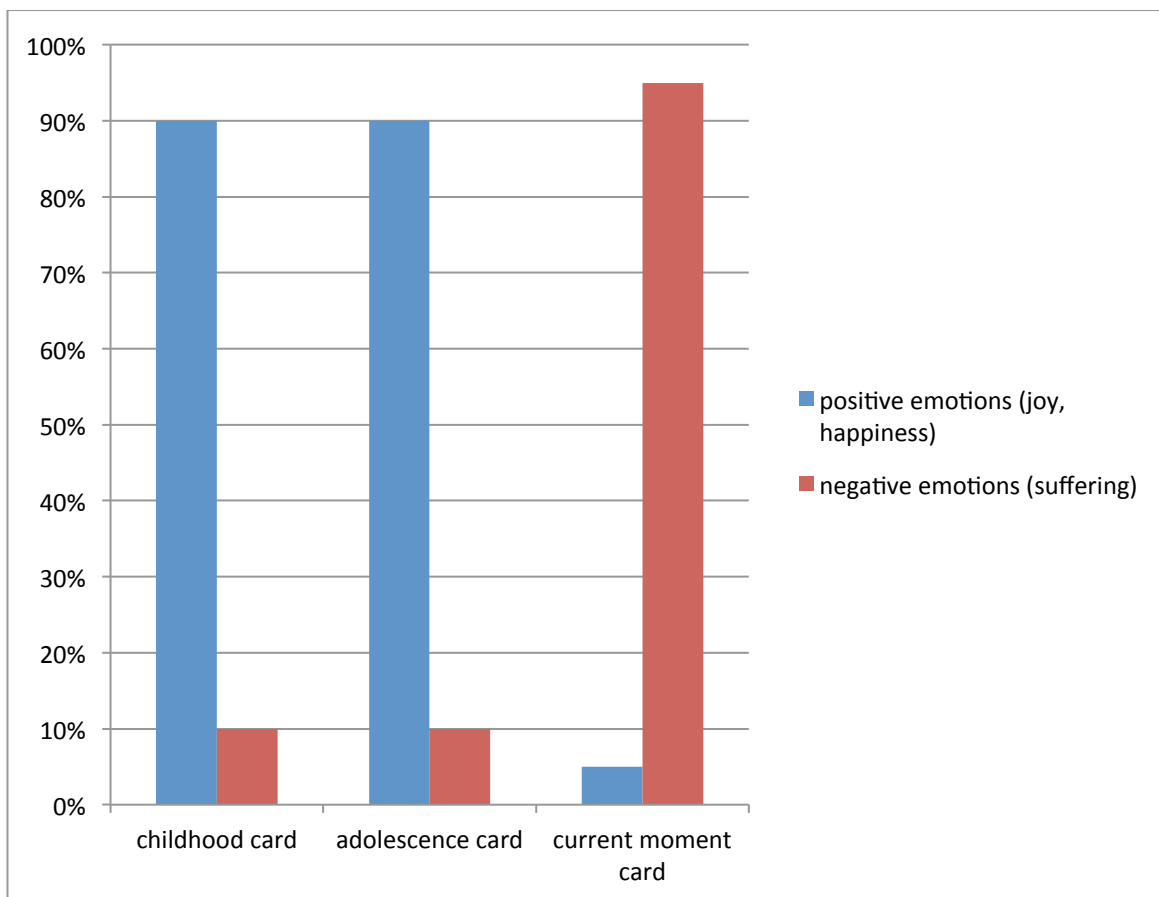




However, in general the women participating in the project have been shown to have a higher capacity, greater susceptibility and a greater pleasure than men to tell their stories.

90% of the sample said that the stimuli on the childhood and adolescence cards have prompt memories and pleasant emotions. Instead, the card relates to the present showed emotions of pain and suffering because it brought back the experience of immigration.

Table 2.



A brief analysis of quantitative and qualitative data derived from the interpretation of the format written by immigrants can have summarized as follows:

- 1) First card related to childhood: the average age of memories ranging between 4 and 6 years. The description of himself/herself has had presented as a mostly carefree period from which emerges above all a physical description of the participants. About the most significance color, women have described above all the pink and yellow, associating those colors to the flowers and the sun; men showed blue and green as colors that best let image the sea, the sky and open spaces. About a representative smell in the childhood, you can find a concordance search: smells that come from the natural environment, that is, plants, soil, or are associated with food prepared from the parents. The main emotions have linked to the pleasant memory of the loving care received by the mother figure. Only in two cases, emotions were negative because they were associated to the remembering of the death of a parent. As regarding the games, all said they had always improvised play activities with recycled materials. Mostly men have had fun with ball while women took as a model the

household activities carried out by their mother. With regard to the fear, two immigrants said to have been afraid of the dark. Finally, about school education (in childhood they all were attending primary school) they all wrote they have had positive experiences and still have good emotions about them. Overall, it appears that almost everyone has experienced a happy childhood and characterized by pleasant memories.

- 2) Second card about adolescence: the age mentioned for the teenage years for most ranges between 10 and 16 years. Women tend to describe their physical look, while men write about their character. The colors are those mentioned in the first card, but with the addition of red and brown colors as related to love, the fire and the mountains. For many participants the smells are associated with the earth, while other smells remain those related to food. The emotions that everyone remembers and describes with great emphasis are those related to first loves. Four of them also add negative memories related to school failure. Significant people are family members, friends and teachers. The relationship with the sacred has intended as approached to participate in religious rituals. Among the desires women stated that they had dreamed of a family and a home, and men, the car or to become a famous sportsman.
- 3) The third card is about the first working experiences in adulthood: In this tab, most adults indicates that they started first job at age 16. Many women have reported that they had never worked as committed to take care of the house, the husband, children and the elderly. The men who started working at a young age are mostly sons of farmers or fishermen and their commitment is related to those professions. Another memory is that relating to marriage and the birth of children, who then become the significant people for excellence and their birth is described by all as the most beautiful moment of life and it is the strongest and most enjoyable emotion.
- 4) Fourth card, which refers to the present: in this part everyone has written his current age and the self-portrait is focused on describing both physical and character. We can point out about that the most significant colors have changed: the participants have recently lived the experience of abandonment of their country of birth to look for a better life in another country, and this has been lived as a traumatic experience. They are now (still) looking for work, and they draw and describe themselves through dark and sad colors such as grey and black; the few who have moved to Italy with their family, however, are slowly integrating and show brighter colors such as red, green and yellow.
- 5) Fifth card, as I image myself in... years: they all imagine themselves only few years older than the current age, reflecting the difficulties encountered in the present that not allow them to look at, think about, or much less plan for the future. 90% of participants declares he/she wants to find a job, to buy a house and a car, to join or to have a family and to integrate into Italian society. 10% indicates instead to look for doing all these goals in their own country.

## Discussion

In summary, the main results achieved in the final phase of the project are:

- a) better language proficiency on the issues addressed;
- b) greater confidence in relating to Italian citizens;
- c) the improvement and expansion of the network of social interaction;
- d) achieved awareness of the opportunity to start a new life in another country.

The project, which have had successfully integrated with the courses offered in the CTP, got first positive results for what concerns the acquisition of linguistic and communicative skills necessary to meet their needs for integration and social relations in a new cultural context and environment.

The project has agreed with the assumption that it is appropriate for adult education stresses the need to develop the skills of the adult population in such a way that they can be appropriate in a constantly changing social, cultural and economic context. It is an education that values the individual, his creativity, his ability to "regenerate" and come back to learn to play their full role as an active citizen and worker. It is learning not only scholastic notions,

not rigid contents, but the concepts and skills that are necessary to achieve specific goals, however, that the adult freely and consciously arises (eg., a higher school degree, more specific skills in the field of spendable professional, a better understanding of complex society and its people, greater social and cultural inclusion). To build new learning that can be internalized in depth and prove significant, it is crucial starting from own each lived story, knowledge and paths and experiences of learner; in particular, with foreign students it is necessary to take account of the great social and cultural changes that each of them has experienced.

The project also relate to the concept of lifelong education devised as a life-style that has the goal of making man the protagonist of his life plan throughout its whole existence to feed his interests, needs, and own objectives. The project also achieved the goal of developing in autobiographical writers greater awareness, guidance and self-guidance, and motivation to want to put themselves along a perspective of lifelong and lifewide learning and education.

The task of returning to the participants of the interpretation of the main meanings within their format, carried out on an individual but also a group in class, has allowed them to know each other better and learn about some of the key experiences. This has been crucial to improve socialization and strengthen interpersonal relationships initially much more sporadic and superficial.

This tracing, remembering and giving meaning to their lives allow you to highlight not only the negative aspects of the landing in a foreign land, often made of difficulties and poverty, but also the positive welcoming the country is able to offer. Thus a new relatedness was born, a new mode of communication and sharing, new forms of cooperation and a sense of citizenship enlarged. The immigrant is no longer frightening, is not only the bearer of trouble and danger or manpower for jobs that Italians no longer want to do, but free individual, rich in experiences and meanings that you can share to build a deeper feeling of inclusive, active and supportive citizenship.

## References

- Alberici A. (2006), *Educazione degli adulti e lifelong learning: le nuove figure professionali* in Alberici A., Orefice P. (a cura di) (2006), *Le nuove figure professionali della formazione in età adulta. Profili e formazione universitari*. Franco Angeli, Milano.
- Alberici A., Catarsi E., Colapietro V., Loiodice I. (a cura di) (2007), *Adulti e Università: sfide ed innovazioni nella formazione universitaria e continua*. Franco Angeli, Milano.
- Alberici A., Di Rienzo P. (a cura di) (2011), *I saperi dell'esperienza*. Anicia, Roma.
- Alandri G. (2011), *Educazione permanente nella prospettiva del lifelong and lifewide learning*, Armando Editore, Roma.
- Argento F., *La letteratura della migrazione in Italia* da Atti Convegno "Culture della migrazione e scrittori migranti." ([http://ww3.comune.fe.it/vocidalsilenzio/Letteratura%20dell'immigrazione.htm#\\_ftn4](http://ww3.comune.fe.it/vocidalsilenzio/Letteratura%20dell'immigrazione.htm#_ftn4) consultato in data 12/6/2014).
- Batini F., D'Ambrosio M. (2008), *Riscrivere la dispersione. Scrittura e orientamento narrativo come prevenzione*. Liguori, Napoli.
- Carbone V., Catarci M., Fiorucci M. (a cura di) (2012), *Immigrazione crisi lavoro. Condizioni occupazionali, mercati del lavoro e inclusione sociale nella Provincia di Roma*. Armano, Roma.
- Chicchi F. (2001), *Derive sociali. Precarizzazione del lavoro. Crisi del legame sociale ed egemonia culturale del rischio*. Franco Angeli, Milano.
- Caritas Migrantes (2014), *XXIII Rapporto immigrazione 2013. Tra crisi e diritti umani*. Tau Editrice, Perugia.
- De Bortoli M. (2005), *Viaggiare per mare sulle rotte dell'autobiografia*. In «Animazione sociale, marzo» 2005, 10-19.
- Demetrio D. (2002), *La ricerca dell'identità nell'autobiografia*. In «Animazione Sociale», novembre 2002, 10-15.
- Demetrio D., Favaro G. (2004), *Didattica interculturale. Nuovi sguardi, competenze, percorsi*. Franco Angeli, Milano.
- Di Rienzo P. (a cura di) (2010), *Il riconoscimento e la validazione degli apprendimenti non formali ed informali nell'Università. Primo rapporto di ricerca: politiche e modelli in Europa. PRIN 2007*. Anicia, Roma.
- De Carlo M.E. (2013), *Ripartire dalle competenze «invisibili» per investire sulla risorsa uomo. Laboratori di rilettura autobiografica per ri-orientarsi tra i saperi dell'esperienza*. In «Educational, Cultural and Psychological Studies», n.7, June, 2013, 235-249.
- Ellero P. (2010), *Letteratura migrante in Italia*. In «Lingua Nostra, e Oltre» Anno 3, Numero 3 -5.
- Evangelista L., (2011), *L'approccio narrativo nell'orientamento*. Article on website: [www.orientamento.it](http://www.orientamento.it). September, 18 2011. (<http://www.orientamento.it/indice/lapproccio-narrativo-nellorientamento-dal-vostro-inviato-al-convegno-vocational-design-and-career-counseling/> viewed on May 7, 2014).
- Gabrielli G. (a cura di) (2006), *Conoscenza, apprendimento, cambiamento*. Franco Angeli, Milano.
- ISTAT (2011), *XV censimento della popolazione e delle abitazioni*. Istat 2001.
- Mottura G. (2010), *Immigrazione e crisi economica. Spunti di riflessione per una futura ricerca*. Ediesse online in F. Carchedi, F. Carrera, G. Mottura, *Immigrazione e sindacato. Lavoro, cittadinanza e territori*. VI rapporto Ires.
- OECD (2013), *International Migration Outlook 2013*, OECD Publishing. [http://dx.doi.org/10.1787/migr\\_outlook-2013-en](http://dx.doi.org/10.1787/migr_outlook-2013-en)
- Savickas M.L., Nota L., Rossier J., Dauwalder J.P., Duarte M.E., Guichard J., Soresi S., Van Esbroeck R., Van Vianen A. (2009), *Life designing:*

*A paradigm for career construction in the 21<sup>st</sup> century*, in «Journal of Vocational Behavior», Volume 75, Issue 3, December 2009, 239-250.  
Sen A. (2006), *Identità e violenza*. Laterza, Bari.  
Todorov T. (1997), *La conquista dell'America. Il problema dell'altro*. Einaudi, Torino.  
Zanfrini L. (2011), *Il lavoro*, in ISMU. *Sedicesimo rapporto sulle migrazioni 2010*. Franco Angeli, Milano.

INTE 2014

# Effect of micro teaching technique on teacher candidates' beliefs regarding mathematics teaching

Kadir Bilen<sup>a\*</sup>

<sup>a</sup>*Akdeniz University, Alanya Faculty of Education, Department of Elementary Education, Alanya, Antalya, Turkey*

---

## Abstract

The study aims to investigate the effect of micro teaching technique on teacher candidates' beliefs regarding teaching mathematics and on their views regarding classroom instruction. The study was undertaken during the fall semester of 2011-2012 educational year with 40 primary school pre-service mathematics teachers enrolled in "Special Teaching Methods II" course. Teacher candidates presented lessons by using the micro teaching technique during the course. The implementation lasted for 10 weeks. The presentations that were recorded were later watched to criticize teacher candidates and discuss more effective lesson presentations. Findings show that teacher candidates like micro teaching implementations with the help of which they acquire information regarding teaching skills. Self confidence levels and teaching skills of teacher candidates were observed to increase as well.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** Micro teaching, elementary pre-service mathematics teacher, effective mathematics teaching.

---

## 1. Introduction

Micro teaching is based on Bandura's (1982) social learning theory. Micro teaching was first developed in Stanford University in 1960 as a part of an experimental program that aimed to increase quality in teacher training (Demirel, 2000). Micro teaching practices and analysis of skills used during micro teaching implementations are widely used in teacher training in England (Bisset, 1999). If teachers can model and control the elements of observations, social learning theory will support their practices. In this sense, micro teaching is believed to be composed of controlled elements (Zenginol, 1993). According to Gürol (2006), teach-reteach cycle is very important in micro teaching. Micro teaching is considered as a method that is mostly employed by teacher training institutions and is included among the group teaching methods. Micro teaching is a recorded and practical implementation system that applies the teaching process in controlled conditions and that focuses on specific teaching skills of the teacher training model based on a systematic approach undertaken with the help of teaching tools (Kazu, 1996). These types of practices prepare teacher candidates for both teaching practices and the teaching profession.

However the experience is not so easy at first for the majority of teacher candidates because first experiences, first impressions and their effects are rather significant for the newcomers to the teaching implementations. The classroom is a rather complex environment for the candidates that first start their teaching practices. Micro teaching is thought to provide a transition period to prepare for such an environment (Külahçı, 1994). In studying micro teaching, Bayraktar (1982) identified that micro teaching technique is beneficial in solving the problems related to

---

\* Corresponding author. Tel.: +090 242 518 11 44 ; fax: +090 242 518 11 99  
E-mail address: kbilen@akdeniz.edu.tr

preparing the student to the class, presenting and implementing the lesson (Kazu, 1996). The results of the study undertaken by Aksan and Çakır (1992) that investigates the effect and efficiency of the micro teaching model that includes planning, preparation, implementations/teaching, feedback and re-teach steps shows support for the model.

Micro teaching is a cycle (Higgins and Nicholl, 2003). In the process of the cycle, teacher candidates plan the lesson focusing on a specific subject matter and present the lesson in a period of 10-15 minutes to 10-15 classmates and the supervising instructor. The presentation is recorded with a video camera and is watched by the candidate, supervising instructor and the classmates without any editing. First critiques which guide the candidate to re-prepare the lesson plan and re-present it to the same group are provided after the viewings. Second presentation is recorded as well and watched with the same group consisting of self, supervising instructor and classmates. The second viewing is followed by another critique session that focuses on the performance of the teacher candidate (Benton-Kupper, 2001). Küçükahmet (2004) defines the micro teaching as a method that aims to instill personality in teacher candidates and to develop their research skills. At the same time, micro teaching is a laboratory method that aspires to simplify the complexity of regular learning and teaching processes. It is a teaching experiment that is minimized and intensified in terms of duration of teaching, number of students and subject matter (Tan, 2002). Micro teaching is also known as the feedback method. It is an organized practice teaching (Harvard University, 2006). The aim is to provide confidence, support and reflection to the educators and during the process students plan what they want to teaching by practicing among friends and colleagues.

One of the most important links of the micro teaching process is the re-teaching process that will be developed through the thinking style and potential provided to the teacher candidate at the start and end of the teaching experiment and the feedback provided. This method is also known to encourage teacher candidates to establish better work (Kazu & Kulaççi, 1994). In this context, micro teaching: Develops teaching skills by examining and assessing personal teaching techniques. Contributes to learning through examining and analyzing the teaching methods of others. In order to simplify the teaching environment, micro teaching limits the number of students, teaching skills and duration of teaching. In addition to experimenting with teaching skills in micro teaching, it is imperative to re-try the areas that involve errors after correcting them. However, the method should not be regarded only as a skill development activity through technical practices because micro teaching aims to develop learning through observing and analyzing the teaching techniques of others in addition to providing self development skills through examining and analyzing self teaching styles.

Teacher candidates in Turkey who are enrolled in Teacher Training Institutions are provided with courses such as "Teaching Practices" and "School Experiences" in order to prepare them for the teaching-learning process (Azar, 1998). Results of studies that focus on tasks and responsibilities of teacher candidates in the teaching process show the existence of some beliefs that affect the behavior of teacher candidates in many instances regarding teaching and classroom management. The existence of these beliefs has created the concept of efficacy beliefs. Concept of teacher competence has been found to be related to several variables such as student motivation, student achievement and classroom management approaches of teachers. Therefore, teacher competence is the most important determinant of teacher behaviors because efficacy beliefs affect teacher behaviors depending on the level of belief held by the teachers.

A large body of research does not exist in Turkey regarding the micro teaching technique whose teaching methods and skills can be used by the teacher candidate in practice teaching in teacher training faculties. The current study aims to develop activities in "Special Teaching Methods II" course with suitable method and techniques and to enhance teaching behaviors of teacher candidates during classroom practice in the most effective manner. Teacher behaviors were critiqued after the implementation and areas of inadequacies were identified.

## **2. Method**

The study investigates the effect of micro teaching technique on teacher candidates' beliefs regarding teaching mathematics and on their views regarding classroom instruction. While investigating these effects, regular activities in the present teacher education program was followed with no modifications. Therefore, the research observes a current situation as is. In this sense, the research is a case study hence it examines the effects of the current teacher training program. According to Merriam (1998), case studies are used to examine a group of people, subject matter, problem or program in detail. Case studies can be used to investigate the characteristics of student experiences,

effects of a school reform or the features of an educational program. However, it is important to select a suitable topic in terms of content and character. The study has single group pretest/posttest design with no control groups. The effect of the experimental treatment is tested with the help of implementations on a single group. Measurements regarding the dependent variable are obtained by using the same samples and the same assessment tools by applying a pretest and a posttest. Randomness and matching are not used. In this sense, the design can be defined as one-factor between-groups design or the repeated measurement design. The design tests the significance of the difference between the pretest and posttest values (O1-O2) for a single group (G) (Büyüköztürk, Çakmak, Akgün, Karadeniz, Demirel, 2011). Symbolic representation of the design is as follows: (Table 1).

Table 1. Research design (single-group pretest-posttest design).

Group	Pretest	Treatment	Posttest
G	O1	X	O2

- O1: Pretest
- X: Learning-teaching process activities organized according to mathematics curriculum based on constructivist approach
- O2: Post test

The sample of the study was composed of 40 elementary pre-service mathematics teachers in their 4<sup>th</sup> year in Department of Elementary Mathematics Teacher Education registered for “Special Teaching Methods II” course during the fall semester of 2011-2012 educational year.

### 2.1. Assessment Tools

Mathematics Teaching Efficacy Belief Instrument (MTEBI) was developed by Enochs et.al. (2000). This instrument is the adaptation of the previous Science Teaching Efficacy Belief Instrument (STEBI-B) developed by Enochs and Riggs (1990). In the first version of the scale, there were 23 items however 2 items were excluded after validity studies and a total of 21 items exist in the current scale. The items are grouped under two factors: 13 items under Personal Mathematics Teaching Efficacy (PMTE) and 8 items under Mathematics Teaching Outcome Expectancy (MTOE) (Enochs et.al. 2000). Another scale used to collect data in the study is “Teacher Candidates’ Views and Ideas Regarding Teaching Class” scale. Görgen (2003) developed this scale by capitalizing Külahçı’s (1994) work titled “Micro Teaching Experiences at Fırat University Faculty of Technical Education, Second Assessment”. Control questions were added to the survey prepared originally as 31 items to provide reliability. Views of three instructors with expertise in the field of Educational Sciences were sought regarding the validity of the survey items. The survey was implemented to the students in the sample twice; one at the beginning and one at the end of the semester.

### 2.2. Implementation

The implementation investigated teacher candidates’ designing classroom instruction through the use of micro teaching method with the help of various teaching technologies and to study the effects of micro teaching on the learning and retention levels of the teacher candidates. The steps of the process are provided below:

1. Before teacher candidates taught in the classroom environment, they were given “Teacher Candidates’ Views and Ideas Regarding Teaching Class” scale and Mathematics Teaching Efficacy Belief Instrument
2. Students were divided into three groups and a subject matter from 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> grades was assigned to each group.
3. While the groups presented their instruction, the other teacher candidates in the classroom assumed the role of students and they also acted as evaluators/assessors when the micro teaching implementation was completed.
4. The works of the groups were recorded with a video camera
5. Each group was evaluated with the help of “Micro Teaching Assessment Form”
6. The results of the assessment forms were analyzed to be used as feedback-correction
7. Feedback-correction was provided by having students watch the video recordings
8. The groups who implemented the instruction self assessed themselves by watching the video recordings

9. The instructor summarized the critiques
10. When the teacher candidates were done with classroom presentations they were once again given “Teacher Candidates’ Views and Ideas Regarding Teaching Class” scale and “Mathematics Teaching Efficacy Belief Instrument”.

### 3. Findings

This section provides the findings related to the beliefs of teacher candidates regarding mathematics teaching and their perceptions about their classroom teaching experiences. The findings regarding the pretest-posttest scores about teacher candidates’ beliefs about mathematics teaching are provided in Table 2 and Table 3.

Table 2. Responses of pre-service teachers to the PMTE items

An example of a column heading	Pre-test		Post-test	
	Mean	SD	Mean	SD
1. Will find better ways to teach mathematics.*	3.52	.94	4.45	.76
2. Will not be able to effectively monitor mathematics activities.	4.11	.73	4.32	.74
3. Will generally teach mathematics ineffectively.*	3.78	.83	4.64	.81
4. Will be able to answer students’ mathematics questions.	4.21	.65	4.55	.60
5. Will not willing to be observed by supervisor while teaching mathematics.*	3.94	.87	4.23	.79
6. Will not teach mathematics as well as most subjects, even if I try very hard.*	3.87	.91	4.27	.83
7. Know how to teach mathematics concepts effectively.*	3.05	.85	4.31	.96
8. Understand mathematics concepts well enough for effective teaching.*	3.78	.66	4.32	.86
9. Will find difficult to use manipulative to explain why mathematics works.	4.12	.55	4.67	.71
10. Wonder if I will have the necessary skills to teach mathematics.*	3.37	.58	4.12	.89
11. Will be at a loss as to how to help the students having difficulty to understand	3.56	.67	4.89	.90
12. Will welcome students’ questions.*	3.97	.74	4.35	.87
13. Do not know how to turn children on mathematics.	4.34	.62	4.66	.73

Table 2 provides the means and standard deviation regarding the results that teacher candidates obtained from Personal Mathematics Teaching Efficacy (PMTE) scale. Results of the analysis and investigation of Table 2 show that; the increase in the means of items 1,3,5,6,7,8,10,11,12 is significant ( $p < .05$ ) whereas the increase observed in the means of other items is insignificant ( $p > .05$ ). Based on these findings, we can say that the effects of micro teaching technique on teacher candidates’ “Personal Mathematics Teaching Efficacy (PMTE)” are positive. The highest means obtained in the posttest was related to the item “Do not know how to turn children on mathematics: 4.66” whereas the lowest means was observed in the item “Wonder if I will have the necessary skills to teach mathematics: 4.12”.

Table 3 provides the means and standard deviation for teacher candidates MTOE results.

Table 3. Responses of pre-service teachers to the PMTE items

An example of a column heading	Pre-test		Post-test	
	Mean	SD	Mean	SD
1. Improved mathematics grades of students are due to teachers’ effective teaching approach.*	4.07	.56	4.42	.78
2. When a low-achieving child progresses in math, it is usually due to extra attention given by the teacher.	3.98	.66	4.22	.71
3. The teacher is generally responsible for the achievement of students.*	3.56	.74	4.12	.98
4. If parents note an increase in the interest in mathematics, it is due to the teacher’s performance.	3.67	.57	3.98	.64
5. When a student does better than usual in mathematics, it is due to teacher’s extra effort.	3.97	.61	4.13	.73
6. Under achievement is due to ineffective mathematics teaching.*	3.90	.78	4.23	.91
7. The inadequacy of a student’s mathematics background can be overcome by good teaching.*	4.12	.87	4.35	.89
8. Mathematics achievement of a student is directly related to teacher’s effectiveness in teaching.*	4.05	.64	4.36	.87

Results of the analysis and investigation of Table 3 show that; the increase in the means of items 1,2, 6,7,8 is



significant ( $p < .05$ ) whereas the increase observed in the means of other items is insignificant ( $p > .05$ ). Based on these findings, we can say that the effects of micro teaching technique on teacher candidates' "Mathematics Teaching Outcome Expectancy (MTOE)" are positive. The highest means obtained in the posttest was related to the item "Improved mathematics grades of students are due to teachers' effective teaching approach :4.42" whereas the lowest means was observed in the item If parents note an increase in the interest in mathematics, it is due to the teacher's performance:3.98".

The study aimed to separately analyze the pretest and posttest results about the perceptions of teacher candidates regarding their own classroom teaching and paired samples t-test was undertaken. Findings that were obtained are provided in Table 4.

Independent samples t-test was undertaken to identify whether there was a significant difference in the achievement scores of both control and experimental groups prior to the study and results are provided in Table 3.

Table 4. Relationship of pretest-posttest results of pre-service teachers in the department of elementary mathematics teacher education.

Test	N	$\bar{X}$	ss	sd	t	p
Pretest	40	112,37	20,67	39	1,07	,00
Posttest	40	128,74	19,51			

As can be seen from table 4, there is a statistically meaningful difference between the pretest and posttest results of the teacher candidates who attend the Department Elementary Mathematics Teacher Education ( $t_{(39)}=1,07$ ;  $p < .05$ ). It is observed that the total pre-implementation scores of 112,37 increased to 128,74 after the posttest. The experience resulted in positive development in teacher candidates who have experienced presenting a lesson through micro teaching technique.

Table 5. t-test results of pre-test and post-test scores of pre-service teachers

ITEMS	$\bar{X}$		t	df	Sig
	pre	post			
1. They do not know how to start the lesson.	3,37	4,43	,846	39	,046*
2. The idea that students will ask and I may not be able to answer their questions worries me.	3,03	4,14	-,223	39	,098
3. To worry about the fact that they may get confused while using the teaching materials and tools	3,29	3,71	-,294	39	,038*
4. To worry about what to prepared for the lesson may finish in the middle of the lesson.	3,54	4,17	1,376	39	,052
5. The idea of presenting a lesson in front of students makes me anxious.	3,00	3,20	1,826	39	,021*
6. To be anxious for the fear of not making some mistakes while teaching	2,69	3,60	3,453	39	,091
7. To be anxious for the fear of not knowing how to correct possible mistakes that may occur.	2,97	3,89	1,426	39	,085
8. Being worried about that the lesson might be criticized.	3,14	3,57	1,000	39	,041*
9. To be anxious for the fear of not knowing how to react to the irrelevant questions	3,29	4,00	2,322	39	,062
10. To be anxious for the fear of not sustaining fluency throughout the lesson	2,91	3,63	-,614	39	,070
11. To be anxious for the fear not to know how to treat a student constantly causing trouble in the	3,20	4,23	-,345	39	,088
12. To be anxious for the fear not to have the control in the classroom.	2,94	3,69	-,301	39	,072
13. The idea of teaching seems to be something enjoyable to me.	3,46	3,91	,316	39	,039*
14. They do not feel there are ready for the role of a teacher	3,34	3,97	,223	39	,045*
15. We feel anxious for the fear that we may not adjust the pitch of my voice and speed of my	3,11	4,17	1,951	39	,092
16. We feel anxious for the fear that we may get confused while teaching.	2,97	4,14	-,236	39	,104
17. The idea of teaching in front of the students worries me.	2,97	4,26	-,399	39	,112
18. I feel anxious for the fear that I may not form correct sentences.	3,26	3,86	2,213	39	,044*
19. When the time to teach comes closer, I feel that I have to learn more.	2,49	3,20	-,114	39	,079
20. We wish we would not have teaching practices at all.	3,97	4,51	1,421	39	,040*
21. For the fear that they might not control the class, they avoid starting group discussions in the	3,71	3,97	1,558	39	,022*
22. They are worried about not being able to lower my level to the students' level	3,06	4,00	1,293	39	,084
23. They are worried about not being able to draw students' attention and interest to the subject	3,00	3,83	,461	39	,077
24. They are worried about forgetting what to tell while telling the lesson.	3,14	3,86	-,251	39	,065

25. They don't know what kind of demonstration I will use while presenting the subjects requiring	3,37	4,11	,437	39	,043*
26. They don't know what kind of reinforcement that could give the students who directly	3,34	4,11	1,288	39	,066
27. They are worried about not being able to communicate with students	3,49	4,37	-,251	39	,071
28. I hesitate to get help from others.	3,66	4,17	1,951	39	,041*
29. They are worried about not being able to be patient while teaching.	2,94	4,11	,381	39	,105
30. They worried about not being able to control their emotions while telling the lesson.	3,14	4,23	-,566	39	,093
31. They do not know how to end the lesson.	3,69	4,46	1,426	39	,060

According to the findings shown in Table 5, significant differences are observed between the opinions of the student teachers before and after they have been exposed to the course of “Training and Development of Children With Mental Disabilities” with regard to the items “1, 5, 8, 13, 14, 18, 20, 21, 25, 28”. These findings can be claimed to be the outcomes of the fact that, the courses involved in this program are based mostly on application and individual experiences. Another reason of these findings might have been the fact that they presented the lesson in an artificial classroom environment and they were watched and observed by their peers and course teacher. The items “2, 3, 4, 6,7, 9, 10, 11, 12, 15, 16, 17, 19, 22, 23, 24, 26, 27, 29, 30, 31” reveal significant differences in the opinions of the student teachers before and after acquiring teaching skills through micro-teaching practices.

#### 4. Results and Discussion

The study which employed single group pretest-posttest method examined the effects of micro teaching technique on teacher candidates’ beliefs regarding mathematics teaching efficacy and their perceptions about presenting a lesson in the class.

In line with the findings of the study, it was identified that mathematics teaching efficacy beliefs of teacher candidates improved as observed in the average means of the posttest. ( $p<.05$ ). This result shows that micro teaching technique positively affects teacher candidates’ beliefs regarding mathematics teaching efficacy. The finding is parallel to the results of many other studies in the field (Cakiroglu, 2000; Cone, 2009; Huinker & Madison, 1997; Liang & Richardson, 2009; Moseley & Utley, 2006; Richardson & Liang, 2008; Swars, 2005; Swars & Dooley, 2010; Woolfok Hoy & Spero, 2005). Another finding obtained from the study is the significant difference in the posttest results of teacher candidates’ perceptions regarding “classroom instruction” ( $p<.05$ ). This results shows that micro teaching technique positively affects teacher candidates’ perceptions of competence related to “teaching class”(Çakır, 2000; Kūlahçı, 1994; Gōrgen, 2003).

The fact that teacher candidates assumed the role of elementary school students during lesson presentations was useful because it allowed observation of teacher candidates’ behavior and provide feedback regarding these behaviors. This implementation resulted in positive changes in student views regarding some of the survey items. Naturally, some survey items did not generate positive changes. Presenting the lesson in an artificial environment, having classmates who are as knowledgeable in the role of elementary school students, excitement felt due to being recorded and the knowledge that critiques will be provided by class mates and the instructor are the disadvantages of micro teaching. Discussions with teacher candidates have shown that they felt excited and stressed at first due to video recordings. Later discussions indicated a decrease in these negative effects (Klinzing, 2002 ; Borko, et al. 2009; Demir, 2011).

Students voiced some of their concerns during the discussions undertaken prior to the start of micro teaching implementations in “Special Teaching Methods II” class. However, decrease in these concerns was observed after the implementation. Positive changes in students’ views can be statistically observed as well. We can say that the use of micro teaching implementations in “Special Teaching Methods II” class helped teacher candidates to overcome their reservations, make them more relaxed during lesson presentations, solve problems faced during lesson presentations, develop classroom mastery skills, be more cautious about their sentences and tones of their voices, be more aware of the need for attracting student attention and interest, be less reserved to try out implementations, be patient toward students in the class, to have ease in communicating and not to experience any problems while ending the class. The findings of the current study are similar to those of Kūlahçı (1994), Çakır (2000), Gōrgen (2003) and Gūrses et.al. (2005), Ananthakrishnan, (1993), Sarı et.al (2003).

Some studies show that micro teaching helps the teacher to overcome problems related to getting ready for class and presenting the lesson; it gives positive results related to professional adaptation of teachers, preparation of lesson plans and acquiring classroom management skills; it is effective in relaxing teachers, helping them to overcome their reservations and making them grasp the need to use different methods according to lesson presentation (Çakır, 2000; Görgen 2003; Gürses et.al., 2005 Aksan and Çakır, 1992). In their study titled “Effectiveness of Micro Teaching in Teacher Training” Kuzu (1997) and Ceyhan and Karagölge (2003) identified that teacher candidates had positive views and responses towards the micro teaching course and listed negative aspects of micro teaching as the brevity of duration, inability to present the class to real students and the inability to present the lesson in a real classroom environment. Following this line of thought the appropriateness of the method used in the current study can be emphasized once again.

## References

- Aksan, Y., & Çakır, Ö. (1992) Pre-service teacher education: a case study The Second International Conference: ELT and Teacher Training in The 1990's: Perspectives And Prospects (23-25 September) Ankara.
- Amobi F.A., (2005). Pre-service teachers' reflectivity on the sequence and consequences of teaching actions in a microteaching experience. *Teacher. Education Quarter.* 32(1), 115-130.
- Ananthakrishnan, N. (1993). Microteaching as a vehicle of teacher training its advantages and disadvantages. *Journal of Postgraduate Medicine*, 39 (3), 142- 143.
- Azar, A., (1998) Fizik öğretmenlerinin mesleki gelişim süreçlerindeki özel konular, Doktora Tezi, KTÜ, Trabzon.
- Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, 37, 122- 147.
- Benton-Kupper, J. (2001). The microteaching experience: Student perspectives". *Education*, 121, 830-835.
- Bisset R.T. (1999). The knowledge bases of the expert teacher. *British Educational Research Journal*, 25(1), 39-55.
- Borko, H., Whitcomb, J., & Liston, D. (2009). Wicked problems and other thoughts on issues of technology and teacher learning. *Journal of Teacher Education*, 60(1), 3-7. doi:10.1177/0022487108328488
- Büyükoztürk, Ş., Kılıç Çakmak, E., Akgün, Ö.E., Karadeniz, Ş. ve Demirel, F. (2011). *Bilimsel araştırma yöntemleri (8.baskı)*. Türkiye. Pegem.
- Çakır, Ö. S. (2000) Öğretmen yetiştirmede teoriyi pratiğe bağlayan mikro-öğretimin Türkiye'deki üç üniversitede durumu *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 18, 62-68.
- Cakiroglu, E. (2000). *Preservice elementary teachers' sense of efficacy in reform oriented mathematics* (Unpublished doctoral dissertation). Indiana University, USA.
- Ceyhan, İ. & Karagölge, Z. (2002) Kimya eğitiminde tezsiz yüksek lisans öğrencileri ile mikro öğretim, V. Ulusal Fen Bilimleri ve Matematik Eğitimi Kongresi, 16-18 Eylül 2002, ODTÜ, Ankara.
- Cone, N. (2009). Pre-service elementary teachers' self-efficacy beliefs about equitable science teaching: Does service learning make a difference? *Journal of Elementary Science Education* 21, 2, 25-34.
- Demir, S. (2011). Two inseparable facets of technology integration programs: technology and theoretical framework. *Eurasia Journal of Mathematics, Science & Technology Education*, 7 (2), 75-88.
- Durmaz, S. (2004). Matematikte öğrenme güçlüklerinin saptanması üzerine bir çalışma. *Kastamonu Eğitim Dergisi*, 12(1), 125-128.
- Enochs, L. G., & Riggs, M. I. (1990). Further development of an elementary science teaching efficacy belief instrument: A preservice elementary scale. *School Science and Mathematics*, 90, 695-706.
- Enochs, L. G., Smith, P. L., & Huinker, D. (2000). Establishing factorial validity of the mathematics teaching efficacy beliefs instrument. *School Science and Mathematics* 100, 194-203.
- Goulding, M., Hatch, G., Rodd, M. (2003). Undergraduate mathematics experience: its significance in secondary mathematics teacher preparation. *Journal of Mathematics Teacher Education*, 6, 361-393.
- Görgen, İ. (2003) Mikroöğretim uygulamasının öğretmen adaylarının sınıfta ders anlatımına ilişkin görüşleri üzerine etkisi, *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 24, 56-63.
- Gürses, A., Bayrak, R., Yalçın, M., Açıkyıldız, M., Doğan, Ç. (2005) Öğretmenlik uygulamalarında mikro öğretim yönteminin etkililiğinin incelenmesi, *Kastamonu Eğitim Dergisi*, 13, 1, 1-10.
- Harrison S.D., (2005). Born or made? Developing personal attributes of teachers. Paper presented 33rd annual conference of Australian Teacher Education Association.
- Harvard University (2006) [http://bookcenter.harvard.edu/2002-06\\_Derek](http://bookcenter.harvard.edu/2002-06_Derek), *Book Center for Teaching and Learning*.
- Hatton, N., & Smith, D. (1995). Reflection in teacher education: Towards definition and implementation. *Teaching and Teacher Education*, 11 (1), 33-49.
- Hiebert, J., Morris, A.K., & Glass, B. (2003). Learning to learn to teach: an “experiment” model for teaching and teacher preparation in mathematics. *Journal of Mathematics Teacher Education*, 6, 201-222.
- Higgins, A. & Nicholl, H. (2003). The experiences of lecturers and students in the use of microteaching as a teaching strategy. *Nurse Education in Practice*, 3, 220-227.
- Huinker, D., & Madison, S. K. (1997). Preparing efficacious elementary teachers in science and mathematics: The influence of methods courses. *Journal of Science Teacher Education*, 8, 2, 107-126.
- Kazu, H. (1996), *Öğretmen yetiştirmede mikro öğretim yönteminin etkinliği (Fırat Üniversitesi Teknik Eğitim Fakültesi Örneği)*, (Basılmamış Doktora Tezi), Fırat Üniversitesi Sosyal Bilimler Enstitüsü

- Klinzing H.G. (2002). How effective is micro-teaching? A survey of fifty three years of research. *Educ. Educ. Res.* 48(2): 194-214.
- Külahçı Ş.G. (1994) The experience of the university of Firat, technical faculty of education in micro education second evaluation. *Education and Science*. 18(2), 36-44.
- Liang, L. L., & Richardson, G. M. (2009). Enhancing prospective teachers' science teaching efficacy belief through scaffolded, students-directed inquiry. *Journal of Elementary Science Education*, 21, 1, 51-66.
- Merriam, S. B. (1998). *Qualitative research and case study applications in education*. San Francisco: Jossey-Bass.
- Moseley, C., & Utley, J. (2006). The effect of an integrated science and mathematics content-based course on science and mathematics teaching efficacy of preservice elementary teachers. *Journal of Elementary Science Education*, 18, 2, 1-12.
- Napoli J.(2008). Relationships among instruction, peer, and self be valuations of undergraduate music education majors' micro-teaching experiences. *Journal of Research in Music Education*. 56(1), 82-91.
- Nicolaou, A. A. & Philippou, G. N. (2004). Efficacy beliefs, ability in problem posing, and mathematics achievement, Proceedings of the 3rd International Biennial SELF Research Conference, *Self-Concept, Motivation and Identity: Where to from here?* Berlin, Germany.
- Olkun, S., & Aydogdu, T. (2003). Üçüncü uluslararası matematik ve fen araştırması (TIMMS): matematik nedir? Neyi sorgular? Örnek geometri soruları ve etkinlikleri. *İlköğretim-Online*, 2(1), 28-35.
- Pauline, R.F. (1993). Microteaching: An integral part of science methods class. *Journal of Science Teacher Education*, 4(1), 9-17.
- Richardson, G. M., & Liang, L. L. (2008). The use of inquiry in the development of preservice teacher efficacy in mathematics and science. *Journal of Elementary Science Education*, 20, 1, 1-16.
- Ryan, H. (2007) *An examination of the relationship between teacher efficacy and teachers' perceptions of their principals' leadership behaviors*. Unpublished doctoral dissertation, University of North Texas.
- Sarı, Y., Sakal, M., & Deniz, S. (2005) *Okul öncesi öğretmen yetiştirmede mikro öğretim yönteminin etkililiği*, Akademik Bilişim 2005, 2-4 Şubat 2005, Gaziantep Üniversitesi, Gaziantep.
- Siegle D. (2003). Influencing student mathematics self-efficacy through teacher training. *Paper Presented At The Annual Meeting of The American Research Association*, Chicago, IL.
- Swars, S. L., & Dooley, C. M. (2010). Changes in teaching efficacy during a professional development school-based science methods course. *School Science and Mathematics*, 110, 4, 193-202.
- Tall, D.O. & Razali, M.R., (1993), Diagnosing students' difficulties in learning mathematics. *International Journal of Mathematics Education in Science and Technology*, 24(2), 209-222.
- Tan, Ş & Erdoğan, A. (2002). *Öğretimi planlama ve değerlendirme*. Ankara: AnıYayıcılık
- Ubuz, B. (2002). *Üniversite eğitimi ve öğretmenlik: matematik öğretmenlerinin ve adayların görüşleri*. V. Ulusal Fen Bilimleri ve Matematik Eğitimi Kongresi, Ankara.
- Umay, A. (2002). *İlköğretim matematik öğretmenliği programının öğrencilerin matematiğe karşı özyeterlik algısına etkisi*. V. Ulusal Fen Bilimleri ve Matematik Eğitimi Kongresi, Ankara.
- Wallace, M. J. (1991). *Training foreign language teachers: A reflective approach*. Cambridge: CUP.
- Woolfok Hoy, A., & Spero, R. B. (2005). Changes in teacher efficacy during the early years of teaching: A comparison of four measures. *Teaching and Teacher Education*, 21, 243-356.
- Yudariah, M.Y. & Roselainy, A.R., (2001), Mathematics education at university teknologi malaysia (UTM): learning from experience, *Journal Teknologi* 34 ,9-24.
- Zachariades, T., Christou, C. & Papageorgiou, E. (2002). The difficulties and reasoning of undergraduate mathematics students in the identification of functions. *Proceedings in the 10th ICME Conference*, Crete, Greece.

# Effect(s) of teacher evaluation on collaborative practices: induction or inhibition?

Ana Marcos<sup>\*a</sup>, Eusébio Machado<sup>\*b</sup>, Marta Abelha<sup>\*c</sup>

<sup>\*a</sup>)University Portucalense Infante D. Henrique, Porto, Portugal, (anamarcos07@gmail.com), (Telf. 351 – 919498084).

<sup>\*b</sup>)University Portucalense Infante D. Henrique, Porto, Portugal, (eacm.estp @ gmail.com).

<sup>\*c</sup>)The Coimbra's University Centre for 20th Century Interdisciplinary Studies - CEIS20, University Portucalense Infante D. Henrique, Porto, Portugal, (mabelha@upt.pt).

---

## Abstract

This article deals with collaborative practices of teachers in the context of teacher evaluation. For this purpose and following a theoretical framework that is previously explained, we proceed to the presentation of partial results obtained in the framework of an ongoing study. In conclusion, and based on the available empirical evidence, we discuss the effect(s) of the teacher evaluation, assessing in particular, its role as a factor of induction or inhibition of collaborative practices.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* collaboration, evaluation of teaching performance, professional development

---

## 1. Introduction

Inserting itself within the more general framework of evaluation and of the promotion of "quality" of education systems, teacher evaluation (TE) has been one of the central concerns in Portugal and also in European education policies (Alves & Machado, 2010; Flores, 2010 ; Tardif & Lessard, 2005; Paquay, 2004, Day, 2001). TE has as its main objective to contribute to the professional development (Day, 2001), on the assumption that supervision or mentoring is an ideal instrument for the improvement of teaching practices (Alarcão, 2000; Vieira, 2009).

The system of TE regulated by the XVIII Constitutional Government and embodied in Decree-Law n° 2/2008 of 7 January, brought about a genuine paradigm shift, resulting in a seismic effect on the lives of schools and teachers, reinforcing the importance of practices of collaboration. The current Government has continued this development and has published the decree-law n° 41/2012 of 21 February 2013. In this decree it underlines the importance of collaborative practices, with its purpose of "encouraging the professional development, recognizing and rewarding merit and good practices, as essential conditions of the dignity of the teaching profession and the promotion of motivation of teachers"(p.830).

Never before has so much been heard about collaboration and collegiality. These notions have been widely present both in political speeches on education and in legal regulations. Collaboration is seen as the ideal way for the teachers to develop personally and professionally throughout their career (Hernández, 2007; Horn, 2005; Sawyer & Rimm -Kaufman, 2007). Furthermore, it is considered for students and for schools as a way of transforming them into authentic "learning communities"(Lima, 2002, p. 42).

The benefits of collegiality are therefore recognized by all, being lauded in almost all sectors of the educational community. Many understand that collegiality is the secret to creating a good school (Fullan & Hargreaves, 2001; Hernández, 2007; Lima, 2002). It is believed that when all educational stakeholders are imbued with a culture of collegiality, everything will work better, there will be more educational success (Bush, 2003; Sergiovanni, 2004) and it will promote good and effective professional development (Fullan & Hargreaves, 2001). Collaborative practice is, in effect, a process that enables the growth and transformation of the teaching profession. In the relationship and interaction with peers, the teacher models a process of building their professionalism through actions that will inevitably reflect on teaching practices and at the same time initiate personal and professional development. It is for this reason that Bolzan (2002) gives a crucial role to the dimension of collaboration stating that, without a relationship of an active and collaborative nature, the teacher can't develop professionally.

Alarcão and Roldão (2009) advocate the idea that the first collaboration aims to support, guide and regulate a process of training, valuing the work done jointly by peers, which, in turn, should stimulate individual work later to be shared in a group. In this case, supervision it's a way of getting great prominence to the importance of collaborative work, which is assumed as the most vivid manifestation of articulation within a given context.

However, the existence of official pressure to adopt behaviors that facilitate collaboration should not be concealed. Currently we could speak of a strong normative bias in the form of a "compulsive collegiality" which facilitating the way for a morale technical interpretation of professional behavior. Little and McLaughlin (1993) draw attention to the fact that collaboration among teachers may be the perverse result of competition. Following this logic, Little and McLaughlin are right when they say "not always professional communities, themselves, are a good thing"<sup>iii</sup> (p.95).

According to Flores and Ferreira (2012), current trends in education have generated a culture of competitive individualism in schools, consuming the teaching time of teachers, intensifying their work to cut costs and burdening them with the need to comply with short-term performance goals. Thus, "the competitive individualism becomes, then, a corrosive individualism that causes the depletion of teachers and destroying little by little, their sense of community"<sup>iii</sup> (Hargreaves, 2003, cit. by Flores & Ferreira, 2012, p.226).

In this context, if we want schools to be true communities of learning for all students, teaching has to be turned into learning for all teachers. Retallick (1999, cit. by Flores & Ferreira, 2012, p.232) also supports this idea, since the school as an educational space also implies considerable reflection on the work of teachers. Learning that develops in school is an essential component of their professional development.

As to whether or not the teachers develop a culture of collaboration with peers, Lima (2002, p.181) points out that the central issue is not, therefore, to know what is missing for teachers to collaborate more but what can be done, in a way that is professionally rewarding and with more positive effects for their students. The evidence is obvious that attempts to reform schools while ignoring the culture of teachers are doomed to failure. The way teachers interact professionally is certainly one of the most powerful factors that influence how the proposed educational reforms are interpreted and applied in schools.

## **2. Methodology**

From the methodological point of view, the study presented here was based on a descriptive and interpretive approach, with the purpose of interpreting a certain reality (Tuckman, 2005) exploring personal meanings, strategies and forms of thinking in action.

The methods and tools have been built based on methodological guidance that combined qualitative and quantitative approaches, predominantly in an interpretive perspective in order to achieve a holistic view of the object under study.

As the main techniques for data collection, in a first stage, we used semi directive interviews with twelve teachers (n = 12), six of them were evaluators and the other six were evaluated teachers.

The data collected and analyzed in the first phase later allowed the development of a questionnaire survey. This was applied to a sample of 1000 teachers of northern Portugal out of a total of 54,781. Of the 1000 questionnaires distributed we had a return of 396 (n = 396), whose data were entered and analyzed using SPSS software, version 17.0.

The sample has the following sociodemographic characteristics:

- 78.8% of respondents were female and 20.7% were male;
- The average age of teachers who responded to this question was 44.23 years, with a minimum of 25 years and a maximum of 61. We also verified that 25% of teachers were 38 years old or under, and 50% were 45 years or under, while 25% of teachers were 50 years or older;

Regarding the academic qualification of the surveyed teachers, there is a predominance of degree holders (58.6% of responses), followed by holders of Masters, with 21.2% of valid responses. 16.7% of the responses indicated the highest degree of training (Post – Graduate). The remaining are holders of a Bachelor degree (only 7, corresponding to 1.8% of the valid responses) and a PhD (5, referring to 1.3% of valid responses);

Regarding the employment status at the time of the survey, we found that 20.2% of respondents are hired teachers, 5.8% of teachers are in the Pedagogic Framework Zone, 24% of teachers are in Clustering Framework, and 49.5% are teachers of the School Board;

It turns out that many teachers teach more than one grade level. Analyzed by total, the most represented level of education is the Secondary level (36.9% of responses), followed very closely by the 3rd cycle of basic education (35.6% of responses). Then we have the 2nd cycle of basic education, with 13.9% of responses, Special Education, with 12.9% of responses and the 1st cycle of basic education, with 12.4% of responses. Finally, the teachers of Preschool, with 7.3% of the responses;

Almost half of the respondents claimed to have been teaching for over 20 years, (47.2% of respondents). Of the remaining, 9.1% are teachers who have been teaching for up to 5 years, 24.7% from 6 to 15 years and 17.9% between 16 and 20 years;

The overwhelming majority of teachers is or has been assessed. (of the 396 respondents evaluated a total of 343, corresponding to 86.6%. 92 respondents identify themselves as evaluators, representing 23.2% of the total. Members of the Scientific Assessment of Teaching Performance (SATP) represent 28 respondents (7.1% of the total) and only 3 respondents with the role of Director ( 0.8% of the total);

Most teachers chose to request of class observation, including 56.1% of respondents, with 39.1% of the total chose not to do so;

- Finally, nearly three quarters of respondents (74.7% of the total) had no training in the process of TE.

### 3. Results

For purposes of analyzing collaborative practices in the context of TE, the following statements were listed in the questionnaire and participants were asked to express their views according to a "rating scale" ("never," "rarely," "sometimes," "many times", "always"):

- 1 - The evaluator collaborated with the preparation of the pedagogical activities.
- 2 - TE entailed significant changes in the collaborative work among teachers of the school.
- 3 - The evaluator evaluated and shared materials, experiences, documents and other materials to support teaching activities.
- 4 - The process of TE encouraged the sharing of teaching experiences among school teachers.
- 5 – The teachers cooperate in the group or within the school in general.
- 6 - The assessor has implemented, through the process of TE, a culture of constant dialogue with the evaluated teachers.

Regarding the assertion 1 (Table 1), the percentage of teachers who answer "never" is 41.2%, followed by those who answer "sometimes" (22.0 %) and ex-aequo, "rarely" and "many times"(13.4%). The results of this question indicate a clear notion of lack of collaboration between the evaluator and evaluated

**Table 1****The evaluator collaborated with the preparation of the pedagogical activities.**

		Frequency	Percent
Valid	Never	163	41,2
	Rarely	53	13,4
	Sometimes	87	22,0
	Many times	53	13,4
	Always	20	5,1
	Total	376	94,9
Missing	System	20	5,1
Total		396	100,0

Regarding the assertion of table 2, the percentage of teachers who say "never" is 30,8 %, followed by those who respond "rarely" (23.7%) and "sometimes" (20,5). As can be seen, we have a significant amount of respondents who concentrate their responses in the "never", with 30,8% and "rarely", with 23,7, a total of almost 60%. Thus, we consider that more than half of respondents believe that the evaluating teachers performance did not involve significant changes in the collaborative work among teachers of the school.

**Table 2****TE entailed significant changes in the collaborative work among teachers of the school.**

		Frequency	Percent
Valid	Never	122	30,8
	Rarely	94	23,7
	Sometimes	81	20,5
	Many times	64	16,2
	Always	25	6,3
	Total	386	97,5
Missing	System	10	2,5
Total		396	100,0

As referenced in table 3, the percentage of teachers who say "never" is 29,3%, followed by those who answer "sometimes" (23,0%) and "rarely" (18,4%). As can be seen in the table, once again, we see that if we add those who answer "never" to those who respond "rarely", we have a total of almost 50%. We may conclude that nearly half of respondents did not share materials, experiences, and other media to support teaching activities.

**Table 3****The evaluator evaluated and shared materials, experiences, documents and other materials to support teaching activities**

		Frequency	Percent
Valid	Never	116	29,3
	Rarely	73	18,4
	Sometimes	91	23,0
	Many times	72	18,2
	Always	33	8,3



	Total	385	97,2
Missing	System	11	2,8
Total		396	100,0

We can observe from table 4 that, the percentage of teachers who say "never" is 28, 8%, followed by those who answer "sometimes" (26, 3%) and "rarely" (23, 2%). According to that information, we found that more than half of respondents believe that the TE does not allow the sharing of teaching experience among teachers of the school, which means that only about 19% of respondents believe that the sharing and exchange of experiences pedagogical happened frequently.

**Table 4**  
**The process of TE encouraged the sharing of teaching experiences among school teachers**

		Frequency	Percent
Valid	Never	114	28,8
	Rarely	92	23,2
	Sometimes	104	26,3
	Many times	58	14,6
	Always	17	4,3
	Total	385	97,2
Missing	System	11	2,8
Total		396	100,0

As to the statement of table 5, the percentage of teachers responding "sometimes" is 32.1%, followed by those who answer "never" (22, 5%) and "rarely" (22, 0%). So, we have a very small number of participants, only 20.2% who believe that the process of performance evaluation cooperating teachers, works in the group or in the school in general.

**Table 5**  
**The teachers cooperate in the group or within the school in general.**

		Frequency	Percent
Valid	Never	89	22,5
	Rarely	87	22,0
	Sometimes	127	32,1
	Many times	61	15,4
	Always	19	4,8
	Total	383	96,7
Missing	System	13	3,3
Total		396	100,0

Finally, is clearly express in table 6, that the percentage of teachers who answer "many times" is 26, 0 %, followed by those who answer "sometimes" (22, 2%) and "always" (18, 2 %). There is a significant concentration of responses in the "many times", "sometimes" and "always", as shown in table 6, which means that there is a deemed value of respondents who say that the evaluator has implemented, through the process of TE, a culture of constant dialogue with the evaluated teachers.

**Table 6**

**The evaluator has implemented, through the process of TE, a culture of constant dialogue with the evaluated teachers.**

		Frequency	Percent
Valid	Never	54	13,6
	Rarely	66	16,7
	Sometimes	88	22,2
	Many times	103	26,0
	Always	72	18,2
	Total	383	96,7
Missing	System	13	3,3
Total		396	100,0

#### 4. Conclusion

Looking at the results, we can infer an unsatisfactory interpretation of collaborative practices developed by teachers in the TE in the context of implementing the legislative framework since 2008. Indeed, the process of TE did not facilitate practices that promote collegiality necessary for the development of collaborative work. Thus, there is a clear lack of collaboration between evaluator and evaluated regarding the involvement in educational activities, particularly with regard to the sharing of materials, experiences, and other media to support teaching activities.

We can also note that, according to the results obtained in this study, the TE did not involve significant changes in the collaborative work among teachers of the school. According to the respondents, they did not develop practices consistent with systematic and intentional collaboration and no change from individualistic action to collaborative practices could be observed.

According to the participants, the process of TE induced the development of highly individualistic practices, often with competitive intentions, generating solitary behaviors, in addition to a lack of dialogue and communication between the pairs involved. As some teachers said the practice of evaluating colleagues, sometimes with more experience and higher qualifications, promoted unhealthy relational practices instead of a shared collegiality.

In short, the results in this article point unequivocally towards an inhibitory effect of TE on collaborative practices and it can be said as a legitimate hypothesis that, in some cases, it has catalyzed dynamic isolation and competitiveness. Although the literature acknowledges the role of evaluation in the professional development of teachers, the Portuguese experience in the last four years demonstrates, however, that the system(s) applied for TE caused unintended, and in some sense, perverse effects, misrepresenting their expressed and rhetorical goals, particularly with regard to collaborative practices in schools.

If you want to effectively dignify the teaching profession and promote the motivation of teachers, as is assumed in the discourse of political legitimacy, which encourages professional development through TE, it is clear that it is necessary to create processes of collaborative work that can be operationalized based on reflexive and dialogical in supervision strategies. Otherwise, the TP is likely to become the nemesis of the teaching profession as the main obstacle to professional development, inhibiting or even eliminating collaborative practices which are not only indispensable for urgent reinterpretation of teacher identity, but also for the successful resolution of the

complex problems within our education systems.

## References

- Alarcão, I. (2000). *Escola Reflexiva e Supervisão. Uma Escola em Desenvolvimento e Aprendizagem*. Porto: Porto Editora.
- Alarcão, I., & Roldão, M. (2009). *Supervisão. Um Contexto de Desenvolvimento Profissional de Professores*. Mangualde: Edições Pedagogo.
- Alves, M. P., & Machado, E. A. (2010). *O Pólo de Excelência. Caminhos para a Avaliação do Desempenho Docente*. Porto: Areal Editores
- Bolzan, D. P. V. (2002). *Formação de Professores: compartilhando e reconstruindo saberes*. Porto Alegre: Mediação
- Bush, T., & Glover, D. (2003). *School Leadership: Concepts and Evidence*. Londres: National College for School Leadership.
- Day, C. (2001). *Desenvolvimento profissional dos professores: os desafios da aprendizagem permanente*. Porto: Porto Editora.
- Flores, M. A. (2010). *Avaliação de professores numa perspectiva internacional: sentidos e implicações*. Porto: Areal Editores.
- Flores, M. A., & Ferreira, F. I. (2012). *Currículo e Comunidades de Aprendizagem: Desafios e Perspetivas*. Santo Tirso: De Facto Editores.
- Fullan, M., & Hargreaves, A. (2001). *Por que é que Vale a Pena Lutar? O trabalho de equipa na escola*. Porto: Porto Editora.
- Hernández, A. (2007). *14 Ideas Clave: el Trabajo en Equipo del Profesorado*. Barcelona: Editorial GRAÓ.
- Horn, I. (2005). Learning on the job: a situation account of teacher learning in high school mathematics departments. *Cognition and Instruction*, 23 (2), 207-236.
- Lima, J. A. (2002). *As Culturas Colaborativas nas Escolas: estruturas, processos e conteúdos*. Porto: Porto Editora.
- Little, J. W., & Mclaughlin, M.W. (1993). Perspectives on cultures and contexts of teaching. In J.W. Little & M. W. Mclaughlin (Eds.), *Teacher's Work, Individuals, Colleagues, and Contexts* (1-8). New York: Teachers College Press.
- Sawyer, L., & Rimm-Kaufman, S. (2007). Teacher collaboration in the context of the Responsive Classroom approach. *Teachers and Teaching: theory and practice*, 13 (3), 211-245.
- Sergiovanni, T. (2004). *Novos Caminhos para a Liderança Escolar*. Porto: Edições Asa.
- Tardif, M., & Lessard, C. (2005) *O trabalho docente: Elementos para uma teoria da docência como profissão de interações humanas*. Editora Vozes
- Tuckman, B. W. (2005). *Manual de Investigação em Educação*. Lisboa. Fundação Calouste Gulbenkian.
- Vieira, F. (2009). Supervisão Pedagógica e Emancipação Profissional. *Elo- Revista do Centro de Formação Francisco de Holanda*, 16, pp. 31-35.
- Decree-Law n.º 2 /2008 de 10 de january
- Decree-Law n.º 2/2010 de 23 de june
- Decree-Law n.º 75/2010 de 23 de june
- Decree-Law n.º 41/2012 de 21 de february

---

\* Translate by the authors

\* idem

\* idem

# Effectiveness of workshop to improve engineering students' awareness on engineering ethics

Pei Cheng Ooi<sup>1\*</sup>, Michelle T. T. Tan<sup>1</sup>

<sup>1</sup>*Department of Electrical and Electronic Engineering, Faculty of Engineering, The University of Nottingham Malaysia Campus, Jalan Broga, Semenyih, 43500 Selangor Darul Ehsan, Malaysia.*

---

## Abstract

This paper summarizes the effectiveness of the engineering ethics workshop organized in the Department of Electrical and Electronic Engineering in The University of Nottingham Malaysia Campus. A pre- and post-survey, as well as focus group discussions were conducted for this purpose. Survey results show that students' theoretical knowledge on engineering ethics did not improve significantly but the workshop motivated them to act ethically. This study has also identified a few possibly more effective methods to conduct ethics workshop.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* Engineering ethics; workshop; pre-survey; post-survey; focus group

---

---

\* Corresponding author. Tel.: +6-03-8924-8160; fax: +6-03-8924-8017.

*E-mail address:* Belle.Ooi@nottingham.edu.my; Michelle.Tan@nottingham.edu.my

## Introduction

Engineers, compared to other single professions, are responsible for majority of the artifacts of the current world which we live in. The impact of an engineer's work on this constructed world has both benefits and risks, ranging from safety and health issues to environmental degradations. As such, engineers have personal and professional obligations to act in an ethical manner, assessing both positive and negative impacts of a particular engineering solution and resolving or minimising the potential conflicts of responsibility to the society, to employers, to fellow colleagues and to self (Passino, K. M., 1998 and Brad Stappenbelt, 2013). In light of this, also partly to the progressive change in university's programmes accreditation requirements, many academic institutions are recognising the importance of these societal and ethical responsibilities and have taken initiatives to incorporate them into engineering curriculum, alongside with traditional technical materials.

There are many ways to inject ethics education into engineering curriculum, for example via free standing short course offered in one semester or direct embedment of ethical components into current course materials taught by various instructors (Robert H Wolverton, Janet Bear Wolverton, 2003). While these methods seem logical, there are several associated problems, namely for free standing short course, students may view ethics as a sidebar rather than an integral part of their engineering studies and for the later, majority of instructors currently do not have formal training and will result in lack of coordination over the integration of ethics across the engineering programme. In addition, insufficient time and large class sizes may also result in ethics being addressed in a superficial manner when integrated into an already packed module (Lam, Margaretha, J., 2001). Therefore, before formal introduction of ethics education into engineering programmes, proper planning must be carried out to ensure their effectiveness among students.

Before fully implementing ethics education into an engineering programme, a key to its effectiveness is to firstly increase engineering students' awareness on the importance of engineering ethics as part of their engineering education. An efficient method is to provide role models, by giving opportunity to the students to meet engineering leaders, particular those who have chosen the ethical career path. In this paper, the effectiveness of workshop to improve engineering students' awareness on engineering ethics is reported. The invited speakers for the workshop are professional engineers who have sound standing in the society. The contents of their talks include introduction to the code of ethics and its importance and also sharing of engineering ethical issues which they have encountered along their career path.

## Methodology

A one-day workshop on engineering ethics was conducted to year one and year three electrical and electronic engineering undergraduate students. The invited speakers were professional engineers who had vast experiences dealing with engineering projects locally and internationally. To gauge the effectiveness of the workshop, a pre-survey and post-survey was conducted before and after the workshop respectively. The pre-survey is divided into three parts: (i) respondent's background, (ii) student's theoretical understanding on engineering ethics and (iii) student's perceptions on ethical/non-ethical behaviour through case studies. The post-survey also consist of similar parts, with an additional section on student's feedback on conducted engineering ethics workshop. Additionally, focus group discussions with a total of 12 volunteers, who all of them participated in the one-day workshop, were conducted to further find out about the workshop effectiveness and identify any possible improvement to the workshop.

## Results and Discussions

A total of 97 students responded to the pre-survey and 56 students responded to the post-survey. Based on the respondent's background survey, more than 70% of the students had no working experience of more than six months and 98% of them had no participation in engineering ethics workshop previously. This data shows that their past industrial experience has less influence on their perception on engineering ethics workshop.

To measure the improvement of theoretical knowledge of the participants, the questions of the theoretical section in the questionnaires were divided into three categories:

1. An engineer's professional responsibilities,
2. Various engineering ethics codes, and
3. What an engineer should do when the employer's interest conflicts with the public.

Figures 1 and 2 summarise the student's theoretical knowledge score based on categories before and after attending the ethics workshop.

Comparing the pre- and post-survey results, student's theoretical understanding on engineering ethics did not show significant improvement after attending the workshop. The only improvement seen was for second category where year 1 students' theoretical knowledge on various engineering ethic codes improved from 77.27% to 78.18%. The reason for the improvement might be due to the wide coverage of code of ethics during the workshop.

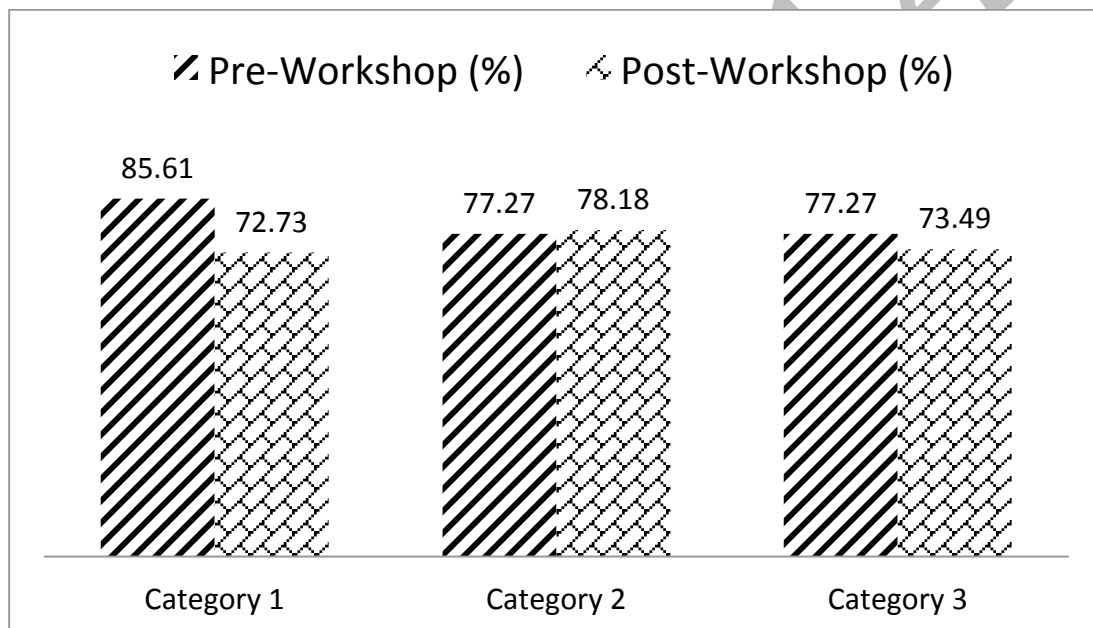


Fig. 1: Year 1 student's theoretical knowledge score before and after workshop.

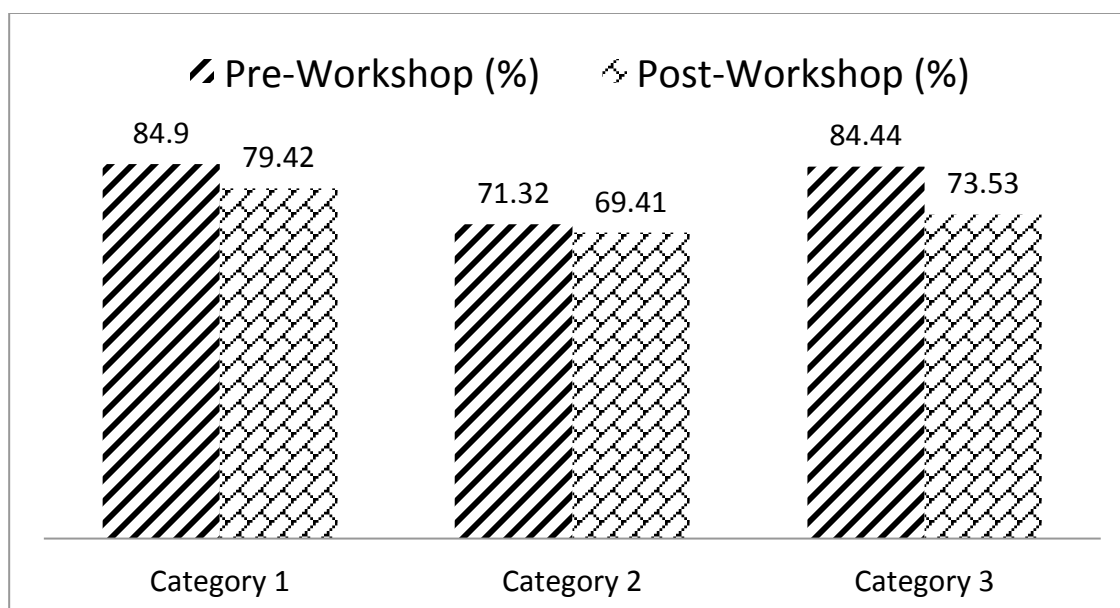


Fig. 2: Year 3 student's theoretical knowledge score before and after workshop.

A few case studies have been included in both the pre- and post-questionnaires to study student's awareness on ethics. The results show improvement as after attending the ethics workshop, significant percentage of students was less likely to perform the unethical actions. Furthermore, their perception that their peers or colleagues would perform the same unethical action reduced. One example of the case studies was as follows:

*Agnes and her friend Lily are enrolled in a class of 250 students, a large lecture with compulsory attendance. The lecturer teaches straight from the book and the material is not very interesting. Agnes and Lily work out a system where they trade off going to class and just sign each other's name as the attendance sheet went around. In this way, they don't "waste" their time or get penalized for missing classes.*

Figure 3 presents the overall results of student's perceptions on ethical/non-ethical behaviour through case studies.

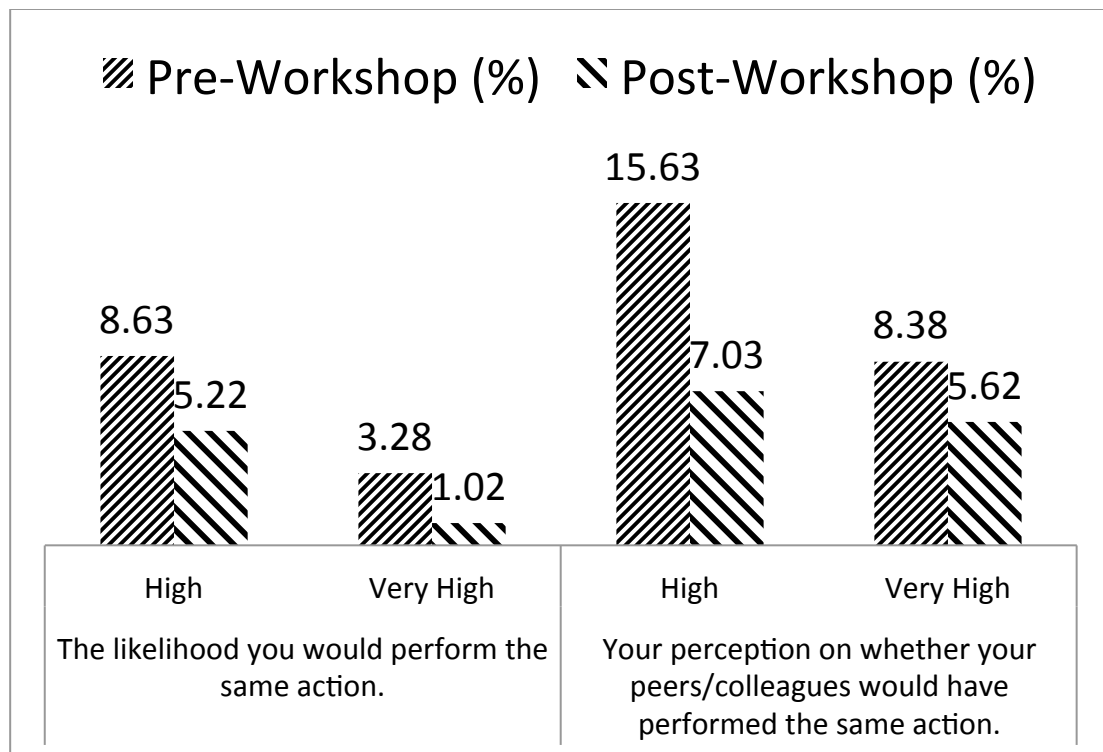


Fig. 3: Year 1 and year 3 student's perceptions on ethical/non-ethical behaviour through case studies.

Using the mentioned case study as example, before attending the engineering ethics workshop, higher percentage of students agreed that they would perform the same unethical action as Agnes and Lily. After attending the workshop, number of students who thought that they would perform the unethical action reduced. More importantly, their perception that their peers would perform the same action significantly reduced. Peers influence or peer pressure is always one of the major factors some actions are being performed. According to Association of Certified Fraud Examiners (Association of Certified Fraud Examiners, Website: <http://www.acfe.com/>), the way in which people perceive the behaviour of their peers can impact their own ethical conduct. Those who observe their peers acting ethically will also be more likely to act ethically; those who observe their peers engaging in misconduct will be more prone to engage in misconduct themselves. Very often, university students pay close attention to the behaviour and actions of their peers. They therefore will normally do what they witness their friends doing. The post-survey shows that students were less likely to perceive their peers would perform the unethical actions. It can be concluded that it is also less likely they would perform the same actions.

The survey section to study student's feedback on the conducted engineering ethics workshop shows that more than 60% of the students agreed that they have sufficient knowledge in understanding engineering ethics after attending the workshop. The result also shows that case study discussion was the most preferred way of conducting in the workshop. Figure 4 shows student's preference methods to conduct the engineering ethics workshop.



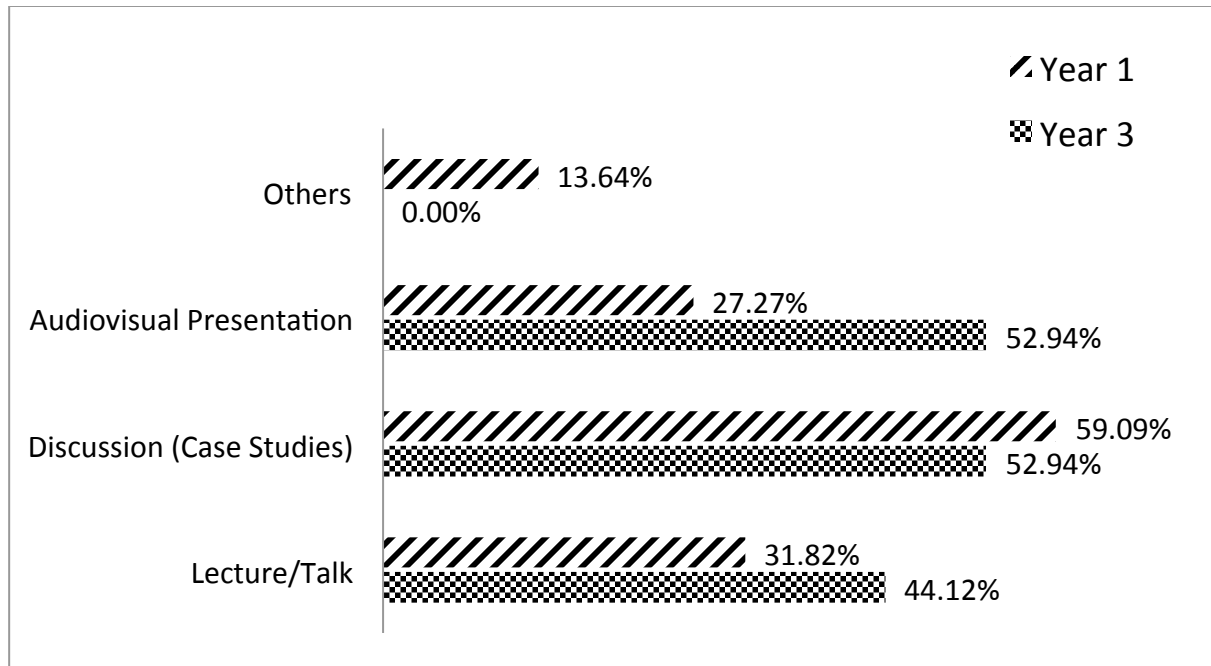


Fig. 4: Student's preference methods on how to conduct the engineering ethics workshop.

Following the surveys, three small focus group discussions were conducted to find out more about the effectiveness of the conducted workshop. From the discussions, it was found that the engineering ethics workshop motivates students to perform ethically. However, some students found that the workshop was too long and dull. This could possibly be one of the major reasons the students' theoretical knowledge did not improve significantly after the workshop.

Based on the study, workshop should be made more targeted especially to final year students with proper structure to relate more closely students' experience to engineering ethics. Focus group discussions also indicate that final year students found the workshop more relevant and useful, and thus appreciated the workshop more compared to first year students. The workshop should be designed so that students could be more engaged in the workshop sessions such as in small group discussions of ethical issues. Case studies, personal and workplace experiences sharing during the workshop sessions could attract more students' participation, due to majority of the students prefer real-life examples than theoretical studies. According to (Frank E Falcone, Edward F. Glynn P.E., Mark Edward Graham and Mark Doorley, 2013), students' interest in the discipline of ethics could be stimulated by connecting it directly to the everyday lives of them.

## Conclusions

The overall results from the participants indicate that workshop on engineering ethics bring positive impacts in preparing students to be ethically responsible engineers. The workshop should be used as a tool to communicate and reinforce student's values and awareness, as well as code of conduct. This result of the study points strongly to the need of organizing more structural and interactive sessions (than traditional lecturing), which can benefit students.

## Acknowledgements

This work was supported by Teaching Development Fund under University's Teaching and Learning Board (TLB), with project code T0005.54.02.

## References

- Passino, K. M. (1998). Teaching Professional and ethical aspects of electrical engineering to a large class. *IEEE transactions on Education*, 41(4), 273-281.
- Brad Stappenbelt (2013). Ethics in engineering: Student perceptions and their professional identity development. *Journal of Technology and Science Education*. 3(1), 86-92.
- Robert H Wolverton, Janet Bear Wolverton (2003). Implementation of ethics education throughout an engineering college. Proceedings of the 2003 American Society for Engineering Education Annual Conference & Exposition.
- Lam, Margaretha, J. (2001). Ethics workshop through LEAP. Proceedings of the 31st ASEE/IEEE Frontiers in Education Conference.
- Association of Certified Fraud Examiners. Website: <http://www.acfe.com/>.
- Frank E Falcone, Edward F. Glynn P.E., Mark Edward Graham and Mark Doorley (2013). Engineering ethics survey for faculty: An assessment tool. 120th ASEE Annual Conference & Exposition, Atlanta, June 23-26, 2013.

# Effects of an assisted repeated reading program on student fluency in a large class in Burkina Faso

Élisabeth Boily, Chantal Ouellet and Catherine Turcotte\*

*Université du Québec à Montréal, Montreal, Quebec, Canada*

---

## Abstract

Due to large class size and typically frontal teaching, learning to read is extremely difficult for elementary school students in Burkina Faso, who struggle to develop the fluency needed for comprehension. This study examined the effects of an assisted repeated reading program (ARR) on student fluency development in a large third grade class in Burkina Faso. The fluency of 94 students was assessed before and after the intervention. The results show that this program had a positive effect on the fluency development of poor and very poor readers.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* Reading fluency; basic education in Sub-Saharan Africa; large class size

---

## Introduction

Reading allows people and societies to thrive, no matter where they are in the world (OECD, 2013.). Literacy skills are fundamental to informed decision-making, personal empowerment and participation in the local and global social community (Stromquist, 2005). In Burkina Faso, as in many other developing nations, the ability to read is especially important as it is the key to poverty reduction. This country has made huge progress in terms of access to primary education, with the number of enrolments doubling in 10 years (MEBA and CONFEMEN, 2009). However, these massive enrolments have been accompanied by high repetition and dropout rates (Vachon, 2008) as well as low success rates in French and mathematics (MEBA and CONFEMEN, 2009). It is therefore vital to focus more on instruction quality, beginning with how reading is taught, as this can have a major impact on the duration of schooling and school attendance (UNESCO, 2005). Since it is an important predictor of reading skills (Zorman, Lequette, Pouget, Devaux and Savin, 2008), reading fluency is an element to consider to foster academic success. With this aim in mind, this study sought to investigate the effects of an assisted repeated reading program (ARR) adapted to local realities and the needs of young children who now have access to school.

## Statement of the problem

Burkina Faso has made great strides on the education front in recent years (Vachon, 2008; Ministère de l'enseignement de base et de l'alphabétisation [Ministry of Basic Education and Literacy of Burkina Faso] CONFEMEN, 2009). Enrolments have grown sharply since 1997, increasing from 800,000 to 1.6 million at the primary level. However, despite the remarkable efforts to provide universal access to basic education and the results obtained, the situation remains worrisome since much like other countries in Sub-Saharan Africa, quantitative gains sometimes come at the expense of quality (Acedo, 2008). Educating such a large number of pupils is fraught with formidable challenges.

---

\* Corresponding author.  
E-mail address: boily.elisabeth@uqam.ca

## 2.1 Large class size

Large classes are often perceived as a major obstacle to improving the quality of education (UNESCO, 2006). According to the *Burkina Faso Country Case Study Prepared for the Education for All Global Monitoring Report 2008*, the increase in the number of children attending school is creating learning difficulties. The pupil/teacher ratio exceeds 200:1 and is even greater in urban areas (Vachon, 2008). The scientific literature reports negative effects associated with teaching large classes, in particular, where instruction time and classroom management is concerned (Benbow, Mizrachi, Oliver and Said-Moshiro, 2007). Class size is also closely tied to teacher motivation (Michaelowa, 2003; Benbow et al., 2007). Finally, Vachon (2008) also found a correlation between overcrowded classes and learning difficulties.

That said, the effect of class size in developing nations cannot be clearly determined. Based on PASEC's data, the effect is small (Michaelowa, 2003). Michaelowa provides a possible explanation for this: "It seems as if in most countries considered, teachers tend to practice "frontal" teaching and do not change to more participatory pedagogical approaches even when class size is reduced." (p.11) The fact is that from kindergarten to university, the African teaching style is largely one of knowledge transmission (Grêt, 2009). According to Dembélé (2003), this type of instruction assigns students a passive role that is limited to memorizing and regurgitating factual information to the teacher. In such a context, student achievement is very much tied to the methods employed by the teacher. Gauthier and Dembélé (2004) argue that what teachers do in the class is undoubtedly the key educational determinant in student learning and achievement. It is therefore essential that African classrooms adopt more appropriate and effective instructional practices, particularly for reading.

## 2.2 Struggling novice readers

Several years ago, Burkina Faso's Ministry of Basic Education and Literacy (MEBA) implemented a system to assess educational attainment. For the 2005-2006 school year, a reading test was administered to 512 grade 2 students. Only 9% were able to read fluently. These results show that learning to read under the conditions described earlier is difficult and that fluency is not easily developed. A number of studies on the types of instructional practices that promote reading fluency (Kuhn and Stahl, 2003; Rasinski, 2003; Rasinski, Blachowicz and Lems, 2006) explain how and why it is important to implement them. Because few of these studies were conducted in Africa, it is important to experiment with evidence-based teaching practices that promote fluency, applying them to the Burkinabé educational context, which is, among other things, characterized by large class size.

## Conceptual framework

### *Reading fluency*

Until recently, fluency was not considered a priority in reading instruction (Rasinski et al., 2006). The scientific community began taking a greater interest in fluency when research showed that it was a necessary prerequisite to good comprehension (Laberge and Samuels, 1974; Stanovich, 1980). More recently, a meta-analysis conducted by the National Reading Panel (2000) concluded that fluency is a key component of effective reading instruction.

Researchers tend to agree on the three main components of fluency: (a) **accuracy** in word decoding, (b) **automaticity** in word recognition, and (c) appropriate use of **prosody**. The first, **accuracy**, refers to the ability to easily and adequately convert letters into sounds (Ellery, 2009). The second, **automaticity**, is defined as the ability to quickly recognize words automatically, with little cognitive effort or attention (Harris and Hodges, 1995). Lastly, **prosody** consists of various aspects that make oral reading expressive: intonation, stress and rhythm (Kuhn and Stahl, 2003). Although many authors agree that fluency consists of these three components, others suggest that

fluency should encompass more than just oral reading (Pikulski and Chard, 2005, Samuels, 2002). Since fluency is not in and of itself a reading goal (Allington 1983), it is important to insist on the role it plays in comprehension (Kuhn and Stahl 2003; Pikulski and Chard, 2005).

Research shows that in order to develop fluency, children need to read more and with high accuracy (Allington, 2009). According to the National Reading Panel (2000), interventions to encourage students to engage in extensive, independent reading are not enough to significantly improve fluency. The assisted repeated reading approach is more effective in this regard. **Repeated oral reading** is one of the best-known methods for improving fluency (National Reading Panel, 2000; Kuhn and Stahl, 2003, Meyer and Felton, 1999, Therrien, 2004). With this approach, students read and reread an assigned passage individually until they reach an appropriate level of fluency (Samuels, 1979). Repeated oral reading programs often include support from tutors, peers, adults, audiotapes or other means (National Reading Panel, 2000) and offer a useful model for developing fluency (Allington, 2009). This strategy provides struggling readers with a precise reading model, with appropriate speed, intonation and expression (Kuhn, 2009).

### *Teaching large classes*

As mentioned earlier, large classrooms are often perceived as a major hindrance to improving the quality of education (UNESCO, 2006). Such conditions are especially acute in the developing world, where class size can swell to over 100 students (Benbow et al., 2007). For most of these countries, the ongoing strong demand for education, combined with limited resources, means the situation is unlikely to improve in the near term (Valerien, 1991). Consequently, according to Valerien (1991), effective methods must be found for large classroom instruction since, at the present time, the repertoire of effective teaching practices for overcrowded classes remains limited (Benbow et al., 2007).

Although little data exist on the effectiveness of teaching methods used to cope with large classrooms, Benbow and her colleagues (2007) managed to compile a list of potentially effective methods that include team teaching, the use of small groups, and peer tutoring. The use of **groupings** is a recurring suggestion in the literature on teaching in large classrooms (O'Sullivan, 2006; Pasigna, 1997). Group work also encourages student interaction. From the standpoint of cognitive development, inter-student interaction during an appropriate task can lead to increased conceptual understanding (Slavin, 1996). Group work is therefore a possible solution to improve learning outcomes in large classroom settings while simultaneously fostering cognitive development. There are several instructional strategies based on group work, including cooperative learning, peer tutoring and within-class groupings, and while they are praised by many authors (Cohen, 1994; Kulik and Kulik, 1987; Slavin, 1996; Topping and Ehly, 1998), the fact is that most of them have only been tested in the Western world.

The use of groupings therefore seems to be an effective way to improve instruction quality in large classrooms. Perhaps this method can also be used with assisted repeated reading to teach reading fluency.

This study therefore had two objectives:

- 1) Assess the effects of an assisted repeated reading program on third grade students in Burkina Faso; and
- 2) Analyze the implementation of this program in a large classroom setting.

## **Methodology**

### *Population*

The school is located in the popular neighbourhood of Bobo-Dioulasso. The residents of this predominantly Muslim neighbourhood are mostly merchants or farmers. The elementary school has 903 students attending grades 1

through 5, with an average of 141 students per class. This study was conducted using the grade 3 class, which had 141 students and 2 teachers (due to its large size). At the time of the study, a student teacher was also present.

#### 4.2 Procedures

A mixed-method approach was used for this study. A quasi experiment was conducted for the first objective, i.e. to assess the effects of ARRP on third grade students in Burkina Faso. Out of the 141 students in the class, 94 participated in the study. The remainder could not because they had not mastered grapheme-phoneme correspondence. During the ARRP sessions, these students received appropriate instruction from the classroom teacher. The participating students were divided into two groups: intervention condition (N=46) and control condition (N=48). To make the groups equivalent, the students were grouped by fluency.

#### 4.3 The ARR program

The ARR program was developed by the researcher with input from the two teachers. Table 1 presents its main characteristics.

Table 1: Characteristics of the ARR program

Formation of reading subgroups	The experimental group is divided into subgroups of 6 or 7 students. The subgroups are heterogeneous, i.e. made up of strong, average and poor readers. A strong reader assumes the role of tutor in each subgroup and is assisted by another strong reader.
Duration and frequency	The intervention takes place over 8 weeks, with 15-minute sessions held 3 times a week.
Organization of the space	Sessions are held in the schoolyard to ensure adequate space between subgroups.
Learning material	The learning material consists of eight texts written on large posters. The texts are 50-65 words each and are based on local realities. Each subgroup is assigned a different text to read every week. The assigned text is reread at each session during the week.
Description of activities	<ol style="list-style-type: none"> <li>1) Predictions: The children predict the content of the text based on its title and on pictures.</li> <li>2) Modeling: The tutor reads the text out loud to demonstrate how it should sound.</li> <li>3) Assisted repeated reading: Each student then reads the entire text with help from the tutor.</li> <li>4) Comprehension questions: The tutor asks questions about key elements of the text.</li> </ol>
Teacher's role	A teacher supervises the activity, offering advice, feedback, encouragement and demonstrations.
Tutor's role	The tutor must follow a certain procedure when a reader struggles or makes a miscue, namely, give him 4 seconds to self-correct. If he is unable to do so, the tutor helps the reader break down the word into syllables using a cover card and a pointer.

#### 4.4 Instruments

The number of words read correctly per minute (WCPM) was calculated for the 94 students at the beginning and at the end of the 8-week intervention. This metric assesses two fluency components: *accuracy*, or number of words read correctly, and *automaticity*, or speed with which the learner reads a given text (Kuhn, 2009). A 181-word elementary school level text was selected for the WCPM calculation. Kuhn (2009) recommends using a 100-200-word text to assess fluency, particularly if a large number of students are evaluated at the same time. The same text was used for both calculations. This text was not used in the intervention sessions.

### Results

#### 5.1 Deviation between mean pre-test and post-test scores

Table 2 presents the post-test results by skill level. These results show that for all skill levels, the deviation

between the mean pre-test and post-test scores is greater for the intervention groups and especially significant for the very poor, poor and average readers.

Table 2: Mean pre-test and post-test scores

Variable	Skills	Pre-test Scores (mean and standard deviation)		Post-test Scores (mean and standard deviation)		Deviation Between Pre-test and Post-test Means	
		Control Condition (N=47)	Intervention Condition (N=43)	Control Condition (N=47)	Intervention Condition (N=43)	Control Condition (N=47)	Intervention Condition (N=43)
WCPM	Very strong	50.30 (10.77)	53.60 (8.93)	57.05 (11.97)	62.58 (9.16)	6.75	8.98
	Strong	30.00 (3.57)	29.07 (2.23)	39.36 (9.09)	42.55 (6.5)	9.36	13.47
	Average	21.46 (2.68)	20.13 (2.57)	28.00 (7.11)	34.19 (5.95)	6.54	14.06
	Poor	7.70 (2.04)	11.62 (1.59)	13.15 (4.68)	21.92 (2.67)	5.45	10.30
	Very poor	1.33 (2.06)	1.88 (2.34)	1.94 (2.58)	6.67 (4.19)	0.61	4.79

### 5.2 Effect of the intervention on fluency

A paired-samples t-test was conducted to assess the effect of the intervention on fluency. Since this test allows us to compare the subjects with themselves before and after the intervention, we can determine whether the differences between the means of the intervention group are significant.

The results of the t-test show a significant difference between the pre- and post-test means (at  $p < 0.01$ ), indicating that the WCPM of the students in the intervention group was significantly higher after the intervention. To evaluate the magnitude of this finding, the effect size was also calculated. At 0.8, the effect size is large.

The next step was to compare, using an independent samples t-test, the post-test means of the intervention and control groups in order to evaluate whether the difference was due to chance or to the intervention. The results showed a significant difference for the very poor readers and the poor readers, (at  $p < 0.01$ ). There was no significant difference between the intervention and the control group for the average, strong and very strong readers. Since the analyses were conducted over a small number of participants, these encouraging results must be carefully interpreted. However, this is a first step toward a better comprehension of innovative instructional practices that could take place in a large class size to better respond to the needs of the most vulnerable children.

## Discussion

After analyzing the results, it appears that in general, the ARR program had a positive effect on the fluency of third grade students. The WCPM scores of the students in the intervention group, all levels combined, improved after the eight-week program. This can be explained by the fact that this program greatly increased the students' exposure to appropriate texts with one-on-one support. As mentioned earlier, although fluency development is influenced by how much students read, they must also be provided with texts that they can read accurately (Allington, 2009). In this program, the significant scaffolding helped students achieve high accuracy. The use of echo reading, repeated reading and peer tutoring meant students received optimal support, thereby increasing their chances of reading fluently. The combination of these three technical aids therefore allowed the students to develop their fluency. However, a comparison of the results obtained in the post-test by the students in the intervention group

and in the control group shows that the poor and very poor students derived the most benefit from these aids. It is therefore reasonable to assume that the struggling readers benefited the most from the significant scaffolding.

## Conclusion

This assisted repeated reading program is promising, first because it has a positive impact on readers' fluency development and second, because it meets the varied needs of students in large classrooms. It also eases the workload of Burkinabé teachers. Using peer tutoring greatly increases student exposure to the written word, something that is very difficult for one teacher to do alone. Using strength in numbers to delegate tasks to stronger learners in large classrooms is an effective and culturally appropriate approach to improving the quality of reading instruction in Burkina Faso. Ethnologist Pierre Erni (1987) found that in traditional African cultures, the peer-to-peer education that takes place in child culture is the main form of socialization. African students would probably derive greater benefits if horizontal teaching was used from time to time. An interesting future study would be to observe how this approach also benefits the development of reading and other skills in stronger students and peer tutors.

## References

- Acedo, C. (2008). Editorial. *Perspectives*, 38(2).
- Allington, R. (1983). Fluency: The Neglected Reading Goal. *The Reading Teacher*, 36(6), 556-561.
- Allington, R. (2009). *What Really Matters in Fluency*. Knoxville: Pearson.
- Armbruster, B., Lehr, F. and J. Osborn (2006). *Put Reading First: The Research Building Blocks for Teaching Children to Read*. National Institute for Literacy.
- Benbow, J., Mizrachi, A., Oliver, D. and L. Said-Moshiro (2007). *Large Class Sizes in the Developing World: What Do We Know and What Can We Do?*. U.S. Agency for International Development.
- Cohen, P. and J. Kulik (1981). Synthesis of Research on the Effects of Tutoring. *Educational Leadership*, 39(3), 227-229.
- Dembélé, M. and B.-R. Miaro (2003). Pedagogical Renewal and Teacher Development in Sub-Saharan Africa: A Thematic Synthesis. ADEA.
- Ellery, V. (2009). *Creating Strategic Readers*. Newark: International Reading Association.
- Erni, P. (1987). *L'enfant et son milieu en Afrique noire*. Paris: L'Harmattan.
- Gauthier, C. and M. Dembélé (2004). *Qualité de l'enseignement et qualité de l'éducation: revue des résultats de recherche*. UNESCO.
- Grêt, C. (2009). *Le système éducatif africain en crise*. Paris: L'Harmattan.
- Harris, T. L. and R.E. Hodges (Eds.). (1995). Newark: International Reading Association.
- Kuhn, M. (2009). *The How and Whys of Fluency Instruction*. Boston: Pearson.
- Kuhn, M., Schwaenflugel, P., Morris, R., Morrow, L. M., Woo, D. G., Meisinger, E., et al. (2006). Teaching Children to Become Fluent and Automatic Readers. *Journal of literacy research*, 38(4), 357-387.
- Kuhn, M. and S. Stahl (2003). Fluency: A Review of Developmental and Remedial Practices. *Journal of educational psychology*, 95(1), 3-21.
- Kulik, J. and C.-L. Kulik (1987). Effects of Ability Grouping on Student Achievement. *Equity & excellence*, 23(1-2), 22-30.
- LaBerge, D. and S.J. Samuels (1974). Toward a theory of automatic information processing in reading\*1. *Cognitive Psychology*, 6(2), 293-323.
- Michaelowa, K. (2003). Determinants of Primary Education Quality: What can we learn from PASEC for francophone Sub-Saharan Africa? ADEA.
- National Reading Panel. (2000). *Teaching Children to Read: An Evidence-Based Assessment of the Scientific Research Literature on Reading and its Implications for Reading Instruction*.
- Meyer, M. and R. Felton (1999). Repeated Reading to Enhance Fluency: Old Approaches and New Directions. *Annals of Dyslexia*, 49, 283-306.
- Ministère de l'enseignement de base et de l'alphabétisation et CONFEMEN. (2009). *Les apprentissages scolaires au Burkina Faso : les effets du contexte, les facteurs pour agir*. Burkina Faso: Ounténi et al.
- OECD. (2013). Perspectives de l'OCDE sur les compétences ocde (2013), Perspectives de l'OCDE sur les compétences 2013 : Premiers résultats de l'Évaluation des compétences des adultes, éditions ocde.
- O'Sullivan, M. (2006). Teaching Large Classes: The International Evidence and a Discussion of Some Good Practice in Ugandan Primary Schools. *International Journal of Educational Development*, 26(1), 24-37.
- Pasigna, A. (1997). *Tips on How to Manage a Large Class*. Institute for International Research.
- Pikulski, J. and D. J. Chard (2005). Fluency: Bridge Between Decoding and Reading Comprehension. *The Reading Teacher*, 58(6), 510-519.
- Rasinski, T. (2003). *The fluent reader: Oral reading strategies for building word recognition, fluency, and comprehension*. New York: Scholastic Books.
- Rasinski, T. and J. Hoffman (2003). Oral Reading in the School Literacy Curriculum. *Reading Research Quarterly*, 38(4), 510-522.
- Rasinski, T., Blachowicz, C. and K. Lems (2006). *Fluency Instruction: Research-Based Practices*. New York: The Guilford Press.



- Samuels, J. (1979). The Method of Repeated Readings. *The Reading Teacher*, 32(4), 403-408.
- Samuels, J. (2002) Vu dans Rasinski, T., Blachowicz, C., and Lems, K. (2006). *Fluency Instruction: Research-based Practices*. New York: The Guilford Press.
- Slavin, R. (1996). Research on Cooperative Learning and Achievement: What We Know, What We Need to Know. *Contemporary Educational Psychology*, 21(1), 43-69
- Stanovich, K. (1980). Toward an Interactive-Compensatory Model of Individual Differences in the Development of Reading Fluency. *Reading Research Quarterly*, 16(1), 32-71.
- Stromquist, N. 2005. The political benefits of adult literacy. Reference document for the EFA Global Monitoring Report 2006.
- Therrien, W. (2004). Fluency and Comprehension Gains as a Result of Repeated Reading. *Remedial and Special Education*, 25(4), 252-261.
- Topping, K., and S. Ehly (1998). *Peer-assisted Learning*. Mahwah: Lawrence Erlbaum Associates.
- UNESCO. (2005). *Rapport mondial de suivi sur l'éducation pour tous*.
- UNESCO (2006). Practical Tips for Teaching Large Classes: A Teacher's Guide
- Vachon (2008). *Burkina Faso: étude de cas, Rapport mondial de suivi sur l'éducation pour tous*. UNESCO.
- Valerien, J. (1991). Innovations for Large Classes: A Guide for Teachers and Administrators. Educational Studies and Documents, No. 56.

# Effects of creative writing activities on students' achievement in writing, writing dispositions and attitude to English.

Şükran TOK<sup>a\*</sup>, Anıl KANDEMİR<sup>b</sup>

<sup>a,b</sup>Pamukkale University, Faculty of Education, Denizli 20070, Turkey

---

## Abstract

This experimental study investigates the effects of using creative writing activities on 7<sup>th</sup> grade students' achievement in writing skill, writing dispositions and their attitude to English. One group pre and post test design was used in the study. The study was conducted during four weeks in 2012- 2013 academic year in an elementary school in the city centre of Denizli, Turkey. The study group was consisted of 17 female and 14 males in total 31 seventh grade students. When pre and post test results were compared it was found that students' achievement in writing skill was increased after the experiment. Students' writing disposition was also increased when compared to their levels before the experiment. However, students' attitude to English course was not increased after the experiment. Results indicate that using creative writing exercises has a positive effect on writing achievement and writing disposition in 7<sup>th</sup> grade English language classes in elementary schools.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords: creative writing; writing disposition; English course attitude; writing achievement.*

---

## Introduction

Creativity plays an important role in technological advance, in the social and behavioural sciences, and in the humanities and arts (Dudek, 2003; cited in Runco, 2004). Because of its role in innovation and entrepreneurship, creativity has become one of the key concerns of organizations and businesses (Runco, 2004). Creativity is 'the ability to come up with new ideas that are surprising yet intelligible, and also valuable in some way' (Boden 2001). The reflection of creative aspects of students in school environment can be seen mostly in the texts they produce by using writing skill. For this reason, creativity and writing skill are very close together and identical (Demir, 2013). Writing includes "creative thinking and relating new information with the prior knowledge and this make new information sense" (Lawwill, 1999; cited in Demir, 2013). Directly associated with creativity, creative writing means one's putting his or her ideas and feelings about a particular topic on paper by using his or her imagination freely (Oral, 2012). Creative writing aids language development at all levels: grammar, vocabulary, phonology and discourse. It requires learners to manipulate the language in interesting and demanding ways in attempting to express uniquely personal meanings. In doing so, they necessarily engage with the language at a deeper level of processing than with most expository texts (Craik & Lockhart 1972). Writing can be viewed as a recursive process involving both cognitive and metacognitive processes. Task, environment, individual cognition and affective processes all impact on producing written text (Larkin, 2009). Writing has an important contribution to the development of other skills and also becomes a tool to express person's feelings, thoughts and information. Writing should be perceived and evaluated not as a mechanical process but as a skill which covering understanding,

---

\* Corresponding author. Tel.: +90-258-296-10-59.  
E-mail address: stok@pau.edu.tr

thinking, developing and producing skills. In this sense, the process-oriented approach should be developed in the improvement of writing skills. Students should be expected to gain some various attainments such as planning, developing their products gradually, supporting ideas, evaluating their writing in writing process (MoNE, 2011). We need to find ways to integrate writing with other skills and activities, giving it more relevance and importance - and also making it more interesting. We need to use meaningful, realistic and relevant writing tasks, based on our learners' needs and interests. We may need to design individual tasks based on what individual learners need to write. In addition we should talk about writing with our learners, how we write well, why we write and for who, and what makes it difficult (Monis & Rodriques, 2012). Teaching creative writing – that is, encouraging students to write by drawing upon their imagination and other creative processes – may support writing development in all its components (Barbot, Tan, Randi, Donato & Grigorenko, 2012). Creative writing on the other hand can help to teach how to behave creatively in their lives (Sternberg, 2009: xvi ). Eckhoff and Urbach, (2008) asserted that children's imagination and creativity are quite advanced but components of an educational environment can either support or stifle children's imaginative abilities. Creative writing gives opportunity to students to choose their own writing subjects and methods. The importance of creative writing is undeniable to improve the cognitive and communicative skills of children (Tompkins, 1982; cited in Essex, 1996). Creative writing is a chance to free your imagination in which people get satisfaction. Through creative writing, students can use their linguistic capabilities and go deeper and further than they cannot do in oral expression. They express more personal thoughts and mental images. Therefore, creative writing tasks are motivating both for L1 and L2 students (Harmer, 2004). Creative writing is characterized by originality and imagination rather than truthfulness or standardization of thoughts (Brookes & Marshall, 2004; cited in Temizkan, 2011). Everett (2005) indicates that a further role for creative writing in English: beyond assisting and enabling learning, it can also provide alternative ways of expressing and demonstrating learning. Raimes (1983) indicates that writing can help our students for those reasons; firstly writing reinforces the grammatical structures, idioms and vocabulary that we teach, secondly when students write, they have a chance to be adventurous with the language to take risks, and lastly they become very involved with the new language; the effort to express ideas. There are many writing forms, some are creative, and some are not. However, all writing is creative writing because writing uses the materials of language, experiences, knowledge, textual sources, personal ideas and imaginings of the writer, bringing out something that did not exist before. All of the writings of students are important and any kind of writing is a creative act (McVey, 2008). İşeri and Ünal (2010) asserted that to acquire writing skill well enough, one should be developed in cognitive, affective and psychomotor aspects. So, affective aspects of the students are also important and should be carefully considered while teaching them how to write creatively. Piazza and Siebert (2008) define dispositions as a broad construct within the affective domain in which writers bring to their writing such resources as self-discipline, perseverance in the face of difficulties, tolerance of ambiguity, autonomy, willingness to take risks, motivation, self-efficacy, and interest. They also explained that The Writing Dispositions Scale (WDS) is intended to be useful for providing explicit, descriptive subcategories of disposition that can serve researchers interested in investigating a well-rounded view of what is involved in learning to write. Baş (2012) also asserted that attitudes are also so valuable while we are talking about education especially about language education. He claims that “Developing positive attitudes toward English is one of the most important goals of English language education. Like in many other countries, English language education in elementary schools in Turkey is highly crucial. Evaluating the attitudes of students in English course is very important both for teachers and curriculum developers. At this point, the measurement of attitudes of students towards English course has a very vital importance”. Because of the fact affective factors can also be effective, writing dispositions and attitudes of students are also measured to see the effect of creative writing activities on these affective aspects.

### *1.1. Purpose of the study*

The purpose of the study is to determine the effects of creative writing activities on students' achievement in writing skill, their attitude to English course and their writing disposition in 7<sup>th</sup> grade English language class.

### *1.2. Problem Statement*

What are the effects of using creative writing activities on students' achievement in writing skill, their attitude to English course and writing disposition in 7<sup>th</sup> grade English language courses?

The questions below are investigated to be able to answer the problem statement.

1. Is there any significant difference between students pre and post test scores obtained in writing test?
2. Is there any significant difference between students pre and post test results obtained from Writing Disposition Scale?
3. Is there any significant difference between students pre and post test results obtained from Attitude Scale?

### 1.3. Limitations

This study is limited to

1. 31 seventh grade students attending a state-elementary school who participated in the study,
2. The creative writing activities and exercises used during the data collection process and
3. four weeks time for the study.

## 2. Method

In this part research design, study group, data collection tools and experiment procedure is presented.

### 2.1. Research Design

One of the pre-experiments design one group pre and post test design (Büyüköztürk et al., 2013) was used to find out the effects of creative writing activities on achievement, writing disposition and attitude to English course. This design includes a pre test measure followed by a treatment and a post test for a single group (Creswell, 2003).

### 2.2. Study group

This study was conducted with 31 seven-grade students at the age of 13-14 years old attending a state secondary school in the city centre of Denizli, Turkey. While 17 (55%) of the participants were female, 14 (45%) of them were male.

### 2.3. Data collection tools

To assess the achievement of students in writing, a biography writing activity was given to students. In this activity students are requested to write a few paragraphs expressing his/her life about someone they know well and in the second part of the activity the students are also requested to give reasons why they have chosen that person. The writing papers are valued according to the “Scoring Profile” (Jacobs et al., 1981) by the researcher. The scoring profile consisted of 5 parts. The first part of the profile was scored for the content and the maximum point is 30 for this part. Second part of the profile was scored for organization and the maximum point is 20. Third part of the profile is for vocabulary and maximum point for this part is 20. Fourth part is for language use and maximum point is 25. Fifth and the last part of the profile is for mechanics (spelling, punctuation, capitalization and paragraphing) and maximum point to get is 5.

The attitude of the students to English course was evaluated with “*Attitude Scale for Elementary English Course*” which was developed by Baş (2012). Scale was consisted of 27 statements and a likert type with five degrees. 12 of the statements are negative and the rest 15 was positive. Baş (2012) claimed that the scale consisted of five dimensions with 15 positive and 12 negative items which make totally 27 items. As a result of the reliability and validity study applied to the scale; Cronbach’s Alpha and Spearman-Brown split half correlation were calculated in the study and the Cronbach’s Alpha value was found as 0.92. It was also found out that the sub-dimensions of the scale were calculated to be changed between 0.77 and 0.93 values. The split half test correlation of the scale was found as 0.83.

To determine the writing dispositions of the students, “*Writing Disposition Scale*” which was developed by Piazza and Siebert (2008) and adapted into Turkish by İşeri and Ünal (2010) was used. The scale has three sub-dimensions as confidence, persistence and passion. The scale is composed of 93 items in total with each sub-dimension including 31 items. The scale is a five-rank Likert type. As a result of the reliability and validity study applied to the scale, the lastly version of the scale consist of 11 items, three of which are from confidence

dimension, four of which are from persistence dimension and four of which are from passion dimension. However, after the adaptation process; the Turkish version of the scale consists of 21 statements; six of which are from confidence, four of which are from persistence and eleven of which are from passion sub-dimension and the Cronbach's Alpha value for the whole scale was found as .893, for confidence sub-dimension .806, for persistence sub-dimension .749 and for passion sub-dimension as .914. Lastly, it is concluded that Turkish version of this scale can be applied to Turkish children age from 6 to 13 (İşeri & Ünal, 2010).

#### 2.4. Procedure

In the first week, after introducing himself to students, the researcher gave information about the study to the students and said that only volunteers can take part in the study. Students are volunteered and both surveys, namely "*Attitude Scale for Elementary English Course*" and "*Writing Disposition Scale*" were distributed to students as a pre test. After that to measure students' writing achievement, a biography writing activity was introduced and explained what is expected and given time to students to do this activity. This activity is also used as a pre test for writing achievement. Researcher has tried to create an enjoyable and safe environment for students by saying this will not affect your marks and no one can see the results. By doing this it is aimed to create a good relation between researcher and the students and make them comfortable.

In the second week, as a creative writing activity, students are again be assured that everybody are free to write how they want but the topic is given by the researcher. Researcher talked a bit of holiday because they were on the last weeks of the semester and students will be on holiday within four weeks. He said that you are going to go on a vacation and you are expected to write a text on a list what you want to take with you, what you are planning to do there, with whom and on which dates you will be there. Students used their imagination and dream at first then they decide where and when and with whom they will go, and write a few paragraphs about their imaginary holiday.

In the third week, a picture is brought to the classroom. In the picture there is a man near a lake who is doing something but not so clear what he is doing. And also two little children are staring at him behind the bushes. In this activity this picture is given to each student and students are expected to look carefully to the picture, and create a little story about that situation, who is the guy and children, why they are near the lake and so on. Students were free to create different situations and tell ideas about that.

In the fourth week, students were given four paragraphs which each of them are the first paragraphs of the stories. Students are supposed to develop a story with this introduction paragraphs and find a title for each of them. Lastly surveys and the biography writing activity was implemented again as a post test. When students' age and their competence in the target language is considered; the creative writing activities used can be described as basic level and suitable for the competence level of the group.

During the implementation the teacher of the class has also attended. It was aimed to create a positive and enjoyable classroom atmosphere for students to produce creative texts. On the other hand, students were informed that each work is valued and there shouldn't be any worry about marks and etc. Also, the researcher has always emphasized that the reason is not just to measure their writing achievement but to measure the effect of the activities implemented on their writing.

#### 2.5. Data analysis

Data collected to examine the differences between the pre test and post test were tested and interpreted using the t-test for paired samples. One Sample Kolmogorov-Smirnov (K-S) Test was used in order to test whether the data collected from the scale were conforming to a specific distribution (uniform, normal or poison). In the data analysis for one group pre test-post test design paired sample t test is used generally. Paired sample t test shows whether or not the mean of the pre and post test is significant (Borg & Gall, 1989; Roscoe,1975; cited in Balci, 2011).

### 3. Findings

Table 1. Analysis of the pre-test and post-test scores for writing test (WT), writing disposition scale (WDS) and attitude scale (ATS)

Test	N	Mean	SD	t	p
Pre-test Scores of WT	31	63.55	7.09	-7,067	0,000
Post-test scores of WT	31	70.26	9.26		
Pre-test Scores of WDS	31	59.06	14.26	-4,964	0,000
Post-test scores of WDS	31	68.45	16.36		
Pre-test Scores ATS	31	97,19	17.61	1,694	0,101
Post-test scores ATS	31	90,94	23.24		

Hypothesis 1 tested in this experiment stated that there is a significant difference in the pre and post-test score of the group on the writing test. The one sample K-S test was used in order to determine which statistical technique should be used to point of whether there was a significant difference between pre and post test scores. The analysis of the results of the one sample K-S test revealed that the study group's pre test scores (K-S (Z)=0.770;  $p>0.05$ ) and post test scores (K-S (Z)=0.857;  $p>0.05$ ) were within a normal distribution. Therefore, the t-test for paired samples, which is a parametric test, was used.

The analysis of study group's pre and post test scores for the writing test are presented in Table 1. This table shows that the study group's mean pre test score was 63.55 and the standard deviation was 7.09. The study group's mean post-test score was 70.26 and the standard deviation was 9.26. Table 1 reveals that the difference between the pre and post-test scores of the study group was statistically significant ( $t=-7,067$ ;  $p<0.05$ ). Consequently, Hypothesis 1 was accepted.

Hypothesis 2 tested in this experiment stated that there is a significant difference in the pre and post test scores of the group regarding writing disposition scale. The one sample K-S test was used in order to determine which statistical technique should be used to point of whether there was a significant difference in the pre and post test scores of the group regarding their writing disposition. The analysis of the results of the one sample K-S test revealed that the study group's pre-test test scores (K-S (Z)=.523;  $p>0.05$ ) and the post-test scores (K-S (Z)=.646;  $p>0.05$ ) were within a normal distribution. Therefore, the t-test for independent samples, which is a parametric test, was used.

The analysis of study group's pre and post test scores regarding their writing disposition are presented in Table 1. This table shows that the study group's mean pre test score was 59.06 and the standard deviation was 14.26. The study group's mean post-test score was 68.45 and the standard deviation was 16.36. Table 1 reveals that the difference between the pre and post-test scores of the study group regarding their writing disposition was statistically significant ( $t=-4,964$ ;  $p<0.05$ ). Consequently, Hypothesis 2 was accepted.

Hypothesis 3 tested in this experiment stated that there is a significant difference in the pre and post test scores of the group regarding attitude to English course. The one sample K-S test was used in order to determine which statistical technique should be used to point of whether there was a significant difference in the pre and post test scores of the group regarding their attitude to English course. The analysis of the results of the one sample K-S test revealed that the study group's pre-test test scores (K-S (Z)=.563;  $p>0.05$ ) and the post-test scores (K-S

(Z)=.519;  $p>0.05$ ) were within a normal distribution. Therefore, the t-test for independent samples, which is a parametric test, was used.

The analysis of study group's pre and post test scores regarding their attitude to English course are presented in Table 1. This table shows that the study group's mean pre test score was 97.19 and the standard deviation was 17.61. The study group's mean post-test score was 90.94 and the standard deviation was 23.24. Table 1 reveals that the difference between the pre and post-test scores of the study group regarding their writing disposition was not statistically significant ( $t=1.694$ ;  $p>0.05$ ). Consequently, Hypothesis 3 was rejected. There are many factors affecting students' attitude to any course. Studying only one skill may not affect attitude so easily. On the other hand when it is considered that the study has continued only for 4 weeks, it can also be hard to change an attitude. This could perhaps stem from the fact that the time allocated for the study was not sufficient to change an attitude positively.

#### **4. Discussion and Conclusion**

The results of the study show that the application of creative writing activities is effective in increasing 7<sup>th</sup> grade students' writing achievement in English. On the other hand, it is also found that using creative writing activities has a positive effect on writing dispositions of 7<sup>th</sup> grade students. Based on these results, it can be suggested that creative writing activities can be used in 7<sup>th</sup> grade English course to increase students' achievement in writing skill and let them to write more. But the mean score obtained from attitude scale of the 7<sup>th</sup> grade students who are attending English course has decreased after the experiment. But this change isn't statistically significant. However, it can be said that studying only writing skill may not affect attitude to a course so easily. On the other hand when it is considered that the study has continued only for 4 weeks, it can also be said that this amount of time is not enough to change an attitude. This could perhaps stem from the fact that the time allocated for the study was not sufficient to change an attitude positively. Colantone, Cunningham-Wetmore and Dreznes (1998) in their study which was used writing creative programme in 3 different schools for 8 weeks time and within the pre and post test design, analysis strategies and creative writing was used in the study. According to post test results, creative writing skills and the writing fluency of the students have increased. This study's result aligns well with the present study's writing test results. Dai (2010) in the study which aiming to explore the teaching of creative writing in English to sophomores in a university of China suggested that the creative writing course allowed students the freedom to explore different aspects of their lives; their language proficiency improved. It has not only changed students' attitudes towards writing, but also helped them grow and know each other better. Erdoğan (2012) in the study to find out the effects of creative writing, collaborative creative writing and writing practices of Primary Turkish Education Programme on student's written expression, attitude towards writing and opinions of teachers' and students' regarding to the course has found that as a result between the gain scores of experimental and control groups in favour of writing expression and attitude towards writing significant differences supporting the experimental group. Between the gain scores of 1st and 2nd experimental groups in favour of writing expression and attitude towards writing significant differences were found supporting the 1st experimental group. Duran (2010), in the research the effect of creative writing techniques on the development of written expression skills of students in the first stage of primary education was analyzed conceptually. It was found out that the development of writing skills of students in the first stage of primary education was affected positively by the activity which was prepared in accordance with the creative writing techniques. Duran's study also aligns well with the present study findings. Both studies claim that writing skill of students are positively affected by creative writing activities. Kuvanç (2008) indicated that using creative writing activities was effective on the increase of vocabulary of the students; Mollaoğlu (2002) highlights that after implementing the creative writing skill, there was an improvement on the German vocabulary repertoires of the students. Akkaya (2011) in a study to show the effectiveness of creative writing techniques on the students' attitudes in Turkish Course has done and the experimental group were divided into two creative writing lessons and information provided about techniques. Experiment group, 8 weeks, were conducted in two hours in a week writing creative writing techniques. According to the findings, as a result of the statistical analysis of data gathered in research it is revealed that the exercises related to creative writing affected the attitudes of the students towards writing positively. But in the present study, it is found that attitude to English course are not changed positively.

Tütüniş and Küçükali (2014) have conducted their study to find an answer to the question ‘Can we improve our students’ writing skills in English if we apply creative writing techniques as a classroom process?’. As a result they have claimed that the creative writing training had a positive effect on students’ writing skills. There is a significant difference between the experimental and the control groups. The results reveal that the experimental group benefited highly from the study. This study also claims that creative writing activities had a positive effect on student’s writing skill so that both studies support each other’s findings. Tüfekçioğlu (2010), in the study named “examination of writing skill in terms of some variables” found that composition writing success of participants which is related with gender and noting conditions is also related with their writing disposition. Tüfekçioğlu’s findings and this present study’s findings go well with each other because this study claims that writing disposition is also affected by creative writing activities. Aktaş (2009) indicated the study which aiming at evaluating A2 level Writing ability based on creative writing approach of European Language Portfolio in Common European Framework in Italian Language it has been found that the writing processes and the competence perception of learners became effective. Aktaş’s study also goes well with the present study in terms of writing process. Similar researches can be done in the native language of students. And also in this study attitude and writing disposition variables are taken into account only and measured the effect on them but for further research some other variables such as writing fluency, attitude to writing can also be studied. Consequently, some suggestions can be done for the English language teachers; creative writing activities are suggested to be integrated in writing classes in English language classes. And writing skill should be valued as much as other skills and be carefully studied on this skill. It is also suggested that the syllabus of English language course for elementary schools in Turkey may be revised and implemented some creative writing activities.

## References

- Akkaya, N.(2011). İlköğretim 6. sınıf Türkçe dersinde yaratıcı yazma yaklaşımının Türkçe dersine yönelik tutuma etkisi, *Buca Eğitim Fakültesi Dergisi*, 30, 311-319.
- Aktaş, M. (2009). *Yabancı dil öğretiminde yaratıcı yazmanın başarıya ve yazılı anlatıma etkisi* (doktora tezi). Ankara Üniversitesi, Sosyal Bilimler Enstitüsü, Ankara.
- Balcı, A. (2011). *Sosyal bilimlerde araştırma yöntem,teknik ve ilkeler* (9.baskı). Ankara: Pegem Akademi.
- Barbot, B., Tan, M., Randi, J. Santa-Donato, G. and Grigorenko, E. L. (2012). Essential skills for creative writing: Integrating multiple domain-specific perspectives. *Thinking Skills and Creativity*, 7, 209-223.
- Baş, G. (2012). İlköğretim İngilizce dersine yönelik tutum ölçeği: geçerlik ve güvenilirlik çalışması. *International Online Journal of Educational Sciences*, 4(2), 411-424.
- Boden, M. A. (2001). Creativity and knowledge in A. Craft, B. Jeffrey, and M. Leibling (eds.). *Creativity in Education*. London: Continuum.
- Büyükoztürk Ş., Çakmak, E. Ç., Akgün, Ö. E., Karadeniz, Ş. ve Demirel, F. (2013). *Bilimsel araştırma yöntemleri*. (15. baskı). Ankara : Pegem Akademi.
- Colantone, L., Cunnigham-Wetmore, M. and Dreznes, J. (1998). *Improving creative writing*. Retrieved from ERIC database (ED420077).
- Craik, F.I.M and Lockhart, R.S. (1972). Levels of processing : a Framework for memory research. *Journal for verbal learning and Verbal Behaviour II* : 617 – 684.
- Creswell, J. W. (2003). *Research design: Qualitative, quantitative and mixed method approaches* (2nd ed.). Thousand Oaks, California: Sage Publications.
- Dai, F. (2010). English language creative writing in mainland China. *World Englishes*, 29(4), 546-556.
- Demir, T. (2013). İlköğretim öğrencilerinin yaratıcı yazma becerileri ile yazma özyeterlik algısı ilişkisi üzerine bir çalışma. *International Journal of Turkish Literature Culture Education*, 2(1), 84-114.
- Duran, S. (2010). *Yaratıcı yazma yaklaşımının yazılı anlatım becerisinin gelişimine etkisi*(yüksek lisans tezi). Trakya Üniversitesi, Sosyal Bilimler Enstitüsü, Edirne.
- Eckhoff, A. and Urbach, J. (2008). Understanding Imaginative Thinking During Childhood: Sociocultural Conceptions of Creativity and Imaginative Thought. *Early Childhood Education Journal*, 36, 179-185.
- Erdoğan, Ö. (2012). *Süreç temelli yaratıcı yazma uygulamalarının yazılı anlatım becerisine ve yazmaya ilişkin tutuma etkisi* (doktora tezi). Hacettepe Üniversitesi, Sosyal Bilimler Enstitüsü, Ankara.
- Essex, C. (1996). *Teaching creative writing in the elementary school*. Retrieved from ERIC database.(ED391182).
- Everett, N. (2005). Creative writing and English. *The Cambridge Quarterly*,34(3), 231-242. doi: 10.1093/camqtly/bfi026.
- Harmer, J. (2004). *How to teach writing*. Malaysia: Pearson Education Limited.
- İşeri, K. and Ünal, E. (2010). Yazma eğilimi ölçeğinin Türkçeye uyarlanması. *Eğitim ve Bilim*, 35(155), 104-117.
- Jacobs. H. L., Zingraf, S. A., Wormuth, D. R., Hartfield, V. F., and Hughey, J. B. (1981). *Testing ESL compositions: a practical approach*. Rowley, Mass: Newbury House.
- Kuvanç, E. B. (2008). *Yaratıcı yazma tekniklerinin öğrencilerin Türkçe dersine ilişkin tutumlarına ve Türkçe dersindeki başarılarına etkisi* (yüksek lisans tezi). Dokuz Eylül Üniversitesi, Eğitim Bilimleri Enstitüsü, İzmir.
- Larkin, S. (2009). Socially mediated metacognition and learning to write. *Thinking Skills and Creativity*, 4, 149-159.



- McVey, D. (2008). Why all writing is creative writing. *Innovations in Education and Teaching International*, 45(3), 280-289.
- Mollaoğlu, A. (2002). *Yaratıcı yazma ilkelerinin ve yöntemlerinin Almanca dil dersinde uygulanması ve öğrencilerin yazma becerisinin geliştirilmesi* (doktora tezi). Hacettepe Üniversitesi, Sosyal Bilimler Enstitüsü, Ankara.
- MoNE (2011). *Ortaöğretim kurumları İngilizce dersi öğretim programı*. Ankara.
- Monis, M. and Rodriques, M. V. (2012). Teaching creative writing in English language classroom. *Indian Streams Research Journal*, 2(10).
- Oral, G. (2012). *Yine yazı yazıyoruz*. Ankara: Pegem Akademi..
- Piazza, C. L. and Siebert, C. F. (2008). Development and validation of a writing dispositions scale for elementary and middle school students. *The Journal of Educational Research*, 101(5), 275-285.
- Raimes, A. (1983). *Techniques in teaching writing*. London: Oxford University Press.
- Runco, M. A. (2004). Creativity. *Annual Review of Psychology*, 55, 657-687.
- Sternberg, R. J. (2009), Foreword, Scott Barry Kaufman and James C. Kaufman (eds.) *The Psychology of Creative Writing*. Cambridge University Press.
- Temizkan, M. (2011). The effect of creative writing activities on the story writing skill. *Educational Sciences: Theory & Practice*, 11(1), 933-939.
- Tüfekçioğlu, B. (2010). Yazma becerisinin bazı değişkenler açısından incelenmesi, *Dil Dergisi*, 149, 30-45.
- Tütüniş, B. and Küçükali, S. (2014). The impact of creative writing on foreign language (English) proficiency development, *International Online Journal of Education and Teaching*, 1(2).

# Effects of English spelling learning experience through a mobile LINE APP for college students

Ru-Chu Shih<sup>a</sup>, Chunyi Lee<sup>a</sup>, & Tsai-Feng Cheng<sup>b</sup>

<sup>a</sup>National Pingtung University of Science and Technology, Pingtung 912, Taiwan

<sup>b</sup>National Kaohsiung Normal University, Kaohsiung, 802, Taiwan

---

## Abstract

The growing development in communication technology changes personal habit in retrieving information. Therefore, this advance has created substantial opportunities for educators to engage students in language learning. This study aims to discover the effects of integrating ubiquitous learning into an English spelling course for college students through the blended teaching approach. A total of 29 college students participated in a 6-week experiment. Data collected from a pre-assessment, a post-assessment, and a survey questionnaire on learning experience were adopted as the instruments and analyzed in this research. In accordance with the results, that the students acquire the ability and the skills in spelling is observed. Moreover, a positive learning mood is shown through this App-based spelling learning. Finally, these results might shed lights on ESL instructors with enthusiasms in mobile assisted language learning and spelling ability enhancements.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* blended teaching, LINE APP, mobile assisted language learning (MALL)

---

## Introduction

With the advanced development of information and communication technology, educators have had substantial opportunities to integrate the technology into language learning and that benefits the students' learning achievement (Chinnery, 2006). The integration of electronic learning (E-learning) into tradition learning via blended learning (BL) approaches has been widely accepted in higher education (Evans, 2008). Previous research further proves that blended learning/ the blend teaching approach have positive impact on learning achievement (Osguthorpe & Graham, 2003; Shih, 2010, 2013). Even though E-learning characterizes its flexibilities in learning paces, time, and spaces (Jia et al.: 2012), the immobility of such working station as desktop PCs and e-learning platforms cause the lag in learner's reading pushed information and the time gap in interaction between educators and learners, which eliminates learning effectiveness. In other words, learner's achievement depends on the accessibility and convenience for a learner. The advancing mobile technology, then, has this problem solved. The increased mobile technology such as smartphones and other mobile devices has applied to support language learning (MALL). The affordances of MALL and the capabilities of smartphones are mutually supplementary. The portability of mobile devices with internet provides users with great conveniences and a learner-centered learning mode which allows real-time learning (Evans, 2007). Additionally, the functions and the user's friendly interface of smartphones, (e.g. recording) is even superior to a desktop PC, typically having a relatively large screen and an operating system capable of running general-purpose applications. These features support the affordance of MALL the ubiquitous access to learning that the learners have reception. With those advantages of mobile tech and MALL, E-mails (Thornton & Houser, 2005), podcast (Evans, 2007), and recording features (Gromik, 2012) of mobile phones have been studied for MALL. These researches, consequently, demonstrated strengths, effectiveness, and positive feedbacks from the learners. However, few studies, or scattered case studies on smartphones APPs for ESL learning

through blended learning has been done. This paper aims to ascertain the effectiveness and perceptions of learners in the utilization of APPs on a smartphone through BL in English spelling course in a university of science and technology. Additionally, the learner's learning through a smartphone APP for ESL learning is also delved.

## Method

In this blended teaching with LINE App, 29 subjects were involved. Lectures were given in class while practices were given via LINE App on a smartphone. Through this teaching and learning model, the students are expected to acquire the skills of spelling.

University students from different colleges volunteered to join in this case study run in the Basic English course on English spelling, an optional course. 29 participants of a spelling course engaged in this case study involving with both qualitative and quantitative methods. For discovering learning effectiveness of the students, we conducted a pre-test and a post-test on them. This study aims to exploit if the students make progress in their English spelling ability by doing assignments pushed onto LINE application on their smartphone, besides the traditional classroom learning. This optional course of English spelling runs for 18 weeks. The experiment was carried out in the first 6 weeks when phonics and K.K. were taught based on the syllabus.

In class teaching, short vowels, consonants, distinguishing stress, and syllables were the teaching aims in class within these 6 weeks. Consonants were taught in the first two hours to construct the base of word spelling. In the following 5 weeks, one short vowel was introduced in the weekly lecture. In the lesson, phonetics and K.K. were also taught to pronounce and note the pronunciation of a word. As the course went on, word selection varied from monosyllabic, multisyllabic, to polysyllabic words. Also, marking the stress was taught.

For practices after class, the 29 participants were invited to join an online group opened by the teacher on LINE App. One exercise with 4 words was pushed to the LINE group Spelling on Mondays, Wednesdays, and Thursdays in the form of an audiovisual file. Their answers should be submitted by 12 a.m. with Chinese translation via personal dialogue window instead of posting them in the LINE group window. The teacher used the recording application of a smartphone to record his pronunciation of four selected words chosen from either handouts, or vocabulary list of TOEIC, based on the topic of each week. The level of difficulty of each exercise gradually became difficult in word selection from and then out of handouts, as well as in vocabulary with monosyllable and then with polysyllable. All participants were requested to look up their spelling in a dictionary to assure their correct spelling. When the teacher received the notice from LINE App, the teacher sent an icon to give praise to the students' excellent job, or gave instructions to guide them do reattempt. The test questions in pre- and post-assessment are identical to examine the participants in five aspects, including consonants, vowels, alphabet order by sounds, syllables, and stress. By comparing the results of both assessments, we could learn an individual's achievement in these different parts.

## Results & Discussion

Table 1. Results of Paired Sample t test on the students' performance

		Paired Difference							Sig. (2-tailed)
		Mean	SD	Standard error mean	95% Confidence Interval of the Difference		t	df	
					lower	upper			
Pair 1	whole pretest-posttest	-12.0	9.06	1.68	-15.48	-8.58	-7.15	28	.000
Pair 2	precon-postcon	.068	1.25	.23	-.40	.54	.29	28	.769
Pair 3	prevowel-postvowel	-2.17	1.58	.29	-2.77	-1.57	-7.39	28	.000
		432							

Pair 4	prephoneme- postphoneme	-.82	1.77	.32	-1.50	-.15	-2.51	28	.018
Pair 5	presyllable- postsyllable	-.86	1.45	.27	-1.41	-.30	-3.18	28	.004
Pair 6	prestress-poststress	-.27	1.41	.26	-.81	.26	-1.05	28	.302

Table 1 shows the results of paired sample t test on the students' performance, including the pre- and post-assessment of the overall performance, consonant learning, vowel learning, phoneme awareness, syllable learning, and stress marking. Among these six areas, the overall performance, vowel learning, scramble, and syllable learning reached significant level ( $t=-7.15$ ,  $df=28$ ,  $sig=.000$ ;  $t=.29$ ,  $df=28$ ,  $sig=.000$ ;  $t=-7.39$ ,  $df=28$ ,  $sig=.018$ ;  $t=-3.18$ ,  $df=28$ ,  $sig=.004$ ).

To acquire spelling ability, a learner should be able to listen to vowels and consonants and to listen to phonemes and syllables. These figures in Table 1 present that the students have made significant progress in their overall achievement in vowel learning, phonemes by sound, and syllable marking after incorporating mobile LINE APP into English spelling class. The outcome demonstrates that with an intensive practice, as be carried out in this case study, can help the learners distinguish vowels. Additionally, the learners can note down alphabets of a word by listening to its pronunciation. They have developed the ability in distinguishing syllables in a word, which is crucial to spell a word in segments with its pronunciation.

**Table 2. Descriptive Results of the Survey Questionnaire**

	N	Min.	Max.	Mean	SD
SEX	29	1.00	2.00	1.3939	.49620
College	29	1.00	5.00	2.3030	1.38033
A1	29	1.00	5.00	3.2424	.79177
A2	29	1.00	5.00	3.6970	1.15879
A3	29	2.00	5.00	3.4242	.70844
A4	29	2.00	5.00	3.5152	.87039
B1	29	1.00	5.00	3.9091	.84275
B2	29	2.00	5.00	3.9697	.72822
B3	29	2.00	5.00	4.0606	.89928
B4	29	2.00	5.00	3.9394	.82687
B5	29	3.00	5.00	4.0909	.76500
B6	29	2.00	5.00	3.6970	.98377
B7	29	3.00	5.00	4.1515	.71244
B8	29	2.00	5.00	4.0909	.76500
C1	29	2.00	5.00	3.7879	.73983
C2	29	2.00	5.00	3.8485	.66714
C3	29	2.00	5.00	4.0303	.84723
C4	29	2.00	5.00	3.8788	.78093
C5	29	2.00	5.00	4.0303	.80951
D1	29	3.00	5.00	4.1515	.66714
D2	29	3.00	5.00	4.1515	.66714
	433				

D3	29	2.00	5.00	3.7273	.87581
D4	29	1.00	5.00	3.5455	.97118
D5	29	1.00	5.00	2.4848	1.20211
D6	29	1.00	5.00	3.5152	1.17583
D7	29	2.00	5.00	4.0606	.86384
E1	29	3.00	5.00	4.2121	.59987
E2	29	3.00	5.00	4.0606	.70442
E3	29	3.00	5.00	3.9697	.72822
E4	29	3.00	5.00	3.8788	.64988
E5	29	2.00	5.00	3.7576	.90244
F1	29	3.00	5.00	4.1818	.58387
F2	29	3.00	5.00	4.0909	.67840
F3	29	2.00	5.00	3.9394	.86384
F4	29	1.00	5.00	3.7879	.92728
F5	29	3.00	5.00	4.1818	.72692

Table 2 shows the results of the students' satisfaction toward English spelling learning. The 34 questions of the questionnaire obtained mean scores ranging from 2.4848 to 4.4000, indicating the students' possess moderate to high learning satisfaction toward incorporating mobile LINE APP into English spell learning. Particularly, QD5: I won't send the answers to my teacher because I am afraid of giving the teacher bad impression on me obtained a mean score of 2.4848, indicating the students would still send the answers back to the teachers and are not afraid of giving the teacher bad impression. Also, QA1: I always open the audio file on LINE APP when I receive a message from my teacher obtained a mean score of 3.2424, indicating the students moderately agreed that they would either respond the message right away or postpone it till later.

In regarding to the development of the ability of English spelling via LINE APP of mobile devices, QB7: Doing exercises after class let me review spelling rules taught in class constantly? reached a mean score of 4.1515, demonstrating that these after-class exercises keep the learners getting handful with the spelling rules. So that QB8: After-class exercises can definitely strengthen my ability in English spelling gained the mean score of 4.0909. This revealed that learning English spelling with LINE APP on a smartphone is found positive results in terms of developing the learning habits of spelling learning.

From the aspect of learner's learning emotion, QD1: Positive remarks and comments from the teacher encourage me and make me feel more confident in learning spelling and QD2: The reply from the teacher can motivate me to do these after-class exercises are both obtained the mean score of 4.1515, while QD6: As I listen to new words in the exercise recording on LINE APP via the smartphone, I feel less confident in providing my answers gained a mean score of 2.4848. These figures present that the learners do need compliments and admirations to keep them up with the learning track and build up their confidence in learning English. Therefore, the learners had actually built up a certain level of confident to face the challenge in vocabulary, as the result of QD6 shows in Table 2.

For the practical use of applying LINE APP on mobile devices to learning English, QE1: I can study English on LINE APP whenever I can access to the Internet gained a mean score of 4.2121. This result demonstrates that LINE APP can be a very useful and convenient tool to learn English. QF1: Learning English with a smartphone is interesting as if the internet access is stable and it is compulsory application in a course, reached the mean score of 4.1818. and QF5: Overall, I think LINE APP on a smartphone as a learning device can benefit English learning obtained the mean score of 4.1818. Both figures indicate that the learners hold a positive attitude toward the application of LINE APP on a mobile device to learning English.

## Conclusion

As information and communication technology is advancing, e-learning leads learning to cross the border of a classroom space and characterizes flexibilities in learning pace, time, and spaces. The mobile technology, then, increase the accessibility and convenience that boost the learning effectiveness. Research on smartphones for mobile assisted language learning (MALL) has presented positive results, few researchers, however, have studied APPs on a smartphone for MALL. The results expose that this case study ascertains the effectiveness and perceptions of learners in the utilization of APPs for smartphones through BL in English spelling course in a university of science and technology. The students have developed the capabilities in English spelling. The results of the assessments also demonstrate a significant outcome in learning achievement of all the participants. To inspect in the statistics of the results of pre-assessment and post-assessment, the participants made a good progress in the overall achievement. They especially made an obvious progress in listening to vowels, phonemes, and syllables.

In addition to the progress made in acquiring spelling ability and the development of learning habits in English spelling, the questionnaire reveals learner's positive learning mood in learning spelling. The learners have developed their confidence in learning spelling and no fear of learning new vocabulary by listening to vowels, consonants, and syllables. As they received the instructions for spelling correction in exercises, they could still do and submit their reattempt to complete their assignment. The teacher's reply, in all, plays an important role in driving the learners to complete each exercise on a smartphone.

Consequently, this case study presents a promising future in applying LINE APP, or other similar APPs on a smartphone to ESL learning, for it is not restricted to learning pace, time, and spaces for learners. Furthermore, it the learners benefits from the interaction of this mobile learning in terms of their learning emotion.

## References

- Chinnery, G. M. (2006) Emerging Technologies Going to the MALL: Mobile Assisted Language Learning; *Language Learning & Technology*, 10 (1), 9-16.
- Evans, C. (2008). The effectiveness of m-learning in the form of podcast revision lectures in higher education. *Computers & Education*, 50(2), 491-498.
- Gromik, N. A. (2012). Cell phone video recording feature as a language learning tool: A case study. *Computers & Education*, 58(1), 223-230.
- Jia, J., Chen, Y., Ding, Z., & Ruan, M. (2012). Effects of a vocabulary acquisition and assessment system on students' performance in a blended learning class for English subject. *Computers & Education*, 58(1), 63-76.
- Osguthorpe TR Granha RC. Blended learning environments. *Quarterly Review of Distance Education* 2003; 4(3), 227-233.
- Shih, R. C.( 2013). Effect of using Facebook to assist English for Business Communication course instruction. *The Turkish Online Journal of Education al Technology*, 12(1), 52-59.
- Shih, R. C. (2010). Blended learning using video-based blogs: Public speaking for English as a second language students. *Australasian Journal of Education al Technology*, 26(6), 883-897.
- Thornton, P., & Houser, C. (2005). Using mobile phones in English education in Japan. *Journal of Computer Assisted Learning*, 21(3), 217-228.

# Effects of school dropout for transition to adulthood

Carlos Reis

## Introduction

Educational attainment has assumed the status of crucial condition for social adaptation of individuals and the economic growth of societies. This is due, no doubt, to the increasing technological development of our societies that, in an increasingly fast changing pace, have become more competitive, taking as pillars of this competition the production and circulation of information. One can say with Castells (2004), that the technological revolution of information and communication systems played an important instrumental role in the restructuring of the economic system and the development of new modes of production. In the new post-industrial stage, the recent industrial forms of production are increasingly associated with the use of energy and knowledge. For this reason, in today's information society, the intellectual capital of a country becomes the guarantor of its maximum competitiveness and progress.

Being the educational institution the context that, par excellence, cognitively forms subjects and facilitates their access to organized forms of information, it is natural to assume that its effectiveness is, in our days, extremely important both for individuals and societies. In a globalized market economy, for which information technologies holds a key role, the lack of specialized training for workers affects the entire business community and, therefore, School sees itself entrusted with the extensive and complex task of massively educate citizens. That is why the extension of compulsory education has been generalized all over the most developed societies, largely because of the increasing complexity of today's requested competences which have focus attention in the analysis of dropout consequences, as we intend to do in this study.

### 1. Early school leavers: Criteria and data

The concept of early school leavers is clearly differentiated in developing and technologically advanced countries. The later recently imposing themselves compulsory

schooling up to a certain age level, the dropout appears as an exception, for this same character of exceptionality, cannot reach levels of great representativeness. Even so, in the context of the various countries of the European Union, the age of compulsory attendance of the education system admits some extent, which is not without consequences on their own prevalence rates of abandonment.

Moreover, it should be recognized that the heterogeneity of criteria to operationalize the concept of school abandonment often makes it difficult to compare statistical data, even in research arising within the same geographical area, such as the United States of America. For example, Thurlow, Sinclair and Johnson (2002) show that this heterogeneity refers to either the grade or school level taken as a point of withdrawal, whether to the postulated period of absence, either yet the time period stipulated for calculating dropout. Differentiating the different types of statistical calculation of abandonment, the authors distinguish the annual index, the index status and longitudinal or cohort index. The first is measured by the proportion of students who leave school in a given year without completing compulsory education; the second is measured by the proportion of students in the age group of 16 to 24 years that have not completed compulsory education and are not attending school; the third measure refers to the dropout rate of students in a given cohort that was submitted to a follow up confirmation. This longitudinal rate shows generally higher values and calculations are more accurate in such circumstances.

Despite the discrepancy in the adopted criteria, the governmental statistics and the data adduced by various researches provide a fair structured calculation of prevalence rates of school dropout traced in technologically advanced countries. For example, in the U.S., according to the National Center for Education Statistics (2002), the percentage of subjects who did not comply with compulsory education was about 14.5%. According to the same statistics, the most affected group was the American Hispanic group. Indeed, in the age group of 18 to 24 years, only 64% of Hispanics students completed compulsory education in face of a higher percentage of African Americans (84%) and Americans of European origins (92%). Considering the educational objectives postulates for the beginning of the millennium (Goals 2000), the average percentage of dropouts in this country it is still problematic in individual and societal terms, while being



significantly onerous. In reference to the American population, Prevatt and Kelly (2003) have stated, a decade ago, that the negative effects of dropout are severe to society in this group, when we include social minimum income, lower discounts for social security, strong demand for social services and the patterns of poor health of these individuals.

In Portugal, the numbers advanced by official statistics justified the implementation of measures whose efficacy still lacks confirmation. In 2001, 44.6% of young people aged between 18 and 24 years left school without completing secondary education, while the dropout rate before completion of 9th Grade was 2.7% for students between 10 and 15 years old and of 24.6% for young people aged between 18 and 24 years old (INE, 2001, ME, 2003). According to report provided by the National Statistics Institute (INE) to Eurostat, in 2007, a significant decrease of the rate of “early school leavers” was verified, although a percentage of 36.3% of young people aged between 18 and 24 years old had a lower level than the 12th grade and did not attend, in the previous four weeks of data collection, any education or training (INE, 2007; ME, 2007). Still referring to our country, it is worth recording the information gathered in the course of a longitudinal study in progress since 1992/1993, for the district of Coimbra. The study relates to 445 students who, at this very year, attended the 2nd Grade (first cohort), as well as to 448 who were already at 4th Grade of primary education (second cohort). At the time of follow-up, when these students were 17 -18 years old, the prevalence rate of early withdrawal (leaving school without completing 9th Grade) reached 18% for the first cohort and 15.3% for the second (Taborda Simões, Fonseca, Formosinho Valley Dias & Lopes, 2008). Meanwhile, a data update, still to be confirmed, found a decrease of the percentage of subjects who claim not to have completed compulsory education.

## **2. Dropout major implications**

Studies focused on school leavers has brought to light some of the negative effects such phenomenon may have to the economic competitiveness of a country. According to data collected from twenty years ago, unemployment levels was indeed higher among individuals

who have not completed compulsory education and their labor income was also significantly lower than those of finished compulsory education (Coley, 1995; Langevin, 1999).

However, the negative implications of early school leavers are not restricted to employment level; they also affect the levels of health and social integration of individuals. Thus, an aspect explored, since the last decades of the previous century, refers to the implications of early interruption of studies in terms of crime (e.g.: Drapela, 2005; Hirschi, 1969; Jarpoura, 1993; Roderick, 1993; Steinberg, Blinde & Chan, 1984; Thornberry, Christenson & Moore, 1985; Warr, 1993; Wehlage & Rutter, 1986). The theoretical and practical relevance of such research is unquestionable, although the results were not always convergent, and therefore do not allow for a unanimous conclusion. In fact, the different interpretive frameworks of delinquency posit different explanatory conditions for the phenomenon and implicitly infer different causal directions for establishing a relationship with dropout.

It is also very important that one calls attention to something that many studies have overlooked: the comparative analysis of the levels of anti-sociality among young dropouts and the persistent ones in phases prior to dropout. Indeed, both the “strain theory” (Cohen, 1955; Cloward & Ohlin, 1960; Elliott & Voss, 1974; Wehlage & Rutter, 1986), and the “theory of social control” (Hirschi, 1969) have focused in offenders effects regarding school dropout. From a conceptual point of view and a practical one, it is important to realize, in the wake of longitudinal studies, such as Farrington (1987), the events prior to dropout that could differentiated dropouts and persistent students, particularly as regards the extent and type of antisocial behavior. This is an aspect that the longitudinal study of Coimbra corroborated by establishing that dropouts exhibit much higher rates of anti-social behaviour (Taborda Simões, Lopes & Fonseca, 2011). In this notice, we sought to examine some of the possible implications of abandoning the routes of transition from childhood to adulthood that, in particular, passing through compulsory education entails.

### **3. Early school leavers and paths of transition to adulthood: Analysis of some results of a longitudinal study**

This study raises the question of the possible consequences of dropout. In particular, it seemed important to consider the transition to labor market and the assumption of some indicative “tasks” of adulthood: social and civic engagement, the creation of a family structure, to have children, to become independent in relation to parents, global satisfaction with life and to achieve certain values.

### 3.1. Methodology

#### 3.1.1. *Sample*

The initial sample for this study initially involved three cohorts of boys and girls who, in 1992-1993, attended the 2<sup>nd</sup>, 4<sup>th</sup> and 6<sup>th</sup> grades in public schools in the municipality of Coimbra. Their selection was based on a sampling steps methodology that randomly selected 38 schools from a universe of 106. In turn, the selection of the classes participating in this study was performed by considering the number of establishments from urban-rural context and then applying a random proportional sampling for each selected school (Simões, Ferreira, Fonseca & Rebelo, 1995). The total number of young people until now evaluated in the last phase of this longitudinal study, still ongoing, was 385 for “cohort 2<sup>nd</sup> year” and 305 for “cohort 4<sup>th</sup> year”, representing, respectively, a loss of 13.5% and 31.9% of the initial sample of 1992-1993. At the time of the first evaluation the subjects from “cohort 2<sup>nd</sup> grade” of primary school were on average, of seven years of age.

The subjects were followed up during 21 years and were assessed three times until 2011. Finally, in 2013 we have collected information on various aspects of their present condition, which served as the basis for the study now presented. Of the initial 445 subjects, 52 (11.7%) withdrew, so that the current sample has only 393 individuals: 209 males (53, 2%) and 184 (46, 8%) females.

#### 3.1.2. *Instruments*

We used a set of instruments, some adapted for the Portuguese population but granting its satisfactory psychometric properties. Other relevant information was gathered through a list of

questions prepared specifically for the Longitudinal Study of Coimbra (Gregório, 2005). Some of these questions were adapted from MASPAQ - Mesures de l'Adaptation Sociale et Personnelle pour les Adolescents Québécois (Le Blanc, 1996)

The current analysis relied on a structured interview, which took place in the subjects' own homes or in an agreed place, and included questions about multiple aspects of the now young adults' condition: academic performance, work, love relations, family, health, values, interpersonal relationships, future projects and satisfaction with their current condition. In the pages that follow, we present and discuss the results of an exploratory analysis conducted on some of these data.

### 3.2. Data Analysis

Of the 393 subjects, 48 (12.2%) reported dropout, while 345 (87.8%) manage to conclude the 12<sup>th</sup> grade, although from these only 235 (59.8%) did so in the normal expected time, which corresponds to 68.1% of those who completed secondary school; by contrast, 110 (31.9%) took longer time than expected.

Dropout cases, 38 subjects (9.7%) were male, which corresponds to 79.2% of the total who have not completed compulsory schooling and 10 (2.5%) were female -representing only 20.8% of all the dropout cases. Among those who completed the 12<sup>th</sup> grade, 171 (43.5%) were male and 174 (44.3%) females, which means a gender balance: 49.6% male face 50.4% were female.

In order to check the possible implications of dropout for the transition paths to adulthood, we applied some statistical tests in order to cross the referred factor with indicator expected consequences for adult life, namely comparing such measures in the group of dropouts with those who completed compulsory schooling.

Crossing gender with dropout, we found a significantly higher incidence in males (Pearson Chi-square 14,829; sig. .000), which is consistent with data from other studies (EC, 2009).

As dropouts differentiating parameters we can point out the earliest access to marital and parenting. We found that, among those who completed the 12<sup>th</sup> grade, there is a lower percentage of individuals who are already parents regarding dropouts (Pearson Chi-square 13.299, sig. .001). In fact, the former subjects are also less likely to marry (Pearson Chi 5,063-square; sig. .020). However, with regard to residential autonomy there were no significant differences between the two groups (Pearson Chi-square 0.753, sig. .238).

The table below presents the statistical tests results regarding the “markers” of personal fulfilment that compare those who completed 12<sup>th</sup> grade with dropouts, verifying that the latter report: less satisfaction with life, generally considered; less involvement in community or civic involvement; lower achievement with respect to dimensions such as family, work, education and money. On average, dropouts enter earlier into the labour market, but the average duration of their first job is shorter.

Table 1: Differences between dropouts and those who completed compulsory education (12th grade.)

#### ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Satisfaction with life (Scale of 5 items – rated from -2 to +2)	Between Groups	114.723	1	114.723	5.976	.015
	Within Groups	7217.830	376	19.196		
	Total	7332.553	377			
Involvement in community or civic engagement (Scale 18 items rated from 0 to 3)	Between Groups	440.163	1	440.163	8.312	.004
	Within Groups	19063.152	360	52.953		
	Total	19503.315	361			
Attitudes of civic engagement (Scale 20 items rated from 0 to 3)	Between Groups	494.952	1	494.952	5.102	.024
	Within Groups	36280.186	374	97.006		

Values (Items rated fom 0 to 2).	Total	36775.138	375			
	Within Groups	5372.095	314	17.109		
	Total	5377.177	315			
	Between Groups	127.287	1	127.287	12.315	.001
	Within Groups	3907.070	378	10.336		
	Total	4034.358	379			
	Within Groups	17378.744	357	48.680		
	Total	17491.582	358			
	Within Groups	556.617	130	4.282		
	Total	560.083	131			
	Within Groups	432.313	329	1.314		
	Total	433.776	330			
	Within Groups	2764.093	355	7.786		
	Total	2857.955	356			
	Within Groups	2055.661	328	6.267		
	Total	2174.500	329			
	Between Groups	178.328	1	178.328	29.003	.000
	Within Groups	1961.392	319	6.149		
	Total	2139.720	320			
	Within Groups	2792.611	324	8.619		
	Total	3261.350	325			
	Within Groups	1592.211	376	4.235		
	Total	1606.934	377			
	Within Groups	80.926	303	.267		
	Average duration of first job					

	Total	81.016	304			
	Within Groups	116.020	303	.383		
	Total	116.118	304			
	Within Groups	119.546	302	.396		
	Total	119.602	303			
	Between Groups	727.659	1	727.659	75.680	.000
	Within Groups	3471.008	361	9.615		
Age at first paid employment.	Total	4198.667	362			
	Within Groups	2584.360	355	7.280		
	Total	2793.720	356			

## References

- Balfanz, R., Bridgeland, J., Bruce, M., & Fox, J. Hornig (2013). *Building a Grad Nation: Progress and Challenge in Ending the High School Dropout Epidemic - 2013 Annual Update*. Washington, D.C.: Civic Enterprises, the Everyone Graduates Center at Johns Hopkins University School of Education, America's Promise Alliance, and the Alliance for Excellent Education. Retrieved from [http://www.civicerprises.net/MediaLibrary/Docs/Building-A-Grad-Nation-Report-2013\\_Full\\_v1.pdf](http://www.civicerprises.net/MediaLibrary/Docs/Building-A-Grad-Nation-Report-2013_Full_v1.pdf)
- Castells, M. (2001). *The Internet Galaxy, Reflections on the Internet, Business and Society*. Oxford: Oxford University Press
- Cloward, R. A. & Ohlin, L. E. (1960). *Delinquency and Opportunity: A Theory of Delinquent Gangs*. New York: Free Press.
- Conselho Nacional de Educação (2011). *Estado da Educação 2011. A qualificação dos Portugueses*. Lisboa: Conselho Nacional de Educação.
- Cohen, A. K. (1955). *Delinquent Boys: The Culture of the Gang*. New York: Free Press.
- Coleman, J. S., Campbell, E. Q., Hobson, C. J., McPartand, A. N., Weinfeld, E. D. & York, R. L. (1966). *Equality of Educational Opportunity*. Washington, DC: US Government Printing Office.
- Coley, R. J. (1995). *Dreams deferred: High school dropouts in the United States*. Princeton, NJ: Educational Testing Service. Policy Information Center.
- Drapela, L. A. (2005). Does dropping out of high school cause deviant behavior? An analysis of national education longitudinal study. *Deviant Behavior*, 26, 47-62.
- Elliott, D. S. & Voss, H. L. (1974). *Delinquency and Dropout*. Toronto: Lexington Books.
- European Commission (2011), "Tackling early school leaving: a key contribution to the Europe 2020 Agenda",

- Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Bruxelas, 31.1.2011. COM (2011) 18 final. Consultado a 6 de maio de 2013 em [http://ec.europa.eu/education/school-education/doc/earlycom\\_en.pdf](http://ec.europa.eu/education/school-education/doc/earlycom_en.pdf).
- European Commission (2009). *Gender differences in educational outcomes: study on the measures taken and the current situation in Europe*. EACEA, P 9. Accessed at [www.eurydice.org](http://www.eurydice.org)
- Farrington, D. (1987). Predicting individual crime rates. In D. M. Gottfredson & M. Tonry (Eds.), *Prediction and classification: Criminal justice decision making. Crime and Justice* (vol. 9). Chicago: University of Chicago Press.
- Ferrão, J. (org.) (2001), *Saída Prematura do Sistema Educativo: Aspectos da Situação, Causas e Perspectivas em Termos de Emprego e Formação* (1999-2000)., Lisboa: GEOIDEIA – Observatório do Emprego e Formação.
- Fonseca, A. C., Rebelo, J. A., Taborda Simões, M. C., Formosinho, M. D. & Ferreira, A. (2004). Antisocial behaviour in portuguese schools: A comparison of state and private systems. In R. A. Gonçalves, R. Roesch, C. Machado & F. Winkel (Eds.), *Victims and offenders: Chapters on psychology and law* (pp. 119-126). Brussel: Politea.
- Formosinho, M. D. & Taborda-Simões, M. C. (2006). Perspectivas sobre a problemática do abandono escolar. In M. C. Taborda-Simões, M. T. Machado, M. L. Vale Dias & L. I. Lima (Eds.), *Psicologia do Desenvolvimento: Temas de investigação* (pp. 117-158). Coimbra, Almedina.
- Goals (2000). *Goals 2000: Educate America Act*. Washington, DC: U.S. Department of Education.
- Gregório, M. H. S. (2005). *Comportamento anti-social, saída prematura do ensino regular e trabalho: Um estudo exploratório*. Coimbra: FPCE-Universidade de Coimbra.
- Hirschi, T. (1969). *Causes of Delinquency*. Berkeley: University of California Press.
- INE – Instituto Nacional de Estatística (2001). *XIV Recenseamento Geral da População* (Censos 2001). Lisboa: INE.
- INE – Instituto Nacional de Estatística (2007). *Inquérito ao emprego – 2.º trimestre de 2007*. Accessed at [www.ine.pt](http://www.ine.pt)
- Janosz, M., Le Blanc, M., Boulerice, B. & Tremblay, R. (2000). Predicting different types of school dropouts: A typological approach with two longitudinal samples. *Journal of Educational Psychology*, 92 (1), 171-190.
- Langevin, L. (1999). *L'abandon scolaire: on ne naît pas décrocheur*. Montréal: Les Éditions Logiques.
- Le Blanc, M. (1996). *MASPAQ: Mesures de l'adaptation sociale et personnelle pour les adolescentes québécoises. Manuel et guide d'utilisation*. Montréal: École de Psychoéducation.
- Ministério da Educação (2003). *Cartografia do abandono e insucesso escolar*. Lisboa: ME.
- Ministério da Educação (2007). *Abandono escolar reduzido para 36,3%*. Accessed at [www.portugal.gov.pt](http://www.portugal.gov.pt)
- Mourshed, M. , Farrell, & Barton, D. ( 2012). *Education to employment: Designing a system that works*. Washington: Mc Kinsey `s Company.
- National Center for Education Statistics (2012). *Dropout rates in United States 2012*. Accessed at [nces.ed.gov/programs/coe/indicator\\_coj.asp](http://nces.ed.gov/programs/coe/indicator_coj.asp)
- Pew Research Center. (2010). *Millennials: A portrait of Generation Next*. Washington, DC: Author.



- Prevatt, F. & Kelly, F. D. (2003). Dropping out of school: A review of intervention programs. *Journal of School Psychology*, 41, 377-395.
- Simões, A., Ferreira, J. A., Fonseca, A. C. & Rebelo, J. A. (1995). Um estudo dos distúrbios do comportamento e dificuldades de aprendizagem no ensino básico: Opções metodológicas. *Revista Portuguesa de Pedagogia*, XXIX (3), 55-68.
- Suh, S., Suh, J., & Houston, I. (2007). Predictors of categorical at-risk high school dropouts. *Journal of Counseling and Development*, 85, 196-203.
- Taborda, M. C., Formosinho, M. & Fonseca, A. C. (2007). Abandono escolar temprano: Datos de un estudio de la Región Centro de Portugal. *INFAD – Revista de Psicología*, XIX, 1 (1), 177-191.
- Taborda-Simões, M. C., Fonseca, A. C., Formosinho, M. D., Vale Dias, M. L. & Lopes, M. C. (2008). Abandono escolar precoce: Dados de uma investigação empírica. *Revista Portuguesa de Pedagogia*, 42-1, 135-151
- Taborda-Simões, M. C., Fonseca, A. C. & Lopes, M. C. (2011). Abandono escolar precoce e comportamento anti-social na adolescência: Dados de um estudo empírico. *Revista Portuguesa de Pedagogia*, ano 45-2, 187-198.
- Thurlow, M. L., Sinclair, M. F. & Johnson, D. R. (2002). Students with disabilities who drop out of school: Implications for policy and practice. *Issue Brief*, I (2). Minneapolis, MN: University of Minnesota, Institute on Community Integration, National Center on Secondary Education and Transition.
- U.S. Department of Education (2000). *Reaching the goals: Goal 2- High school completion*. Washington, DC: Office of Educational Research and Improvement.
- Wehladge, G. G. & Rutter, R. A. (1986). Dropping out: How much do schools contribute to the problem? *Teachers College Record*, 87,374-392.

# Effects of teaching strategies supported by information and communication technologies on satisfaction and learning of college students

Andreia Araujo Lima Torres<sup>a\*</sup>, Gardênia da Silva Abbad<sup>b</sup>, Kelb Bousquet-Santos<sup>b</sup>

<sup>a</sup>PhD Candidate at University of Brasilia – Health Education Project, Institute of Psychology, Brazil

<sup>b</sup>Professor, University of Brasilia, Brazil

---

**This work has been supported by CAPES and FAPDF**

## Abstract

Studies show that Brazil is currently experiencing a double burden of nutritional problems related to malnutrition and other nutritional deficiencies on one side and the onset of the binomial overweight / obesity on a population scale on the other side. Such disorders are linked to complex factors. Therefore it is understood that their resolution will only be possible with the involvement of the whole society. In Brazil, health courses do not address, except for nutritionists and, to some extent, nurses, specific contents on human nutrition, compromising the action of other health professionals in the area. This study aims to contribute to the teaching of basic nutrition content in a course offered to undergraduate healthcare students of a public college in Brazil. The course was restructured in order to meet the educational objectives previously set. New features, educational technologies and materials based on instructional theories and instructional design were developed and included on the course. The main results on satisfaction and learning are presented.

© 2015 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** Learning in Health Education; Multimedia features; New information technologies and communication; Human Nutrition

---

## Introduction

Even within a context of economic, political and social turmoil, Brazil has changed substantially over the last fifty years due to external factors, derived from a progressively globalized world, and also due to autonomous circumstances associated to its own historical and cultural processes (Batista son & Rissin, 2003). However, the country still faces significant regional disparities in income distribution, contributing to the complex epidemiological situation of nutritional problems, manifested by a double burden of diseases, in which it is observed on one side malnutrition and nutritional deficiencies (especially of iron, iodine and vitamin A), and on the other side problems related to the excessive consumption of processed foods and the appearance of the binomial overweight / obesity on a population scale (Malta et al, 2006; Victora et al, 2011; Mendes, 2012).

One of the causes that explain the increase of the population weight is the change in the eating habits in Brazil. Recent surveys show that 34.2% of the population consumes fatty meat, 56.4% eat whole dairy products, 28.1% make regular use (5 times per week) of sodas and only 20.2% of the population consume daily the adequate amount of fruits and vegetables (IBGE, 2010; Brazil, 2012). There is also evidence of a relationship between poor diet and

---

\* Corresponding author. Tel.: +55-61-3201-1029  
E-mail address: andreiat@camposetorres.com.br

chronic diseases, among them obesity, cardiovascular diseases and diabetes (Monteiro et al., 2010). These diseases elevate the costs of the health system and, if not prevented and managed properly, demand increasing healthcare investments, which justifies the adoption of integrated sustainable strategies for their prevention and control (Malta et al. 2006). The solution requires interventions at the macro, meso and micro levels, involving government, industry, school, health services, health professionals and families (OECD, 2014).

In Brazil the training of health professionals is done predominantly through classroom courses (Ruiz-Moreno, Milk, & Ajzen, 2013), guided by the traditional pedagogy, but without delivering the desired professionals needed by the population (Buchabqui, Capp, & Petuco, 2006) and without generating relevant changes in current health practices (Batista, & Gonçalves, 2011). Thus, it is important to test differentiated educational strategies in an attempt to reduce the imbalance between the skills of health professionals and the needs of the population. Information and Communication Technologies (ICTs) are being used by educators as a strategy capable to induce the development of new learning methods, that are more dynamic and individualized and able to facilitate the teaching-learning process, contributing to the development of key skills in the area (Westera 2012).

Thus, the central aim of this research is to restructure a basic nutrition course, assessing the effects of new educational methods with the inclusion of teaching strategies supported by information and communication technologies on satisfaction and learning of the students enrolled in it. The hypothesis is that the development of courses and materials supported by a theoretical and empirical research base produce greater satisfaction and lead to greater gains in student's knowledge.

## Method

The 30-hour Basic Nutrition presential course held at a Brazilian public university is offered to students of 5 undergraduate courses. It is a mandatory course for nursing students and an elective course to pharmacy, physiotherapy, occupational therapy and public health students. After the analysis of the profile of students, interviews with the professor responsible for the course and analysis of materials provided the course was restructured according to the cognitive theory, as well as instructional theories. As a complement the Food Guide for the Brazilian Population (Brazil, 2005a) was analyzed to ensure that the minimum knowledge of the area were identified and compared to the themes of the syllabus available.

The restructuring of the course consisted of: (1) defining and classifying educational goals; (2) defining the sequence of instruction; (3) defining the educational procedures; (4) preparing the contents and materials for each class; (5) selecting the media for material distribution (6) developing the presentation format of the content in the virtual environment (Moodle); (7) developing learning and satisfaction assessment tools; (8) training tutors.

The contents extracted from the food guide for the Brazilian population, and the interview with the professor in charge of the course, were transformed into educational objectives (Bloom et al., 1956). The original sequence of the course was kept, with the exclusion of the subject hospital malnutrition and the inclusion of a review class. The learning situations (procedures and educational events) were chosen in order to facilitate the acquisition of the skills described in the educational objectives. There are different strategies, techniques or educational events used for the learner to acquire the competencies defined in the educational objectives (Borges-Andrade, 1982).

Appropriate references were found in the form of scientific articles and textbooks. They were chosen along with the professor and made available at Moodle. However there were not found adequate multimedia materials in Portuguese that would meet the instructional objects. Therefore, 8 podcasts and 6 video classes were recorded specially for the course.

For the development of instruments to assess satisfaction of participants regarding the course, the professor, the materials, the virtual learning environment and the activities proposed the scales of Abbad et al (2012) were adapted. The satisfaction scale was made available at Moodle by the end of the term. The development of the instruments to assess student's learning was supported by Anderson's taxonomy.

The new instructional design was tested during the period ranging from April to July 2013. The presential classes were held once a week with the duration of 1 hour and 40 minutes. In the first lesson, the syllabus was read and the students gained access to Moodle. The new features available, the strategies that would be adopted every lesson as

well as the evaluation methods were explained. No ambience to the Moodle environment was required because the students had already taken other courses that used the same virtual learning platform. Even so, 2 tutors and means of contact were made available. The learning platform contained hyperlinks, audio files (podcasts), video classes, films, a free nutrition software (NutWin – UNIFESP), suggested readings and classes slides. The learning platform was organized by class including a study guide with all materials and its links.

For the efficacy evaluation the final grades, students' performance during the proposed activities and their reactions (degree of satisfaction) were correlated. The statistical analyzes were conducted using the Statistical Package for Social Sciences (SPSS, version 20).

#### 4. Results

The course was offered during the first semester of 2013. There were 47 enrolled students, being 40 females (85.1%) and 7 males (14.9%). Of these, 43 were 25 years or younger (91.4%) and 4 were above 26 years of age (8.6%).

The reactions of students were assessed in two ways, by the answers of students in May 2013 through a forum at Moodle and by the end of the course, through the application of the instrument of satisfaction. The first assessment occurred after the first test and aimed to assess if students considered the podcasts and video classes useful. Only 28 students (59,57%) answered the forum questions that showed that 50% of the respondents considered podcasts very important for learning, 29% considered them important and 7% of medium importance. No student considered podcasts unimportant and 71% of the respondents reported that they should be kept in subsequent modules. Only 7% of students would like them to be eliminated and the rest were indifferent. As for the video classes 43% of the respondents considered them as very important, 36% important and 7% of medium importance. Most students (86%) agreed that video classes helped learning and should be maintained during the whole course, but 14% of them were indifferent and no students asked them to be suppressed. Thus, we opted for the maintenance of these media in the other modules of the course.

At the end of the course (july/2013) the adapted instrument of satisfaction evaluation was applied. The scale provided to students varied from 0 to 10. Overall, the course and the professors were well evaluated by students. However, some items can be highlighted as deficient (items below average 7.0), according to the opinion of students: practice workload was considered insufficient. On the other hand students thought the amount of paper reviews, forums and portfolios excessive for the course. In addition, the group did not consider forums and portfolios as relevant for learning as other strategies. The second part of the instrument was meant to evaluate study conditions. The lowest score (4.61) showed that students find it difficult to reconcile their various academic activities with the nutrition course. They also reported not having studied with the regularity needed for optimal performance during the course (Table 1).

Table 1. Reactions (degree of satisfaction) of the students by the end of the semester.

Item	Mean	Median	Mode	Standard Deviation
Clear definition of objectives	8,38	9	10	2,13
Compatibility of goals with your needs in the area	8,56	9	10	1,66
Theoretical hours (face-to-face course)	7,94	8	10	2,27
Practice workload	6,56	7	9	2,82
Sequence of modules	8,56	9	10	1,77
Quality of face-to-face lessons	8,94	9	10	1,20
Quality of class slides provided	9,05	10	10	1,25

Quality of video classes	8,97	9	10	1,20
Quality of podcasts	9,07	10	10	1,22
Usefulness of knowledge for personal life	9,28	10	10	1,05
Opportunities to applying the knowledge	7,46	8	10	2,29
Assimilation of knowledge	8,15	8	8	1,20
Ability to impart knowledge to others	8,23	8	8	1,01
Intend to implement knowledge in faculty	8,6	9	7	1,42
Probability of finding personal life opportunities for the application of the knowledge learned	8,25	8	10	1,81
Number of paper reviews	5,53	5	5	3,10
Importance of paper reviews for learning	7,61	8	10	2,14
Number of Moodle forums	5,5	5	5	3,08
Importance of Moodle forums for learning	6,76	7	10	2,67
Number of case studies	7,69	8	5	2,98
Importance of case studies for learning	8,1	8	8	1,30
Number of tests	8,79	10	10	2,04
Importance of tests for learning	8,6	8	8	1,3
Amount of tasks in the portfolio	4,94	4	0	3,99
Importance of portfolio for learning	6,30	7	10	3,22
Moodle: Visual presentation	8,89	10	10	1,65
Moodle: Resources (links, podcasts, video classes)	8,66	9	10	1,56
Moodle: clarity of messages	8,23	9	10	1,67
Moodle: Amount of resources	8,43	9	10	1,91
Moodle: color, type and size of the texts	8,80	9,5	10	1,68
Moodle: ease of use	7,92	9	10	2,67
Prior experience in computer use and Moodle facilitated the course?	8,17	9	10	2,67
Ease of combining the course with other university obligations	4,61	4	2	2,87
Ease of combining the course with personal life	6,02	7	8	2,96
Access to virtual environment with sufficient frequency	7,15	8	8	2,75
Frequency of study	6,58	7	7	2,29
Quality of internet connection	8,80	9,50	10	1,7
Your health	6,84	7	10	2,52
Your family's health	8,12	9	10	2,45

Table 2 shows the result of students' satisfaction regarding the professors' performance. The scores of both of them were higher than 9.0 (in a scale from 0 to 10).

Table 2. Reactions of the students regarding professor's performance.

Item	Professor 1	Professor 2
Ability to transmit the content	9,2	9,6
Summaries and reviews	9,2	9,6
Class organization	8,7	9,6

Classes depth	9,0	9,5
Use of motivational strategies	8,4	9,5
Teaching resources	8,5	9,0
Mastery of content	9,2	9,6
Certainty about the content being taught	9,3	9,5
Respect regarding student's ideas	9,6	9,8
Mean	9,1	9,5

Two students quit the course, four students failed and the others were approved (n = 41, 87.23%). Pearson test showed no correlation between student's degree of satisfaction and the final course grade (Table 3).

Table 3. Pearson correlation: Degree of satisfaction (student's reactions and final grade).

		Degree of satisfaction mean	Final grade
Degree of satisfaction mean	Pearson correlation	1	,185
	Sig. (1 tale)		,133
	N	38	38
Final grade	Pearson correlation	,185	1
	Sig. (1 tale)	,133	
	N	38	47

A significant positive correlation between the quality of the work and activities done by students' and the final outcome (Table 4) was detected. The higher the students performed their activities, the higher were their final grades. Or students who did their activities with greater care could show their knowledge more appropriately in tests.

Table 4. Pearson correlation: Activities' grades and Test grades

		Activities' grades	Final grade
Activities' grades	Pearson correlation	1	,911**
	Sig. (1 tale)		,000
	N	47	47
Final grade	Pearson correlation	,911**	1
	Sig. (1 tale)	,000	
	N	47	47

\*\* . Significant correlation at level 0,01 (1 tale)

It is inferred that the way the course and its activities were settled contributed for learning. Moodle platform offers the possibility to examine the percentage of students who accessed the podcasts and video classes. It was observed that 7% (n = 3) of the students did not access the multimedia material any time and 26% (n = 13) of them have accessed more than 76% of the media available (Fig. 1).

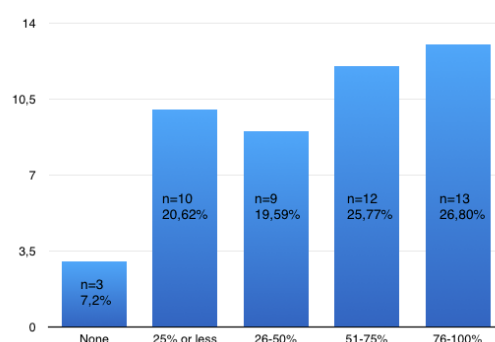


Fig. 1. Podcasts and video classes assessed

Spearman test also showed that the higher was the percentage of podcasts listened to and video classes watched the higher were the test scores and final grade (Table 5).

Table 5. Spearman correlation: Activities' grades and Test grades

		% of podcasts listened to and video classes watched	Test 1 grade	Test 2 grade	Final grade
% of podcasts listened to and video classes watched	Spearman correlation	1	,489**	,302*	,622**
	Sig. (1 tale)		,000	,025	,000
	N	47	47	43	47

\*Significant correlation at level, 0,05 (1 tale); \*\*. Significant correlation at level 0,01 (1 tale)

Strategies supported by ICTs were well received by students. Podcasts and video classes, for example, can be used as aids to learning strategies. This study showed that the restructuring of a discipline based on cognitive and instructional theories could lead to greater satisfaction and learning among students. However, these data need to be more investigated, since variations of grades depend on multiple factors, including the profile of the students, changes in teaching strategies and types of assessment.

## Conclusion

The use of teaching strategies based on New Information and Communication Technologies has the possibility to democratize education, expanding study access and motivating students to learn. However, evidence suggests that not all positive effects in education can be attributed to the use of the technology itself, but the way they are used (Hew, & Cheung, 2013). This study showed that the restructuring of a discipline using cognitive, instructional and instructional design theories led to great satisfaction and learning. This study has limitations as the fact that it was not possible to compare our students to a control group, in which similar issues have been addressed but without the use of technologies. Moreover, it was not possible to apply a pre knowledge test, something that will be achieved in subsequent courses.

## References

- Batista Filho, M., & Rissin, A. (2003). A transição nutricional no Brasil: tendências regionais e temporais. *Cadernos de Saúde Pública*, 19, Sup. 1, S181-S191.
- Batista, K.B.C., & Gonçalves, O.S.J. (2011). Formação dos profissionais de Saúde para o SUS: significado e cuidado. *Saúde & Sociedade*, 20(4): 884-899.
- Brasil (2005a). Ministério da Saúde. Secretaria de Atenção à Saúde. Coordenação Geral da Política de Alimentação e Nutrição. *Guia alimentar para a população brasileira: promovendo a alimentação saudável*. Brasília: Ministério da Saúde, 2005. 217p.
- Brasil (2005b). *Portaria Interministerial MS/MEC n. 2.101, de 03 de novembro de 2005*. Institui o Programa Nacional de Reorientação da Formação Profissional em Saúde - Pró-Saúde – para os cursos de graduação em Medicina, Enfermagem e Odontologia. Disponível em <http://portal.saude.gov.br/portal/arquivos/pdf/2101.pdf>
- Brasil (2012). Ministério da Saúde. Secretaria de Vigilância em Saúde. Secretaria de Gestão Estratégica e Participativa. Vigitel Brasil 2011. *Vigilância de Fatores de risco e proteção para doenças crônicas por inquérito telefônico*. 2012b.
- Buchabqui, J.A., Capp, E., & Petuco, D.R.S. (2006). Convivendo com Agentes de Transformação : a Interdisciplinaridade no Processo de Ensino / Aprendizado em Saúde. *Revista Brasileira de Educação Médica*, 30(1), 32–38.
- IBGE (2010a). Diretoria de Pesquisas, Coordenação de trabalho e rendimento. *Pesquisa de Orçamentos Familiares 2008-2009: avaliação nutricional da disponibilidade domiciliar de alimentos no Brasil*. Rio de Janeiro: 2010. 54p.
- Malta, D.C., Cezário, A.C., Moura, L., Morais Neto, O.L., & Silva Junior, J.B. (2006). A construção da vigilância e prevenção das doenças crônicas não transmissíveis no contexto do Sistema Único de Saúde. *Epidemiologia e Serviços de Saúde*, 15(1), 47-65.
- Mendes, E.V. (2012). *O cuidado das condições crônicas na atenção primária à saúde: o imperativo da consolidação da estratégia da saúde da Família*. Brasília: Organização Pan-Americana da Saúde, p. 515p.
- Monteiro, C.A., Levy, R.B., Claro, R.M., Castro, I.R.R., & Cannon, G. (2010). Increasing consumption of ultra-processed foods and likely impact on human health: evidence from Brazil. *Public Health Nutrition*, 14(1), p. 5-13.
- OECD (2014). Trends shaping education 2014. Spotlight 2. The weight of nations. Available at <http://www.oecd.org/edu/eri/SpotlightBodyandSociety.pdf>
- Victora, C.G., Barreto, M.L., Leal, M.C. et al. (2011). Condições de saúde e inovações nas políticas de saúde no Brasil: o caminho a percorrer. *The Lancet*, 90-102.
- Westera, W. (2012). The eventful genesis of educational media. *Education and Information Technologies*, 17(3), 345–360.



# Effects of the IQ up cognitive development method on the cognitive development of 10- to 12-year-old children

Hatice Kafadar<sup>a\*</sup>, Zafer Akıncı<sup>b</sup>, Belgin Çakır<sup>b</sup>

<sup>a</sup>Abant İzzet Baysal University Bolu, Turkey

<sup>b</sup>Human Psychological Research and Development Institute İstanbul, Turkey

---

## Abstract

We examined the effectiveness of the IQ Up Cognitive Development Method, which was designed to solve various problems that may emerge from cognitive processing in daily life, in healthy children. The IQ Up Cognitive Development Method is a cognitive-training program designed to improve the cognitive processing of participants. To this end, 201 healthy participants between 10 and 12 years of age were included in the research. Experimental and control groups were tested before and after experimental manipulation. Neuropsychological tests measuring cognitive processes such as memory, attention, problem solving, general ability, planning, and working memory were administered to the participants in both the experimental and the control groups before the experimental manipulation. Following these tests, 131 participants in the experimental group took part in the IQ Up Cognitive Development Method for 30 days, 5 days a week, 45 minutes per day. Participants in the control group did not receive any training. At the next stage, the neuropsychological tests were again administered to the participants in both the experimental and the control groups. The istatistical analyses demonstrated that the IQ Up Cognitive Training Program affects the cognitive development of children positively.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** IQ Up Cognitive Development Method; Cognitive development; Cognitive training; Intelligence; Working memory training; Fluid intelligence

---

## 1. Introduction

During the last decade, several methods of cognitive training have been developed to help people effectively use cognitive processing strategies. For healthy people or people who are living with cognitive dysfunction, cognitive training aims to help individuals focus their attention on a specific stimulus for a sustained period of time, to organize stimuli in their mind, to store and remember these stimuli properly by further repetition, and to decrease memory loss in daily life. With these methods, it is possible to teach individuals to properly and effectively use strategies to improve such high-level cognitive functions as problem solving, reasoning, ratiocination, abstract thinking, planning, and decision making. Therefore, it may be possible to avoid problems such as inattentiveness, forgetfulness, coping skill deficiencies, and academic failure as well as a lack of success in business endeavors despite working long hours (Bracy, 1994; Holmes, Gathercole, Dunning, 2009; Klinberg, 2010; Sternberg, 2008).

---

\*Corresponding author. Abant İzzet Baysal University, Faculty of Science and Art Department of Psychology, 14280 Golkoy Campus Bolu, Turkey. Tel: +90 374 2541000/1316

E-mail address: haticekafadar@yahoo.com, kafadar\_h@ibu.edu.tr

In daily life, one of the areas in which these problems are frequently faced is the field of education. Academic failure due to cognitive processing deficiencies is a major problem for children attending school. The cognitive development of children attending school is critical to their academic success. It is believed that the academic success of a child is directly proportional to the dynamic control and management of cognitive processing strategies. Many common problems contribute to this issue, such as overcrowded classrooms; inadequate equipment, laboratories, computers, and libraries; and teacher shortages. Individual differences between children can also lead to the underdevelopment and improper and ineffective use of cognitive processing strategies and thus academic failure. As a result, sufficient and necessary educational quality cannot be achieved for children receiving education in such a system (Gedikoğlu, 2005).

Several commercial training programs are being developed to enable effective cognitive processing by methods of cognitive training. For these training programs, the target population may be either sufferers from cognitive dysfunction or healthy people, or both groups. One of the notable features of these programs is that they are computer-based programs. The participant performs brain/cognitive exercises on a computer. The exercises help the participant to actively use cognitive processing strategies. Several studies have examined whether these cognitive-training programs are effective for various populations. These studies have commonly found that cognitive training has positive effects on cognitive processing (Bergman and coll. 2011; Holmes, Gathercole, Dunning, 2009; Klauer, Willmes, 2001; Klauer, Phye, 2008; Klingberg, 2010; Jaeggi and coll., 2011; Mahncke and coll., 2006; Rueda, Checa, Cómbita, 2012; Owen and coll., 2010; Smith and coll., 2009; Tachibana and coll., 2012). However, some authors have suggested that the findings are not sufficient to demonstrate that cognitive-training programs are effective (Melby-Lervåg, Hulme, 2012; Shistead, Redick, Engle 2012).

The IQ Up Cognitive Development Method is a program providing cognitive training that is adaptive to the individual differences of participants. It was developed from the basic theories and applications of cognitive psychology and neuropsychology to aid healthy individuals in the effective and proper use of strategies to improve cognitive processes such as memory, attention, working memory, reasoning, problem solving, mental elasticity, decision making, imaging, analytic thinking, and language. The IQ Up Cognitive Development Method consists of a training process designed to aid the cognitive development of individuals by considering individual differences, continuously monitoring cognitive development, and facilitating long-term improvements in skills. The most notable feature of the program is that the participants perform the exercises with a trainer one on one.

Participants who take part in the training process undergo a series of procedures. At the initial stage, participants take online tests measuring cognitive processes such as attention, memory, problem solving, reasoning, and ratiocination, designed with the age of the participant in mind. In the evaluation of these test results, the performance of the individual for each cognitive function is expressed as a percentage. After this evaluation, a special booklet is prepared for each of the participants. In this booklet, there are cognitive exercises, which are prepared specifically for each participant based on the age and cognitive potential of the participant. These exercises are performed with a trainer who has already received training. The difficulty level of the exercises is varies depending on the age and cognitive potential of the participant. Training sessions continue for 1 to 10 months, 5 days a week, 45 minutes per day with the trainer. In the next stage, each of the participants is administered a test every 30 days to determine whether there is a change in cognitive development. These tests are used to determine the degree to which the cognitive exercises contribute to the cognitive development of the participants, as well as the extent of the increase or decrease in the performance related to each of the cognitive processes. The goal of these cognitive exercises is to help each participant more effectively use of cognitive processing strategies (<http://www.iqup.com.tr/>).

The purpose of the current study is to test whether the IQ Up Cognitive Development Method, which has been developed based on theories and applications of cognitive psychology and neuropsychology, improves the cognitive processing and facilitates the cognitive development of healthy children in the target age group. The development of cognitive functioning was examined using pre- and post-tests before and after the training in the IQ Up Cognitive Development Method. To determine the efficacy of the IQ Up Cognitive Training Program, a control group equivalent to the experimental group was also included. Neuropsychological tests were carried out to determine whether there was an improvement in the cognitive function of the participants. These tests included the Wechsler Intelligence Scale For Children-Revised (WISC-R) arithmetic sub-test, to measure verbal comprehension and arithmetic abilities; the Wechsler Adult Intelligence Scale-Revised (WAIS-R) symbol sub-test, to test focused and

continuous attention and visual perceptual motor comprehension; the Serial Digit Learning Test (SDLT), to measure verbal memory and learning processes; the Öktem Verbal Memory Processes Test (Öktem-VMPT), to measure short and long term verbal memory; the Rey Complex Figure Test and Recognition Trial (RCFT), to measure the momentary memory, short- and long-term visual memory and recognition; the Raven Progressive Matrices Test (RSPM), to test problem solving, reasoning, abstract thinking, working memory and general abilities; and the Tower of London (TOL), to measure planning and strategy formulation.

## 2. Method

### 2.1. Subjects

Two hundred and one healthy children participated in the study. There were 130 participants in the experimental group with an average age of 10.83 (0.44) years. Sixty-nine participants were male (53.1%), while 61 were female (46.9%), and 90.8% of the participants were right handed. In the control group, there were 71 participants. The average age of the participants was 10.52 (1.41) years. There were 40 males (56.3%) and 31 females (43.7%) in the control group, and 90.2% of the participants in the control group were right handed. Approval to conduct the study was received from the Social Sciences Research Ethics Committee of Abant İzzet Baysal University. In addition, the parents of the participants were informed about the content of the study, and with their consent, the children were included in the study.

The participants of the study are composed of students attending two schools that are equal to each other in terms of demographic characteristics. Random sampling was employed to determine the school to serve as the experimental group and the one as the control group.

### 2.2. Materials

*2.2.1. Information Collection Form.* Data on participants' demographic characteristics and health conditions (such as whether the participant had any illnesses or required medicine or had a visual defect or color differentiation problem) were collected using the Standard Information Collection Form.

*2.2.2. Raven Standard Progressive Matrices Test.* The RSPM, which was developed by Raven, consists of 60 test items in 5 sets, each of which contains 12 items (Raven, 2000; Raven, Raven, Court, 1993).

*2.2.3. Tower of London<sup>DX</sup>.* The TOL<sup>DX</sup> test consists of two pieces of wood that are equal lengths. One of these strips belongs to the participant, while the other belongs to the examiner. There are three wooden pegs on each of the strips of wood. The longest of these pegs can hold three balls, while the one with middle length holds 2 balls, and the shortest one holds one ball. On each strip of wood, there are three balls of different colors: blue, red and green (Atalay, Cinan, 2007; Culbertson, Zillmer, 2005).

*2.2.4. Serial Digit Learning Test.* This test was developed by Zangwill in 1943. In the Serial Digit Learning Test, the required number of attempts to correctly repeat a sequence of numbers consisting of 9 digits is measured. In this test, it is possible to use a different number sequences for repeated measurements.

*Öktem Verbal Memory Processes Test:* The test, which consists of 15 perceptible words, was developed by Öktem (2011) to measure short- and long-term verbal memory abilities. There are different word lists in three different forms of the test; therefore, in repeated measurements, different word lists are used.

*2.2.5. Rey Complex Figure Test and Recognition Trial.* In the current study, the revised version of this test by Meyers and Meyers (1995) was used. The RCFT consists of 4 stages and measures momentary memory, short- and long-term visual memory, and recognition abilities (Varan, Tanör, Gürvit, 2007).

*2.2.7. WISC-R Arithmetic Sub-Test.* In this sub-test of the WISC-R, participants are asked to respond to 18 arithmetic problems by performing mental calculations in the shortest time possible. There is a time limit for each problem. If a participant answers incorrectly four times in succession, the test is terminated. The participant receives 1 point for each correct answer (Savaşır, Şahin, 1995; Wechsler, 1974).

*2.2.8. WAIS-R Symbol Sub-Test.* In the registration form of this sub-test, each number from 1 to 9 is marked with a different sign (for example, a short perpendicular line or two short lines, one over the other). While there is a number on each of the boxes on the registration form, the underside is left blank, to be filled in by the respondent.

The task of the respondent is to draw the sign corresponding to each number in the box below the number in 90 seconds. At the end of the time, 1 point is awarded for each correct sign (Baştuğ, 2000; Yargıcı, 2000; Yılmaz, 2000, Wechsler,1981).

*2.2.9. IQ Up Cognitive Development Method.* The materials for the IQ Up Cognitive Development Method were prepared specifically to develop cognitive processing in individuals, and each of the items requires cognitive processing to complete. No harm material was used in the testing design. Each item is targeted to the functions of a local area of the brain and, correspondingly, to different cognitive functions. The difficulty level of the cognitive tasks in the materials gradually increases. IQ Up Cognitive Development Method was developed to improve participants' verbal, numeric and visual memory; verbal, numeric and visual attention; and verbal, numeric and visual reasoning. A verbal text is given to the participants to improve their verbal memory processes. In the cognitive task, the participant must improve the skills of first reading the text and then recalling what is read. The participant must answer the questions related to the text in a certain period of time. In the numeric memory task, the participant is given number sequences in different combinations. The participant is required to give answers to the questions related to those numbers during a specified time period. In the visual memory task, on the other hand, the participant is expected to answer the questions related to the visual stimuli presented in different combinations in a specified time period. Memory tasks aim to improve participants' working memory capacity and the speed of mental processes.

In the numeric attention test, the participant must find the numbers and number sequences indicated in the instructions among mixed numbers in a certain period of time. In the verbal attention task, the participant is required to find the letters in a given text and the differences between two texts in a certain time period. In the visual attention task, on the other hand, the participant is expected to find some certain figures among mixed figures and the differences between two pictures during a specified time period. Through these tasks, such basic features of objects as color, size, direction, and movement must be determined. Attention tasks aim at improving participants' visual-spatial perception, selective attention, reaction speed and rashness.

In the verbal reasoning task, the participant is asked to form meaningful associations between the data in the text in a certain period of time. The participant must reach new data by making some logical inferences from the present data. In the numeric reasoning task, the participant is asked to form meaningful associations between numbers and try to reach the expected results within a specified time period. In this cognitive task, the participant must use the skills of scrutinizing, changing categories, and general ability. In visual reasoning task, the participant is expected to make logical inferences by forming meaningful associations between pictures and shapes in a certain time period. The aim of the reasoning tasks is to improve participants' skills of orderly thinking, mental activity speed, working memory, visualization, and general ability.

The materials used in the IQ Up Cognitive Development Method and the tasks to be performed by the participants using these materials are as follows:

*IQ Up-1:* There are different colors in the background, in the letter used in imprinting and in the inscription itself. The participant is expected to match the three specified combinations. The aim is to improve participants' visual attention and memory.

*IQ Up-2:* On a different background color, there are pictures that are similar to each other, identical to each other, or different from each other. The participant is expected to match or remember the pictures with respect to the specified features. The aim is to improve participants' visual attention, memory and reasoning.

*IQ Up-3:* On a different background color, there are phonologically and semantically similar words. The respondent is expected to match or remember the inscriptions based on the specified features. The aim is to improve participants' verbal attention, memory and reasoning.

*IQ Up-4:* On a white background, there are specific number combinations. The respondent is expected to match or remember the numbers based on the specified features. The aim is to improve participants' numeric attention, memory and reasoning.

*IQ Up-5:* There are stimuli made up of 4 numbers and 8 colors. The respondent is expected to answer the question by matching the numbers with the specified colors. The aim is to improve participants' visual memory and reasoning.

*IQ Up-6:* This item consist of rectangles and squares that are proportional to each other, but in different sizes. The respondent is expected to carry one of the materials from one point to another point among the other materials

based on a given rule. The aim is to improve participants' visual reasoning.

*IQ Up-7:* This item consists of materials with different shapes, colors and sizes. The respondent is expected to choose the material with the specified shape, color, or dimensions to form another meaningful shape from these or to arrange the shapes in accordance with their specified characteristics. The aim is to improve participants' visual attention, memory and reasoning.

*IQ Up-8:* This item consists of materials with different geometrical shapes and colors. The respondent is expected to form a shape within the specified boundaries with the given materials. While doing this, the participant is also expected to use the materials correctly. The aim is to improve participants' verbal and visual reasoning.

*IQ Up-9:* This item consists of 28 cards that are different from each other. The respondent is expected to see and maintain the movement of the given cards. The aim is to improve participants' visual attention.

*IQ Up-10:* This item consists of 32 letters. The letters are upper or lower case, and with respect to size, they are large followed by small or the reverse. The respondent is expected to match the same letters according to a specified order, to remember the letters in detail, or to form some words given in a text with these materials. There are also some other applications, such as forming a combination with other materials or matching the materials with other materials. The aim is to improve participants' verbal attention, memory and reasoning.

*IQ Up-11:* This item consists of 10 numbers, and with respect to the content and size, the materials are large or small, black or white, and the reverse. The respondent is expected to match the same numbers according to a specified order, to remember the numbers in detail, or to form a combination with other materials or to match the materials with other materials. The aim is to improve participants' numeric attention, memory and reasoning.

*IQ Up-12:* This item consists of different shapes with different sizes and colors. The respondent is expected to choose the material with the specified shape, color or size, to form another meaningful shape, or to arrange the order of the shapes according to specified features. There are some other applications, such as forming a combination with other materials or matching the materials with other materials. The aim is to improve participants' visual attention, memory and reasoning.

*IQ Up-13:* This item consists of materials with different colors. The respondent is expected to remember or choose the color according to the meaning given to the color. There are some other applications, such as forming a combination with other materials or matching the materials with other materials. The aim is to improve participants' visual memory, reasoning, and attention.

*IQ Up-14:* The participant is expected to match the squares containing pictures similar to each other, the same as each other, or different from each other. The respondent is also expected to remember or match the pictures according to the specified content. The aim is to improve participants' visual attention, memory and reasoning.

*IQ Up-15:* Cards consist of specified letters or numbers. The respondent is expected to find the requested information among all the cards. The aim is to improve participants' verbal and numeric attention.

*IQ Up-16:* This item consists of sticks with different dimensions. The respondent is expected to use the materials to solve the problems given. The aim is to improve participants' visual and verbal reasoning.

*IQ Up-17:* Cards consist of information related to daily life, such as a name, a profession, an age, a town, a food, or an entertainment area. The respondent is expected to remember or find the information on the card in an excerpt of text. The aim is to improve participants' verbal memory and reasoning.

*IQ Up-18:* This item consists of different place names and aerial view maps. The respondent is expected to find the places on the map based on data provided in the text and to remember the names of the places in the correct order. The aim is to improve participants' verbal memory and reasoning.

*IQ Up-19:* This item is a set consisting of a plastic panel, rubber bands, and cards with numeric and verbal content. The application starts by placing the cards on the panel. The respondent is expected to form a shape by using the rubber bands in accordance with the directions. The respondent is also expected to find specific letters or shapes in the picture. The aim is to improve participants' visual attention and memory, and verbal and numeric reasoning.

### 2.3. Procedure

Participants began by filling out the Information Collection Form and completing the neuropsychological tests.

Tests were administered at the Üsküdar Municipality Information Houses to each participant in the experimental group. Following the administration of pretests to the participants in the experimental group, participants took the online IQ Up test. The online IQ Up test consists of tests that require the use of various cognitive functions such as verbal, numeric and visual attention; verbal, numeric and visual memory; and verbal, numeric and visual reasoning. Following this test, the performance of the participant, for each cognitive functions was determined as a percentage. Upon determining each participant's level of cognitive functioning, booklets specific to each participant were prepared that described how to perform the cognitive tasks and that enabled the participants to develop their weaker cognitive functions. Then, each of the participants started the IQ Up Cognitive Development Method, using their personalized booklets. This training was conducted by trainers who were knowledgeable in the subject matter. Training sessions were conducted in classes with 8-10 participants and one trainer. These sessions lasted 30 business days in total and were conducted 5 days a week for 45 minutes per day for each participant. After the participants in the experimental group completed these training sessions, the neuropsychological tests were again administered to these participants. In the experimental group, the trainers applying the IQ Up Cognitive Development Method and the testers applying the neuropsychological tests are not the same people. In the application of pre-test and neuropsychological tests, different test items of the Serial Digit Learning Test and Öktem Verbal Memory Processes Test were used. However, the test items of the other neuropsychological tests used in the study were the same in the experimental and control group pre-test and post-test applications.

Neuropsychological tests were administered to the participants in the control group twice, with an interval of roughly 30-40 days. Neuropsychological testing was performed at İstanbul Bağcılar Municipality Information Houses. The participants in the control group and experimental group continued their usual daily activities between the pre- and post- neuropsychological tests.

### 3.Results

To evaluate the data obtained in this study, arithmetic means, standard deviations, correlations and results from a General Linear Model Repeated Measure were obtained. The pretest means, posttest means, standard deviations, F values and significance levels for both the experimental and the control groups are presented in Table 1 and 2. From the data, it is apparent that the means of the experimental group are higher than those of the control group. While pretest F values show that neuropsychological test results are not meaningfully different between the experimental and the control groups, the posttest F values are significantly different between the groups. In other words, the IQ Up Cognitive Development Method was effective for the participants in the experimental group and had a positive impact, increasing their cognitive development. On the other hand, no change was observed in the cognitive development of the control group participants, who did not attend the IQ Up Cognitive Development Method. Moreover, for the control group, a decrease was observed in the mean for the neuropsychological posttest compared to the neuropsychological pretest (for example, on RSPM Total Points).

As mentioned previously, the participants in the experimental group took the online cognitive tests prior to the IQ Up Cognitive Development Method to determine their cognitive processing ability related to the tested cognitive functions. In Table 3., the correlation values for these cognitive test results are presented for the participants in the experimental group. In other words, Table 2 presents the cognitive performance level of the participants related to the cognitive exercises. These cognitive tests were developed to evaluate the verbal, numeric and visual memory; attention; and reasoning skills of the participants. The correlations between verbal memory and the reasoning exercises, between verbal attention and visual attention, and among all the reasoning exercises are significant.

Table 4. shows the correlation coefficients between the IQ Up Cognitive Development Method results (presented in Table 4) and the neuropsychological test results. These correlation coefficients were calculated to determine whether Cognitive Test results were consistent with neuropsychological test results. The IQ Up Cognitive Test results for the verbal, numeric, visual memory; attention; and reasoning presented in Table 2 are grouped into three categories (memory, attention and reasoning), and the total scores for these 3 categories were obtained. The coefficients presented in Table 4 are the correlation values between the pretest scores of the participants in the experimental group and their IQ Up Cognitive Test results.

Table-1. Neuropsychological test scores of the participants in the experimental and control group, pretest means, standard deviations, F values, and significance levels.

	Pretest							
	Experimental Group			Control Group			F	P
	N	$\bar{X}$	S.D.	N	$\bar{X}$	S.D.		
WAIS-R Symbol	115	39.51	8.25	70	37.71	9.15	1.9	.17
WISC-R Arithmetic	109	13.11	2.47	71	13.10	2.74	.001	.977
Serial Digit Learning Test	115	14.01	6.54	70	14.89	6.60	.776	.379
Öktem-Verbal Memory Processes Total Learning	117	114.25	16.75	70	119.44	17.15	<b>4.13</b>	<b>.043</b>
Öktem-Verbal Memory Processes Long Term Memory	102	12.73	2.12	64	12.52	2.00	.402	.527
Rey Complex Figure Copy Test	120	31.92	4.75	69	30.97	6.06	1.40	.238
Rey Complex Figure Test and Immediate Recall	117	18.73	7.64	69	16.05	7.48	<b>5.42</b>	<b>.021</b>
Rey Complex Figure Test and Delayed Recall	118	19.03	7.87	69	15.95	7.43	<b>6.94</b>	<b>.009</b>
Rey Complex Figure Test and Recognition Trial	114	20.30	2.10	68	18.97	2.16	<b>16.77</b>	<b>.000</b>
Stroop-1 Time	117	10.57	3.29	71	10.82	3.17	0.25	.618
Stroop-2 Time	117	11.13	4.25	71	11.45	3.34	.297	.586
Stroop-3 Time	117	15.36	3.32	71	15.85	3.80	.845	.359
Stroop-4 Time	117	23.57	6.30	71	23.97	5.79	1.88	.665
Stroop-5 Time	117	33.54	11.52	71	35.66	9.00	1.75	.186
Tower of London Total Correct Score	113	2.53	1.91	65	2.38	2.05	.228	.634
Tower of London Total Move Score	113	47.60	18.25	65	50.66	22.17	.988	.321
Tower of London Total Initiation Time	113	30.05	40.24	65	32.37	32.84	.154	.695
Tower of London Total Rule Violations	113	1.15	1.54	65	1.62	2.46	2.39	.124
Raven Standard Progressive Matrices Total Score	103	37.66	8.49	44	36.20	10.89	.761	.385
Raven Standard Progressive Matrices Time	103	30.56	8.27	44	26.29	7.73	8.54	.004

Table-2. Neuropsychological test scores of the participants in the experimental and control group, posttest means, standard deviations, F values, and significance levels.

	Posttest								
	Experimental Group			Control Group					
	N	$\bar{X}$	S.D.	N	$\bar{X}$	S.D.	F	P	
WAIS-R Symbol	115	44.26	8.83	70	39.58	8.25	<b>12.84</b>	<b>.000</b>	W
WISC-R Arithmetic	109	14.11	2.14	71	13.18	2.50	<b>7.10</b>	<b>.009</b>	hen
Serial Digit Learning Test	115	17.90	4.49	70	12.35	7.55	<b>39.24</b>	<b>.000</b>	these
Öktem-Verbal Memory Processes Total Learning	117	126.96	11.59	70	113.48	17.84	<b>39.21</b>	<b>.000</b>	corre
Öktem-Verbal Memory Processes Long Term Memory	102	13.00	1.74	64	11.54	2.69	<b>17.82</b>	<b>.000</b>	latio
Rey Complex Figure Copy Test	120	32.94	3.97	69	30.02	5.72	<b>17.02</b>	<b>.000</b>	n
Rey Complex Figure Test and Immediate Recall	117	24.33	6.31	69	19.02	8.79	<b>22.78</b>	<b>.000</b>	valu
Rey Complex Figure Test and Delayed Recall	118	23.86	6.54	69	17.89	7.90	<b>31.07</b>	<b>.000</b>	es
Rey Complex Figure Test and Recognition Trial	114	21.11	1.86	68	19.94	1.91	<b>16.32</b>	<b>.000</b>	are
Stroop-1 Time	117	8.89	1.85	71	10.29	2.07	<b>22.90</b>	<b>.000</b>	exa
Stroop-2 Time	117	10.71	3.23	71	12.95	4.08	<b>17.29</b>	<b>.000</b>	mine
Stroop-3 Time	117	13.68	2.99	71	14.91	2.78	<b>7.86</b>	<b>.000</b>	d,
Stroop-4 Time	117	18.64	4.04	71	20.25	3.97	<b>7.12</b>	<b>.008</b>	the
Stroop-5 Time	117	26.45	7.48	71	31.50	7.62	<b>19.86</b>	<b>.000</b>	total
Tower of London Total Correct Score	113	2.95	2.13	65	2.12	1.86	<b>6.88</b>	<b>.009</b>	scor
Tower of London Total Move Score	113	43.20	18.48	65	49.29	20.49	<b>4.13</b>	<b>.044</b>	e for
Tower of London Total Initiation Time	113	32.77	34.50	65	22.47	24.37	<b>4.49</b>	<b>.035</b>	mem
Tower of London Total Rule Violations	113	.16	.39	65	.43	1.18	<b>4.64</b>	<b>.032</b>	ory
Raven Standard Progressive Matrices Total Score	103	41.18	7.98	44	33.70	10.95	<b>21.44</b>	<b>.000</b>	
Raven Standard Progressive Matrices Time	103	28.31	8.51	44	19.14	6.49	<b>40.73</b>	<b>.000</b>	

lated with the scores for arithmetic, Stroop 4 time and Öktem-VMPT, and the total score for attention correlated

with the Stroop 3 and Stroop 4 error scores. Moreover, the total score for reasoning correlated with the Symbol subtest score; the Stroop 3, 4 and 5 time scores; the Stroop 5 error score; all the Öktem-VMPT scores; the Tower of London run-time; and the total RSPM score.

Table-3 Correlation values indicating the online cognitive test scores of the participants prior to the IQ Up Cognitive Training Program (n= 114).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Verbal Memory-1	1								
(2) Numerical Memory-2	.163	1							
(3) Visual Memory-3	-.009	.021	1						
(4) Verbal Attention -1	-.081	-.119	-.226*	1					
(5) Numerical Attention - 2	.056	.026	.029	.167	1				
(6) Visual Attention t -3	.097	-.034	-.084	<b>.333**</b>	.119	1			
(7) Verbal Reasoning- 1	<b>.490**</b>	.067	.054	-.131	<b>.240**</b>	-.119	1		
(8) Numerical Reasoning - 2	<b>.236*</b>	.147	.080	-.108	.063	-.031	<b>.353**</b>	1	
(9) Visual Reasoning -3	<b>.258**</b>	.127	.133	.026	.199*	-.062	<b>.398**</b>	<b>.206*</b>	1

\*p<.05, \*\*p<.01

Table-4 Correlation between IQ Up cognitive test scores and pre-test neuropsychological test scores for the participants in the experimental group (n= 114) .

Pretest Neuropsychological Scores of Experimental Group	Memory Total	Attention Total	Reasoning Total
Symbol	.003	.405	<b>.411**</b>
SDLT	-.092	-.106	-.076
Arithmetic	<b>.241*</b>	.186	<b>.488**</b>
Stroop-1 Time	-.123	.074	<b>-.286**</b>
Stroop-2 Time	-.037	-.016	-.185
Stroop-3 Time	-.096	-.057	<b>-.285**</b>
Stroop-3 Error Score	.054	<b>-.201*</b>	.069
Stroop-4 Time	<b>-.229*</b>	.089	<b>-.308**</b>
Stroop-4 Error Score	.023	<b>-.218*</b>	.015
Stroop-5 Time	-.150	-.009	<b>-.331**</b>
Stroop-5 Error Score	-.116	-.073	<b>-.282**</b>
Öktem VMPT Immediate Recall	.076	.104	.182
Öktem VMPT SBST Total Learning	<b>.227*</b>	.103	<b>.245**</b>
Öktem VMPT Highest Learning	<b>.246**</b>	.107	<b>.258**</b>
Öktem VMPT Long Term Memory	<b>.279**</b>	.094	<b>.331**</b>
Öktem VMPT Recognition	<b>-.293**</b>	-.148	<b>-.298**</b>
RCFT-R Copy	.133	.023	.171
RCFT-R Immediate Recall	.195	-.052	-.015
RCFT-R Delayed Recall	<b>.200*</b>	.012	.048
RCFT-R Recognition	.133	.177	-.027
TOL Total Correct Score	-.032	.099	-.004
TOL Total Move Score	-.057	-.004	-.062
TOL Initiation Time	-.064	.013	.057
TOL Execution Time	-.003	<b>-.271**</b>	<b>-.215*</b>
TOL Total Time	-.021	<b>-.250**</b>	-.185
TOL Total Rule Violations	.035	<b>-.220*</b>	-.172
RSPM Total Score	.090	.157	<b>.420**</b>
RSPM Time	-.013	.049	.094



\* $p < .05$ , \*\* $p < .01$

#### 4. Discussion

This study was conducted to test whether the IQ Up Cognitive Development Method contributes to the cognitive development of healthy, school-age children. To this end, neuropsychological tests were administered to 201 children in both the experimental and the control groups by means of pretest and posttest. The data obtained were examined using multivariate statistical analysis. There was no meaningful difference in the pretest performance between the experimental group and the control group, but there was a significant difference in their posttest performances. This difference is evident in the mean neuropsychological test scores of the groups. This result is consistent with other empirical research showing that various cognitive training programs positively contribute to the cognitive development of healthy participants (Brehmer, Westerberg, Backman, 2012; Olesen, Westerberg, Klinberg, 2003; Thorell and coll., 2009; Roughan, Hadwin, 2011). According to a research study, elementary school students whose inductive reasoning skills were improved through cognitive education have an improved performance in quick intelligence, and consequently an increase in academic success. According to the researchers, the cognitive education that students get leads to an improvement in their problem solving skills (Klauer, Phye, 2008).

The students who received cognitive education with IQ Up Cognitive Development Method also made progress in the processes of working memory, attention and reasoning. The increase in the post-test neuropsychological test scores of the participants in the experimental group supports this finding. Particularly, the increase in RSPM and Tower of London test scores made it possible to achieve an improvement in experimental group participants' such cognitive processes as problem solving, planning, strategy development and mental processing speed. The same situation is observed in the scores of pre and post-test SDLT, Öktem-VMPT, and RCGT, which measure the verbal and visual memory processes of the participants in the experimental group. In other words, there is an improvement in participants' memory processes. Moreover, as expected in Stroop test time scores, a decrease was observed in post-test scores. Accordingly, there was an increase in the attention processes and reaction speed of the participants in the experimental group. It is believed that the individual application of the IQ Up Cognitive Development Method for each participant had a positive impact on research results.

To determine in which cognitive processes, and to what extent, the IQ Up Cognitive Development Method promotes development, participants in this study were administered in-depth neuropsychological tests that measure cognitive processes such as attention, memory, problem solving, planning, strategy formation, arithmetic, and working memory. The results of the statistical analysis also show that the IQ Up Cognitive Development Method, which was conducted for 45 minutes per day, 5 days a week for 30 days in total, positively contributed to the cognitive processing of the participants in the experimental group. The results also reveal that there is a meaningful relationship between the scores obtained in cognitive exercises performed by the participants during IQ Up Cognitive Development Method and the results of the neuropsychological tests. This finding also supports the existence of a relationship between the cognitive exercises performed within the scope of the IQ Up Cognitive Development Method and the neuropsychological test results and, hence, various other cognitive processes. This finding is consistent with the findings of similar studies conducted on healthy children (Brehmer, Westerberg, Backman, 2012; Jaeggi and others, 2011; Olesen, 2004).

For the control group participants, scores on the Serial Digit Learning Test, Verbal Memory and Learning Processes Test and the Raven Standard Progressive Matrices Test decreased from the pretest to the posttest. This decrease may have resulted, in part, from the proximity of the posttest to a school vacation. Thus, the participants' neuropsychological testing occurred at a time when participants were less mentally active. On the other hand, scores for Symbol, Arithmetic, Rey Complex Figure test and the Tower of London increased from the pretest to the posttest. The Stroop Test, a test of reaction time, also decreased from the pretest to the posttest.

The IQ Up Cognitive Development Method can reduce the likelihood of academic failure resulting from poor performance (forgetfulness, inattentiveness, disorganization, attention deficiency, etc.) in cognitive processes, especially for school-age children. The most important characteristic of the program is that it encourages active participation in the training program, increasing the activation of mental processes.

The materials for the cognitive exercises developed in the program are given to the participant, and the participant performs cognitive exercises with these materials in the company of a trainer. The IQ Up Cognitive

Development Method is not a computer-based program; instead, the efforts of participants to perform the cognitive exercises with the materials given to them increase the effectiveness of the program. Therefore, participants may achieve substantial improvement in cognitive processing, and participants may be better-equipped to deal with problems that require increasingly greater cognitive functioning. The IQ Up Cognitive Development Method is different, in this respect, from similar brain/cognitive training methods.

Another notable characteristic of the IQ Up Cognitive Development Method is that it improves performance related to cognitive processes that are not well developed in the participant. The main aim of the IQ Up Cognitive Development Method is to improve performance related to the weaker cognitive processes of the participant. The cognitive exercises that were performed by the participants were selected with this objective. However, these findings show that in addition to the cognitive processes of the participant that were expected to improve, other cognitive processes of the participant improved as well. This finding is important because it shows that cognitive processes have a very close relationship with each other, which may be related to the presence of neural networks in the brain (Kafadar, 2004;2012a;2012b).

The benefits of cognitive training programs are not limited to healthy people. It is particularly crucial to examine whether these programs are effective as a treatment method for children and adults with attention deficit disorders, hyperactivity disorders, learning difficulty, dyslexia, autism, head trauma, mild cognitive disorders, dementia and other similar neurological and psychiatric disorders. Some computer-based cognitive training programs have demonstrated a treatment effect for people with these cognitive dysfunctions (Beck and others, 2010; Dahlin, 2011; Gibson and others, 2011; Holmes, and others. 2010; Van der Molen and others, 2010). It is necessary to examine whether the IQ Up Cognitive Development Method is a potential treatment method for conditions involving cognitive impairment. In addition, in future studies, it will be necessary to determine whether there are changes in the social behaviors and emotional processes of the participants and whether the IQ Up Cognitive Development Method contributes to the personality development of children. In light of this possibility, whether the IQ Up Cognitive Development Method causes molecular and neural changes in the brain should be further examined with neurological studies.

## Acknowledgments

The authors would like to thank B. Akıncı, Janin Marazyan, M. Kılıç, H. Yıldırım, K. Güler, B. Güvenç, H. Çelik, S. Güdücü, P. Erçelik for taking part in the administration of the neuropsychological tests,

## References

- Atalay, D., Cinan, S. (2007). Planning ability of adults: Standardization and reliability of TOL<sup>DX</sup> *Turkish Psychology Journal* 22, 25-38.
- Baştuğ, B. (2000). Pilot study on the performance subtest of Wechsler Adult Intelligence Scale-Revised (WAIS-R). (Unpublished master thesis), Ankara University.
- Beck, S. J., Hanson, C. A., Puffenberger, S. S., Benninger, K. L., & Benniger, W. B. (2010). A controlled trial of working memory training for children and adolescents with ADHD. *Journal of Clinical Child and Adolescent Psychology*, 39, 825–836.
- Bracy, O. L. (1994). Cognitive functioning and rehabilitation: *Journal of Cognitive Rehabilitation*, 12, 12-16.
- Brehmer, Y., Westerberg, H., Backman, L. (2012). Working-memory training in younger and older adults: training gains, transfer, and maintenance. *Frontiers in Human Neuroscience*, 6, 63.
- Culbertson, W. C., Zillmer E. A. (2005). Tower of London Drexel University (2<sup>nd</sup> Ed.) Toronto: Multi-Health Systems.
- Dahlin, K. I. E. (2011). Effects of working memory training on reading in children with special needs. *Reading and Writing*, 24, 479–491.
- Gedikoğlu, T. (2005). The European Union is in the process of the Turkish education system: problems and Solution recommendations. *Journal of Mersin University Faculty of Education* 1, 66-79.
- Gibson, B. S., Gondoli, D. M., Johnson, A. C., Steeger, C. M., Dobrzanski, B. A., & Morrissey, R. A. (2011). Component analysis of verbal versus spatial working memory training in adolescents with ADHD: A randomized, controlled trial. *Child Neuropsychology*, 17(6):546-63
- Holmes, J., Gathercole, S. E., Place, M., Dunning, D. L., Hilton, K. A., & Elliott, J. G. (2010). Working memory deficits can be overcome: Impacts of training and medication on working memory in children with ADHD. *Applied Cognitive Psychology*, 24, 827–836.
- Kafadar, H. (2012a). Mental Flexibility, Reasoning, Focused Attention, Planning and Fluid Intelligence: A Latent Variable Approach. *Journal of The International Neuropsychological Society*, 41th-Mid-Year Meeting, Oslo Norway.
- Kafadar, H. (2012b). Cognitive Model of Problem Solving. *New Symposium* 50,(4)195-206.
- Kafadar, H. (2004). Prediction of fluid intelligence through performance intelligence, verbal intelligence, executive functions, working memory, selective attention and short term memory processes ( Doctorate thesis). Ankara: Hacettepe University.
- Klauer, K. J., Wilmess, K. (2002). Inducing inductive reasoning: Does it transfer to fluid intelligence. *Contemporary Educational Psychology*,

- Klauser, K.J., Phye G.D. (2008). Inductive reasoning: A training approach. *Review of Educational Research*, 78:85.
- Klingberg, T. (2010). Training and plasticity of working memory. *Trends in Cognitive Sciences*, 14, 317–324.
- Jaeggi, S. M., Buschkuhl, M., Jonides, J., & Shah, P. (2011). Short and long-term benefits of cognitive training. *Proceedings of the National Academy of Sciences of the United States of America*, 108, 10081–10086.
- Mahncke, H. W., Connor, B. B., Appelman, J.,... (2006). Memory enhancement in healthy older adults using a brain plasticity-based training program: A randomized, controlled study.
- Melby-Lervåg, M., & Hulme, C. (2012). Is Working Memory Training Effective? A Meta-Analytic Review. *Developmental Psychology*. Advance online publication doi:10.1037/a0028228
- Meyers, J.E., Meyers, K.R. (1995). Rey Complex Figure Test and Recognition Trial. Florida: Psychological Assessment Resources.
- Raven, J. (2000). The Raven's Progressive Matrices: Change and Stability Over Culture and Time. *Cognitive Psychology*, 51, 1-48.
- Raven, J., Raven, C., Court, J.H. (2000). *Raven Manual: Section 3. Standard progressive matrices 2000 Edition*. San Antonio, Texas: Harcourt Assessment.
- Roughan, L., Hadwin J A (2009). The impact of working memory training in young people with social, emotional and behavioural difficulties. *Learning and Individual Differences*, 21, 759-764.
- Rueda, M. R., Checa, P., Cómbita, L. M. (2012). Enhanced efficiency of the executive attention network after training in preschool children: Immediate changes and effects after two months. *Developmental Cognitive Neuroscience*, 2, 192.
- Olesen, P., Westerberg, H., Klingberg, T. (2004). Increased Prefrontal and Parietal activity after training of working memory. *Nature Neuroscience*, 7, 1038-1065.
- Owen, A. M., Hampshire, A., Grahn, J. A., Stenton, R., Dajani, S., Burns, A. S., ... Ballard, C. G. (2010). Putting brain training to the test. *Nature*, 465, 775–778.
- Savaşır, I., Şahin, N. (1995). Wechsler For Children Intelligent Scale-Revised (WISC-R) Manuel Book, Ankara: Turkish Psychologist Society Publish.
- Smith, G.E., Housen, P., Yaffe, K. .... (2009) A Cognitive Training Program Based on Principles of Brain Plasticity: Results from the Improvement in Memory with Plasticity-based Adaptive Cognitive Training (IMPACT) Study. *JAGS* 57,4 594–603.
- Sternberg, R. J. (2008) Increasing fluid intelligence is possible after all. [www.pnas.org/cgi/doi/10.1073/pnas.0803396105](http://www.pnas.org/cgi/doi/10.1073/pnas.0803396105)
- Shipstead, Z., Hicks, K.L., Engle, R. W., (in press) Cogmed working memory training: Does the evidence support the claims? *Journal of Applied Research in Memory and Cognition*.
- Tachibana, Y, Yoshida J, Ichinomiya M, Nouchi R, Miyauchi C, Takeuchi H, Tomita, N,... (2012). A GO intervention program for enhancing elementary school children's cognitive functions and control abilities of emotion and behavior: study protocol for a randomized controlled trial. *Trials*, 13, 1-8.
- Öktem, Ö. (2011). *Öktem Verbal Memory Processes Test (ÖKTEM-VMPT) Manuel Book*, Ankara: Turkish Psychologist Society Publish.
- Thorell, L.B., Lindqvist, S., Bergman Nutley, S., Bohlin, G., Klingberg, T. (2009). Training and transfer effects of executive functions in preschool children. *Developmental Science* 12, 106-113.
- Varan, E., tanör, Ö., Gürvit, H. (2007). Rey Complex Figure Test-Recognition Trial: Norm Determination Study on Turkish Adult Sample. *Journal of Turkish Neurology*, 13, 387-394.
- Van der Molen, M. J., Van Luit, J. E. H., Van der Molen, M. W., Klugkist, I., & Jongmans, M. J. (2010). Effectiveness of a computerised working memory training in adolescents with mild to borderline intellectual disabilities. *Journal of Intellectual Disability Research*, 54, 433–447.
- Yargıcı, S. (2000). Pilot study on the performance subtest of Wechsler Adult Intelligence Scale-Revised (WAIS-R). (Unpublished master thesis), Ankara University.
- Yılmaz B. (2000). Pilot study on the vocabulary subtest of Wechsler Adult Intelligence Scale-Revised (WAIS-R). (Unpublished master thesis), Ankara University.
- Wechsler, D. (1974). Manual for the Wechsler Intelligence Scale for Children—Revised. New York: Psychological Corporation.
- Wechsler, D. (1981). Wechsler Adult Intelligence Scale —Revised Manual. New York: Psychological Corporation.
- Zangwill OL (1943) Clinical tests of memory impairment. *Proceedings of Royal Society of Medicine*, 36, 576-580.

# Effects of the media to promote the scratch programming capabilities creativity of elementary school students

Worarit Kobsiripat\*

*Department of Computer Education, Faculty of Science and Technology, Nakhon Ratchasima Rajabhat University,  
Nakhon Ratchasima Province, 30000, Thailand*

---

## Abstract

Developing creative Promote higher-order thinking processes Give learners specific ability to think on their wide variety and innovative of the original. It led to the discovery and creation of new inventions or form new ideas. Consistent with the educational goals of the program. This research aim to study a guild line of using Scratch Computer Program that leading to creativity. And study the effects of media on the Scratch programming capabilities creativity.

The sample consisted of 60 students who were studying in semester 1. 2013 academic year, using purposive sampling (Purposive Sampling) tool used in this research is a lesson plan, Scratch and computer media test innovative ideas. Statistics used Data analysis were percentage, mean, standard deviation and Dependent t-test.

The findings indicated that

First, Mediums Scratch program can be used as a medium for learning activities. The adoption includes a multimedia interactive media as a tool to support learning.

Second, Scratch media performance of computer programs is equal according to the criteria set 82.46/82.25 E1/E2 is 80/80.

Creativity of students. Received instruction from the learning activities through the medium of a computer program Scratch by elements of creativity is an idea ingenious ideas flexibility. Initiatives and ideas census. Higher posttest than pretest statistically significant at the .05 level of performance, computer media Scratch equals 82.46/82.25 according to defined criteria E1/E2 is 80 /80.

In conclusion the computer program Scratch media can lead creative development of students through the learning activities that promote innovative education that cause the learners' desirable.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* Scratch programming, Higher-order Thinking, Creative Thinking, Computer Multimedia;

---

## 1. Introduction

In teaching and learning computer the teacher need to be innovative in the development of the teaching process. In order to make the students to understand content that is changing fast. Which can be respond to the nature of the learners. Educational innovation, Published Scratch which is software that produced by Massachusetts Institute of Technology, where the students can write object-oriented programs through media applications. (Brennan, 2012: IPST, 2013) That can be used in teaching and learning to be effective. Innovative education that is consistent with the National Education Act BE 2542

The student centered, all students have the ability to learn and develop themselves. Which help them to encourage students to develop their full potential naturally. The learning process must be consistent with the

interests and aptitudes of individual differences. By providing skills training, cognitive management situations and apply the knowledge to prevent and solve problems. (Office for National Education Standards and Quality Assessment, 2006).

Therefore, there should be the development of innovative educational computer programs Scratch Cards to be able to transfer the knowledge, skills, attitudes and cognitive development. In particular, advanced thinking. To enable the students to think of a solution. To be adjusted as the circumstances consistent with the Basic Education Core Curriculum BE 2551 Determining the Students desirable to five factors: the ability to communicate. The ability to think, to solve and with the ability to use technology skill in their life. (Ministry of Education, 2008)

To guide the development of learning activities aimed at learning more about the performance. The creative thinking is high (Higher order thinking), should be encouraged. Encourage the creative development of children from the first step. Due to the nature of this age need to learn by curiosity already high. If a child has been promoting since it will help to develop critical thinking to a higher (Kowasin, 1997).

---

So the development of creative talent should begin to develop from students in elementary school. Which is the development of creativity rather constant (Panmanee, 2002) and the importance of such issues. Researchers are interested in the development of computer programs to develop capabilities Scratch creativity. For elementary school students Emphasis on learning through modern media of stimuli to stimulate interest.

Thus contributing to the development of creative research to make the media Scratch program for elementary school students effective appropriate to the learning and teaching of computer media. It will bring out the creative process of developing the ability to deploy properly. To guide the development of instructional computers to provide students with features consistent with educational goals. Contribute to improving the quality of education that focuses on students is significant. National Education Act BE 2542 and the findings can be used to develop instructional materials Computer for elementary school students to develop academic anyway.

## **2. Purpose of the Study**

1. To study guideline for applying the Scratch Program in managing learning activities.
2. To develop a computer program to promote Scratch capabilities creativity of elementary school students.
3. To study the effects of media on the Scratch programming capabilities creativity.

## **3. Research Questions**

How the use of computer program, Scratch media can affect the creativity of elementary school students?

## **4. Method**

The researcher used a form of experimental research. (Experimental design) as well as the experimental group (One Group Pre test-Post test Design) are conducting research on the following topics.

### **4.1 Population and sample**

1. Population used in the study are elementary school Students at all levels at Demonstration School Nakhon Ratchasima Rajabhat University. There were 262 people during first semester academic Year 2013.

2. Sampling of 60 elementary school students used methods of purposive sampling.

### **4.2 Research Tools**

1. Lesson plans using the Scratch programming media for use as a guide. In the event the course of four planned duration of 16 hours.
2. Scratch computer media for learning activities about the creation of digital media. Used as the medium of instruction by learning plans number of 4 pieces.
3. The researcher adapt from Torrance Measurement of Creativity updates by Aree Panmanee

(Teacher Training Department, 1979).

#### 4.3 Data collection and analysis.

The research was conducted manually by following procedure.

1. A rating of 3 members meeting to clarify issues in the ratings in order to adhere to the same standards
2. Orientation for students in Grade 4 to clarify issues in the use of computer media Scratch program to develop creative skills.
3. After orientation the students test their creativity by A Picture (Torrance Test of Creative Thinking Figural Form A) 3 activities at 10 minutes following activities.
  - 3.1 The drawing 1 item.
  - 3.2 by the addition of images to complete 10 questions.
  - 3.3 Use of parallel lines of 30 items.
4. Recheck a test of creativity through picture form (Torrance Test of Creative Thinking Figural Form A) as part of a creative test scoring by 3 directors. The scores were combined and averaging
5. Teaching conducted by using a computer program Scratch media to develop creative skills of the elementary school students By the Activities Plan Number 4 units with a total time of 16 hours, which the researcher who taught themselves.
6. Post-test by students to test academic achievement and test their creativity through photo tags (Torrance Test of Creative Thinking Figural Form A) the same as the pre-test study with the experimental group. Class time confirm rate by the original series.
7. Collecting data to be analyzed by statistical methods as follows.
  - 7.1 Analysis Plan. An analysis of the proper consistency of lesson plans and summary of feedback from the experts.
  - 7.2 Scratch program performance analysis of computer media to develop creative skills. The elementary school students. The benchmark E1/E2 is 80/80.
  - 7.3 Comparison of the creative abilities of elementary school students. Before and after the study materials, computer programs using scratch tested by t-test for dependent.

#### 5. Findings

Research The Scratch Computer Aided media to promote the creative abilities of elementary school students revealed the following results:

1. Published Scratch program can be used as a medium for learning activities. The adoption include a multimedia interactive media and as a tool to support learning. According to the development of the computer of the experts.



Figure 1. The media Scratch Computer that developed by the researcher.

2. Scratch media performance of computer programs is equal according to the criteria set 82.46/82.25 E1/E2 is 80/80. As shown in Table 1.

Table 1: Effectiveness of computer media Scratch program to develop creative skills of the elementary school students.

items	number of students	Means ( $\bar{X}$ )	Percentage	the performance criteria
Scoring tests during the study Efficiency of the process ( $E_1$ )	30	65.97	82.46	80/80
Post test Scoring tests of the performance of the results ( $E_2$ )	30	32.90	82.25	
The performance of the Scratch media computer programs is 82.46/82.25/				

From Table 1, Published performance test results of the Scratch program to develop creative skills of elementary school students found that the efficiency of the learning process with computer media Scratch derived from test scores between students' average score is 82.46 percent. And the performance of computer media Scratch program to change the behavior of the learner derived from the average of the test after school with an average of 82.25 percent. So the Scratch computer media develop creative skills of the elementary school students, thus effectively equal to 82.46/82.25 according to defined criteria is 80/80.

3. The Creativity of primary school students received instruction from the event. Learning through computer programming Scratch by elements of creativity, fluent thinking, flexible thinking, initiatives and ideas census. The higher posttest than pretest statistically significant at the .05 level. As shown in Table 2 and Table 3.

Table 2 Ratings the creative side previous and after learning of elementary school students. Learning through computer-mediated Scratch program to develop creative skills.

The creative abilities	Pre test ( $N=30$ )	post test ( $N=30$ )
------------------------	---------------------	----------------------

	$\bar{X}$	<i>S.D.</i>	$\bar{X}$	<i>S.D.</i>
The initiative	13.11	0.45	32.31	0.91
The thinking fluency	12.58	1.06	31.93	1.51
A flexibility and meticulous thinking.	5.04	0.86	10.81	0.79
Total	30.73	2.37	75.06	3.20

From Table 2, we found that elementary school students which learning through computer-mediated Scratch program to develop creative skills. The development of creative capabilities pre test 30.73 and post test 75.06, which is higher.

Table 3 the comparison of the ratings the creative side before and after the class. Elementary school students to learn computer programming with Scratch the media to develop creative skills.

Testing	<i>N</i>	$\bar{X}$	<i>S.D.</i>	<i>t</i>
pretest	30	30.73	2.37	116.964**
posttest	30	75.06	3.20	

\*\* Significant at .05 level.

From Table 3, showed that the creative abilities of students are average ( $\bar{X}$ ) Equals 30.73 and the standard deviation (*S.D.*) of 2.37, Rating creative side after learning the average ( $\bar{X}$ ) was 75.06 and the standard deviation (*S.D.*) of 3.20, the statistical value is equal to -116.964, which showed that after learning with computer media. Scratch programming for elementary school students Develop the creative side higher than before learning with computer-mediated Scratch program to develop creative skills. Statistically significant at the .05 level, indicating that an effective media program Scratch. Gives students the ability to develop creativity soared.

## 6. Discussion

1. The results showed that: Scratch computer media guidelines to apply a multimedia interactive media and as a support tool for learning consistent with Hongto (2005) proposed that the computer lesson help the better the performance. Content analysis is through education as a selection of teachers and scholars used appropriately.

However, bringing about computer use in teaching which consistent with the findings of Quing (2006) studied the effects of using a computer for the adult learner. Study found that the mathematics of the lesson have a positive impact on for mathematics. But it should take into the account of the experience of the learner as well.

2. The results showed that: Scratch media performance of computer programs is equal according to the criteria set 82.46/82.25 E1/E2 was 80/80 show that the computer- generated research. According to set criteria the computer- generated the process of building a system through the assessment and monitoring of both experts in the field of teaching career and technology strand. In terms of the lessons include images, audio, questions and an exercise which is consistent with the concept of Cheenatakul (2003) noted that the computer can create animated pictures and sound which Motivating learners. And in each step of the tutorial also focus the learning process on their own. The nature of learning emphasizing learner is important.

However, should encourage the students to use the computer by self-study, both before and after learning. Consistent with the findings of Hargrave and Kenton (2002) has researched the subject, presentations, multimedia programs, teaching research found that use multimedia programs that have been designed well before teaching. Gives students gain a learning experience that is different from the original.

3. The results showed that: Creativity of students which received instruction from the learning activities through the medium of a computer program Scratch by elements of creativity is an idea ingenious ideas flexibility. The initiatives and ideas census are higher post test than pre test statistically significant at the .05 level



due to computer media Scratch and plan activities that promote creative learning. Consistent with the findings of Seelipat (1997) studied the scientific creativity of the students at one of a series of events create scientific inventions and ideas fluently scientific ideas and flexible scientific student. By using a series of activities to create scientific inventions with the teacher as the instructor to create scientific inventions difference is statistically significant at the 0.01 level part of the global initiative scientific differences are statistically significant at the 0.05 level.

However, it should focus on activities designed to promote the use of thinking skills in line with guidelines to promote creativity through the learning process of Torrance (Pornrungrat, 2003) has focused on encouraging children to discover their own answers. A question of provocation and urged the answer is to help develop your child's creativity with. Use questions to stimulate intellectual development. The idea is to expand the types of questions encourage respondents have used several ideas approach. Does not cause anxiety, but it must be the response of the opinions of the respondents. There needs to express ideas and solve problems.

## 7. Recommendations

### 1. Useful suggestions

1.1 According to an expert interviews gathering for the effective online learning development, so instructors should adapt feedback to develop innovative media package. By taking into account the content of the lesson appropriate to comply with the level of the course. As well as to be the guidelines for evaluation and achievement, online learning lessons, a visual presentation, the graphics and the sound of the CAI should be appropriate to the content and the class of learners, respectively.

1.2 The development of online effective computer follows the 80/80, so the instructors should use the guide of the development of a computer. This makes students achievement higher. The development of creative and satisfaction are significant to manage to improve the teaching and learning purposes.

1.3 The result of using computer help the students developed creativity. So should continue to reinforce learning, creativity constantly. By additional training outside of school hours in order to develop the creativity of students to develop a rich and meaningful learning.

### 2. Suggestions for further research.

2.1 Should develop in various other content and grade level of a computer and technology to develop their creativity.

2.2 Should have been doing research on the computer in other ways, such as testing simulations, review, or a game of instruction, etc., to a variety of media for teaching and developing skills in thinking.

## Acknowledgments

The researcher would like to express his sincere thanks to Nakhon Ratchasima Rajabhat University for financial support to this research and research presentation.

## References

- Brennan, K. (2012). *Best of Both Worlds: Issues of Structure and Agency in Computational Creation, In and Out of School*. Ph.D. Dissertation. MIT Media Lab.
- Cheeratrakul, S. (2003). *Development of Computer Mathematics. Fractions Grade 3*. Thesis M.Ed. Degree: Mahasarakham University.
- Hargrave, C.P. and Kenton, J.M. (2002). Pre-Instructional Simulations: Implications for Science classroom teaching. *Journal of Computers in Mathematics and Science Teaching* 19 (1), 47-58
- Hongtho, V. (2005). *Effect of bringing the CAI to the Art and Life Course 3. The design*. M.Ed. Thesis, Bangkok : Srinakharinwirot University.
- Kowasin, C. (1997, January). Develop thinking. *Journal of Educational Measurement Srinakharinwirot University*. 18 (54): 1-20.
- Ministry of Education. (2008). *Course Core Basic Education Act 2551*. Bangkok: Ministry of Education.
- Office for National Education Standards and Quality Assessment . (2006) . *Summary of the Synthesis external evaluation. Education, basic education*. Retrieved July, 2012 from [http://www.onesqa.or.th/upload/195/Fileupload/1398\\_2097.pdf](http://www.onesqa.or.th/upload/195/Fileupload/1398_2097.pdf)
- Panmanee, A. (2002). *Trained to think is to think creatively*. Bangkok: Yai mai Educate.
- Pornroongroj, C. "Canonical nine aspects of the development of children's creativity,.". *Academic Journal*. 1 (4): 44; November, 2003.
- Quing, Li. (2006). *Mathematic and a-risk adult learners: Would technology help?*. [Online]. Available: <http://www.eric.ed.gov/ERICWebPortal/recordDetail?accno=EJ728899> [2013, February 10].
- Seelipat, P. (1997) *Studied the effects of a series of events create media artifacts with science camp. The ability to create inventions*

*and scientific creativity of the students* . M.Ed. thesis, Bangkok: Srinakharinwirot University.  
Teacher Training Department. (1979). *The Study on the creativity of the children in Thailand*. Bangkok : Supervisory Unit.

INTE 2014

# Efficient education of ergonomics in industrial engineering study program

Marek Bures\*

*Department of Industrial Engineering and Management, Mechanical Faculty,  
Univerzity 22, Pilsen 30614, Czech Republic*

---

## Abstract

The paper is focused on development of innovated course focused on ergonomics education in the conditions of the Czech Republic. Although the proposed course can be seen as a country oriented it is built on universal foundations, which can be applied everywhere. The ambition is to create innovated course content that will be fun and educated at the same time. During course preparations a Constructivism theories were applied to ensure better understanding of the ergonomics issue. The course is also constructed according to recommendations of International Ergonomics Association and Federation of European Ergonomics Societies.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* Ergonomics; Higher Education; Constructivism; E-learning; Digital Human Models;

---

## Introduction

Ergonomics is currently one of the most developed science disciplines in the Czech Republic. Ergonomics is according to IEA (International Ergonomics Association, 2000) defined as a scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance. After access to the European Union in April 2003, it was necessary to harmonize all legislation according to EU rules. Safety at work along with ergonomics were some of the many areas covered by this harmonization. Although it is already over 10 years since these procedures were done, we still have reserves in the practical application of ergonomic rules. Within the product ergonomics, the situation is not so bad. Due to the operation of international companies ergonomics came earlier in the product design. At present so called process ergonomics, the application of ergonomic principles in the production design, is very actual. Interpretation of legislative regulations and rules is not always easy and therefor only a small group of experts who are able to implement ergonomic principles into businesses exists.

The fact, that ergonomics in manufacturing is still an asset of rather medium or large enterprises, is supported by absence of special degree or certificate courses in the Czech Republic, as it is in the case of some countries within the EU. There is no CPE accreditation by the Board of Certification in Professional Ergonomics, no Eur. Erg. accreditation by Federation of European Ergonomics Societies (FEES) or no Royal Charter from the Ergonomics Society of the United Kingdom, etc. (Bridger, 2012). Approved academic programs for ergonomists training are also missing. Education on universities in this area is often realized by several specialized subjects within product design

---

\* Corresponding author. Tel.: +420-731-575781; fax: +420-377-638400.  
E-mail address: buresm@kpv.zcu.cz

or industrial engineering study programs. In industrial engineering there is often focus on physical ergonomics, because much of the production is still labor intensive.

To take action in our own hands a proposal for improved and balanced ergonomic course, which will be implemented in industrial engineering study program on University of West Bohemia in Pilsen, is presented in this paper.

## Methodology

Education on universities in Czech Republic is provided still in more traditional way. As described by Barbosa (Barbosa, 2012) the teaching methods are based on memorization and repetition, without students' realization of the true meaning of the information. The prevailing thought is that the teacher has the knowledge and on the other hand the student knows nothing. This education can be seen as an act of depositing information in student's memory. In this way students get proper education and information though, but they do not stay in their head for a long time and are very rapidly displaced by other information.

More appropriate is the Constructivism approach or Constructivism theory. It is based on the idea that people construct their own knowledge through their personal experience. The effectiveness of Constructivism is that it prepares students for problem solving in complex environment (Al-Huneidi, 2013). They are more active in building and creating knowledge based on their experience and interpretations. Teacher's role is essential and important in learning process. He/she must act as a mentor and help students to interpret knowledge and guide them to refine their understanding and interpretations.

The basic theories of Constructivism are summarized in Table 1. (Janjai, 2012)

Table 1. Learning activities designed by using theories of constructivism.

Principle of learning	Learning activities
1. Construction of new knowledge	1. Request the students to describe their background experience on the subject to be learned. Encourage the students to propose the method for learning new knowledge according to their interest and competency.
2. Authentic learning	2. Let the students face real situations, such as problems in the classroom.
3. Activity-based approach	3. Request the students to construct the knowledge by themselves from various activities such as the study from documents, survey, interview and experiments.
4. Group process and member interaction	4. Assign the students to work together as groups, each of which has 4-6 students. Each member of the group has a specific role and mission. The outcome of the work was evaluated by all members of the group. 5. Request students to use the rule of PDCA (Plan, Do, Check, Act) to control their work to achieve the goal.

Great help when building new course with Constructivism theory is hidden in case studies. This practical examples can be used as a basis for theoretical reflection and also promote active postures in students. For example the survey conducted by (Eroglu et. al., 2013) on 79 students from industrial design departments of various universities in Turkey was beside other areas aimed on satisfaction/dissatisfaction with their ergonomics education. The mean value of the answer was 2.6 from maximal 5 points, which is below average. Regarding the concrete reasons reflecting students dissatisfaction, these were coded into five categories: instructor was incapable (30,2%), insufficient applied studies (41,9%), syllabus was not suitable for industrial design (11,6%), course duration was short (4,7%) and finally the syllabus was found poor (30,2%). From these result we can see that "insufficient applied studies" was the most mentioned category and obviously the most desired one. Most of the respondents indicated that the education they received was mainly theoretical. Their general idea was, for industrial design education, ergonomics should be thought through hands-on application and case studies.

Although we would like to put emphasis on Constructivism approach in proposed course we need to present some of the basic knowledge to the students to unify everybody's view. Knowledge base of ergonomics can be described by four levels (Bridger, 2012):

*Core knowledge:* fundamental concepts in basic sciences, statistics and engineering that underpin research and practice.

*Basic applications:* Principally, the use of core knowledge to optimize user-device interaction and, more generally, person-environment fit.

*Tools and processes:* Implementation of core knowledge and data into structured design and risk assessment tools. Processes for human-machine integration in system design.

*System integration:* Macroergonomic and systems-theoretical constructs used to manage the application of ergonomics in systems design and development. Ergonomics as a tool for policy development.

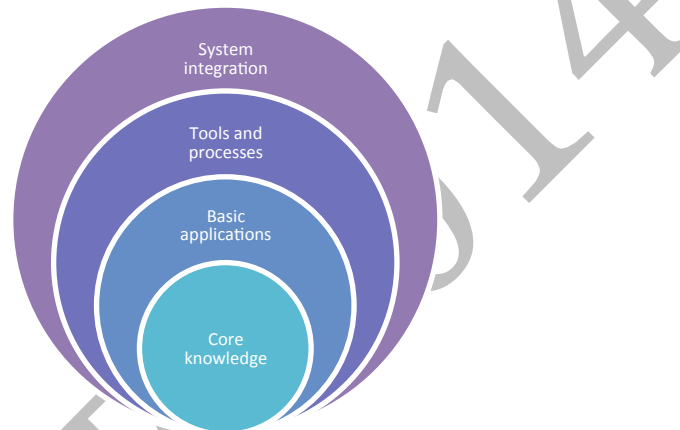


Fig. 1. Levels of knowledge in ergonomics education

Although the research needs in ergonomics may differ around the world, the knowledge base, systems of research governance, and research standards should be broadly comparable. Thus, ergonomics educators should always “think globally act locally” (Bridger, 2012). With this statement in mind we used IEA and FEES guidelines for ergonomics courses to create basic structure of proposed course as follows:

*Ergonomics principles:* Introduction to the ergonomics approach and its relation to sciences.

*Human characteristics:* Basic knowledge from disciplines such as human biology and psychology that has particular relevance for ergonomics.

*Work analysis and measurement:* Techniques and methods for analysis, measurement, investigation and computation.

*People and technology:* Applied knowledge from engineering and human sciences that has particular relevance for applying ergonomics.

*Professional issues:* Legislation, economics, politics of ergonomics investigation, ethic etc.

*Applications:* Practical experience of applying ergonomics on practical projects.

## Results

With Constructivism theory in mind and also the specifications on content from FEES guidelines we approached to the development of a new course. “Labor Organization and Management” is a compulsory course in Industrial

Engineering and Management study program and Manufacturing Processes study program at University of West bohemia. These programs are master type of study and can be passed in both full-time and combined form of study.

Part of the course description is as follows: “The goal of this course is to refer to the importance of work optimization regarding to the production system productivity. The attention is paid in different rate especially to work rationalization, job standardization and ergonomic areas. In the work rationalization area the students will be familiarized with terms like productivity, added value or losses in production system. In the job standardization area the students will learn how to use predetermined time methods according to MTM-1 and Basic MOST. The biggest attention is paid to the last area which is ergonomic. Students will understand the system approach of ergonomics and linkage to other related branches. Close attention is paid to three main components of production systems which are man - machine - medium. At the end of this subject the modern software tools supporting the previous topics are introduced.”

The course consists of two modules. In the first module, the foundation of the theory and an overview of the content is presented to the students, and in the second module, a project based learning activities take place, in which constructivism characteristics are applied. The learning content of the first module is structured as a set of topics, where the traditional teaching approach prevails. Students gets the idea of ergonomics as a complex science where everything depends on everything and that system approach in designing the industrial workplaces is the only one right (Bures, 2009). The duration of each of the modules is 13 weeks and they run parallel. Closer description is dedicated to the second module with constructivism principles. Students work can be divided into 3 parts.

*Part 1: Creation of the project teams and software for ergonomic modeling (3 weeks duration)*

Students will form individual project teams consisting of 3-5 students. Each student in the team will be assigned by a role that he needs to fulfill (eg. team leader, presenter, designer, etc.). Teams must be composed of students from both study programs; Industrial Engineering and Management as well as Manufacturing Processes, for ensuring collaboration between those fields and exchange of knowledge. Working in groups allows students to exchange their ideas and express their experience, thus enhancing their knowledge. Social interaction is an essential source for constructing the new knowledge (Janjai, 2012).

Beside the team creation students will be provided with e-books that are focused on virtual ergonomic modelling with the help of Digital Human Models (DHM) from software Delmia V5 Human or Tecnomatix Jack (Polasek, 2014). E-books are great for education of IT topics. You have the opportunity to use commented or not commented videos, animations describing real examples or screen capture videos which describes how to work with the software. E-books are also good tool for students studying in combined form of study who lack time for spending at university. After self-study phase with these e-books, students will have a lecture on the spot with the teacher where they can ask questions and go deep into the DHM problematic. The first part of the proposed course will be ended by selection of software that will be used by the team for elaboration of practical project.

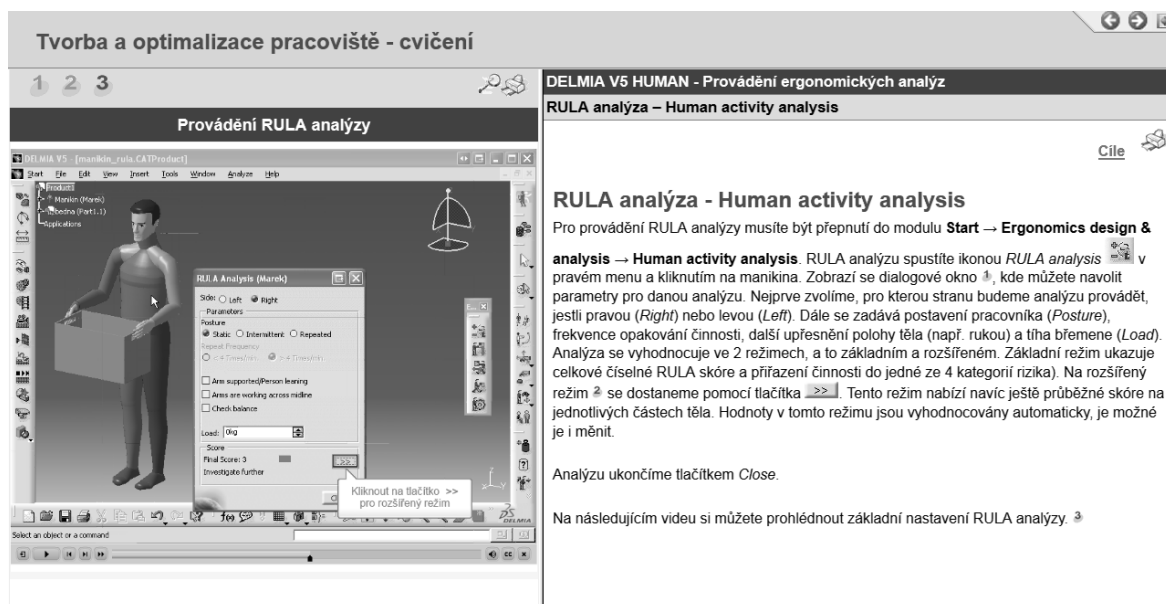


Fig. 2. An example from e-book on virtual ergonomic modelling

### *Part 2: Elaboration of practical projects (7 weeks duration)*

In collaboration with team members students will develop solutions in practical projects. They will have two options. Either they can bring their own proposal for project focused on ergonomic optimization in production or the assignment will be assigned to them. For this reason students will be also forced to create combined teams of full-time and combined students. The combined students that are already working will bring the practical aspects in consideration and will be the source of real situation problems. Together the team will solve the project in which they will be obliged to describe the problem, provide the solution and prove the benefits by evaluating improvement in working conditions or increase of productivity. All the proposals will be supported and evaluated with the DHM and virtual ergonomic modelling. For the purposes of verification a predetermined time methods can be used (Kurkin, 2011). All this time the lector act as a facilitator or mentor. He will guide the students, provide them with feedback and correct any mistakes that may appear during project solving.

### *Part 3: Projects presentation, evaluation and knowledge transfer (3 weeks duration)*

The last part will serve for knowledge transfer between the students. In the last 3 weeks students will present their practical project during which the collaborative learning and assessment among students will be promoted. The teams of students will received comments from other students and also can benefit from solutions presented by others. The lector acts again as a moderator of discussions and corrects the students' thoughts and ideas.

The evaluation of students' activity and ability will be performed by traditional assessment. The teacher evaluates students' activity in the course, participation, team work, and fulfilment of practical project. Final assessment will be done at final exam which will be combined, written and spoken.

## **Discussion and conclusion**

The paper summarized motives and reasons that led to the development of innovated course focused on ergonomics topic. One of the main reasons was the lack of proper education in ergonomics which is available in other EU countries. The content of the current course was reformed, so both the content and the teaching form would be more effective. The new concept of the teaching was developed according to the Constructivism theories. In the future course the students will be more independent. They will be evaluated on the basis of practical project

elaboration. The projects teams will be formed by different students focus groups (or let's say study programs) which will ensure transfer of the knowledge and construction on the new one. Not only the concept but also the content was innovated. According to the IEA and FEES guidelines for ergonomics courses the new content will provide knowledge from basic information, its application with different tools and methods, to the system concepts of the whole problematic.

The proposed and innovated course will be implemented in the study program from February 2015. During this pilot run the students' satisfaction with the new course will be evaluated. The intent is to divide students in two groups. One group will be taught by the old manner, the other one by the new manner. The work of both groups will be monitored closely during the whole semester and at the end the evaluation of theirs satisfaction will be done by questionnaire. The results will be evaluated together with students study results. After this pilot action there will be an actual proof of the new course eligibility.

### Acknowledgements

This paper was created with the subsidy of the project NEXLIZ – CZ.1.07/2.3.00/30.0038 which is co-financed by the European Social Fund and the state budget of the Czech Republic.

### References

- Al-Huneidi, A., & Schreurs, J. (2013). Constructivism based blended learning in higher education. *Communications in Computer and Information Science*, 278, 581-591.
- Barbosa, L. H., & Pinheiro, M. H., C. (2012). The challenges of interdisciplinary education and its application on teaching ergonomics. *Work*, 41, 5456-5458.
- Bridger, R. S. (2012). An international perspective on ergonomics education. *Ergonomics in Design*, 20, 12-17.
- Bures, M. (2009). New approach to ergonomic design of industrial workplaces, International Conference on Industrial Engineering and Engineering Management (IEEM). Hong Kong, China.
- Eroglu, I., Cifter, A. S., & Ozcan, K. (2013). Ergonomics education and students' tendency to use research methods. *Contemporary ergonomics and human factors*, 431-438.
- IEA - International Ergonomics Association. (2000). *In the discipline of ergonomics*. Retrieved from <http://www.iea.cc>.
- Janjai, S. (2012). Improvement of the ability of the students in an education program to design the lesson plans by using an instruction model based on the theories of constructivism and metacognition. *Procedia Engineering*, 32, 1163-1168.
- Kurkin, O., Bures, M. (2011). Evaluation of operational times by MTM methods in the digital factory environment, Proceedings of the 22th International DAAAM Symposium. Vienna, Austria, 671-672.
- Polasek, P., Simon, M. (2014). Usage of digital tools of ergonomics in practice, Proceedings of the 23rd International Business Information Management Association Conference. Valencia, Spain, 437-441.



# EĞİTİM İLE ÜCRET İLİŞKİSİ: TÜRKİYE ÜZERİNE BİR DEĞERLENDİRME

Yrd. Doç. Dr. Seda Tekeli  
Anadolu Üniversitesi  
İktisat Fakültesi/Çalışma Ekonomisi ABD

Doç. Dr. Güler Günsoy  
Anadolu Üniversitesi  
İktisat Fakültesi/İktisat ABD

Son yıllarda araştırmacılar ilgi uyandıran konulardan biri de ücret ve eğitim arasındaki ilişki olmuştur. Ücret iktisadi bir olgudur; çünkü insanın varlığını sürdürmesi ve yaşamını devam ettirebilmesi için gerekli gelir kaynağıdır. Ücret aynı zamanda sosyal bir olgudur. Ücretin, çalışanların sadece kendilerinin değil ailelerinin de beslenme ve barınmasıyla birlikte sosyal ve kültürel ihtiyaçlarını karşılamaya yeter düzeyde olması gerekmektedir. Ücret uygulamalarının bütünüyle fiyatlar genel düzeyi, gelir dağılımı, ekonomik büyüme, ödemeler dengesi, istihdam ve işsizlik üzerine etkileri olup, ülkelerin ekonomik ve sosyal yapılarına göre bu etkilerin yönü değişmektedir. Ücretin belirlenmesinde ise etkili olan faktörler farklılaşmaktadır. Bu durumda, eğitim, beşeri sermayenin güçlenmesi, verimlilik, gelir seviyesinde artış, gelir dağılımında iyileştirme ve yoksullukla mücadelede önemli bir belirleyici olurken, beşeri sermayeye yapılan yatırımlar içinde eğitim harcamaları doğrudan doğruya kişinin ücret geliri üzerinde belirleyici olmaktadır. Bu bağlamda çalışmada, Türkiye özelinde bireylerin sahip oldukları eğitimlerin ücretleri üzerindeki etkisinin incelenmesi amaçlanmıştır. Bu amaçla, TÜİK'in (Türkiye İstatistik Kurumu) eğitim ve kazanç veri tabanından yararlanılarak, eğitimin ücret üzerindeki etkisini aylık ve yıllık kazançlar üzerinden hem cinsiyete göre hem de meslek ana gruplarına göre analiz edilecektir. Bu çerçevede, eğitim düzeyi ve meslek ana gruplarına göre ücret farklılıkları ortaya konularak, Türkiye'de sahip olunan eğitimin ücretler ya da kazançlar üzerindeki etkisi açıklanacaktır.

**Anahtar Kelimeler:** Eğitim, Beşeri Sermaye, Ücret.

### **RELATION BETWEEN EDUCATION AND WAGE: TURKISH CASE**

One of the most sparking topics among researchers in last years has been the relation between wage and education. Wage is an economic concept, because it is the resource for people to subsist and continue to live. But it is also a social concept. Because it has to be on a level that makes not only the earners but also their families to feed, shelter and provide them with social and cultural needs. Wage policies have effects on price level, income distribution, economic growth, balance of payments, employment and unemployment and the direction of those effects may change according to economic and social structures in various countries. The factors that determine wage level are manifold. In this case, education effects raise in human capital, productivity, raise in income level, improvement in income distribution and struggle against poverty, while education expenditures for human capital has a direct effect on people's wage. In that context, this study aims to analyze the effects of education on people's wage. Data are gathered from education and earnings database in Turkish Statistics Institute and the effect of education on monthly and annual wage level for main groups of both gender and profession are analyzed. Within this scope, wage differences relating to education and profession will be put and the effect of education in Turkey on wage level will be explained.

**Keywords:** Education, Human Capital, Wage

## **1. GİRİŞ**

Toplumların ekonomik ve sosyal gelişim süreçlerinin her aşamasında farklı unsurlar ücret ya da gelirlerin belirlenmesinde etkili olmuştur. Tarımsal üretim yaygın olduğu tarım ekonomisi döneminde en önemli gelir kaynağını toprak oluştururken; sanayi toplumuna ve sanayi ekonomisine geçilmesiyle birlikte toprağın yerini sermaye almıştır. Bilgiye ve bilgi teknolojisine dayalı bilgi toplumuna geçişle birlikte de artık gelirin en önemli belirleyicisi beşeri sermaye yani eğitimidir. Bilginin en önemli rekabet unsuru olduğu günümüz bilgi toplumlarında daha yüksek ücret ya da gelir elde etmek ancak daha yüksek eğitim, daha fazla bilgi ve beceri ile mümkün olmaktadır (Çalışkan, 2007: 235).

Eğitim ile ücret arasındaki ilişki, sadece bireye sağladığı ekonomik katkı açısından değil; ülke ekonomisine ve büyümesine sağladığı katkı açısından da değerlendirilmelidir. Mikro açıdan eğitim, bireylerin ücretleri ya da gelirleri üzerinde etkili olurken (Katz ve Autor, 1998: 1-5); makro düzeyde ise ülkenin ekonomik büyümesi ve milli geliri üzerinde de etkili olmaktadır (Lucas, 1988: 3-6; Barro, 1991: 407; Topel, 1999: 1). Eğitimin bireylerin nitelik ve becerilerine sağladığı olumlu katkı, bireylerin verimliliğinin artmasına, verimliliğin artması ise doğrudan ücret ya da gelir oranlarının artmasını sağlamaktadır (Ünal, 1992: 113-114). Öte yandan eğitim

istihdam fırsatlarını artırma, işgücüne katılımı artırma, niteliksel nüfusu artırma, gelir dağılımı eşitsizliğini iyileştirme ve yoksulluğu azaltma yönünde de etkileri olmaktadır. Ülkelerin eğitim düzeyi yükseldikçe, nüfus artış hızı yavaşlamakta, daha iyi istihdam fırsatları sağlanmakta ve sağlık ve beslenme standartlarındaki gelişme ile gelirin daha adil dağılımı sağlanarak yoksulluk azalma eğilimi göstermeye başlamaktadır (Çalışkan, 2007: 236).

Bu kapsamda çalışmada öncelikle literatürde yer alan çalışmalarla ücret ile eğitim arasındaki ilişki ortaya konulmaya çalışılacak; sonrasında ise TÜİK'in hazırlamış olduğu ücret ve eğitim verileri üzerinden Türkiye'deki eğitim ve ücret ilişkisi, deskriptif olarak açıklanmaya çalışılacaktır.

## 2. LİTERATÜRDE EĞİTİM-ÜCRET İLİŞKİSİ

Çalışma ilişkilerinin doğduğu ve yaşanmaya başladığı yıllardan bu yana, bir ülkenin ekonomik kalkınmasında, sosyal gelişiminde ve ülke içerisindeki politik istikrarın sağlanmasında ücret önemli bir yere sahip olmuştur (Topalhan, 2010: 3). Ücret tanımlanırken işçi ve işveren tarafından farklı açılardan ele alınmaktadır. İşveren ücreti maliyet olarak görürken; işçi ise kendisinin ve ailesinin geçimini sağlayacak tek gelir kaynağı olarak görmektedir. Milkowic (2002: 72), çalışmasında ücreti “*çalışanların iş ilişkilerinin bir parçası olarak elde ettikleri maddi yarar ve hizmetler ile her türlü finansal kazançların toplamı*” olarak tanımlamaktadır. Alayoğlu (2004: 5222) ise, ücreti tanımlarken ödüle benzetmekte ve “*çalışanların emeklerinin karşılığı olarak elde ettikleri iç ve dış ödüller*” olarak görmektedir (Işığışok, 2011: 3).

Eğitimin ekonomik rolünü açıklayan en eski yaklaşım “Beşeri Sermaye Kuramı” olarak bilinir. Kurama göre, ekonomik büyümenin ve bireysel gelir farklılıklarının en önemli belirleyicisi insan sermayesidir (Palaz vd., 2013: 121). Beşeri sermaye düzeyi, işgücü piyasasında bulunanları birbirlerinden farklılaştıran temel özelliklerdendir. Çünkü, beşeri sermaye teorisine göre eğitim ve verimlilik arasındaki pozitif yöndeki ilişki, verimlilik ile doğrudan ilişkili olan ücret üzerinde de etki oluşturmaktadır. Örneğin, eğitim düzeyi arttıkça işgücü piyasasındaki bireylerin verimlilikleri de artacağından ücret olumlu yönde etkilenecek, ücretlerde de artış sağlanacaktır. Tersî durumda ise, düşük eğitim düzeyindeki bireylerin verimlilikleri de düşük olacağından ücretler de bundan olumsuz yönde etkilenecektir (Biçerli, 2011: 225).

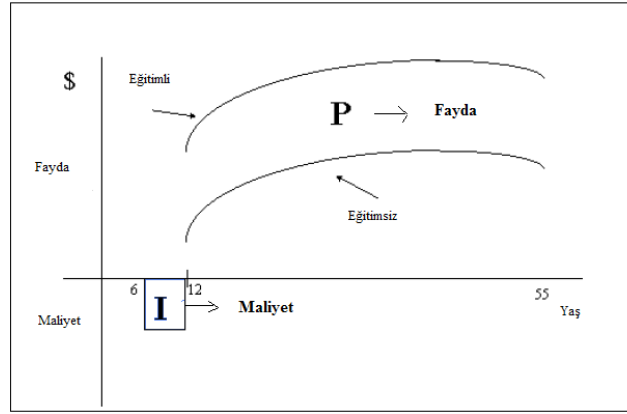
Klasik iktisatçılardan Adam Smith, 1776 yılında yayınlanan “Ulusların Zenginliği” kitabında ücret ve etkilerine yönelik düşüncelerini açıklamanın yanında, eğitilmiş işçiyi pahalı bir makineye benzetmekte ve pahalı bir makine ile alışılmışın dışındaki her türlü şeyin üretilebileceğini ifade etmektedir (Biçerli, 2000: 231; Biçerli, 2011: 253; Yumuşak vd., 2010: 330). Smith ücret ile eğitim ve etkileri konusundaki görüşlerini “Ulusların Zenginliği” kitabında şöyle ifade etmektedir.

*“Emeğin bolca ödüllendirilmesi, soy sop üremesini kamçılacağı gibi halk tabakasının çalışmasını da artırır. Emek ücretleri, çalışmanın körükleyicisidir. İnsanın bütün öteki iyi huyları gibi bu da gösterilen teşvik oranında mükemmelleşir. Bol beslenme, işçinin beden gücünü çoğaltır. Durumunu düzeltip ömrünü belki rahat rahat bolluk içinde sona erdiririm diye beslediği tatlı ümit, onu bu gücü son kertesine dek zorlamaya şevklendirir. Nitekim işçilerin hamarat, çalışkan ve eli çabuk olanlarını, ücretlerin düşük olduğu yerde değil hep yüksek olduğu yerde görürüz” (Smith, 2006: 89)*

Ayrıca Smith çalışmasında, zamanını eğitim için harcayan bireyin eğitim süresince maddi bir kayba uğradığını, aldığı eğitim ile verimliliği yükseldiğinden ücret düzeyinin de yüksek olacağını böylece eğitim süresince oluşan maddi kaybın yüksek ücretlerle telafi edilebileceğini vurgulamaktadır (Biçerli, 2000: 231; Biçerli, 2011: 253; Yumuşak vd., 2010: 330). Smith’in eğitim ile ücret arasındaki ilişkiye ait görüşlerini, eğitim düzeyi yükseldikçe ücret oranlarındaki artışın hem verimlilik artışından hem de eğitim için harcanan zaman ve paranın telafi edilmesinden kaynaklandığı şeklinde özetleyebiliriz. Smith’in ücret ile ilgili düşünceleri iktisat literatüründe “Etkin Ücret Teorisi” olarak yer almaktadır (Ünsal, 2007: 45-46; Taban, 2011: 30). Bireylerin beşeri sermayelerini geliştirmek adına eğitimlerine yaptıkları yatırım onların çalışma hayatındaki verimliliklerini doğrudan etkilemekte ve çalışan ücretlerinde farklılaşmalara neden olmaktadır. Bu nedenle, bireylerin beşeri sermaye gelişimlerinde eğitimleri için yaptıkları yatırımın miktarındaki artış, verimliliklerini belirlemekte; yatırım miktarı arttıkça verimlilikte aynı yönde artış göstermektedir. Bu bağlamda, bireylerin eğitim yatırımları kaynaklı verimlilik farklılıkları doğrudan ücret ya da kazanç oranlarında da farklılıklara neden olmaktadır (Ünal, 1992: 115).

Eğitimin ekonomik getirileri arasındaki ilişki ise literatürde yaş-kazanç profili ile gösterilmektedir. Eğitimli ve eğitimsiz durumuna göre yaş-kazanç profili Şekil 1’de görülmekte, düşey ekseninde kazanç; yatay ekseninde ise emekli olana kadar geçen yaş yer almaktadır. Yatay eksenin altındaki alan maliyetleri göstermektedir. Yaş-kazanç profili belirlenirken, “belli bir düzeyde eğitim alan bir kişinin okulu bitirip çalışmaya başlayacağı varsayılır. Eğitimine bağlı olarak üretkenliği ve maaşı belli bir düzeye kadar yükselir, bir süre için sabit kalır, daha sonra da azalma eğilimi gösterebilir. Eğitimsiz olarak gösterilen eğrinin altındaki alan yaşam boyu geliri yani emekli olana dek elde edeceği geliri göstermektedir”. Şekil 1’de görüldüğü üzere, temel eğitimi aldıktan sonra (eğitimli eğri) çalışmaya başlayan kişinin verimlilik düzeyi, temel eğitimi almaksızın çalışmaya başlayan kişiden (eğitimsiz eğri) daha yüksektir. Bireyin eğitime devam ettiği için katlandığı maliyeti ve eğitim yatırımları I ile eğitime devam eden kişinin verimliliği ve sağladığı fayda ise P ile gösterilmektedir. Bu artı kazancın toplam maliyete olan oranı ise fayda maliyet oranıdır” (“Kaytaz, 2005:19-20”den aktaran Günsoy, 2009: 29-30).

### Şekil 1: Eğitimli Eğitimli Yaş-Kazanç Profili



**Kaynak:** “Van Der Gaag (1997), “Early Child Development: An Economic Perspective” , Early Child Development Investing in Our Chihdrens Future, M Young (Ed). Elsevier Science, B.V.” den aktaran Günsoy, 2009: 30.

Eğitimin gelir üzerindeki etkisi ülkelerin gelişmişlik seviyelerine göre de farklılık göstermektedir. Gelişmiş ülkelerde, eğitimin gelir üzerindeki etkisi daha düşükken; gelişmekte olan ülkelerde ise bu etki daha yüksek olmaktadır. Bunun nedenlerini, gelişmekte olan ülkelerde nitelikli eğitim almış bireylerin sayısının azlığı, anne ve babaların sosyal statüsünün çocukların eğitim düzeyini etkilemesi ve eğitime ulaşma zorluğu olarak sıralamak mümkündür (Yumuşak ve Bilen, 2000: 83). Psacharopoulos (1993), çalışmasında gelişmiş ve gelişmekte olan ülkeler bakımından eğitimin sosyal ve bireysel getiri oranlarını hesaplamış (tablo 1) ve gelişmekte olan ülkelerde tüm eğitim düzeylerinin sosyal ve bireysel getirisinin, gelişmiş ülkelere göre daha yüksek olduğu sonucuna ulaşmıştır. Gelişmekte olan ülkelere eğitimli birey sayısının azlığı eğitimin sosyal ve bireysel katkısını artırırken; gelişmiş ülkelere ise herkesin eğitimli olması bireysel ve sosyal katkısı azaltmaktadır (Taban ve Kar, 2008: 330-331).

**Tablo 1:** Gelişmiş ve Gelişmekte Olan Ülke Gruplarına Göre Eğitim Yatırımlarının Sosyal ve Kişisel Getiri Oranları (%)

Ülke Grupları	Sosyal Getiri Oranı			Bireysel Getiri Oranı		
	İlköğr.	Orta öğr.	Yüksek öğr.	İlköğr.	Orta öğr.	Yüksek öğr.
<b>Gelişmekte olan ülkeler</b>						
Alt Sahra Afrika	24	18	11	41	27	28
Asya	20	13	12	39	19	20
Latin Amerika	18	13	12	26	17	20
<b>Gelişmiş Ülkeler</b>	14	10	9	22	12	12

**Kaynak:** “Psacharopoulos (1993)”den aktaran, Taban ve Kar, 2008: 330.

Literatürde eğitim yatırımlarının veya eğitim için katlanılan maliyetlerin ekonomik getirilerinin çok yüksek olduğuna ilişkin çok sayıda araştırma vardır. Psacharopoulos (1994) çalışmasında,

fazladan bir yıl daha ilkokul eğitimi almasının bireyin gelecekteki verimliliğini %10'dan %30' artıracağını ifade etmektedir ("Van Der Gaag ve Tan,1998: 6-8" den aktaran Günsoy, 2009: 29). Ayrıca, ABD'de eğitim ücret ilişkisini ele alan çalışmaları inceleyen Psacharopoulos, eğitim düzeyine göre değişmekle birlikte eğitimin gelir farklılıklarını açıklama oranının 0,77 olarak kabul edileceğini ifade etmektedir ("Woodhall, 1987: 212"den aktaran Ünal, 1992: 118). Eğitim ve gelir arasındaki ilişkiyi inceleyen bir başka önemli çalışma da ise, Mincer, eğitim ile tecrübenin gelir farklılıklarını açıklama payının %33 olduğu sonucuna ulaşmıştır (Varlier, 1982: 18)

Eğitim ve gelir arasındaki ilişki mikro ve makroekonometrik çalışmalarla da incelenmiştir. Eğitimin gelirin en önemli açıklayıcısı olduğunu mikroekonometrik çalışmalarda ortaya konulurken; makroekonometrik çalışmalarda da (Benhabib ve Spiegel, 1994) tersi sonuçlar elde edilmiştir. Makroekonometrik çalışmalarda eğitim ve gelir arasında anlamlı sonuçlar elde edilememesini Krueger ve Lindahl (1999, 2000) kullanılan verilerin ölçüm hatalarıyla ilişkilendirmişlerdir (Krueger-Lindahl, 2001: 1130).

Ücret ile eğitim arasındaki ilişkinin yönünü ortaya koymaya yönelik çalışmaların temelini bu ilişkinin varlığına ilişkin kanıt arayışları oluşturmaktadır. Türkiye'de eğitim ile ücret arasındaki ilişkiyi inceleyen çalışmalarda, daha çok TÜİK Hanehalkı İşgücü Anketi üzerinden değerlendirmeler yapılarak, gerek cinsiyete göre gerekse de bölgesel olarak ücret ve eğitim arasındaki ilişkiler ortaya konulmaya çalışılmıştır. Eğitim ile ücret arasındaki ilişkiyi inceleyen bazı çalışmalar şunlardır. Eğitim ve ücret arasındaki ilişkiyi cinsiyet temelinde inceledikleri çalışmalarında Dayıoğlu ve Kasnakoğlu (1997), ücret gelirinin elde edilmesinde eğitimin önemli bir belirleyici olduğu ve cinsiyete göre ise, kadınların ücret artışlarında eğitimin getirisinin erkeklerden daha fazla olduğu sonucuna ulaşmışlardır (Sarı, 2002: 368). Eğitim ile ücret geliri arasındaki ilişkiyi cinsiyet temelinde inceleyen bir başka çalışma ise Tansel'in 1994 yılındaki çalışmasıdır. Bu çalışmada da Dayıoğlu ve Kasnakoğlu'nun (1997) çalışmalarında olduğu gibi Hanehalkı İşgücü Anketi sonuçlarından yararlanılmış ve ilkokul ve ortaokul mezunu kadınlar için eğitimin getirisinin erkeklerden daha yüksek olduğu sonucuna ulaşılmıştır (Tansel, 1994: 315). Tansel, 2000 yılındaki bir diğer çalışmada ise fazladan bir yıllık eğitimin kendi işini yapanlar ve ücretli çalışanlar bakımından cinsiyete göre getirisini incelemiştir. Buna göre, ücretli çalışan kadınların eğitime bağlı getirilerinin kendi işinde çalışan kadınların getirilerinden daha düşük olduğu sonucuna ulaşılmıştır (Tansel, 2000: 2). Benzer nitelikteki bir başka araştırma ise, Özcan, Özcan ve Üçdoğruk tarafından 2003 yılında İstanbul ili özelinde yapılmıştır. Çalışmada ücretliler ve kendi adına bağımsız çalışanlar açısından eğitim ve gelir ilişkisi incelenmiş ve kendi adına bağımsız çalışanların eğitime bağlı kazançlarının ücretli çalışanlardan daha yüksek olduğu sonucuna ulaşılmıştır (Özcan vd., 2003: 1). İstanbul ve Ankara illeri özelinde, Akçomak ve Kasnakoğlu (2002) çalışmalarında da, eğitim ve tecrübenin kazançlar üzerinde anlamlı bir etkiye sahip olduğu sonucuna ulaşmışlardır (Akçomak vd., 2002: 15-16). Sarı (2002), Mincer usulü kazanç modellerini kullanarak yaptığı ampirik çalışmada eğitimin geliri belirleyen en

önemli unsur olduğu sonucuna ulaşmıştır (Sarı, 2002: 378). Kazancın eğitimin, tecrübenin ve cinsiyetin bir fonksiyonu olduğunu ifade eden Mincer'in kazanç modelini kullanarak analiz yapan Öksüzler (2008) çalışmasında, eğitimin sadece bireysel kazancı etkilemediğini, aynı zamanda daha iyi çalışma koşullarına, eğitilmiş ailelerin eğitilmiş nesiller yetiştirmesine katkı sağladığını vurgulamaktadır (Öksüzler, 2008: 6)

### 3. TÜRKİYE'DE EĞİTİM VE ÜCRET İLİŞKİSİ

#### Amaç ve Önemi

Araştırmanın amacı, eğitimin ücret üzerindeki etkisini aylık ve yıllık kazançlar üzerinden hem cinsiyete göre hem de meslek ana gruplarına göre incelemektir. Bu amaçla, TÜİK resmi web sitesinde yer alan ücret istatistiklerinden yararlanılmıştır. Ancak elde edilen istatistikler sadece 2006 ve 2010 yıllarına ait istatistikler olduğundan sonuçlar sınırlı bir dönemi kapsamaktadır. Bu kapsamda konunun içeriği açısından öncelikle Türkiye'de ücretli çalışanların eğitim düzeyine göre dağılımı cinsiyetler temelinde incelenmiş ve ücretli çalışan erkeklerin ve kadınların aylık ve yıllık brüt kazançları belirlenmiştir. Sonrasında ise, cinsiyetler arasında ücret farklılıkları tespit edilerek, meslek ana gruplarına göre ücretlerin nasıl değişkenlik gösterdiği analiz edilmeye çalışılmıştır. Tüm bu değerlendirmeler sonrasında ise, Türkiye genelinde eğitimin ve yapılan işin ücret düzeyleri ve farklılıkları üzerindeki etkisi vurgulanacaktır.

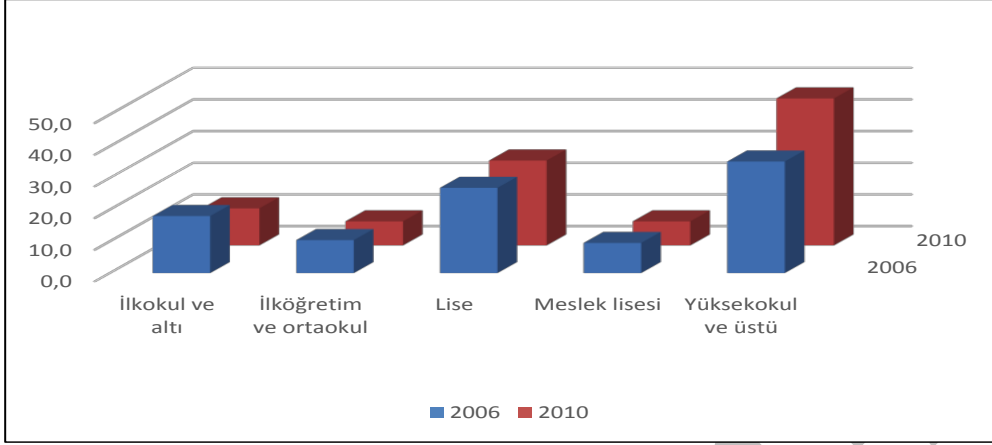
#### Yöntem

Çalışmada TÜİK resmi veri tabanından elde edilen 2006 ve 2010 yıllarına ait eğitim düzeyine ve cinsiyete göre ücretli çalışanlar; eğitim düzeyi ve cinsiyete göre aylık, yıllık brüt kazançlar ve saatlik ücretler; eğitim düzeyi ve cinsiyete göre ücret farklılıkları; cinsiyet ve meslek ana gruplarına göre yıllık ortalama kazanç verileri kullanılarak betimsel analiz yapılmıştır. Böylece bu veriler kapsamında, Türkiye'de eğitimin ücret ya da kazançlar üzerindeki etkisi vurgulanmaya çalışılmıştır.

#### Türkiye'de Eğitim ve Ücret İlişkisi (Cinsiyet, Yıllık-Aylık-Saatlik Ortalama Brüt Ücret, Ücret Farkları)

Türkiye'de çalışan ücretlilerin, cinsiyete göre dağılımını şekil 1 ve 2 yardımıyla inceleyebiliriz. Buna göre, 2006 ile 2010 yılları karşılaştırıldığında Türkiye'de ücretli çalışanların çoğunluğunu erkeklerin oluşturduğunu söyleyebiliriz. Cinsiyet ve eğitim düzeyine göre ücretlileri incelediğimiz de ise, 2006 ve 2010 yılları için eğitim düzeyi arttıkça ücretli kadın çalışanların yüzdesi artmaktadır. Özellikle yükseköğretim ve üstü eğitim düzeyine sahip ücretli çalışan kadınların oranı 2006 yılında %35,2 iken; bu oran 2010 yılında %46,4'e yükselmiştir.

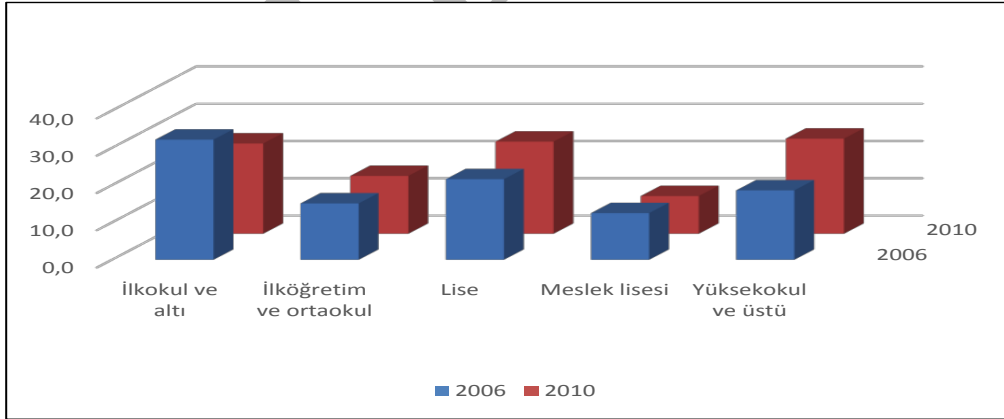
**Şekil 1: Türkiye’de Eğitim Düzeyine Göre Ücretli Çalışan Kadınlar**



**Kaynak:** TÜİK, resmi web sitesi veritabanından yararlanılarak oluşturulmuştur.

Benzer bir değerlendirme ücretli çalışan erkekler için yapıldığında ise, özellikle 2006 yılında eğitim düzeyi artıkcı ücretli çalışan erkeklerin sayısı azalma eğilimi göstermektedir. Örneğin 2006 yılı için, erkeklerde ilkököl ve altı eğitim düzeyinde ücretli çalışanların oranı daha yüksekken (%32,2); yüksekoköl ve üstü eğitim düzeyindeki erkeklerin oranı ise %18,6 ile oldukça düşük bir seviyededir. 2010 yılında ise, ilkököl ve altı eğitim düzeyindekiler ile yüksekoköl ve üstü eğitim düzeyine sahip olan erkeklerde ücretli çalışma oranı daha yüksektir.

**Şekil 2: Türkiye’de Eğitim Düzeyine Göre Ücretli Çalışan Erkekler**



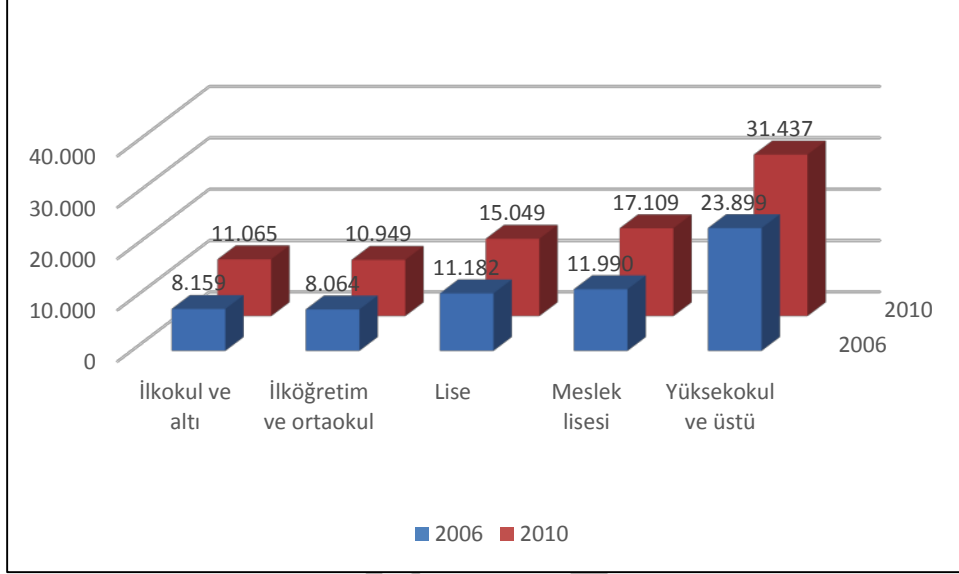
**Kaynak:** TÜİK, resmi web sitesi veritabanından yararlanılarak oluşturulmuştur.

Cinsiyet ve eğitim düzeyine göre yıllık ve aylık ortalama brüt kazancı ise şekil 3 ve 4 üzerinden inceleyebiliriz. Şekil 3’te kadınların eğitim düzeyine göre yıllık ortalama brüt kazançları yer almaktadır. Buna göre, hem 2006 yılı hem de 2010 yılı için kadınların eğitim düzeyi artıkcı yıllık ortalama brüt kazançlarının da artış gösterdiğini söyleyebiliriz. Sayılarla ifade edecek



olursak, günümüze daha yakın olması itibariyle, 2010 yılında ilkokul ve altı eğitim düzeyine sahip kadınların yıllık ortalama brüt kazancı 11.065 TL iken; bu rakam lise eğitim düzeyine sahip kadınlarda 15.049 TL'ye, yüksekokul ve üstü eğitim düzeyindeki kadınlarda ise, brüt 31.437 TL'ye yükselmektedir.

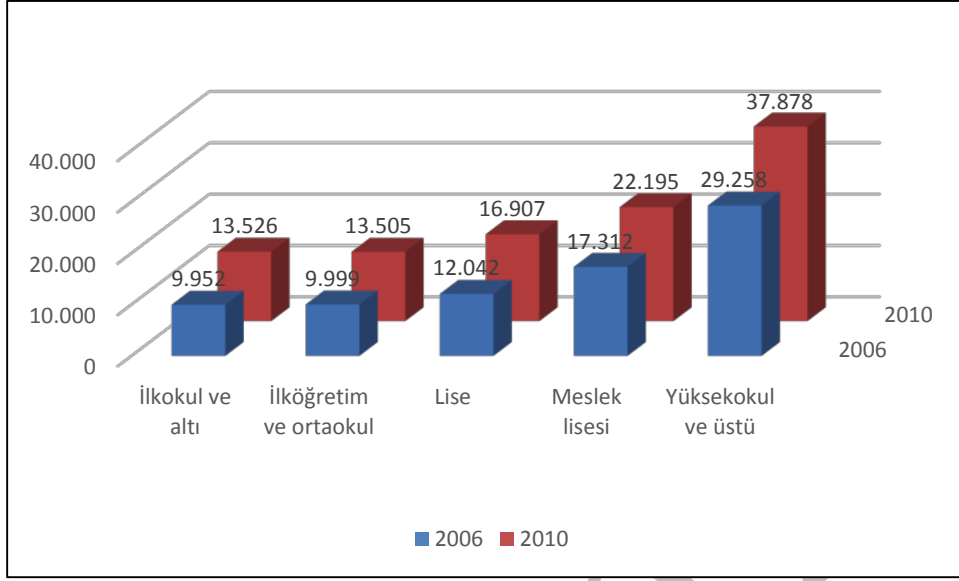
**Şekil 3:** Türkiye’de Eğitim Düzeyine Göre Kadınların Yıllık Ortalama Brüt Kazancı



**Kaynak:** TÜİK, resmi web sitesi veritabanından yararlanılarak oluşturulmuştur.

Erkeklerin ise yıllık ortalama brüt kazancı tüm eğitim düzeylerinde hem 2006 hem de 2010 yılı için, kadınlardan daha yüksek olduğunu söyleyebiliriz (şekil 4). Erkeklerde de eğitim düzeyi yükseldikçe yıllık ortalama brüt kazanç artmaktadır. 2010 yılı için ilkokul ve altı eğitim düzeyindeki erkekler için yıllık ortalama brüt kazanç 13.526 TL iken; lise düzeyinde eğitime sahip olanlarda 16.907 TL'ye, yüksekokul ve üstü eğitime sahip olanlarda ise 37.878'e yükselmektedir.

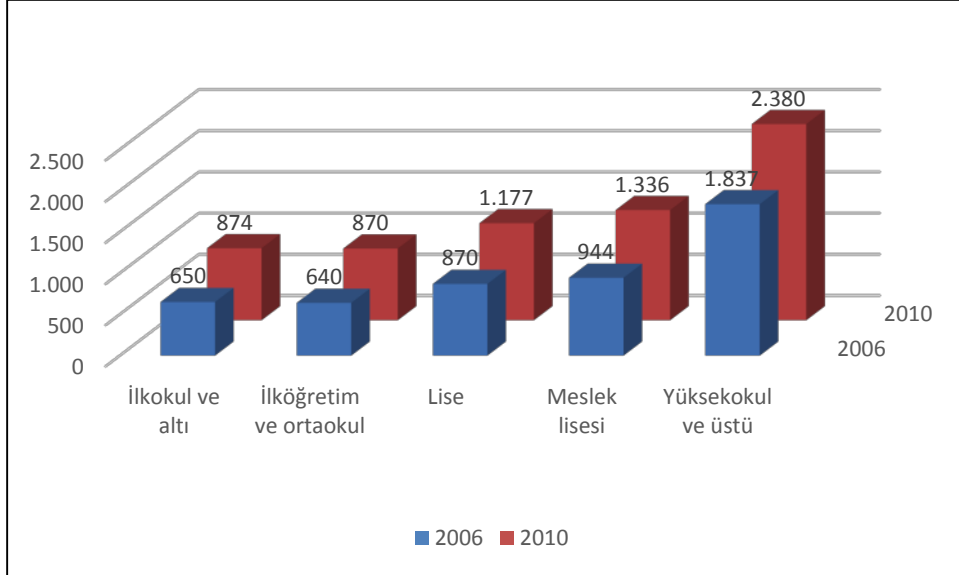
**Şekil 4:** Türkiye’de Eğitim Düzeyine Göre Erkeklerin Yıllık Ortalama Brüt Kazancı



**Kaynak:** TÜİK, resmi web sitesi veritabanından yararlanılarak oluşturulmuştur.

Cinsiyet ve eğitim düzeyine göre yıllık brüt kazanç için elde ettiğimiz sonuçlar; aylık brüt kazançlar için de geçerlidir. Şekil 5 ve 6'ya göre, kadınların aylık brüt kazançları 2010 yılında 2006 yılından daha yüksek olmasına rağmen; erkeklerin aylık brüt kazançları her iki dönem içinde kadınlardan daha yüksek gerçekleşmiştir. İlkokul ve altı eğitim düzeyindeki kadınlarda aylık ortalama brüt kazanç 874 TL iken; eğitim düzeyindeki yükselme ile kazanç artmakta ve yüksekokul ve üstü eğitim düzeyindeki kadınlarda 2.380 TL'ye yükselmektedir (şekil 5).

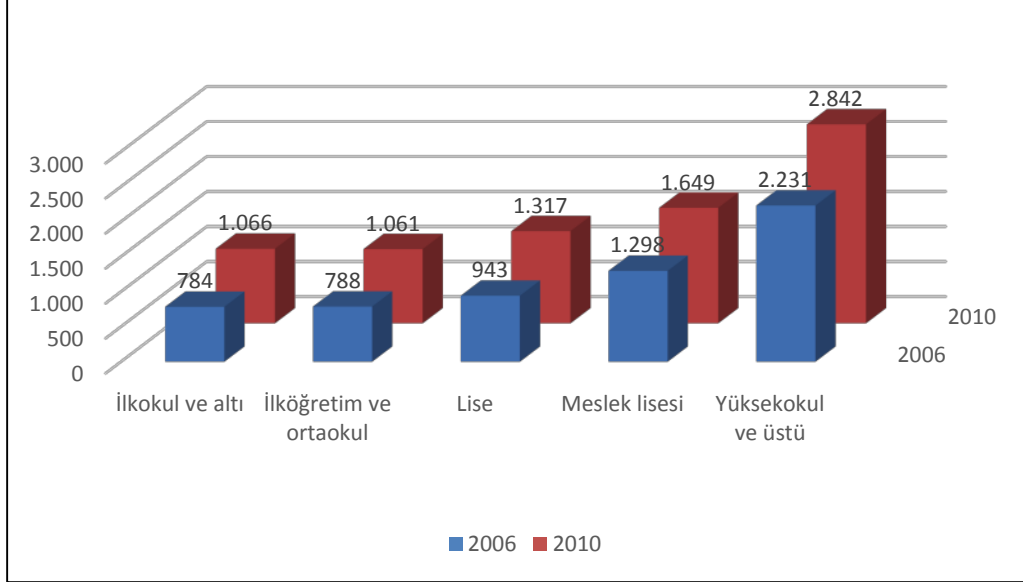
**Şekil 5:** Türkiye'de Eğitim Düzeyine Göre Kadınların Aylık Ortalama Brüt Ücreti



**Kaynak:** TÜİK, resmi web sitesi veritabanından yararlanılarak oluşturulmuştur.

Erkeklerde ise, ilkokul ve altı eğitim düzeyindekilerin aylık ortalama brüt kazançları 1.066 TL'iken; yüksekokul ve üstü eğitim düzeyindekilerde ise 2.842 TL'ye yükselmektedir (şekil 6). Erkeklerde kadınlardan zaten daha yüksek olan aylık ortalama brüt kazanç eğitim düzeyindeki yükselme ile daha da artmaktadır.

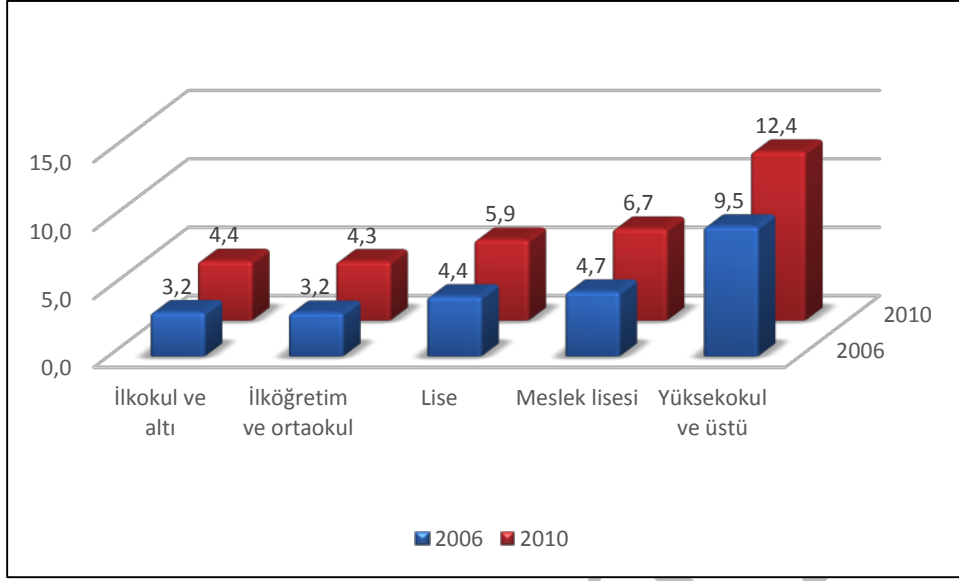
**Şekil 6:** Türkiye’de Eğitim Düzeyine Göre Erkeklerin Aylık Brüt Ücreti



**Kaynak:** TÜİK, resmi web sitesi veritabanından yararlanılarak oluşturulmuştur.

Ortalama brüt ücretler saatlik olarak değerlendirildiğinde de 2006 ve 2010 dönemleri için kadınların eğitim düzeyi yükseldikçe ortalama brüt saatlik ücretleri de artış göstermektedir (şekil 7). 2010 yılı için, yüksekokul ve üstü eğitim düzeyindeki kadınlar için ücret 12,4 TL iken; ilkokul ve altı eğitim düzeyindeki kadınlar için ücret 4,4 TL olarak belirlenmiştir.

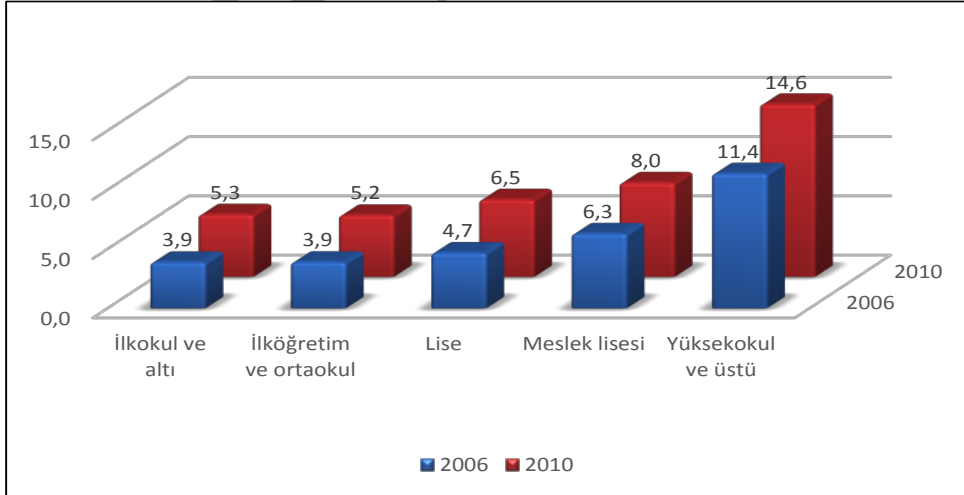
**Şekil 7:** Türkiye’de Kadınlarda Saatlik Ortalama Brüt Ücret



**Kaynak:** TÜİK, resmi web sitesi veritabanından yararlanılarak oluşturulmuştur.

Saatlik ortalama brüt ücret erkekler için değerlendirildiğinde de eğitim düzeyi yükseldikçe saatlik ortalama brüt ücretleri artmaktadır (şekil 8). 2010 yılı için, yüksekokul ve üstü eğitim düzeyindeki erkeklerin saatlik ortalama brüt ücreti 14,6 TL iken; ilkokul ve altı eğitim düzeyinde 5,3 TL'ye düşmektedir. Ancak hem kadınlar hem de erkekler için eğitim düzeyindeki artışın yıllık, aylık ve saatlik brüt ücretlerde artışa neden olduğunu söylesek bile; erkeklerin ortalama brüt ücretleri kadınlardan daha yüksektir.

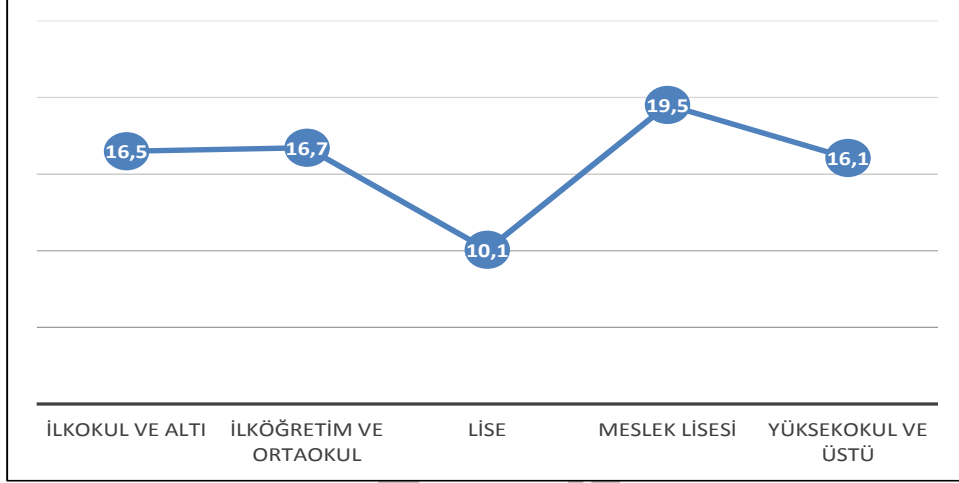
**Şekil 8:** Türkiye’de Erkeklerin Saatlik Ortalama Brüt Ücret



**Kaynak:** TÜİK, resmi web sitesi veritabanından yararlanılarak oluşturulmuştur.

Cinsiyet ve eğitim düzeyine göre ücret farkları üzerinde de durmakta yarar vardır (şekil 9). Eğitim düzeyine göre değerlendirildiğinde cinsiyetler arasındaki ücret farklarının en yoğun olduğu eğitim düzeyi meslek lisesi eğitim düzeyinde (%19,5) gözlenmektedir. Ücret farkının en düşük olduğu eğitim düzeyi ise %10,1 ile lise eğitim düzeyidir. Tüm eğitim düzeylerinde erkeklerin ücretleri kadınlardan yüksek olmakla birlikte; bu farklılık lise eğitim düzeyinde en az, meslek lisesi eğitim düzeyinde ise daha çok gözlenmektedir.

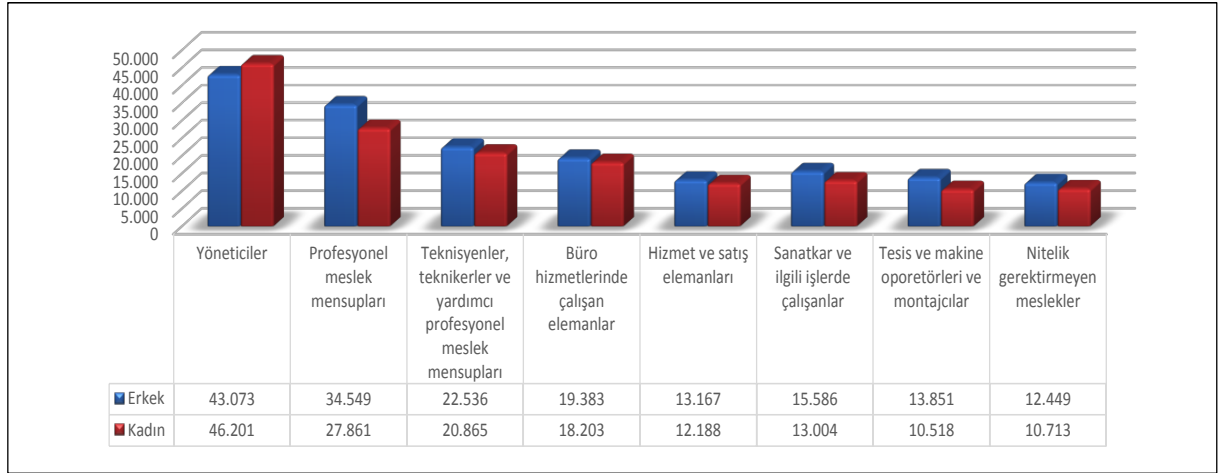
**Şekil 9:** Türkiye’de Eğitim Düzeyi ve Cinsiyete Göre Ücret Farkı



**Kaynak:** TÜİK, resmi web sitesi veritabanından yararlanılarak oluşturulmuştur.

Meslek ana gruplarına göre, Türkiye’de cinsiyete göre yıllık ortalama brüt kazançlar şekil 10 yardımıyla incelenebilir. Meslek ana grupları açısından yıllık ortalama brüt kazançlar değerlendirildiğinde ise yöneticilik görevindeki kadınların yıllık brüt kazançlarının (46.201 TL) erkeklerden (43.073 TL) daha yüksek olduğu görülmektedir. Diğer meslek ana gruplarına baktığımızda ise, erkeklerin yıllık brüt kazançlarının kadınlardan daha yüksektir. Şekil 10’a göre, işgücü piyasasında erkek işi olarak değerlendirilen meslek ana gruplarında (tesis ve makine operatörleri ve montajcılar; teknisyenler, teknikerler ve yardımcı profesyonel meslek mensupları ile profesyonel meslek mensupları vb.) erkeklerin yıllık ortalama brüt kazançları kadınlardan daha yüksektir. Kadınların yoğun olarak istihdam edildiği hizmet satış elemanları meslek ana grubunda ise erkekler (13.167 TL) ile kadınların (12.188 TL) yıllık ortalama brüt kazançları arasındaki fark azalmaktadır.

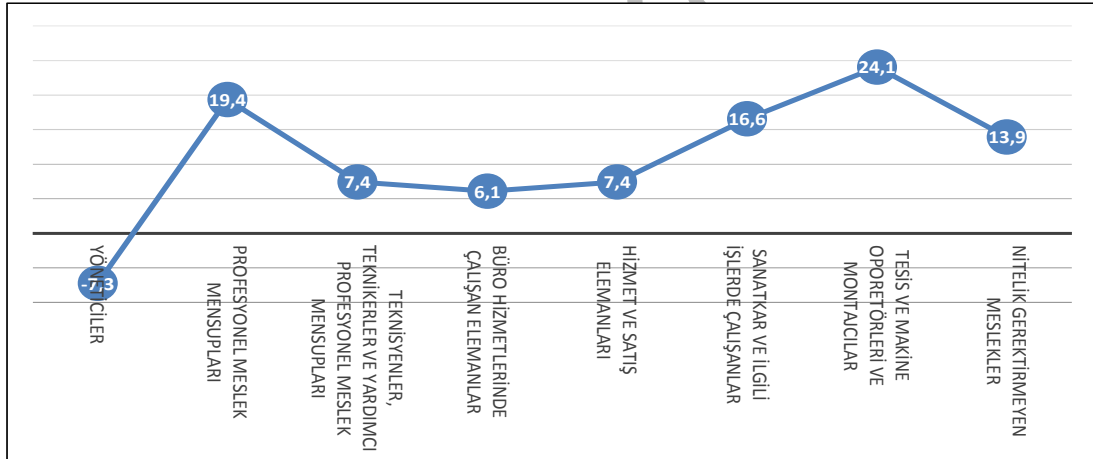
**Şekil 10:** Türkiye’de Meslek Ana Gruplarına Göre Yıllık Ortalama Brüt Kazanç



**Kaynak:** TÜİK, resmi web sitesi veritabanından yararlanılarak oluşturulmuştur.

Şekil 11 yardımıyla meslek ana gruplarına göre cinsiyete dayalı ücret farkları incelendiğinde de durum daha iyi anlaşılmaktadır. Yöneticiler meslek ana grubunda kadınlar ve erkekler arasındaki ücret farkı (-7,3) oldukça yüksek düzeydedir.

**Şekil 11:** Türkiye’de Meslek Ana Gruplarına ve Cinsiyete Dayalı Ücret Farkı (%)



**Kaynak:** TÜİK, resmi web sitesi veritabanından yararlanılarak oluşturulmuştur.

### Araştırmanın Bulguları ve Değerlendirilmesi

Türkiye’de eğitimin ücret üzerindeki etkisi incelenirken, TÜİK’in 2006 ve 2010 yılı için hazırladığı ücret verilerinden yararlanılmıştır. Bu bağlanmada çalışmada elde edilen bulgular şöyledir; Türkiye’de 2006 ve 2010 yılları için ücretli çalışanlar cinsiyete göre incelendiğinde hem erkek hem de kadın ücretli çalışanların sayısı ilkökul ve altı, lise ve yüksekokul ve üstü eğitim düzeyinde daha yüksektir. Aynı dönemler için Türkiye’de eğitimin ücret üzerindeki etkisi

cinsiyete göre incelendiğinde 2006 ve 2010 yılları için hem kadınların hem de erkeklerin eğitim düzeyi artıkça yıllık ortalama brüt kazançları da artmaktadır. Ancak bu artış, erkeklerde kadınlardan daha fazladır. Yıllık brüt kazançlarda olduğu gibi aylık ve saatlik ortalama brüt ücretler de eğitim düzeyindeki artıştan olumlu yönde etkilenmekte; hem kadınların hem de erkeklerin eğitim düzeyindeki artışla ortalama brüt ücretleri artmaktadır. Eğitim düzeyine göre ücret farkları açısından değerlendirildiğinde ise, cinsiyetler arasındaki ücret farklarının en yoğun olduğu eğitim düzeyi meslek lisesi eğitim düzeyidir. Ücret farkının en düşük olduğu eğitim düzeyi ise lise eğitim düzeyidir. Meslek ana grupları cinsiyet açısından değerlendirildiğinde ise yıllık ortalama brüt kazançlar değerlendirildiğinde ise yöneticilik görevindeki kadınların yıllık brüt kazançlarının erkeklerden daha yüksek olduğu görülmektedir. Profesyonel meslek mensupları; teknisyenler, teknikerler ve yardımcı profesyonel meslek mensupları; sanatkâr ve ilgili işlerde çalışanlar; nitelik gerektirmeyen işler ve tesis ve makine operatörleri ve montajcılar meslek ana gruplarında ise, erkeklerin yıllık brüt kazançları kadınlardan daha yüksektir. Ücret farkı açısından ise, yöneticiler meslek ana grubunda, kadınların lehine, erkekler ile kadınlar arasındaki ücret farkı en yüksek düzeydedir.

#### 4. SONUÇ

Tarihsel süreç içerisinde iktisat literatüründe gelir ve ücretlerle ilgili teoriler ve bu kapsamdaki gelişmeler her dönemde araştırmacıların ilgisini çekmiştir. Özellikle küreselleşme hareketleri, teknolojik gelişmeler, değişen çalışma ilişkileri ile birlikte ücreti belirleyen faktörler ve ücretlerin etkilediği alanlar önem kazanmıştır. Ücretin belirlenmesinde etkili olan faktörlerden biri de eğitim veya eğitim düzeyidir. Literatürde yer alan teorik ve ampirik çalışmalarda gelir, kazanç ve ücret düzeylerinin belirlenmesinde eğitimin önemi vurgulanmakta; ülke ekonomisinin büyümesinde ve gelir adaletinin sağlanmasında eğitimin yeri sorgulanmaktadır. Türkiye’de 2006 ve 2010 yılları için eğitim ücret ilişkisine yönelik yapılan analizde, eğitim düzeyindeki artış ücretli çalışan sayısını hem kadınlar hem de erkekler için olumlu yönde etkilemektedir. Ancak, ücretli çalışanların sayısı sadece cinsiyete göre incelendiğinde ise erkeklerin sayısının kadınlardan daha yüksek olduğu sonucuna ulaşılmıştır. Özellikle literatürdeki araştırmalarda, kadınların işgücüne katılımını belirleyen faktörler incelendiğinde eğitim düzeyinin önemli bir faktör olduğu vurgulanmaktadır. Bu bağlamda, Türkiye’de kadınların eğitim düzeyinin her kademesinde genelde erkeklerden daha düşük olması işgücüne katılımı azaltmakta ve kadınların işgücüne katılım oranlarının düşük olması da ayrıca, ücretli çalışan kadınların sayısının da erkeklerden daha az olmasına neden olmaktadır. Yıllık, aylık ve saatlik ortalama brüt kazançlar incelendiğinde ise 2006 ve 2010 yılları için, kadınların kazançlarının erkeklerden daha düşük olduğu ancak literatürdeki çalışmalarda da vurgulandığı gibi, eğitim özellikle kadınların ücret ve kazanç elde etmelerinde çok belirleyici bir faktördür. Kadınların eğitim düzeyleri erkeklere göre düşük olması nedeniyle kadınların elde ettikleri her eğitim düzeyinin özellikle ücretle birlikte bireysel ve sosyal getirileri erkeklerden daha fazla olmaktadır. Ancak, ücret veya kazanç gelirinin elde edilmesinde eğitimin dışında, yapılan işin niteliği, türü, işin gerektirdiği tecrübe,

fazladan alınan eğitim, sahip oldukları donanımlar, iş sürecini yönetme ve kararlı olma vb. faktörler de etkili olabilmektedir. Bu faktörlerin etkilerinin cinsiyet bağlamında farklılaşması sonucunda kadın ve erkeğin eğitim düzeyleri aynı olsa bile elde ettikleri ücretlerin de farklılaşmasına neden olmaktadır. Ücret farkları eğitim düzeyine göre değerlendirildiğinde ise, meslek lisesi eğitim düzeyinde cinsiyetler arasındaki ücret farkları en yoğunken; lise eğitim düzeyinde ise bu fark azalmaktadır. Meslek lisesi eğitimlerin daha çok erkekler tarafından tercih edilmesi, meslek lisesi eğitimine dayalı işlerin daha çok erkek işi olarak değerlendirilmesi ve erkek meslek lisesi mezunlarının işgücüne katılımlarının genel lise, ortaokul, ilkokul vb. eğitim düzeylerine göre daha fazla olması, erkek lehine ücret farkının yükselmesine neden olmaktadır (Günsoy ve Özsoy, 2012: 28-31). Cinsiyet bağlamındaki ücret farklılaşmasını meslek ana gruplarında da ücret farklılıklarına yol açmaktadır. İşgücü piyasasında işlerin cinsiyete göre kadın işi ve erkek işi olarak yazılı olmayan ayrımlaştırılması, bu meslekleri yapan bireylerin doğrudan kazançları üzerinde de etkili olmaktadır. Erkek işi olarak nitelendirilen işler kadınlar tarafından yapıldığında, aynı işin farklı şekilde ücretlendirilmesine ve kadınların işte terfi olanaklarının sınırlandırılmasına neden olabilmektedir. Kadının aile ve iş sorumluluklarının aynı zamanda yerine getirme mecburiyeti, kadınların çoğunlukla esnek çalışma modellerini tercih etmesi, erkeklerden daha uzun süreli izin (doğum izni, emzirme izni vb) kullanımı bazı mesleklerde (yöneticilik, profesyonel meslekler vb) kadınlar yerine erkeklerin tercih edilmesine neden olmaktadır. Tüm bu sınırlamalar kadınların hem işgücüne katılımını hem de aldıkları ücretleri etkilemektedir. Kadınlar ile erkekler arasındaki ücret farkının en yüksek olduğu meslek ana grubu, 2010 yılı için, “Yöneticiler” meslek ana grubudur. Ancak bu farklılık kadınlar lehine oluşmuş, yöneticiler meslek ana grubundaki kadınların yıllık ortalama brüt kazançları erkeklerden daha yüksektir. Literatürdeki çalışmalar doğrultusunda bu sonucun birçok nedeni olabilir. Bu nedenleri literatürdeki çalışmalarda da vurgulandığı gibi, eğitim düzeyi, fazladan alınan eğitim, tecrübe ve deneyim, ailenin eğitim düzeyi, iş tatmini, örgüte bağlılık, işyerinin kurumsallığı vb. olarak sıralayabiliriz.

Çalışmanın bulgularından elde edilen sonuçlara göre, Türkiye’de ücret ve kazanç düzeyinin belirlenmesinde eğitim önemli belirleyicilerden biri olmakla birlikte, tek belirleyicisi değildir. Özellikle kadın ücretli çalışanlar açısından eğitimin ücret düzeyi üzerindeki etkisi erkeklerden fazla olmasına rağmen; sosyo-ekonomik, ailevi, kültürel, geleneksel faktörler ile işgücü piyasasında karşılaşılan ayrımcı davranışlar, işlerin cinsiyetleştirilmesi vb. bazı unsurlar da ücret ve kazançlar üzerinde etkili olmaktadır. Bu bağlamda kadın ve erkek için hem eğitimin güçlendirilmesine hem de ücretleri belirleyen unsurlara yönelik iyileştirici ve düzenleyici politikaların cinsiyet ayrımı yapmadan geliştirilmesi ve uygulanması önem taşımaktadır.

## KAYNAKÇA



- Akçomak, İ. S. ve Z. Kasnakoğlu. (2002). “Tehe Determinants of Earnings Differentials in Ankara and İstanbul”, ERC Working Papers in Economics, 01/02, May, s. 1-19.
- Barro, R. J. (1991). “Economic Growth in a Cross Section of Countries”, Quarterly Journal of Economics, Vol. 106, No:2, May, s. 407-443.
- Biçerli, M. K. (2000), Çalışma Ekonomisi, Beta Yayınları, İstanbul.
- Biçerli, M. K. (2011), Çalışma Ekonomisi, Beta Yayınları, Gözden Geçirilmiş Altıncı Baskı, İstanbul.
- Çalışkan, Ş. (2007). “Eğitimin Getirisi (Uşak İli Örneği)”, Süleyman Demirel Üniversitesi, İktisadi ve İdari Bilimler Fakültesi, C.12, S.2, s.235-252.
- Günsoy, G. (2009). “Beşeri Sermaye ve İnsani Gelişme İçin Erken Çocukluk Eğitiminin Önemi”, The Journal of Knowledge Economy & Knowledge Management, Vol.4, Fall, s.23-43.
- Günsoy, G. ve C. Özsoy (2012). “Türkiye’de Kadın İşgücü, Eğitim ve Büyüme İlişkisinin VAR Analizi”, Finans Politik & Ekonomik Yorumlar Dergisi, Yıl:49, Sayı:568, Haziran, s.23-42.
- Işığçık, Ö. (2011). Ücret (Teorisi-Politikası-Yönetimi-Sistemleri), Marmara Kitabevi Yayınları, Ekim, Bursa.
- Katz, F. L. ve D. H. Autor. (1998). “Changes in the Wage Structure and Earnings Inequality”, Orley Ashenfelter ve David Card (ed), Handbook of Labor Economics, Volume 3A, Amsterdam ve New-York: North-Holland.
- Krueger, A. B. Ve M. Lindahl. (2001). “Education for Growth: Why and For Whom?”, Journal of Economic Literature, Vol. XXXIX, December, s. 1101-1136.
- Lucas, R. E. (1988). “On the Mechanics of Economic Developments”, Journal of Monetary Economics, 22, North-Holland, s. 3-42.
- Öksüzler, O. (2008). “Does Education Pay off in Turkey? An Ordered Logit Approach”, MPRA, February, s. 1-8.
- Özcan, Y. Z.; Ş. Üçdoğruk ve K. M. Özcan. (2003). “Wage Differences by Gender, Wage and Self Employemnr in Urban Turkey”, Journal of Economic Cooperation, 24, 1, s. 1-24.
- Palaz, S.; Ö. Şenergin ve O. Öksüzler. (2013). “Eğitim Düzeyi Farklılıklarının Gelir Dağılımına Etkisi: Türkiye Örneği”, Girişimcilik ve Kalkınma Dergisi, (8:2), s. 119-131.
- Sarı, R. (2002), “Kazançlar ve Eğitim İlişkisi: İl Bazında Yeni Veri Tabanı ve Kanıt”, ODTÜ Gelişme Dergisi, 29 (3-4),s. 367-380.

- Smith, A. (2006). Milletlerin Zenginliği, (Çev: Haldun Derin), Türkiye İş Bankası Kültür Yayınları, İstanbul.
- Taban, S. (2011). İktisadi Büyüme – Kavram ve Modeller, Nobel Yayınevi, Ankara.
- Taban, S. ve M. Kar. (2008). “Beşeri Sermaye ve Kalkınma”, Kalkınma Ekonomisi Seçme Konular, (ed. S. Taban ve M. Kar), Gözden Geçirilmiş ve Güncellenmiş 2. Baskı, Ekin Basın Yayın ve Dağıtım, Bursa, s. 325-351.
- Tansel, A. (1994). “Wage Employment, Earnings and Returns to Schooling for Men and Women in Turkey”, Economics of Education Review, Vol.13, No:4, s. 305-320.
- Tansel, A. (2000). “Wage Earners, Self-Employment and Gender in the Informal Sector in Turkey”, Policy Research Report on Gender and Development, Working Paper Series No:24, November, s. 1-47.
- Topalhan, T. (2010). Ücret ve Ücret Teorileri, Gazi Kitabevi, Ekim, Ankara.
- Topel, R. (1999). “Labor Markets and Economic Growth”, O. Ashenfelter ve D. Card (ed), Handbook of Labor Economics, Amsterdam ve New York: North Holland.
- Ünal, I. (1992). “Eğitim ve Gelir İlişkisi”, Eğitim Bilimleri Fakültesi Dergisi, Cil.25, S.1, s.113-129.
- Ünsal, E. M. (2007). İktisadi Büyüme, İmaj Yayınevi, Ankara.
- Varlıer, O. (1982). Türkiye’de Kazanç Eşitsizliklerinin Nedenleri, Gazi Üniversitesi Yayınları No: 13, İktisadi ve İdari Bilimler Fakültesi, Yay. No: 11, Ankara.
- Yumuşak, İ. G. ve M. Bilen. (2000). “Gelir Dağılımı-Beşeri Sermaye İlişkisi ve Türkiye Üzerine Bir Değerlendirme”, K. Ü. Sosyal Bilimler Dergisi, Y: 1, S: 1, s. 77-96.
- Yumuşak, İ. G. ve M. Bilen; Y. Bayraktar ve A. Türk. (2010). “Eğitim Düzeyi-Ücret İlişkisi ve Türkiye’de Adalet ve Eğitim Sektörü Üzerine Bir Değerlendirme”, Sosyal Siyaset Konferansları, Cilt.57, ss. 327-356.

# Eğitim ve fen fakültesi matematik öğretmen adaylarının geometrinin temel kavramları hakkında kavram görüntüleri

Sare ŞENGÜL<sup>a</sup>, Ayşe ALTIN<sup>b\*</sup>, Pınar GÜNER<sup>c</sup>

<sup>a</sup>Marmara Üniversitesi, Eğitim Fakültesi İlkokul Bölümü, İstanbul, Türkiye

<sup>b</sup>Hacettepe Üniversitesi, Fen Bilimleri Fakültesi Matematik Bölümü, Ankara, Türkiye

<sup>c</sup>19 Mayıs Üniversitesi, Eğitim Fakültesi İlkokul Bölümü, Samsun, Türkiye

---

## Abstract

Bu araştırmanın temel amacı eğitim ve fen fakültesi matematik öğretmen adaylarının geometrinin temel kavramlarına (doğru, doğru parçası, düzlem, uzay, vektör ve vektörler üzerindeki işlemler) yönelik kavram görüntülerini belirlemektir. Araştırmanın çalışma grubunu bir devlet üniversitesinin eğitim ve fen fakültesi matematik bölümü öğrencilerinden toplam 90 öğretmen adayı oluşturmaktadır. Öğretmen adaylarına belirtilen matematik kavramları ile ilgili dört adet açık uçlu soru içeren geometri kavram testi uygulanmıştır. Araştırma verileri nicel ve nitel araştırma yöntemleri kullanılarak değerlendirilmiştir. Nitel veriler frekans ve yüzde nitel veriler ise öğretmen adaylarının açık uçlu sorulara verdikleri cevapların kodlanmasından elde edilmiştir. Araştırmacılar tarafından birbirinden bağımsız olarak kodlanan veriler birbiriyle karşılaştırılarak fikir birliğine varılmıştır. Ortak değerlendirme kriterleri belirlendikten sonra öğretmen adaylarının geometrinin temel kavramları hakkındaki kavram görüntüleri analiz edilmiştir. Elde edilen bulgulara göre, hem eğitim fakültesi hem de fen fakültesi öğretmen adaylarının sınıf düzeylerine göre en düşük birinci sınıf olmak üzere temel geometrik kavramlar ile ilgili yetersiz kavram görüntüsüne sahiptirler. Öğretmen adayları kavramların tanımlarını sorgulamadıklarını ve bu durumun üzerinde çok durulmadığı için kavramların önemini çok fark edemediklerini belirtmişlerdir. Araştırma bulguları ışığında araştırmacılara öneriler geliştirilmiştir.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Hacettepe University

**Keywords:** Concept image; geometric concepts, teacher education

---

## 1. Introduction

Matematiğin öğrenilmesi ve öğretilmesi göz önüne alındığında dikkat edilmesi gereken en önemli hususlardan biri matematiğin yapısıdır. Bir disiplin olarak matematik, aksiyomatik yapısı gereği diğer bilimlerden farklı olup tanım ve teoremler üzerine kuruludur. Günlük hayatta kavramların tanımları bilinmeden kullanılmasına rağmen matematikteki kavramlar tanımlarla verilirler. Bu anlamda, günlük hayattaki kavramlardan ayrılırlar. Matematik kavramları hakkındaki ilk deneyimlerimiz onların tanımlarıyla olmaktadır. Bu ilk deneyimler aracılığı ile diğer matematik kavramları öğrenilmektedir. Bu nedenle matematiğin kavramsal öğrenilmesinin en temel gerekliliği kavramların doğru bir şekilde yapılandırılmasıdır.

Matematik eğitimcilerinden Tall ve Vinner (1981), matematik otoriteleri tarafından doğruluğu kabul edilmiş matematik kavramları ile ilgili olarak bireylerin zihinlerinde oluşturdukları bütün zihinsel resimleri içeren bilişsel yapıyı “kavram görüntüsü” olarak tanımlamışlardır. Bireyler yaşadığı deneyimler yoluyla matematiksel kavramlara

---

\* Corresponding author: Tel.: +90 0 312 2977885  
E-mail address: ayse@hacettepe.edu.tr

yönelik kavram görüntüleri oluşturmaları ve her bireyin kavramlarla ilgili deneyimleme süreçlerinin farklı olması nedeniyle bireylerin kavram görüntüleri ile kavramın soyut matematiksel tanımı uyumlu olmayabilmektedir. Bu durum etkili bir öğretimin organizasyonu yapacak olan öğretmenler adayları için önem arz etmektedir. Çünkü öğretmen adaylarının kavramsal öğrenme boyutunu yakalayabilecekleri bir öğrenme ortamını hazırlayabilmeleri ancak kendilerinin doğru ve kapsamlı kavram görüntülerine sahip olmaları ile mümkün olabilecektir (Ma, 1999; McDiarmid, Ball, and Anderson, 1989). Brown ve Borko'ya (1992) göre de matematik öğretmen adaylarının eğitimlerinin önündeki en önemli engellerden birisi sahip oldukları sınırlı matematik bilgisidir. Bu görüşlerin geometri öğretiminde de geçerli olduğu söylenebilir (Brown ve Borko, 1992; alıntı: Bozkurt ve Koç, 2012).

Geometri çok boyutlu düşünme becerisini geliştiren matematiğin en önemli disiplin alanlarından biridir. Baykul'a (2004) göre geometri, nokta, doğru, düzlem, düzlemsel şekil, uzay, uzaysal şekiller ve bunlar arasındaki ilişkilerle ilgilenen bir bilim dalı, Hızarcı'ya (2004) göre ise bireye görüş kazandıran, düşünmeyi kolaylaştıran ve şekilleri göz önünde canlandırarak çözüme ulaşmayı sağlayan bir bilim dalıdır. Geometrinin bireyin yaşadığı çevreyi ve başka matematik konularını anlamasında adeta bir köprü rolünde olduğunu göz önüne alınırsa temel geometrik kavramların öğretimi de bir o kadar önem taşımaktadır. Bu noktada temel geometrik kavramları öğrencilerin zihinlerinde yapılandıracak olan öğretmen adaylarının kavramsal bilgi düzeylerinin bilinmesi gerekmektedir. Geometri alanında yapılan ulusal ve uluslararası çalışmalar göz önüne alınırsa öğretmen adaylarının; ge

Geometri kavramlarını tanımlamada sorunlar yaşadığı (Duatepe Paksu, Musan, İymen ve Pakmak , 2012, Gutierrez ve Jaime, 1999; Linchevski ve ark., 1992; Koç ve Bozkurt, 2011; Tunç ve Durmuş, 2012); bir kavramı ifade eden birden fazla tanımın olabileceğini düşünemedikleri (Linchevski ve ark., 1992); kavramların tanımlarını ezbere bildikleri (de Villiers, 1998) görülmektedir. Eğer matematik öğrenen bireyler matematik ile ilgili bir alanda çalışacaklarsa tanımları öğrenmeleri ve nasıl kullanılacağını bilmeleri gerekir (Vinner, 1991). Belirtilenler doğrultusunda matematik öğretmen adaylarının geometrik kavramlar ile ilgili kavram görüntülerinin ortaya konulacağı araştırmaların yapılması özellikle öğretmen yetiştiren eğitim fakülteleri ve fen fakültelerindeki içerik bilgisinin öğretmen adayları tarafından nasıl yapılandırıldığının değerlendirilmesinde önemli rol oynayacaktır. Bu nedenle öğretmen adaylarının geometri ile ilgili kavramsal bilgilerini ölçen ve kavramsal bilginin önemini ortaya koyan çalışmaların artırılması gerekmektedir. Bu araştırmanın amacı, eğitim fakültesi matematik öğretmenliği 3. sınıfında ve fen fakültesi matematik bölümü 1. ve 4. Sınıflarında okuyan öğretmen adaylarının geometrik kavramlardan doğru, düzlem, uzay ve vektör kavramlarına ait kavram görüntüleri incelemektir. Bu kapsamda doğru, düzlem, uzay ve vektör kavramının katılımcılar tarafından nasıl tanımlandığı araştırılmıştır.

## 2. Method

### 2. 1. Research Design

Bu araştırma hem nitel hem de nicel araştırma yöntemlerine göre gerçekleştirilmiştir. Nicel analiz olarak yüzde ve frekans kullanılır iken nitel araştırma sürecinde ise doküman analizi ve gözlemler yapılmıştır. Elde edilen veriler "içerik analizi" tekniği uygulanarak değerlendirilmiştir. İçerik analizinin amacı verileri tanımlamak, verilerin içinde saklı olabilecek gerçekleri ortaya çıkarmaktır (Yıldırım ve Şimşek, 2008). İçerik analizinin temelinde yapılan işlem, birbirine benzeyen verileri belirli kavramlar ve temalar çerçevesinde bir araya getirmek ve bunları okuyucunun anlayabileceği bir biçimde organize ederek yorumlamaktır.

### 2. 2. Working Group

Çalışma grubu, Ankaradaki bir devlet üniversitesinin ilköğretim matematik öğretmenliği'nin 3. sınıfında öğrenim gören 30 ( 21 bayan, 9 erkek) ve sırasıyla fen fakültesi matematik bölümü 1.sınıfında ( 20 bayan; 10 erkek) ve 4.sınıfında( 23 bayan, 7 erkek) öğrenim görmekte olan 30'ar kişi olmak üzere toplam 90 öğretmen adayından meydana gelmektedir. Öğretmen adaylarının (%71) bayan, (%29) erkektir.

### 2.3. Data Collection Tools and Collecting Data

Veriler araştırmacılar tarafından hazırlanan “Temel Geometrik Kavramlar Testi (TGKT)” ile toplanılmıştır. Araştırmacılar tarafından hazırlanan bu form öğretmen adaylarına dağıtılmış ve adaylardan bu formu doldurmaları istenmiştir. Öğretmen adaylarına formu doldurmaları için bir ders saati saat (45’) süre verilmiştir. TGKT, öğretmen adaylarının geometrinin temel kavramlarındaki kavram görüntülerini tespit etmek amacıyla uzman görüşü alınarak araştırmacılar tarafından geliştirilen toplam 10 adet açık uçlu sorudan oluşmaktadır. Bu çalışma için yalnızca TGKT’nin dört sorusu değerlendirilmiştir.

### 2.4. Data Analysis

Çalışmaya Ankaradaki bir devlet üniversitesinde bulunan eğitim fakültesi ilköğretim matematik öğretmenliği ve fen fakültesi matematik bölümünde okuyan öğretmen adaylarına uygulanan 10 soruluk bu test uygulanarak başlanmıştır. Testin uygulanması sonucu toplanan veriler ayrı ayrı analiz edilmiştir. Öğrencilerin verdikleri cevapların birbirine yakınlığı göz önüne alınarak bazı sorular yeniden tek bir soru altında toplanmıştır. Elde edilen değerlendirme sonuçlarından sonra, araştırmacılar ve uzmanlar arasındaki görüş birliği Miles ve Huberman (1994) tarafından belirtilen “Uzlaşma Yüzdesi =  $[Görüş Birliği / (Görüş Birliği + Görüş Ayrılığı)] \times 100$ ” formülü ile hesaplanmıştır. Uzaman ve araştırmacıların uzlaşma yüzdelerinin 0.89 ile 0.95 arasında değiştiği, arasında değiştiği belirlenmiştir. Böylece araştırmanın amacına hizmet edebilecek, doğru, düzlem, uzay ve vektör kavramlarını içeren testin dört temel sorusu dikkate alınmış ve bu sorular üzerinden değerlendirme yapılmıştır. Elde edilen verileri analiz etmek için, ilk önce araştırmacılar tarafından 3 kriter belirlenmiştir. Bu kriterler; i) doğru ii) Kabul edilebilir iii) yanlış ve boş’tur. Bu bağlamda, araştırmacılar tarafından, belirlenen kriterlere göre incelemeler yapılmıştır. Araştırmacılar ve matematik eğitimi alanında iki uzman tarafından ayrı ayrı her bir problemi değerlendirilmiş, değerlendirme sonuçları karşılaştırılmıştır. Meydana gelen farklılıklar üzerinde tartışılmış ve uzlaşma sağlanmıştır. Sonuçta, her bir boyutla ilişkili olacak şekilde gerçekleştirilen değerlendirme sonuçları, frekans (f) ve yüzde (%) bazında sunulmuştur.

### 2.5. The Reliability and Validity of Study

Nitel araştırmalarda geçerlik, araştırılan olgunun olduğu biçimiyle ve olabildiğince yansız gözlenmesidir (Kirk & Miller, 1986). Araştırılan konunun bütüncül bir resim halinde sunulabilmesi için araştırmacının, elde ettiği verileri ve ulaştığı sonuçları çeşitleme, katılımcı teyidi veya meslektaş teyidi ile teyit etmesi gerekir (Yıldırım & Şimşek, 2008). Bu bağlamda verilerin analizi araştırmacılar dışında matematik eğitimi alanında uzmanlaşmış başka iki araştırmacıya da analiz ettirilmiş ve araştırmanın geçerliği bu meslektaş teyidi ile sağlanmıştır.

Nitel araştırmalara, gerçeklerin bireylere ve içinde bulunulan ortama göre sürekli bir değişme içinde olduğu ve araştırmanın benzer gruplarda tekrarlanmasının aynı sonuçlara ulaşmayı mümkün kılmayacağı düşüncesi ile başlanmaktadır. Bu bağlamda nitel araştırmacı güvenilirliği sağlayabilmek için araştırmada veri kaynağı olan bireyleri açık bir şekilde tanımlamalıdır (Yıldırım & Şimşek, 2008). Bu çalışmada da güvenilirliğin sağlanması amacıyla çalışma grubu detaylı bir şekilde tanımlanmıştır.

Ayrıca, elde edilen verilere, çalışma içerisinde sıkça yer verilmiştir. Bu şekilde inandırıcılık sağlanmaya çalışılmıştır. Bunun yanında değerlendirme sonuçları frekans (f) ve yüzde (%) bazında sunulmuştur. Buradaki amaç, verilerin güvenilirliğini arttırmak, yanlışlığı azaltmak ve veriler arasında karşılaştırma yapma olanağı sağlamaktır. Ayrıca, yapılan küçük ölçekli bu çalışmanın, daha sonra anket gibi araçlarla daha geniş bir örnekleme ulaşılarak tekrar sınanmasına olanak vermesi (Yıldırım & Şimşek, 2008) için sayısallaştırma yapılmıştır.

## 3. Findings and Comments

Bu kısımda sırasıyla İlköğretim Matematik Öğretmenliği 3. sınıf, fen fakültesi matematik bölümü 1. ve 4.sınıf öğretmen adaylarının “Doğru”, “Düzlem”, “Uzay” ve “Vektör” Kavramları Hakkındaki Kavram Görüntüleri” İle İlgili Bulgular sunulmuştur.

Tablo1: İlköğretim Matematik Bölümü 3. Sınıf Öğretmen Adaylarının “TGKT” Testi Sonuçları

	Doğru	Kabul edilebilir	Yanlış	Boş
1.Soru(Doğru)	2/30; %6.6	12/30; %40	8/30; %26.6	8/30; %26.6
2.Soru(Düzlem)	5/30; %16.6	20/30;%66.6	5/30; %16.6	0/30; %0
3.Soru(Uzay)	12/30; %40	10/30;%33.3	4/30; %13.3	4/30; %13.3
4.Soru(Vektör)	1/30, %3.3	25/30;%83.3	3/30; %10	1/30; %3.3

Tablo1’e göre öğretmen adaylarından % 6’ sı gibi çok azı  $R^3$  te vektörel yapıda tanımlanan doğru denklemini t parametresinin değişimine göre tanıyabilmiş; ; % 40 kabul edilebilir % 26.6 ‘sı ise bu soruya yanlış cevap vermiş, % 26.6 ise boş bırakmıştır. Yine ilköğretim matematik öğretmen adaylarının %16.6 sı düzlem kavramını doğru tanımlar iken; % 66.6’sı kabul edilebilir; % 16.6 ‘sı yanlış cevap vermişlerdir. Benzer şekilde ilköğretim matematik öğretmen adaylarının %40’ı uzay kavramını doğru tanımlar iken; % 33.3 ’ ü kabul edilebilir; % 16.6 ‘sı yanlış, % 16.6 ‘sı ise boş bırakarak bu soruya cevap vermemişlerdir. Diğer yandan ilköğretim matematik öğretmen adaylarının %3.3’ü “vektör” kavramını doğru tanımlar iken; % 83.3 ’ ü kabul edilebilir; % 10’nu yanlış, % 3.3’ü ise boş bırakmışlardır. Bu sonuçlara göre öğretmen adaylarının  $R^3$  vektörel denklemi verilen doğrunun t parametresinin durumuna göre değişimini yapılandıramadıkları gibi vektör kavramının kavramsal anlamını ifade etmekte zorlandıkları söylenebilir. Genel anlamda “uzay” kavramını doğru cevaplama yüzdesinin diğer kavramlara göre daha çok olduğu; bunun da uzay kavramını öğretmen adaylarının Genel Matematik ve Analiz I, II ve III gibi derslerinin fonksiyon konusunda daha yoğun kullanılmasından kaynaklanmış olabileceği düşünülmektedir.

Tablo 2. Fen Fakültesi Matematik Bölümü 1. Sınıf Öğretmeni Adaylarının “TGKT” Testi Sonuçları

	Doğru	Kabul edilebilir	Yanlış	Boş
1.Soru (Doğru)	3/30; %10	4/30, %13.3	9/30; %30	14/30;%46.6
2.Soru (Düzlem)	2/30; %6.6	8/30,%26.6	18/30; %60	2/30; %6.6
3.Soru (Uzay)	11/30;%36.6	5/30;%16.6	8/30; %26.6	8/30, %26.6
4.Soru (Vektör)	1/30, %3.3	21/30; %70	2/30; %6.6	6/30; %20

Tablo2’ye göre fen fakültesi 1. sınıf matematik öğretmen adaylarından % 10’ u gibi  $R^3$  te vektörel yapıda tanımlanan doğru denklemini t parametresinin değişimine göre tanıyabilmiş; ; % 13.3’ü kabul edilebilir % 30 yanlış cevap verir iken % 46.6 ise bu boş bırakmıştır. Yine fen fakültesi 1. sınıf matematik öğretmen adaylarının %6.6 sı düzlem kavramını doğru tanımlar iken; % 26.6’ kabul edilebilir; % 60’ı yanlış cevap vermişler, %6.6’sı ise boş bırakmıştır. Benzer şekilde fen fakültesi 1. sınıf matematik öğretmen adaylarının %36. 6’sı uzay kavramını doğru tanımlar iken; % 16.6’sı kabul edilebilir; % 26.6 ‘sı yanlış, % 26.6’sı ise boş bırakarak bu soruya cevap vermemişlerdir. Ayrıca fen fakültesi 1. sınıf matematik öğretmen adaylarının %36.6’ sı “vektör” kavramını doğru tanımlar iken; % 70’ i kabul edilebilir; % 6.6’sı yanlış, % 20’si ise boş bırakmışlardır. Bu sonuçlara göre fen fakültesi 1. sınıf öğretmen adaylarının en çok doğru cevap verdikleri kavramlar öncelikle “uzay” ve “doğru” kavramı olup; en az ise “ düzlem” ve “vektör” kavramını doğru cevaplamışlardır. Kabul edilebilir cevaplar göz önüne alınırsa öğretmen adaylarının vektör kavramını tam anlamı ile yapılandıramasalar bile yinede en fazla bu kavram hakkında bilgi sahibi oldukları söylenebilir. Yanlış cevaplara bakıldığında öğretmen adaylarının “düzlem”

kavramını tanımlamakta zorlandıkları belirtilebilir. Genel olarak bütün kavramlar için yanlış ve boş cevaplar birlikte düşünülürse fen fakültesi 1. sınıf öğretmen adaylarının çalışma kapsamındaki kavramlar için zayıf bir kavram görüntüsüne sahip oldukları ifade edilebilir.

Tablo 3. Fen Fakültesi Matematik Bölümü 4. Sınıf Öğretmeni Adaylarının “TGKT” Testi Sonuçları

	Doğru	Kabul edilebilir	Yanlış	Boş
1.Soru (Doğru)	6/30; %20	8/30, %26.6	11/30;%36.6	5/30; %16.6
2.Soru (Düzlem)	0/30; %0	5/30, %16.6	21/30; %70	4/30; %13.3
3.Soru (Uzay)	11/30;%36.6	6/30;%20	5/30; %16.6	8/30;%26.6
4.Soru (Vektör)	4/30, %13.3	22/30;%73.3	0/30; %0	4/30; %13.3

Tablo3’e göre fen fakültesi 4. sınıf matematik öğretmen adaylarından % 20’ si gibi  $R^3$ ’ te vektörel yapıda tanımlanan doğru denklemini t parametresinin değişimine göre tanıyabilmiş; ; % 26.6 ‘sı kabul edilebilir % 36.6’sı yanlış cevap verir iken % 16.6 ise bu boş bırakmıştır. Yine fen fakültesi 4. sınıf matematik öğretmen adaylarının hiç biri düzlem kavramını doğru tanımlayamaz iken ; % 16.6’ kabul edilebilir; % 70’i yanlış cevap vermişler, %13.3’ü ise boş bırakmıştır. Benzer şekilde fen fakültesi 4. sınıf matematik öğretmen adaylarının %36. 6’sı uzay kavramını doğru tanımlar iken; % 20’si kabul edilebilir; % 16.6 ‘sı yanlış, % 26.6’sı ise boş bırakarak bu soruya cevap vermemişlerdir. Ayrıca fen fakültesi 4. sınıf matematik öğretmen adaylarının %13.3’ü “vektör” kavramını doğru tanımlar iken; % 73.3’ ü kabul edilebilir, % 13.3’ü ise boş bırakmışlardır. Vektör sorusuna fen fakültesi 4.sınıf öğretmen adaylarının hiç biri yanlış cevap vermemişlerdir. Bu sonuçlara göre fen fakültesi 4. sınıf öğretmen adaylarının en çok doğru cevap verdikleri kavramlar öncelikle “uzay” ve “doğru” kavramı olup; en az ise “ düzlem” ve “vektör” kavramı olmuştur. Kabul edilebilir cevaplar göz önüne alınırsa öğretmen adaylarının vektör kavramını tam anlamı ile yapılandırmasalar bile yinede en fazla bu kavram hakkında bilgi sahibi oldukları söylenebilir. Burada en dikkat çekici sonuç ise fen fakültesinin son sınıfında okuyan hiçbir öğretmen adayının düzlem kavramına doğru cevap verememesidir. Yanlış cevaplara bakıldığında diğer öğretmen adayları gibi fen fakültesi son sınıf matematik öğretmen adaylarının “düzlem” kavramını tanımlamakta zorlandıkları söylenebilir. Genel olarak bütün kavramlar için yanlış ve boş cevaplar birlikte düşünülürse fen fakültesi 4. sınıf öğretmen adaylarının da çalışma kapsamındaki kavramlar için zayıf bir kavram görüntüsüne sahip oldukları söylenebilir.

#### 4. Conclusion, Discussion and Implications

Araştırmada eğitim fakültesi 3.; fen fakültesi 1. ve 4. sınıf öğretmen adaylarının temel geometrik kavramlar hakkındaki kavram görüntülerini araştırmak amacıyla yapılan bu çalışma bulgularına göre öğretmen adaylarının genel olarak kavramları tanımlamakta ve matematiğin sembolik yapısını anlamlandırmakta zorlandıkları söylenebilir. İlköğretim matematik bölümü 1. sınıf öğretmen adaylarının hem yanlış hem de boş bırakılan cevaplar birlikte göz önüne alınırsa doğru kavramını t parametresine göre anlamlandıramamış; düzlem kavramına ise çok azı doğru cevap verebilmiştir. Uzay kavramını göz önüne alırsak öğretmen adaylarının dörtte biri cevap verememiş iken vektör kavramına ise yaklaşık beşte biri cevaplandıramamıştır. Bu sonuçlar, öğretmen adaylarının sorulara verdikleri kabul edilebilir cevaplarıyla birlikte göz önüne alınırsa aslında zayıf kavram görüntülerine sahip oldukları söylenebilir. Çünkü öğretmen adaylarının çoğunluğu doğru sorusuna cevap verememiş; yani sembolik formda verilen doğru denklemini anlamlandırmakta zorlanmışlardır. Bu sonuç matematik dilin katılımcılar tarafından

yapılandırılarak diğer kavramlar içinde tanımlama becerisine dönüşemediğinin bir göstergesi olarak düşünülmektedir. Ayrıca, 3.sınıf eğitim fakültesi matematik öğretmen adaylarının yaklaşık yarısı uzay kavramını tanımlayabilirken, büyük çoğunluğu vektör kavramını kabul edilebilir düzeyde tanımlayabilmişlerdir. Katılımcıların geometrik kavramları kavramsal olarak edinmemiş olmaları doğru tanımlar yapmalarına engel olmuş olabilir (Linchevsky ve ark., 1992). Dolayısıyla, eğitim fakültesinde verilen analitik geometri ve geometri derslerinin 3.sınıf matematik öğretmen adayları tarafından içselleştirilerek kavramsal öğrenme boyutunun yakalanamadığının bir göstergesi olarak kabul edilebilir. Araştırmanın bu bulgusu (Duatepe Paksu ve diğ. 2012; Koç ve Bozkurt, 2011; Tunç ve Durmuş, 2012) araştırma sonuçları ile paralellik göstermektedir.

Diğer yandan, fen fakültesi matematik bölümü 1. sınıf öğretmen adaylarının sorulara verdikleri yanlış cevaplar boş bırakılanlarla birlikte değerlendirilse, öğretmen adaylarının dörtte üçü vektörel formda verilen doğru kavramını t parametresine göre anlamlandıramamış; düzlem kavramına ise yarısından fazlası doğru cevap verememiştir. Uzay kavramını göz önüne alırsak öğretmen adaylarının yarısı cevap verememiş iken vektör kavramını ise dörtte biri cevaplandıramamıştır. Benzer şekilde, elde edilen sonuçlar katılımcıların sorulara verdikleri kabul edilebilir cevaplarıyla birlikte değerlendirilirse, 1.sınıf fen fakültesi matematik öğretmen adaylarının kavram görüntülerinin kavram tanımlarından oldukça farklı olduğu söylenebilir. Bu durum üniversite sınavındaki matematik ve geometri sorularına çoğunlukla cevap vererek matematik bölümüne gelen öğretmen adayları için üzerinde durulması gereken bir sonuçtur.

Fen fakültesi 4.sınıf matematik öğretmen adaylarının “doğru” sorusuna cevap vermemiş veya yanlış cevap vermişleri birlikte değerlendirilirse öğretmen adaylarının yarısından fazlasının vektörel formda verilen bir doğru denklemini t parametresine göre belirleyemedikleri söylenebilir. Bu durum üniversitede alınan eğitimin öğretmen adaylarına matematiksel dili kullanma becerilerinin geliştirmeleri açısından değerlendirildiğinde oldukça düşündürücü bir sorun olarak karşımıza çıkmaktadır. Diğer yandan bu sonuç katılımcıların fen fakültesi dördüncü sınıfta bulunmaları sebebiyle değerlendirildiği zaman, hem geleceğin öğretmenlerinin kendi yapılandıramadıkları kavramları öğrencilere nasıl aktaracakları konusunda pedagojik alan bilgisi açısından hem de üniversitede yapılan öğretimin neden kalıcı bilgi boyutunu oluşturamadığının sorgulanması bakımından da önem arz etmektedir. Ayrıca, düzlem sorusuna hiç bir öğretmen adayının cevap verememesi yalnızca beşte birinin kabul edilebilir cevap vermesi aslında geometri kavramlarının tanımlardan değil genelde örnekler üzerinden öğretilmeye çalışmasının bir sonucu olduğunu düşündürmektedir. de Villiers’in 1998 çalışmasında öğrencilerin geometri kavramlardaki anlayışlarının geliştirilmesinde izlenen yolun geometrik kavramların tanımlama süreçlerinin doğasındaki karmaşık yapıyla öğrencileri meşgul etmeyip örnekler üzerinden kavramların verilmesinin daha anlaşılır yapılar oluşturacağı düşüncesinin hakim olduğunu belirtmektedir ki araştırma sonucu da bu düşünceyle paralellik göstermektedir. Yine, Villiers’in belirttiği üzere, matematik eğitiminde matematiksel tanımların inşasına, problem çözme, varsayımlar yapma, genelleme ve ispat gibi matematiksel aktiviteler kadar önem verilmemiştir. (VEYA :Arka planında tutulmuştur mu? diyelim). Araştırmanın bu bulgusu de Villiers’i destekler nitelik taşımaktadır. Diğer yandan, katılımcıların en fazla doğru cevap verdiği uzay kavramı olmasına rağmen bu da % 36.6 dır. Diğer yandan vektör kavramına katılımcıların yalnız % 13.3 kadarı doğru cevap vermiştir. Bu sonuçta aslında öğretmen adaylarının kavramları sorgulamadan olduğu gibi işlemsel düzeyde kullandıkları ve çok temel kavramları bile tanımlayamadıklarını söylenebilir. Araştırmanın bu sonucu Çetin ve Dane (2004) ile Duatepe Paksu, Musan, İymen ve Pakmak’ın , (2012) çalışmalarındaki öğretmen adaylarının geometrik kavramlara yönelik bilgi eksikliklerinin olduğu, kavramları tanımlayamadıkları ve uygulayamadıkları bulgusu ile örtüşmektedir. Araştırmadan elde edilen bulgular ışığında kavramsal öğrenmenin ön plana çıkarılması gerekliliği yeniden ortaya çıkmıştır. Her ne kadar bu çalışma eğitim ve fen fakültesinde öğrenim görmekte olan öğretmen adaylarının bazı temel geometrik kavramlar hakkında sadece kavram görüntüleri incelemiş ise de benzeri araştırmalar diğer ders kapsamı içinde yapılmalıdır. Ayrıca, öğretmen adaylarına kavramların ve doğru kavram görüntüsü oluşturma önemi hissettirilmelidir. Schneider ve Stern,e (2005) göre kavramsal bilgi alandaki temel kavram ve prensipler ve bunlar arasındaki ilişkileri içeren bilgi olup bu nedenle kavram tanımları kavramsal bilginin oluşmasında önemli rol oynamaktadır. Bu çerçevede neden ve niçin sorularını kendisine soran araştırmacı öğretmen adaylarının yetiştirilmesi için üniversitedeki ders içeriklerinin sunuş şekli ile öğretim ortamlarının nasıl zenginleştirilmesi gerekliliğinin tartışılmasının faydalı olacağı düşünülmektedir.



## References

- Baykul, Y. (2004). *İlköğretimde matematik öğretimi*. Ankara: Pegem Yayıncılık.
- Bozkurt, A. ve Koç, Y. (2012). İlköğretim matematik öğretmenliği birinci sınıf öğrencilerinin prizma kavramına dair bilgilerinin incelenmesi. *Educational Sciences: Theory & Practice*. 12(4) , 2941-2952.
- Çetin, Ö. F. ve Dane, A. (2004). Sınıf öğretmenliği III. sınıf öğrencilerinin geometrik bilgilere erişim düzeyleri üzerine, *Kastamonu Eğitim Dergisi*, 12(2), 427-436.
- De Villiers, M. (1998). To teach definitions in geometry or teach to define. In A. Olivier & K. Newstead (Eds.), *Proceedings of the twenty-second international conference for the psychology of mathematics education: Vol.*
- Duatepe Paksu, A., Musan, M., İymen, E. ve Pakmak, G. (2012). Sınıf öğretmeni adaylarının boyut konusundaki kavram görüntüleri. *Buca Eğitim Fakültesi Dergisi* 34.53-68.
- Gutierrez, A., & Jaime, A. (1999). Pre-service primary teachers' understanding of the concept of altitude of a triangle. *Journal of Mathematics Teacher of Education*, 2 (3), 253-275.
- Hızarcı, S. (2004). Sunuş. (Edt: S. Hızarcı, A. Kaplan, A. S. İpek & C. Işık). *Euclid geometri ve özel öğretimi*. Ankara: Öğreti Yayınları.
- Linchevsky, L., Vinner, S., & Karsenty, R. (1992). To be or not to be minimal? Student teachers views about definitions in geometry. In W. Geeslin & K. Graham (Eds.), *Proceedings of the sixteenth international conference for the psychology of mathematics education, Vol. 2* (pp. 48-55). Durham USA.
- Kirk, J., & Miller, M. L. (1986). *Reliability and validity in qualitative research*. Beverly Hills, CA: Sage.
- Koç, Y., & Bozkurt, A. (2011). Evaluating pre-service mathematics teachers' comprehension level of geometric concepts. In B. Ubuz, (Ed.), *The Proceedings of the 35th annual meeting of the international group for the psychology of mathematics education Vol. 1*. (p. 335). Ankara, Turkey.
- Ma, L. (1999). *Knowing and teaching elementary mathematics: Teachers' understanding of fundamental mathematics in China and the United States*. Mahwah, NJ: Lawrence Erlbaum.
- McDiarmid, G. W., Ball, D. L., & Anderson, C. (1989). *Why Staying One Chapter Ahead Doesn't Really Work: Subject-Specific Pedagogy*. In M. C. Reynolds (Ed.), *Knowledge Base for the Beginning Teacher* (pp. 193-205). Elmsford, NY: Pergamon Press.
- Miles, M. B., & Huberman, M. A. (1994). *An expanded sourcebook qualitative data analysis*. London: Sage Publication.
- Schneider, M., & Stern, E. (2005). *Conceptual and procedural knowledge of a mathematics problem: Their measurements and their causal interrelations*. Retrieved Nisan 24, 2014 from [http:// www.ifvll.ethz.ch/people/schmich/SchneiderStern2005.pdf](http://www.ifvll.ethz.ch/people/schmich/SchneiderStern2005.pdf)
- Tall, D., & Vinner, S. (1981). Concept images and concept definitions in mathematics with particular reference to limits and continuity. *Educational Studies in Mathematics*, 12, 151-169.
- Tunç, M. P., & Durmuş, S. (2012). Pre-service elementary school classroom and mathematics teachers' interpretations about the definition of angle concept. *Energy Education Science and Technology Part B: Social and Educational Studies*, 4 (1), 131-140.
- Vinner, S. (1991). The role of definitions in the teaching and learning mathematics. In D. O. Tall (Ed.), *Advanced mathematical thinking* (pp. 65-81). Dordrecht: Kluwer.
- Yıldırım, A., Şimşek, H. (2008). *Sosyal Bilimlerde Nitel Araştırma Yöntemleri*. Ankara: Seçkin Yayıncılık.

# E-learning at the polish university in the opinion of students

Justyna Truskolaska<sup>a\*</sup>, Magdalena Łuka<sup>b</sup>, Nasturcja Toruj<sup>c</sup>,  
Katarzyna Wrona<sup>d</sup>,  
Patrycja Smagowska<sup>e</sup>

<sup>a,b</sup>The John Paul II Catholic University of Lublin, The Off-Campus Faculty of Social Sciences, Ofiar Katynia 6a, 37-450 Stalowa Wola, Poland

<sup>c,d,e</sup>The John Paul II Catholic University of Lublin, The Faculty of Social Sciences, Al. Racławickie 14, 20-950 Lublin, Poland

---

## Abstract

E-learning is a tool that appears on the Polish universities. Whether it is a form appropriate for all students? How to efficiently build e-learning course? The experiment made on a group of 20 participants of an on-line course answers these questions. The study consisted of two questionnaires which contain mostly open questions. The conclusion is that the students have positive attitude towards on-line courses. Their worries are mostly related to technical problems and their expectations are diverse. After on-line course the students' expectations were fulfilled and their concerns in the vast majority were not confirmed. In the opinion of students, teaching on-line is an attractive alternative to the traditional way of education.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** e-learning; higher education; experiment; students

---

## E-learning and blended learning

“The term e-learning includes all processes related to teaching and learning in the environment and through modern information technologies, especially the Internet. E-learning is an interactive process of educating, which through the available technical means enables to realize the specific relationship between the lecturer (tutor) and student, and between students in the group” (Szawłowska, 2013). The process of teaching - learning can be carried out only through the Internet which can be done by using various types of educational platforms or it can be combined with teaching in a traditional classroom or hall of the university. In the last case we are dealing with the so-called blended learning or combined teaching which is also known as mixed.

It can be discussed whether e-learning and blended learning are methods, forms or means of teaching. The computer itself and the program as a material object could be treated as a mean of teaching. By remote teaching we can use both verbal methods – objective, simulative or even problematic (Kupisiewicz, 2012), therefore, it seems that from the point of view of the theory of teaching, e-learning is much broader than teaching method – it can, in fact, use a broad spectrum of methods. So maybe e-learning can be understood as a form of education next to the traditional form of class-lesson or next to such forms as stationary and correspondence (Okoń, 2004). Taking into consideration the criterion of the number of participants of the learning process, e-learning includes both individual, group and collective work.

The characteristic feature of e-learning is to conduct educational process in a complete or partial separation from the physical framework of the existing school class. This form of learning can be carried out for individual users or dispersed group, where members do not have “face to face” contact with each other as it is in a traditional school or

---

\* Corresponding author. Tel.: +48 660 799 593; fax: +48 15 842 49 51.  
E-mail address: justyna.truskolaska@kul.pl

academic teaching. The very characteristic thing in e-learning is also a constant use of modern information technologies and technical means.

### **E-learning – recipients, subject area and tools**

Nowadays in Poland, e-learning is used in the educational process at universities (e.g. Catholic University of Lublin), in selected schools (e.g. private Catholic High School and Junior High School. Fr. Casimir Gostyński in Lublin), it is also used for trainings in companies that are completely not related to education. It becomes popular among courses to acquire new skills, such as interpersonal linguistic ones. A very interesting thing is that e-learning is used to train educationalists (by Polish Dyslexia Association), to train teachers (by the Polonia Centre for Teacher Training) or to train correctional services (Kalaman, 2012; Kalman & Strzelec 2013).

In fact, every theoretical knowledge may be conveyed through e-learning and in conjunction with stationary meetings also the practical knowledge may be conveyed. The most important, however, are tools used for this purpose. The basic ones are articles, tests, quizzes, and placed links to external sources (such as books and magazines), but they can also be audio recordings, videos, puzzles, games, crosswords, discussions on forums, chat rooms or popular presentations or blogs. Recently very popular are so-called skills pills – pills of knowledge (Dzega, 2013). It all depends on the creativity and skills of the teacher.

### **Technical aspect of e-learning at the university**

An academic teacher that wants to participate in e-learning must be open to new possibilities. This is the first and essential step, because this way of teaching is significantly different from the standard. First of all, it is precisely structured. The work on the preparation of the course in the subject begins even a year before the actual start of it. The aim is to determine the issues, scope of knowledge, literature and forms of knowledge to transfer. Currently it requires a lot of effort and commitment of the teacher. This course must be carefully worked out, teach what it is supposed to teach so cover all that is in the description of the object (Oziewicz, 2013). Such developed material can be used in the following years.

Naturally, the work of the teacher goes further than the preparation of materials and the course itself. Tutor is an authority, master and guide for his students. Not only verifies and evaluates their assignments, not only transmits the knowledge, but also takes an active part in discussions on forums, answers questions, assesses the activity and inspires you to work. In this form, with insight into each individual student's statement, in his or her every work done and the exact time spent on the platform, the teacher has the ability to individualize the work and perceive the educational needs of each student. Individual tutoring conducted by the lecturer is not nearly as laborious as it might seem. In fact - according to Oziewicz – it takes about four to five hours a day, and the work can be done from any place that has an access to the Internet (Oziewicz, 2013).

Eventually, what you should pay attention to is the relationship between the teacher and the university. The university itself must establish a general rule of using e-learning and compensating employees, as the leading way of working is very different than stationary teaching. But you cannot avoid introducing this method, and the sooner it happens the better, as the current society lives in the digital era (Oziewicz 2013).

### **Advantages and disadvantages of e-learning**

Undoubtedly, the advantage of e-learning is the ability to manage an individual learning process. It reduces the cost of travels and accommodation of people studying outside their place of residence, as well as the cost of educational materials. It also saves time – no complex organizational activities (getting to a place, checking attendance, planned and unplanned interruptions, etc.). E-learning also allows you to work at any time – for one it

will be late in the evening, and for another weekend classes. The participation in the classes can be suited to an individual plan of the day, week and personal activities. One distinct advantage for conducting the course is the possibility of re-use of the once prepared resources. Multiple repetition of the same material, which for many people can be tedious, does not occur in the case of distance education. We provide them during the next edition of the same subject, but always with the possibility to change them for the next group. While deciding to teach in the form of e-learning, the lecturer actually devotes his time to students in a more valuable way because it is based on individual contact, discussions, transmission of additional knowledge and dispelling doubts. He also inspires them to work (even in groups) and develops their interest in a particular field of knowledge (Oziewicz, 2013). The attractiveness of the course, and thus enabling to assimilate the material depends on the creativity of the teacher. In a way, this undermines the objection about the impossibility of the impact of own personality – it is possible but implemented in a different way.

The form of the online classes allows you to transmit and acquire knowledge in a different way than it has been done so far. It is also reliable but collected interactively and systematically, what results from the experiences and opinions reported by students. This method of teaching additionally allows to use opportunities and resources of the Internet. Above all, however, it retains the authority of the teacher, while getting rid of anonymity that is typical for crowd of students and a rigid hierarchy between the lecturer and the student that often impedes the contact and the opportunity to deepen the knowledge acquired by the student-master relationship (Oziewicz, 2013).

This form of learning allows for an easy way of making new friends with people who are physically distant but may be close in terms of interests, problems and experiences. It favors to develop social contacts for people who are shy, taciturn or closed. Also, the contact with professionals is facilitated - in chat or forum we can talk with authorities in the field with whom we would not have a contact in real life or this contact would be very difficult. E-learning helps us to access the exciting online content such as lectures, films, presentations, articles that have been recommended to us by a professional and in an orderly manner put into the program of the course. Among other advantages of e-learning are also listed such things as high efficiency of acquiring knowledge and the attractiveness of the technical environment, especially for young people (Szawłowska, 2013).

However, this advantage for some people becomes a drawback – especially for the older participants, the opacity of the designed tool forces the necessity of learning new technical issues, operating a learning platform, program, etc. The disadvantage is also the lack of direct contact with the group and teacher, “face to face” relationship. This minus is especially important from the point of view of the students of the social sciences, where it is important not only to acquire knowledge but also social skills, such as communication skills, the ability to “play with a personality”, or create the right atmosphere in the direct professional contact – this is a serious dilemma while studying pedagogy and psychology and using e-learning platform. The big drawback is the lack of social and professional experiences appearing directly in the group. These are especially the experiences that are acquired during the workshops, some of the exercises and seminars. For the student of the social sciences, it is important not only to read the materials, listen to the lecture, but also to participate in the observation and to experience actively certain educational or teaching situation as well as to acquire skills in action (e.g. skills of teaching groups of children, young people or the elderly).

It should be added that the e-learning training requires more discipline from the student, because of the lack of daily activities taking place in the physical space of the university, during which the teacher stimulates the students to learn, for example checks for the presence, tests, encourages on the basis of his or her example, pulls to the scientific activities (conferences, research groups, research projects).

E-learning can be regarded as a particularly good form for young people which is especially irreplaceable while teaching territorially dispersed group that would have difficulty in meeting in one place. It is also a great form of education for people with some experience that do not need so much training of practical skills.

## Methodology of the research

The primary objective of the study was to find the factors determining the effectiveness of e-learning courses and learning expectations and concerns of students before the concept of classes in the form of e-learning. The practical aim of the research was to improve the quality of education with the help of this form of teaching.

The study involved 20 students of the fourth year of pedagogy (not full-time) conducted in the form of e-learning. The overwhelming majority were women, which follows from the general structure of students choosing this field of study. Fourteen people of the respondents (70%) had never attended classes conducted in the form of e-learning.

The study was conducted anonymously over the Internet and consisted of two polls, mainly with open questions. The first of these was completed by the students before the beginning of the course and was designed to assess their attitudes to this form of learning and to get to know their opinions, concerns and expectations of the participants related to e-learning lessons. After completing a semester course participants were asked again to complete a survey in which they were asked the questions regarding their satisfaction with the course, the difficulties encountered during the course, the realization of their expectations of the course and the suitability of the materials provided by the teacher. Participation in the survey was not mandatory, nor taken into account in assessing. The only form of motivation was to ensure their students that the answers will be taken into account when constructing the schedule for the next semester.

Due to the fact that the participants were asked about various features of the classes, it is necessary to carry out a brief description of the course to understanding the context of their responses. During the course students get the materials available in various forms - written, graphic, audiovisual, and in the form of plays. The teacher regularly provided a new content for the participants of which assimilation he checked through a short test including 4 to 5 questions that could be answered several times. In addition, the activity was also scored on the basis of the forum, where participants could take part in discussions initiated by the teacher. There were also the tasks that regularly appeared and included for example watching a film about the teaching experiment, describing presented in study dependent and independent variables. Finally, the level of knowledge was tested in the form of a stationary oral exam.

## Results of the research

Because of the breadth of the respondents' answers, the results were divided into three thematic blocks: the opinions of the participants about the course in the form of e-learning before starting the course, the preferred forms of the available materials, the elements of the course, which in the opinion of the respondents contributed to the efficiency and comfort of learning.

### *The opinion of the participants about the classes in the form of e-learning*

In the evaluation of the answers of these examined people, the use of e-learning allows people who work, live abroad, have a family, or come from a small village, near which there is no college education to study. In addition, the respondents decided on this form of education because of the opportunity to study in any hours (50%), low education costs (30%), and the comfort of learning at home (40%). These aspects the participants described as the advantages of part-time of e-learning studies. In contrast, the most frequently mentioned by them drawback of this form of education was the lack of direct contact with the teacher and other participants (55%).

Then discussing the expectations of the respondents, it was found that in most cases they concerned materials posted on the platform, they hoped that they would be understood, available, and transmitted in various forms - text, audio, video, links to websites, in an interesting and transparent way (55% of respondents). In addition, they expected that this form of education would enable them to acquire the knowledge and skills closely related to the level gained at the full-time studies (10%). Most fears of the participants before taking the course focused on

potential technical failures and fears associated with personal competences while using computers and e-learning platform (45%), a significant proportion of people also feared of the fact that the materials would be incomprehensible (30%).

#### *Preferred form of the materials and tasks available*

The most preferred forms are such materials as articles (50%), lectures in the audio form (15%), tests (25%) and illustrations and links to websites (10%).

#### *Elements of the course that in the opinion of the people examined influenced the effectiveness and comfort of educating the most*

The respondents were mostly satisfied with the way the message was sent, which they assessed as a clear, precise and understandable (60%). In addition, participants pointed here to such items as the possibility of contacting with the teacher (25%), conducting tests and giving them the tasks (20%). They also appreciated the regularity of the information provided and the opportunity to participate in forum discussions.

### **Conclusion**

Analyzing the information obtained in the study it is concluded that e-learning is a good alternative way of working for people living abroad or having a family. Students expect from their classes that the information given will be clear and that the level of education will not differ from the full-time studies. The results clearly indicate that the e-learning courses can be conducted in an interesting and understandable way and that the level of assimilation of knowledge can be regularly checked by short online tests which is the additional motivation to participants to learn.

Studies allow to emerge a number of elements which determine the efficiency constructing e-learning courses, these are:

- the commitment and competence of the person offering the course because it depends on it if he can arouse the interest of the participants,
- the use of different forms of learning such as the providing the materials, initiating a discussion on the forum, creating tests and reference works,
- the richness of shared materials, including the bigger number of the written materials,
- the regularity of the shared content,
- openness of the teacher to a contact with course participants,
- the competences of the participants in the use of computers and e-learning platform, the university should offer voluntary course in this regard.

The studies show that, as well as the traditional forms of teaching and learning such, e-learning to the greatest extent depends on the competence of the teacher's, his ability to transfer his knowledge, commitment and innovation. If the person conducting the course has the appropriate skills and is sufficiently motivated to transfer knowledge in a clear way, the level of the education through the Internet does not have to differ from the traditional education, but can provide an important alternative for people who for various reasons choose it.

## References

- Dzega, D. (2013). Metodyka przygotowania kursów e-learningowych z uwzględnieniem pigulek wiedzy. In M. Dąbrowski & M. Zając (Eds.), *Rola e-edukacji w rozwoju kształcenia akademickiego* (pp. 140-147). Warszawa: Fundacja Promocji Akredytacji Kierunków Ekonomicznych.
- Kalaman, M. R. (2012). Wybrane problemy doboru do roli zawodowej funkcjonariuszy i pracowników Służby Więziennej. In A. Watoła & K. Wójcik (Eds.), *Rynek pracy pedagogów. Bariery i perspektywy* (pp. 177-197). Dąbrowa Górnicza: Wydawnictwo Wyższej Szkoły Biznesu.
- Kalaman, M. R. & Strzelec, M. (2013). Nowoczesne formy nauczania w Służbie Więziennej. In K. Jędrzejak, M. R. Kalaman & R. Poklek (Eds.), *20 lat działalności Polskiego Towarzystwa Penitencjarnego. Refleksje i impresje jubileuszowe* (pp. 159-179). Kalisz: Polskie Towarzystwo Penitencjarne, Centralny Ośrodek Szkolenia Służby Więziennej.
- Kupisiewicz, C. (2012). *Podstawy dydaktyki*. Warszawa: Wydawnictwo Graf Punkt.
- Madden, D. (1999). 17 elementów dobrego kursu on-line. *Revised*, 3, 1-3.
- Okoń, W. (2007). *Nowy słownik pedagogiczny* (10th ed.). Warszawa: Wydawnictwo Akademickie Żak.
- Oziewicz, M. (2013). Nauki humanistyczne w formacie on-line – wykorzystanie amerykańskich doświadczeń. In M. Dąbrowski & M. Zając (Eds.), *Rola e-edukacji w rozwoju kształcenia akademickiego* (pp. 11-18). Warszawa: Fundacja Promocji Akredytacji Kierunków Ekonomicznych.
- Szablowska-Mdor, A. (2009). Skuteczność e-learnigu w geoinformatyce – badanie opinii studentów. In M. Dąbrowski & M. Zając (Eds.), *E-edukacja – analiza dokonań i perspektyw rozwoju* (pp. 159-165). Warszawa: Fundacja Promocji Akredytacji Kierunków Ekonomicznych.
- Szawlowska, K. *Propedeutyka kształcenia na odległość*. <https://open.kul.lublin.pl/kurs.html?op=5&zbid=37&aid=77&powid=103&kstart=0> (22.10.2013).

# E-learning in French Language Teaching in Higher Education in the Czech Republic

Radka Fridrichová \*

University of Hradec Králové, Rokitsanského 62, Hradec Králové 500 03, Czech Republic

---

## Abstract

In this paper we focus on the area of e-learning, which is now included in the educational process of French specialization at the Faculty of Education of the University of Hradec Králové. On the one hand, this paper reflects the broader context of the current situation in the field of e-learning in the aforementioned workplace based on a questionnaire survey conducted among the students; on the other hand, it assesses and outlines its future development.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* e-learning, questionnaire survey, internet in education, information and communication technologies in education

---

## Introduction

Nowadays, e-learning is one of the crucial approaches to modern education at universities. New courses are developed as a part of more or less ambitious projects, along with e.g. introduction of combined studies or as theoretical frameworks of individual pedagogues who adopt this new educational approach. M. Toupin (1996) even talks about the *cybernetic market* (*cybermarché de la formation*).

The output presented in this paper is a part of a lower-range internal project of the Section of French Language and Literature (referred to as OFJL) at the Faculty of Education of the University of Hradec Králové (referred to as PdF UHK) which intends to introduce a French lexicology e-learning course (based on state-of-the-art trends in French language).

Before introduction of this study method, we wanted to find as much information as possible on students' attitudes to e-learning. To explore the grounds of the current state and future needs and requirements of e-learning in the local context, we used a questionnaire to find out some basic information on this issue. The results will also be used as a base for further theoretical backgrounds in teaching French language through information technologies.

The questionnaire was distributed among the students of the BA French in Education degree programme, BA French in Tourism degree programme and MA Teaching French for Primary Schools degree programme.

The results of this survey, carried out in January and February 2014, are, along with theoretical backgrounds on e-learning and information technologies in education in general, briefly presented in the following section.

## Definition of basic terms

Before presenting the issue of applying e-learning at the Section of French Language and Literature of the PdF UHK, we will focus on a short description of several basic terms associated with this form of education.

---

\* Corresponding author. Tel.: 420- 49-333-1528.  
E-mail address: radka.fridrichova@uhk.cz



## Definition of e-learning

According to Lévy (1997), e-learning<sup>1</sup>, in French also referred to as *formation en ligne* (the term recommended by the institution *La délégation générale à la langue française et aux langues de France*), *apprentissage en ligne* (Canada), *e-formation*, the term used in French environment as a part of TICE (*Les technologies de l'information et de la communication pour l'enseignement*), i.e. information and communication technologies for teaching, belongs to the area of *cyberculture*.

Recent research (carried out in the Czech Republic) from 2009-2010 describe e-learning as a type of learning where knowledge acquirement and application are distributed and facilitated with electronic devices (Průcha a kol., 2009: 66), including all theory, research and any educational process (with different degrees of intention) “*in which information and communication technologies processing digital data are applied, in accordance with ethical principles.*” Methods of using ICT (*Information and Communication Technologies*) and availability of learning resources vary depending on educational goals and content, the nature of the educational environment, the needs and options of all participants who are a part of the given educational process (Zounek, 2009: 37–38). L. Rohlíková and J. Vejvodová (2010: 60), the authors of ‘*Vyučovací metody na vysoké škole*’ define this term as “*individualized self-educational learning through information and communication technological tools in a pedagogically constructed system.*”

According to the European Union, e-learning can be understood as “applying new internet multimedia technologies to improve quality of learning, facilitating access to appropriate resources and services, as well as distant exchange and collaboration” (“*l'utilisation des nouvelles technologies multimédias de l'Internet pour améliorer la qualité de l'apprentissage en facilitant d'une part l'accès à des ressources et à des services, d'autre part les échanges et la collaboration à distance*”; retrieved from <http://www.awt.be/>).

E-learning tends to use multimedia (rich media), i.e. internet links, animations, videos, audio, images, interactive tests and surveys, etc., using various distribution channels, such as LMS (*Learning Management System*). LMS is a controlling teaching/learning system (learning management), a central application for management and organization of the e-learning materials and processes.

According to Karel Květoň (2003), there are three basic approaches to online education through information and communication technologies, which we also considered in the questionnaire. The approach least exploiting the capacities of virtual environment is labeled **static use of the web**. In this case, e-learning is used especially as a tool for publishing the documents relating to course organization - the syllabus, content, goals, itinerary, etc. Another method of web use is called **dynamic**. It includes inline learning resources, automatically evaluated tests, discussions, forums, as well as various multimedia, such as audio, videos, animations, etc. The third approach is a **complete online course**, including not only learning in the virtual environment, but also the entire communication through various software tools and “aids”. This is the approach widely using LMS systems, namely Moodle in case of the UHK (the University of Hradec Králové).

In professional and public environments, both benefits and drawbacks of online education are frequently discussed (e.g. Vašutová, 2002). The latter were stressed in our previous paper (refer to Fridrichová, 2014), which concludes that every teacher should find an appropriate concept and compromise between self-study with use of information and communication technologies, and direct instruction.

## E-learning in departmental French teaching – current state and survey results

Within the introduction and increasing support of learning through information and communication technologies in the PdF UHK, we decided to carry out a survey among departmental French students in the environment of the

---

<sup>1</sup> In English, the terminology is even more variable, frequently defined by ICT involved, e.g. *multimedia learning*, *technology-enhanced learning*, *computer-based training*, *computer-assisted instruction*, *internet-based training*, *web-based training*, *online education*, *virtual education*, *virtual learning environments*, *learning platforms*, etc.

OFJL. Results of the survey will be compared to the current state. Finally, general goals and needs of students will be formulated for future creation of digital frameworks and courses in Moodle at the OFJL, intended to facilitate more efficient targeting of further pedagogical ambitions of the department in the area of digital education.

Currently, there are fourteen subjects of departmental French with theoretical frameworks in Moodle (kurzy.uhk.cz). They focus mainly on background studies and didactics, yet with single units they also represent the areas of translation and interpretation, phonetics, conversation, and include a multimedia application in French. This fact is mentioned, as a question on representation of individual philology related subjects was also included in the questionnaire and it reflects the students' requirements for specific theoretical frameworks in the virtual environment.

The existing e-learning concepts are intended as theoretical frameworks for regular degree programs. Students have access to online materials which they can use in classes or improve. According to specialization of individual subjects, they include various documents. Most frequently these are texts in PDF, DOC, PPT, enhanced with audio and video files, internet links, and tests with an answer key. The teacher is not actively involved in the course, i.e. the e-learning is static, with only a few examples of subjects with multimedia tools belonging to dynamic use of the web. However, discussions, forums and automatically evaluated tests are missing completely. There is no complete e-learning course available yet.

We will use the results of the questionnaire to consider and suggest such a type of online education which will best match the needs of the department's students.

#### *Results of the survey questionnaire - perspectives*

Our research included 67 respondents. The questionnaire was divided into two sections.

The first section addressed personal details of the student. The overwhelming majority (88 per cent) of the participants were women. Age categories were divided into three ranges, the first covering the range from 18 to 20 years, the second from 21 to 23 years and the third from 24 years of age. Percentage rates of individual groups are shown in Table 1. As can be seen in the table, the most numerous group are students within the range of 18 to 20 years of age, usually attending their first or second year. The first year was predominant (43 %), while the second and third years were balanced, represented by 24 % and 22 % of students. The follow-up Master's degree years were included in a single group, making 10 % of the total number of participants.

Table 1. Age ranges

Age	
18-20 years	50 %
21-23 years	42 %
from 24 years	8 %

In the second section of the survey, a questionnaire of general questions was used to ask the participants about their experience with e-learning, with further attention to the already existing theoretical frameworks available at kurzy.uhk.cz, and finally we focused on the participants' attitude to future creation and concept of e-learning courses and theoretical frameworks.

In the following text we will point out several crucial findings and interesting observations resulting from the questionnaires.

The vast majority of OFJL students participating in the survey, exactly 98 per cent, have already encountered the term e-learning. 93 per cent have been using the theoretical frameworks in Moodle available at kurzy.uhk.cz. However, they do not consider these frameworks as e-learning, even though the frameworks belong to e-learning according to Karel Květoň's definitions. On that account, a great part (61 %) of the participants responded that they had not participated in any complete e-learning course up to that point, and therefore they could not assess such a

learning method (75 %). On the other hand, those who had already had such an experience consider e-learning as positive (10 %) or even very positive (15 %).

The majority of the respondents (78 %) would also appreciate more e-learning courses at the OFJL, while their preferences for individual philological areas vary. The following figure (Fig. 1) shows how individual preferences are represented (individual percentage rates refer to total number of respondents as it was possible to select multiple options).

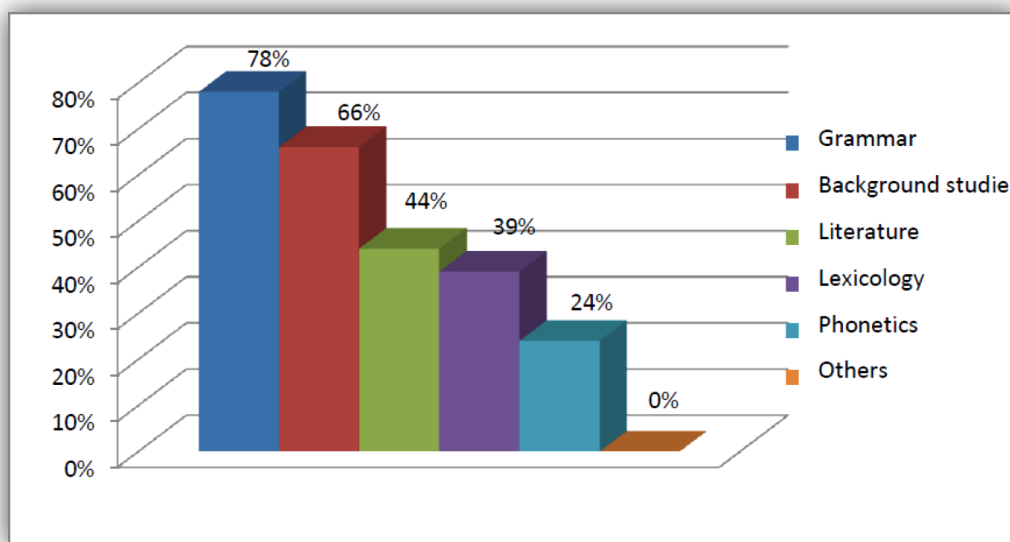


Figure 1. E-learning preferences sorted by specialization.

The data show interesting information. The first finding says that students would most appreciate (78 %) online theoretical frameworks for grammar which have not been covered by OFJL Moodle courses yet. The second area to be addressed (66 % of respondents) by e-learning are background studies, which are already significantly represented in the existing courses. Even numbers (approximately 40 %) can be seen in the interest in lexicology and literature, neither of which have e-learning frameworks available at [kurzy.uhk.cz](http://kurzy.uhk.cz). As to e-learning, the lowest preference rate was found in phonetics. The key argument for this result is that while practising proper pronunciation, the students need immediate feedback from their teacher.

Question 8, addressing e-learning forms, self-study rate and tutor (teacher) roles, provided further interesting findings. The results imply that the students of departmental French prefer the e-learning form already introduced in the OFJL, i.e. an online course in the form of theoretical background supported by regular classes. According to the questionnaire results, this form is preferred by 85 per cent of the students. Only 10 per cent of the respondents preferred a distance tutored e-learning (the tutor actively participates in the course, moderates discussions and forums, provides answers for online posted questions). The minority of 5 % of the survey participants would prefer fully distance non-tutored e-learning. It is not surprising that this response was chosen mainly by older students involved in the follow-up Magister degree programme, as most of them already have their jobs and need to use their time as effectively as possible.

The results and information presented above, acquired from departmental French students through a questionnaire, indicate that the students of the regular degree programmes still prefer face-to-face learning. Nevertheless, they do not object to new modern technology trends and their introduction in learning. However, such

methods should not be applied at the expense of decreasing the amount of regular classes and direct contact with the environment of the university.

As to the future development of e-learning courses and creation of online theoretical frameworks, the OFJL should primarily focus on hitherto absent materials covering the areas of grammar, literature and lexicology, as well as improving the existing background study resources. Some areas, such as phonetics, may be supported by additional online resources, especially by links to pronunciation records or theoretical background for seminars, as for their features and the tools they use, e-learning courses might not accommodate the needs of all areas and subjects.

#### 4. Conclusion

The students of the departmental French at the Faculty of Education of the University of Hradec Králové do generally know and have positive experience with e-learning, yet they are rather sceptical about the introduction of a complete e-learning course in their education. They prefer regular courses, which they also chose when deciding about their study form. They find direct contact with their teachers and classmates necessary. a “regular teacher” is therefore considered an indispensable part of the educational system and they are not supposed to be replaced by digital, computer-controlled learning, no matter how error-free and almost perfect such a system might be.

Modern technologies may be of great help and online courses provide us with many new options and benefits. Namely, as the students said in the questionnaires, these can be for example “saved time”, “pace of the learning adapts to each individual student”, “efficiency”, “effectiveness”, “availability of resources”, “learning experience improvement”, “richer learning”, “time independence”, “a more viable option for students with jobs”, “time flexibility”, “comfortable learning from home”, “quickly searchable information”, “not being burdened by textbooks”, “necessary information available through a single spot”, “student may choose when they would study”, “student may allocate as much time as they can”, “home office”, etc.

Even despite these positive views on virtual education, the OFJL students keep preferring regular forms of study which may however be supported by various digital resources. This perspective makes it interesting to monitor future trends in this area. Will the preferences of the students shift with the next generation which has been fully raised in the environment of omnipresent information technologies?

#### References

- Agence Wallonne des Télécommunications. *Qu'est-ce que l'e-learning* [on-line], 2008 [cit. 2014-02-18]: <http://www.awt.be/web/edu/index.aspx?page=edu,fr,gui,080,010>.
- Dostál, J. (2008). Pedagogická efektivita off-line learningu v celoživotním vzdělávání. In *Klady a zápory e-learningu na menších vysokých školách, ale nejen na nich*. Praha: SVŠES.
- Fridrichová, R. (2014). Využití e-learningu ve vysokoškolském vzdělávání – na příkladu výuky oborové francouzštiny. In *Sapere Aude, Pedagogika, psychologie a dnešní společnost* (331–338). Hradec Králové: Magnanimitas.
- Klement, M. et al. (2012). *E-learning - elektronické studijní opory a jejich hodnocení*. Olomouc: Gevak.
- Kopecký, K. (2006). *E-learning (nejen) pro pedagogy*. Olomouc: Hanex, 2006.
- Květoň, K. (2004). *Základy e-learningu 2003*. Ostrava: Ostravská univerzita v Ostravě.
- Lévy, P. (1997). *Cyberculture*. Paris: Odile Jacob.
- Mužik, J. (1998). *Andragogická didaktika*. Praha: Kodex Bohemia.
- Průcha, J. (2009). *Pedagogická encyklopedie*. Praha: Portál.
- Průcha, J. et al. (2009). *Pedagogický slovník*. Praha: Portál.
- Rohlíková, L., Vejvodová, J. (2010). *Vyučovací metody na vysoké škole*. Plzeň: Západočeská univerzita v Plzni.
- Toupin, M. (1996). Un cybermarché de la formation. *Distances*, 1(2), 35–47.
- Vašutová, J. (2002). *Strategie výuky ve vysokoškolském vzdělávání*. Praha: PdF UK.
- Wagner, J. (2005). Nebojme se e-learningu. *Česká škola* [on-line], 2005 [cit. 2014-02-18]: <http://www.ceskaskola.cz/>.
- Zounek, J. (2009). *Elearning – jedna z podob učení v moderní společnosti*. Brno: Masarykova univerzita.

# E-learning system in blended learning environment to enhance cognitive skills for learners in higher education

Jintavee Khlaisang<sup>a\*</sup> and Maneerat Likhitdamrongkiat<sup>b</sup>

<sup>a</sup> Associate Professor, Department of Educational Technology and Communications,  
Chulalongkorn University, Bangkok, 10330, Thailand (jintavee.m@chula.ac.th)

<sup>b</sup> Lecturer, Department of Multimedia Technology, Faculty of Engineering and Architecture, Rajamangala  
University of Technology Isan, Nakhon Ratchasima 30000, Thailand (m2nual@gmail.com)

---

## Abstract

This research aims to develop the e-Learning system in Blended Learning Environment (BLE) to enhance cognitive skills for higher education learners. The system was developed based on the survey of 400 higher education instructors. Then, it was tested by 120 students in three major disciplines established by OHEC Thailand. Data analysis indicated that there was statistical difference between pre and post test scores at .05 level of significant. Then, the system was approved by the experts. Accordingly, the results showed that the system should consist of four core elements along with 14 sub elements as detailed in the article.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* E-Learning System; Blended Learning; Environment; Cognitive Skills; Higher Education

---

## Introduction

According to the National Education Act B.E. 2542 (1999) introducing education reform that focused on student-based learning, along with the use of technology to support suitable learning process to students, the Office of Higher Education set out Thailand Qualifications Framework for Higher Education. The Framework defined three qualifications for higher education emphasizing to support students to have knowledge and specialize in their discipline, create and apply knowledge to develop themselves, and work to develop country for global competitiveness. The qualifications were also relevant to the standards in creating and developing knowledge-based society. Therefore, higher educational institutes have to change teaching methods to respond to the above mentioned qualifications (Ministry of Education Gazette: Qualifications Framework for Higher Education, 2009; Royal Gazette: Qualifications Framework for Higher Education, 2009; Office of Higher Education Notice: Implementation on Qualifications Framework for Higher Education, 2009). The Qualifications Framework for Higher Education focused on enhancing cognitive skills of learners. According to the Framework on cognitive skills emphasizing on the academic disciplines (Bureau of Higher Education Standards and Evaluation, 2004), cognitive skills for learners in Health Sciences included problem solving, systematic thinking, analytical thinking, and scientific process. Cognitive skills for learners in Science and Technology included problem solving, analytical thinking, creative thinking, and critical thinking. Cognitive skills for learners in Humanities and Social Sciences include problem

---

\* Corresponding author. Tel.: +662-218-2644 ; fax: +662-218-2644  
E-mail address: jintavee.m@chula.ac.th

solving, analytical thinking, creative thinking, and applicative thinking (Bureau of Higher Education Standards and Evaluation, 2009).

According to the National Education Act B.E. 2542 (1999), section 9 and the Qualifications Framework for Higher Education on enhancing cognitive skills, blended e-Learning is learning which combines the benefit of classroom and online learning in content delivery, activities, and measurement and evaluation. Blended e-Learning has become widespread in higher education because of its flexibility for instructors to integrate educational technology in teaching. Also, instructors can offer more effective teaching by implementing student-centered method. Students can access and study contents anywhere and anytime. They can participate and exchange ideas in classroom and learning social media. Therefore, instructors can improve learner's cognitive skills and necessary learning attitudes in the classroom period. There are six important elements for the designing of this teaching method: courseware, learning management system, communication, evaluation, instructor's role, learner's role, supporter's role, and pedagogy. The ratio of the teaching method is online teaching at 30-79% and classroom teaching 21-70% (Khlaisang, 2012; Khlaisang, 2010; Bonk & Graham, 2006; Waterhouse, 2005; Wilson & Smilanich, 2005; Sloan Consortium Foundation, 2005).

From the above issues, the author concluded that higher education students were an important target group that should be developed cognitive skills to respond to education reform on self-paced learning and lifelong learning that emphasized on preparing learners for technology and the Qualifications Framework for Higher Education on cognitive skills development. Knowledge gained from this research will contribute to the advancement of academic discipline on technology and communication studies by developing e-Learning system to enhance the cognitive skills of higher education learners. The research will be used as an example for the integration of education technology and education science because there has not been any e-Learning system to enhance cognitive skills for higher education yet. Therefore, it is needed to develop e-Learning system to enhance cognitive skills for higher education which will be applied in higher education.

### **Objectives**

This paper is a report on the findings of a study conducted on e-Learning system in Blended Learning Environment (BLE) to enhance cognitive skills for learners in higher education. This project is a sub project research under the research on "E-Learning System to Enhance Cognitive Skills for Learners in Higher Education" which consists of two sub projects: 1) "E-Learning System to Enhance Cognitive Skills in Virtual Learning Environment for Learners in Higher Education" which present a learning design for the future classroom, and 2) "E-Learning System to Enhance Cognitive Skills in Blended Learning Environment for Learners in Higher Education" which present a learning design for the present classroom. Accordingly, the objectives of this research were: (1) to study input and process of e-Learning system in BLE to enhance cognitive skills for learners in higher education, (2) to develop e-Learning system in BLE to enhance cognitive skills for learners in higher education, (3) to study the result e-Learning system in BLE to enhance cognitive skills for learners in higher education, and (4) to present e-Learning system in BLE to enhance cognitive skills for learners in higher education.

### **Research Question & Hypothesis**

The research question is what and how are the input, process, output, and feedback of e-Learning system in BLE to enhance cognitive skills for learners in higher education. The hypothesis is there will be statistical difference between pre and post test scores at .05 level of significant.

### **Research Method & Results**

This paper is a report on the findings of a study conducted on e-Learning system in BLE to enhance cognitive skills for learners in higher education. The methodology of this study was R&D research. The instruments in this research consisted of: (1) the learning activities' plans, (2) the cognitive skills test, and (3) the learners' observation record form. The methodology was conducted in accordance with the objectives as detailed in the followings.

#### **Phase 1: To examine input and process of e-Learning system in BLE to enhance cognitive skills for learners in higher education**

Research phase 1 was conducted to examine instructors' opinion on e-Learning system in BLE as detailed in the followings.

#### **Research Method**

1. Study, analyze, and synthesis concepts, theories, and researches on (1) e-Learning system in BLE to use as basic information to identify input, process, output, and feedback of blended e-Learning system to enhance cognitive skills for learners, and (2) pedagogy on e-Learning in BLE to enhance cognitive skills to use as basic information to create a beta blended e-Learning system to enhance cognitive skills for learners and to identify a concept in enhancing cognitive skills of learners.

2. Study opinions of 400 higher education instructors out of 153,499 instructors under the Office of Higher Education Commission (Bureau of General Administration, Office of Higher Education Commission, 2010). The formula of Taro Yamane to calculate the sample size (n) with an acceptable random sampling error is  $\pm 5\%$  (Yamane, 1973) was used to study the input which is the process of teaching and learning using e-Learning system to enhance cognitive skills for learners in higher education. The result was integrated with information from step 1 develop the beta system.

#### **Research instruments**

The researcher used a questionnaire to study the input which was the process of e-Learning system in BLE to enhance cognitive skills for learners in higher education. The questionnaire was used as an instrument to collect data from the sample group. The details included (1) General information of instructors, (2) Elements and process of e-Learning, (3) Pedagogy, including teaching principles, teaching methods, and teaching process that affected cognitive skills of three disciplines, (4) Skills in information and communication technology and experiences in using e-Learning to enhance cognitive skills of higher education learners in lines with the needs and current context, and (5) Information about the institute to study the readiness in supporting e-Learning to enhance cognitive skills for learners.

#### **Research results**

The result of research phase 1 that studied the input which was the process element of e-Learning system in BLE to enhance cognitive skills for learners in higher education. Data analysis was divided into 2 parts.

1. Analysis of the priorities of cognitive skills in three disciplines from the experts, it was found that (1) Health Sciences, the first 3 skills were systematic thinking, analytical thinking, and application, (2) Science and Technology, the first 3 skills were scientific process, systematic thinking, analytical thinking, and (3) Humanities and Social Science, the first 3 skills were creative thinking, analytical thinking, systematic thinking. This result will be used for further analysis in this research.

2. The result of the study of opinions from 400 instructors to study the current situation and the readiness of instructors for e-Learning system in BLE.

#### **Part 1** General information of higher education instructors

The survey about general information of instructors in higher education found that gender: most respondents were female, accounted for 56.3 percent, age: most respondents were aged between 31-40 years, accounted for 34.0 percent, educational level: most respondents had Master's degree, accounted for 44.8 percent, and teaching disciplines: most respondents taught in Humanities and Social Science at 39.3 percent, Health Sciences at 34.0 percent, and Science and Technology at 26.8 percent, respectively. Details are shown in Table 1.

**Table 1:** General information of the respondents

General information	Persons	Percent
<b>1. Gender</b>		
Male	175	43.8
Female	255	56.3
Total	400	100
<b>2. Age</b>		
Between 20-30 years old	88	22.0
Between 31-40 years old	136	34.0
Between 41-50 years old	110	27.5
Above 51 years old	66	16.5
Total	400	100
<b>3. Highest educational level</b>		
Bachelor's Degree	77	19.3
Master's Degree	179	44.8

General information	Persons	Percent
Doctoral Degree	79	19.8
Others	65	16.3
Total	400	100
<b>4. Teaching disciplines</b>		
Health Sciences	136	34.0
Science and Technology	107	26.8
Humanities and Social Science	157	39.3
Total	400	100

**Part 2** aims to study the use of computers to check the readiness of the instructors for e-Learning system in BLE. It was found that the respondents used computer for working 100 percent. For the frequency of using computers per week, it was found that most respondents used computers to work every day, accounted for 92.0 percent, followed by 3-4 days per week at 4.0 percent. For the question of owning the computer, it was found that most respondents had their own computer at 96.2 percent and most did not share it with colleagues at 77.8 percent. For the question of the use of computers, most respondents used computers for information searching at 20.8 percent, followed by preparing teaching materials at 17.1 percent.

The question about the use of smart phones by the students found that most students used smart phones, accounted for 72.7 percent. As for tablets, most respondents did not use tablets, accounted for 75.8 percent, followed by using tablets at 24.2 percent. Most respondents who used tablets used Samsung (GalaxyTab) at 50.5 percent. For the question of using tablets in teaching, it was found that most respondents did not use tablets in teaching at 59.7 percent. Most students in the respondents' class did not use tablet at 58.3 percent. As for e-Learning question, most respondents have offered blended/hybrid learning at 48.3 percent, followed by web-facilities learning at 44.1 percent.

**Table 2** Information of respondents on the use of computers

Information on the use of a computer	Persons	Percent
<b>1. Do you use a computer at the workplace?</b>		
Yes	400	100
No	0	0.0
<b>2. The frequency of using a computer per week.</b>		
Everyday	366	92.0
4 3times a week	16	4.0
1-2times a week	13	3.3
Others	3	0.8
<b>3. Do you have your own a computer for work?</b>		
Yes	379	96.2
No	15	3.8
<b>4. Do you share the computer at your workplace with colleagues?</b>		
No	309	77.8
Yes, with 1-2 colleague (s)	35	8.8
Yes, with 5 3colleagues	35	8.8
Yes, with 10 6colleagues	18	4.5
<b>5. What do you use a computer for? (Multi answers are acceptable.)</b>		
Analyzing students' learning results	241	13.8
Preparing teaching materials	298	17.1
Searching information	364	20.8
Teaching and making lessons	257	14.7
Presenting	275	15.7
Analyzing data	239	13.7
Others	73	4.2
<b>6. Do the students in your class use a smart phone?</b>		
Yes	282	72.7
No	106	27.3
<b>7. Do you use a table such as iPad, Samsung Galaxy Tab</b>		
Yes	96	24.2
No	301	75.8
<b>8. Which tablet do you use?</b>		
Apple (iPad)	44	47.3



Information on the use of a computer	Persons	Percent
Samsung (Galaxy Tab)	47	50.5
Others	2	2.2
<b>9. Do you use a tablet in teaching?</b>		
Yes	58	40.3
No	86	59.7
<b>10. Do the students in your class use a tablet?</b>		
Yes	148	41.7
No	207	58.3
<b>11. Which type of e-Learning have you used?</b>		
Web-Facilitated	199	44.1
Blended/ Hybrid	218	48.3
Virtual Learning Environment	34	7.5

**Part 3** shows the data of the respondents on the use information technology in teaching to design e-Learning system in BLE to enhance the cognitive skills of higher education learners. It was found that most respondents have used Learning Management System (LMS) at 71.6 percent. Most have used the electronic book (E-Book), accounted for 73.4 percent, file sharing tools, at 78.6 percent, web application tools at 72.5 percent, communication tools at 88.4 percent, community tools at 88.9 percent, and streaming video at 89.2 percent. Details are shown in Table 3.

**Table 3:** Experiences in using technology in teaching

Information on the use of technologies in teaching	Persons	Percent
<b>1. Have you ever used LMS: Learning Management System?</b>		
Yes	285	71.6
No	113	28.4
<b>2. Have you ever used E-Book?</b>		
Yes	292	73.4
No	106	26.6
<b>3. Have you ever used file sharing tools?</b>		
Yes	313	78.6
No	85	21.4
<b>4. Have you ever used web application tools?</b>		
Yes	287	72.5
No	109	27.5
<b>5. Have you ever used communication tools?</b>		
Yes	352	88.4
No	46	11.6
<b>6. Have you ever used community tools?</b>		
Yes	354	88.9
No	44	11.1
<b>7. Have you ever used streaming Video?</b>		
Yes	355	89.2
No	43	10.8

## **Phase 2: To develop e-Learning system in BLE to enhance cognitive skills for learners in higher education Research Method**

1. Study opinions of the experts about the results from phase 1 to develop a prototype of e-Learning system in BLE to enhance cognitive skills for learners. Issues in consideration included input, process, output, and feedback. Also, the experts considered about the transfer of meaning, the covering of contents, and the appropriateness of using the system. Suggestions from the experts from the interview about e-Learning to enhance the cognitive skills of higher education learners were used to improve the prototype.

2. The experts evaluated the prototype of e-Learning system in BLE on the input, process, output, and feedback. The experts included professionals on the developing of e-Learning system in BLE to enhance the cognitive skills of higher education learners and on higher educational framework.

3. Design and develop e-Learning system in BLE from the prototype suggested and approved by the experts in phase 1 and 2. The steps included (1) designing e-Learning system in BLE which featured web applications and

traditional classroom by creating site structure and storyboard; (2) developing learning activities' plans of e-Learning system in BLE based on information from studying, analyzing, and synthesizing of concepts, theories, and researches on blended e-Learning and cognitive skills; (3) developing the cognitive skills test of learners. Products from above 3 steps were evaluated by the experts in each field and tested with the sample group.

4. Develop e-Learning system in BLE with LMS that had plugin which was open source software with PHP language and MySQL Server. The system included e-Learning courseware, communication tools, and assessment and evaluation tools. The system was tested and tried out with the sample group. Then an instruction manual of e-Learning system in BLE would be developed in the next phase.

5. Organize the focus group of 15 experts, presenting the developed research instruments. The experts reviewed, brainstormed, and commented.

#### **Research instruments**

Research phase 2 had 3 forms for collecting data. They were interview forms for the experts, including a structured interview form, an approval evaluation form for e-Learning in BLE to enhance the cognitive skills of higher education learners, and a focus group record form.

#### **Research results**

The focus group was organized to review the prototype of e-Learning system in BLE to enhance the cognitive skills of higher education learners. There were 4 components of the system that were reviewed: (1) the model of e-Learning system in BLE to enhance the cognitive skills of higher education learners; (2) input: elements of teaching and the appropriateness of tools and technology to enhance the cognitive skills of learners; (3) process: the appropriateness of 5 cognitive skills, including creative thinking, analytical thinking, systematic thinking, applicative thinking, and scientific thinking; (4) output that was relevant to 5 cognitive skills. The experts reviewed the issues including the transfer of meaning, the covering of contents, and the appropriateness of using the system. Also, suggestions have been made about e-Learning to enhance the cognitive skills of learners. Overall, the average scores of the opinions were at the highest level. There were suggestions on improving the system. E-Learning system in BLE to enhance cognitive skills for learners in higher education will be presented in research phase 4.

**Phase 3: To study the result e-learning system in BLE to enhance cognitive skills for learners in higher education** Research phase 3 aims to study the result of the test of e-Learning system in BLE to enhance cognitive skills for learners in higher education. The sample group in the research was selected by purposive sampling method. The group included volunteer undergraduate students in the institutes under OHEC which had readiness in ICT. The sample group consisted of 120 students, including 40 students in Health Sciences discipline, 40 students in Science and Technology discipline, and 40 students in Social Sciences and Humanities discipline.

#### **Research method**

Research method were: (1) the sample group of students studied in the developed e-Learning system in BLE for one semester, then the researcher followed the process by defining input, process, output, and feedback as the experts suggested in phase 2; (2) the students took pre-test and post-test of cognitive skills. The results were analyzed in the next step; (3) during the research, the observation was made in teaching process, group learning, and behaviors showing the development of cognitive skills; and (4) the students did an opinion survey on e-Learning in BLE in the last part of the research.

#### **Data Analysis**

In this research, data was collected from the results of the assessment of cognitive skills of the sample group, the scores of learning behavior assessment that presented the development of cognitive skills by self- assessment and assessment from classmates, instructors, or observers, and opinions on the e-Learning system in BLE of the sample group. However, this paper will present only the results of the analysis of frequency and percentage of the sample group and the results of data analysis of cognitive skill assessment, using the t-test statistics.

#### **Research instruments**

Research instruments included e-Learning system in BLE, system developing and instruction manual, and cognitive skills test.

#### **Research results**

Data analysis of cognitive skills test of the sample group used the statistical t-test including the mean ( $\bar{X}$ ),

standard deviation (SD) and the compared average scores of the cognitive skill pre-test and post-test of students from all three disciplines. It was found that there was statistical difference between pre-test and post-test scores at .05 level of significant. **Students in Health Sciences discipline** have an average score of cognitive skills pre-test at 36.45 with standard deviation at 10.563 and average score of post-test at 64.90 with standard deviation at 15.772. **Students in Science and Technology discipline** have an average score of cognitive skills pre-test at 40.91 with standard deviation at 20.488 and average score of post-test at 83.58 with standard deviation at 11.154. **Students in Social Sciences and Humanities discipline** have an average score of cognitive skills pre-test at 34.65 with standard deviation at 8.793 and average score of post-test at 67.09 with standard deviation at 18.039.

**Table 4:** Data analysis of mean ( $\bar{X}$ ), Standard Deviation (SD), and the results comparing the average scores of cognitive skills of pre-test and post-test of the students in three disciplines.

Discipline	Test	n	$\bar{X}$	S.D.	t	Sig.
Health Sciences	Pre-test	40	36.45	10.563	-10.861	000.*
	Post-test	40	64.90	15.772		
Science and Technology	Pre-test	40	40.91	20.488	-12.912	000.*
	Post-test	40	83.58	11.154		
Social Sciences and Humanities	Pre-test	40	34.65	8.793	-10.479	00.0*
	Post-test	40	67.09	18.039		

\*P < .05

#### Phase 4: To present e-Learning system in BLE to enhance cognitive skills for learners in higher education

Phase 4 is to present e-Learning system in BLE to enhance cognitive skills for learners in higher education. The results from the study of the use of blended e-Learning were used to improve the system. The system was presented to the focus group to be approved.

#### Research method

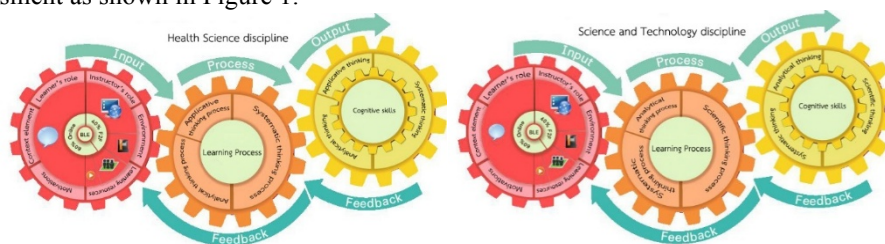
Research method included: (1) research results from phase 3 were used to improve the system. The system was presented in diagram and essay; (2) present the system to the focus group, including instructors, institute administrators, and experts in e-Learning in BLE, cognitive skills, quality framework of higher education, and educational innovation. The focus group commented and approved e-Learning system in BLE; (3) analyze data of the e-Learning in BLE approval form using the mean and standard deviation. Then the results and comments from the experts were used to improve the system; and (4) improve the system and present it in diagram and essay.

#### Research instruments

Research instrument used in this phase was the approval form of e-Learning in BLE. The approval form was developed by using the result from phase 3: (1) input, (2) process, (3) output, and (4) feedback. The form used Likert Scale of 5 level and open-ended questions.

#### Research results

From the research phase 4, the e-Learning system in BLE to enhance cognitive skills for learners in higher education was presented. It contained four core elements along with 14 sub elements, including (1) Input which is elements such as learner's role, instructor's role, learning environment, learning resources, and motivation, (2) Process which is the process of teaching management including analytical thinking process, creative thinking process, scientific thinking process, systematic thinking process, and applicative thinking (this process will take the result of e-Learning system in blended learning environment and e-Learning in virtual environment of sub projects to analyze and develop perfect e-Learning system), (3) Output which is cognitive skills, and (4) Feedback which is the system assessment as shown in Figure 1.



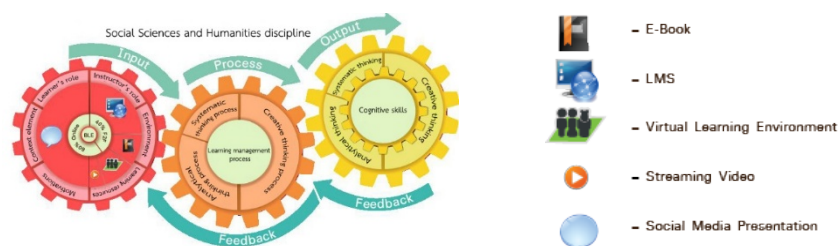


Figure 1: E Learning System in Blended Learning Environment

## Conclusion

This paper is a report on the findings of a study conducted on e-Learning system in Blended Learning Environment (BLE) to enhance cognitive skills for learners in higher education. This project is a sub project research under the research on “E-Learning System to Enhance Cognitive Skills for Learners in Higher Education” which consists of two sub projects: 1) “E-Learning System to Enhance Cognitive Skills in Virtual Learning Environment for Learners in Higher Education” which present a learning design for the future classroom, and 2) “E-Learning System to Enhance Cognitive Skills in Blended Learning Environment for Learners in Higher Education” which present a learning design for the present classroom. The methodology of this study was R&D research with the objective to develop blended e-Learning system to enhance cognitive skills for learners in higher education. The research methods included Phase 1: to examine input and process of e-learning system in BLE to enhance cognitive skills for learners in higher education; Phase 2: to develop e-learning system in BLE to enhance cognitive skills for learners in higher education; Phase 3: to study the result e-learning system in BLE to enhance cognitive skills for learners in higher education; and Phase 4; to present e-learning system in BLE to enhance cognitive skills for learners in higher education. The research results answered the question of the basis and importance of the use of educational technology by developing e-Learning system in BLE to enhance cognitive skills for learners in higher education. Also, it was a model of integrating educational technology and pedagogy to enhance cognitive skills for learners in higher education which will lead to the application in higher education.

## Acknowledgment

This paper was a part of the project funded by the National Research Council of Thailand (NRCT) in 2012. The author would like to express our sincere appreciation to NRCT for the support. Sincerely thank must also go to Chulalongkorn University and Thailand Cyber University Project who are the supported institutes. Special thanks also go to all advisors, scholars, and experts for their help and support in creating new knowledge via this paper to strengthen the educational technology and communications field.

## References

- Office of Higher Education Commission. (1999). **National Education Act B.E. 2542 (1999)**. Office of the Educational Council, Royal Thai Government.
- Office of Higher Education Commission. (2009). **Ministry of Education Gazette: Qualifications Framework for Higher Education, B.E. 2552 (2009)**. Office of Higher Education Commission, Ministry of Education. [Online]. Available from: <http://www.mua.go.th/users/tqf-hed> [2011, July 6]
- Bonk, C. J. & Graham, C. R. (2006). **The handbook of blended learning**. San Francisco, CA: Pfeiffer.
- Khlaissang, J. and Likhitdamrongkiat, M. (2014). **Final Report of Research on ‘E-Learning System in Blended Learning Environment to Enhance Cognitive Skills for Learners in Higher Education’** Funded by the National Research Council of Thailand in 2012.
- Khlaissang, J. (2012). Development of Pedagogical Blended E-Learning Model Using Cognitive Tools Based Upon Constructivist Approach for Knowledge Construction in Higher Education. **Proceedings of the Fourth International e-Learning Conference 2012**, the Office of the Higher Education Commission, Bangkok, Thailand, June 14, 2012.
- Khlaissang, J. (2010). Proposed Models of Appropriate Website and Courseware for E-Learning in Higher Education: Research Based Design Models. **Proceedings of the E-LEARN 2010 World Conference on E-Learning in Corporate, Government, Healthcare & Higher Education**, the Association for the Advancement of Computing in Education, Orlando, Florida, October 22 18, .2010.

- Sloan, Consortium. (2008). **Blending In: The Extent and Promise of Blended Education in the United States**. [Online]. Available from: <http://sloanconsortium.org/publications/freedownloads> [2011, July]
- Songkram, N. and Khlaisang, J. (2014). **Final Report of Research on 'E-Learning System to Enhance Cognitive Skills for Learners in Higher Education'** Funded by the National Research Council of Thailand in 2012.
- Waterhouse, S. (2005). **The Power of E-Learning: The Essential Guide for Teaching in the Digital Age**. Boston, MA: Pearson Education, Inc
- Wilson, D. &Smilanich, E. (2005). **The Other Blended Learning**. San Francisco, CA: John Wiley & Sons, Inc.

# E-learning system in virtual learning environment to develop creative thinking for learners in higher education

Noawanit Songkram<sup>a\*</sup>

<sup>a</sup>Associate Professor

Department of Educational Technology and Communication, Faculty of Education, Chulalongkorn University, Bangkok and 10330, Thailand

---

## Abstract

The objective of this research was to study e-learning system in virtual learning environment to develop creative thinking for learners in higher education. This e-learning system was built up from theories, principals and research in educational background and then it was tested with thirty undergraduate students in Social Sciences and Humanities disciplines. The quantitative data was statistically analyzed using mean, standard deviation, and t –test. For the qualitative data they were collected by attitude questionnaire. The improved system was approved by the groups of e-learning system and creative thinking skills experts as detailed in the article.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

**Keywords:** E-Learning System, Virtual Learning Environment , Creative Thinking, Higher Education

---

## Introduction

It can be seen that the education reform that occurred more than a decade which focused on learners by using technology to support the learning process and need to develop about higher order thinking.( National Education Act B.E, 1999) Creative thinking skill, which are under consideration by the National Qualifications Framework for Higher Education 2552, is a one of the five important higher- order thinking skills that focus on the skill-development of all learners. Therefore, the development of learning with e-learning on a virtual environment for creative development is considered a necessary which confirm by the survey of the Ministry of Education, 2552 which found that the creative thinking skill of young learners was low by creativity test. Thus, when student enters the learning in higher education institutions, it is necessary to accelerate development and to build on the basic policy of the Commission that focuses on the students developing their creativity. E-learning system on the virtual learning environment, which means the environment to teaching and learning activities via the Web, focusing on teaching the students to participate in a virtual reality classroom to help enhance learning anywhere and anytime and to encourage formal learning. Besides, learning with e-learning system on a virtual learning environment to promote creative thinking to students by supporting communications between students and instructors, students and students, reflecting of tacit and explicit knowledge both learners and instructors, collaborating and acquiring knowledge, which there are online tools to support instruction. Thus, in designing of e-learning system, model of e-learning is very important to enhance creative thinking by including teaching techniques, teaching methods, innovation creation, and pedagogy in the model of learning (Songkram, 2013). Therefore, in this research it was

---

\* Noawanit Songkram Tel.: +6681-848-5490; fax: +662-218-2644.

E-mail address: noawanit.s@chula.ac.th

studied, experimented and monitored effectively and reliably in the e-learning system in virtual learning environment to develop creative thinking for learners in higher education.

### **Objective**

The purposes of this research were as follows:

1. to investigate components, processes of e-Learning system in virtual learning environment to develop creative thinking for learners in higher education
2. to create e-Learning system in virtual learning environment to develop creative thinking for learners in higher education
3. to study the results of e-Learning system in virtual learning environment to develop creative thinking for learners in higher education
4. to propose e-Learning system in virtual learning environment to develop creative thinking for learners in higher education

### **Research Question**

1. What and how are the components and processes of e-Learning system in virtual learning environment to develop creative thinking for learners in higher education?
2. Can undergraduate students create knowledge construction and creative problem solving ability using this model?

### **Hypothesis**

The creative thinking posttest of students in the sample group after learning by using create e-Learning system in virtual learning environment to develop creative thinking was higher than the pretest at the .05 level of significant.

### **Research Method**

The e-learning system in virtual learning environment to develop creative thinking for learners in higher education was R&D research. The methodology consisted of the following; the researcher

Phase 1. Analyzed and synthesized information and research about components and processes of e-learning system ,virtual learning environment , creative thinking

Phase 2. Created the e-learning system in virtual learning environment to develop creative thinking for learners in higher education

Phase 3. Studied the results of using the e-learning system in virtual learning environment to develop creative thinking

Phase 4. Proposed the e-learning system in virtual learning environment to develop creative thinking for learners in higher education.

In the details as follows:

#### **Phase 1: Analyzed and synthesized information and research about components and processes of e-learning system, virtual learning environment, creative thinking**

The study was conducted by analyzing and synthesizing information and research about components and processes of e-Learning system which consisted of components and processes. For virtual learning environment, there were studied in learning platform, pedagogy, online collaborative tools, synchronous and asynchronous web-based application.

## **Phase 2: Created the e-learning system in virtual learning environment to develop creative thinking for learners in higher education**

2.1 A beta e-learning system in virtual learning environment to develop creative thinking for learners in higher education was reviewed by five experts monitoring this model for. The experts examined the components, processes, content covering, and the appropriateness of using the system. Also, comments were made about e-learning system in virtual learning environment to develop creative thinking for learners in higher education before testing.

2.2 Designing a draft of e-learning system in virtual learning environment to develop creative thinking for learners in higher education.

2.3 Developing the research instruments, there were a creative assessment, lesson plans, and an opinion questionnaire. The data was statistically analyzed using mean, standard deviation, and t-test.

## **Phase 3: Studied the results of using the e-learning system in virtual learning environment to develop creative thinking for learners in higher education**

E-Learning system was experimented in higher education with 30 undergraduate students, major in educational technology from the Faculty of Education, Chulalongkorn University, academic year 2012. The subjects were similar in terms of age (ranging from 20-21) and educational background by purposive sampling method with the required qualifications. After trial, the researcher revised, modified this system and followed by considering and approving by five experts in the educational field.

Table 1 A t-test comparison of post-test scores and pretest scores in creative thinking

Mean	S.D	t	df	Sig.
-46.50	62.43	-4.07	29	.000

A t-test comparison of post-test scores and pretest scores of the samples showed statistically significant difference at .05 level between creative thinking and satisfy with the systems in high level. E-learning system in virtual learning environment to develop creative thinking for learners in higher education consisted of five components: 1) Technology for supporting learning 2) Role of learners 3) Role of Instructors 4) Self-direct 5) Evaluation and eight processes: 1) Preparation of the learners 2) Identifying objectives 3) Finding the fact 4) Finding the ideas 5) Finding problem solutions 6) Creating productivity 7) Evaluation 8) Accepting productivity.

## **Phase 4: Proposed the e-learning system in virtual learning environment to develop creative thinking for learners in higher education**

After collecting experimental results and comments from the subjects, the researcher improved the system. The system was approved by five experts in the field before achieving the final proposed the e-learning system in virtual learning environment to develop creative thinking for learners in higher education.

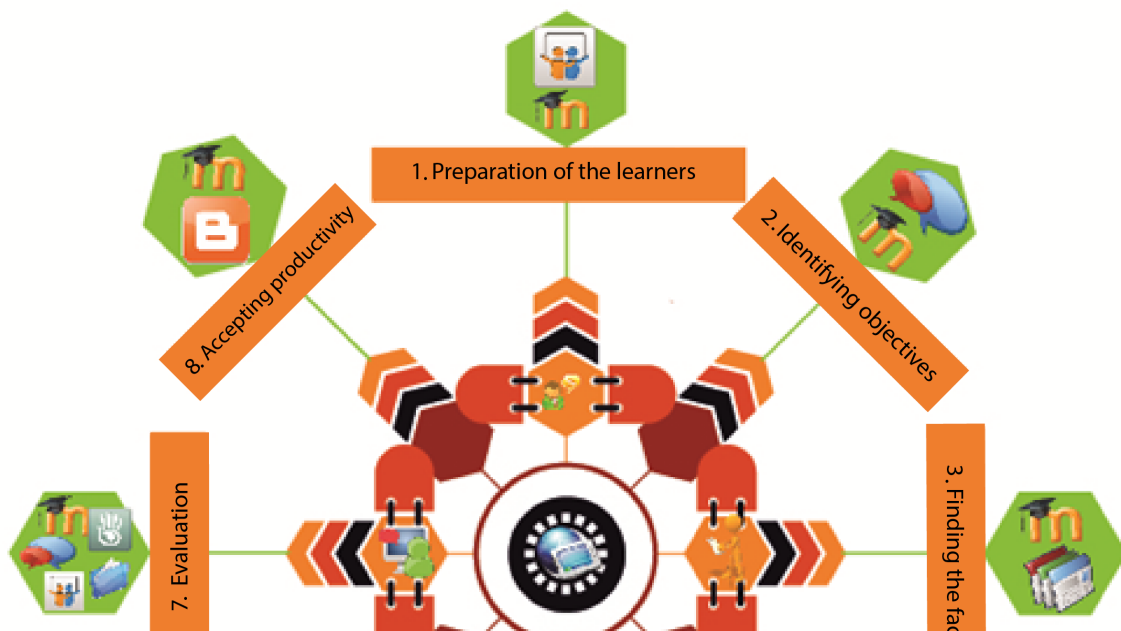




Fig. 1 The e-learning system in virtual learning environment to develop creative thinking for learners in higher education.

Online tools	Components
<b>= LMS: Moodle</b>	<b>= Technology for supporting learning</b>
<b>= Slide share</b>	<b>= Role of learners</b>
<b>= Chat</b>	<b>= Role of Instructors</b>
	<b>= Self-direct</b>
	<b>= Evaluation</b>

Research result can answer research questions as follows:

1. E-learning system in virtual learning environment to develop creative thinking for learners in higher education consisted of: 1) Technology for supporting learning 2) Role of learners 3) Role of Instructors 4) Self-direct 5) Evaluation and eight processes: 1) Preparation of the learners 2) Identifying objectives 3) Finding the fact 4) Finding the ideas 5) Finding problem solutions 6) Creating productivity 7) Evaluation 8) Accepting productivity.
2. A t-test comparison of posttest and pretest of the sample group showed statistically significant difference at.05 level in creative thinking and the sample group revealed that they were satisfied with e-learning system in virtual learning environment to develop creative thinking for learners in higher education.

### **Acknowledgements**

This paper was a part of the project funded by Chulalongkorn University in 2013. The author would sincerely thank to Chulalongkorn University . Sincerely thanks must also go to Faculty of Education. Special thanks also go to all advisors, scholars, and experts for their help and support in creating new knowledge via this paper to strengthen the educational technology and communications field.

## References

- De Bono, E. (2010). **Lateral thinking: Creativity step by step**. Harper Collins.
- De Bono, Edward.. **lateral Thinking : A Text Book of Creativity**. Haronds Wort : Penquine Book. 1982.
- De Bono's, Edward. **Six Thinking Hats**. Penguin book, united states of America. 1982.
- De Freitas, Sara, et al. (2010): "Learning as immersive experiences: Using the four-dimensional framework for designing and evaluating immersive learning experiences in a virtual world." **British Journal of Educational Technology** 41.1 69-85.
- Dillon, A.,and Zhu,E.(1997) Designing web-based instruction: a human-computer interaction perspective.
- Ellgn, G.(1995). **Creative Problem Solving** . The Co-Creatiity Institute : Illinois.
- Fabun, D. (1968). **You and Creativity**. New York: Macmillan. Cited in Davis, G. A. 1983.
- Creativity is Forever. United State of America: Kendal/Hunt Publishing Company.
- Fobes, R. (1993). **The creative Problem Solver's Tool box : A Complete Course in the Art of Creative Solutions to Problems of fing Kind**.
- Guilford,J.P. (1970).**Traits of Creativity, Creativity: Selected Reading** P.E. Vernon, Editor, Penguin Books
- Songkram, N. (2011). The Blended Learning Model with Team Learning and Creative Promotion Processes for Innovation Creation in Undergraduate Students. **Proceedings of Global Learn Asia Pacific 2011** - Global Conference on Learning and Technology, Australia, 1894 – 1899.
- Songkram, N. (2011). The Project -based Learning and Collaborative Learning Model for Innovative knowledge Creation for Undergraduate Students in Higher Education Institutions. **Proceedings of Global Learn Asia Pacific 2011** - Global Conference on Learning and Technology, Australia, 1079 – 1084.
- Songkram, N. (2012). The blended learning model with active learning for knowledge construction and creative problem solving ability for undergraduate students in higher education. **Proceedings of the Fourth Asian Conference on Education 2012**, October 24-28 2012, Osaka, Japan
- Songkram, N. (2012). **Final Report of Research Project on E-Learning System in Virtual Learning Environment to Enhance Cognitive Skills for Learners in Higher Education**, funded by the National Research Council of Thailand 2012.
- Songkram, N. and Khlaisang, J. (2012). **Final Report of Research Program on E-Learning System to Enhance Cognitive Skills for Learners in Higher Education**, funded by the National Research Council of Thailand 2012.
- Songkram, N. (2013). Effect of organizing active learning and hybrid learning on design of virtual field trip and to enhance creativity for undergraduate education students. **Journal of Education, Silpakorn University** 10 ( 2) (Nov.2012 – March 2013)
- The Office of the National Education, (1999) **The National Education Act B.E. 1999**. Office of the Prime Minister.
- Torrance, E.Paul. (1962). **Guiding Creative Talent**. Englewood Cliffs, N.J.: Prentice-Hall, Inc.
- Upper Secondary Education Bureau, Ministry of Education (2010). **Digital Literacy World-Class Standard School**. The Agricultural Co-operative Federation of Thailand, Limited Press.
- Weller, Martin (2007). **Virtual Learning Environments: Using, Choosing and Developing your VLE**. Oxford, UK: Routledge.
- Wong, M.R. (1971) Integrative Reconciliation in Meaningful Learning. **Cognitive Psychology**,2, 325-329.
- <http://std.kku.ac.th/4970500126/sara5.html>

# E-learning system in virtual learning environment to enhance cognitive skills for learners in higher education

Noawanit Songkram<sup>a\*</sup> Bundit Puthaseranee<sup>b</sup>

<sup>a</sup>Associate Professor <sup>b</sup>Computer Technical Officer

<sup>a</sup>Department of Educational Technology and Communication Faculty of Education, Chulalongkorn University, Bangkok and 10330, Thailand.

<sup>b</sup>Thailand Cyber University Project, Office of the Higher Education Commission, Ministry of Education, Bangkok and 10400, Thailand

---

## Abstract

The objective of this research was to create and approve e-learning system in virtual learning environment to enhance cognitive skills for learners in higher education Instruments consisted of: (1) the learners' observation record form, (2) the learning activities, plans, and (3) the cognitive skills test. The system was tested with 120 students in three disciplines; Physical-science, science-technology and arts and humanities students in three famous public universities in Thailand. Data were analysed by mean, standard deviation, and t-test. The results of this study revealed that: the e-learning system consisted of Input, Process, output and feedback, as detailed in the article.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** E-Learning System, Virtual Learning Environment, Cognitive Skills, Higher Education

---

## Introduction

Education is one of the most crucial factors to improve the quality of people in the country. The foundation of the country is people and the foundation of people is education. Educated people will help create the country's sustainable prosperity in the future. Preparation of quality people to be a leader is an important issue for the nation progress. Educational reforms have to be implemented seriously and sincerely to maximize the benefits of education. Students should be prepared to be a leader in solving problems effectively and in creating new technologies, which are critical in the development and growth of the country. This is in accordance with the importance of educational technology in the National Education Act B.E. 2542 (1999), Section 9 which stated that the government must provide technology infrastructure and support the development of quality educational media. Also, it focused on developing educational personnel to have skills in creating and using technology to enhance learning. Students need to be developed with sufficient skills and knowledge to use technology to pursuit knowledge throughout their life. Also, it covered the research, development, monitoring, and evaluation to achieve the effectiveness and be suitable for students. It focused on educational reforms for student-based learning to allow students to be able to develop their full potential, develop self-learning behavior, and acquire knowledge throughout their life. It can be seen that the educational reforms over the decades focused on student-based learning using technology to support suitable learning process. Also, it emphasized on enabling students to gain knowledge by themselves continuously throughout their life using technology (The Office of the National Education, 1999).

---

\* Noawanit Songkram Tel.: +6681-848-5490; fax: +662-218-2644.  
E-mail address: noawanit.s@chula.ac.th

The Office of on Higher Education Commission introduced Thailand Qualifications Framework for Higher Education. It defined three qualifications for higher education, including the qualification of the quality of graduates, the qualification of administration, and the qualification of the creation and development of knowledge-based society. The quality qualifications for the quality of graduates stated that "The graduate of higher education is a knowledgeable, moral, and ethical person with the ability to learn and develop themselves. They can apply knowledge to live in society, physically and mentally healthy and be a responsible citizen of the country and the world". The quality of graduates composed of three indicators, including (1) the graduate had knowledge and expertise in their own field and was able to learn, create, and apply knowledge to develop themselves and create work to develop the country for a global competitiveness, (2) the graduate was conscious in living and perform duties under the responsibility with morality and ethics, (3) the graduate was both physically and mentally healthy and took care and maintained their health properly. With the characteristics of the graduate according to the Framework, the graduate's qualities consisted of technical knowledge, professional skills, experiences, and ethics. The Framework was also consistent with the standards in the creation and development of knowledge-based society. There was a focus to improve learning programs and to change teaching methods to develop learners in thinking, problem solving, and seeing the value of Thai culture. Therefore, higher educational institutes had to change teaching methods to respond to the above mentioned qualification (Ministry of Education Gazette: Qualifications Framework for Higher Education, 2009; Royal Gazette: Qualifications Framework for Higher Education, 2009; Office of Higher Education Notice: Implementation on Qualifications Framework for Higher Education, 2009).

The Qualifications Framework for Higher Education focused on enhancing the cognitive skills of learners. The Qualifications Framework divided academic disciplines into two disciplines which were 1) academic disciplines focusing on pure science of Arts or Science. The study mainly focused on the content and methods of science disciplines but did not directly relate to the profession. And 2) vocational disciplines which focused on applied science to provide students with the knowledge and high-level skills needed for profession and lead to compliance with professional standards. According to the academic disciplines (Bureau of Higher Education Standards and Evaluation, 2004), Health Sciences discipline consisted of Medical Sciences, Dentistry, Medical Technology, Pharmacy, Allied Health Sciences, Nursing, Public Health sciences, Sport sciences, Physical education, Health education, Science and Technology Science discipline consisted of Physical and Biological and sciences, Engineering, and Architecture. Social sciences and Humanities discipline consisted of Business Administration, Finance, Accounting, Management, Tourism, Economics, Education, Arts, and Fine Arts. According to the Qualifications Framework for Higher Education, cognitive skills for learners in Health Sciences included systematic thinking, problem solving, analytical thinking, and scientific process. Cognitive skills for learners in Science and Technology included problem solving, analytical thinking, creative thinking, and critical thinking. Cognitive skills for learners in Humanities and Social Sciences include problem solving, analytical thinking, creative thinking, and application (Bureau of Higher Education Standards and Evaluation, 2009).

According to the National Education Act B.E. 2542 (1999), section 9 and the Qualifications Framework for Higher Education on enhancing cognitive skills, e-Learning in virtual learning environment was learning via website focusing on activities that allowed students to participate in like a real classroom to enhance learner's capacities. Students can study anywhere and anytime, promoting 'self-paced learning' which is the goal of education – to develop learners for lifelong learning. E-learning in virtual learning environment not only developed cognitive skills for learners, but also encouraged learners for self-learning and self-direct. At present, global education focused on world class standard program, emphasizing on digital literacy from primary school to secondary school (Upper Secondary Education Bureau, Ministry of Education, 2010). Therefore, higher education should support the learning continuously because learners in higher education is a new generation who will bring country to the development and will be developed to be a professional. Therefore, instructors in higher education should have knowledge, understanding, digital literacy, and online learning management to accommodate the advancement and the preparation for learners in 21st century (Noawanit Songkram, 2011; Kalay, 2004).

E-Learning in virtual learning environment included the input which was the design principle of learning in virtual learning environment. The principle included communication between instructor and learner, collaboration between learners, learner's feedback, various feedbacks, sufficient information resources responding to learners in

different levels, and the support of knowledge creation of learners (Sclater, 2009; University of Leeds, 2008). The input will help enhance learner's cognitive skills and offer learning process such as problem solving, critical thinking, systematic thinking, and other higher thinking skills. It provided teaching principles, teaching methods, and teaching process that enhanced cognitive skills. Also, instructors can assign more effective teaching by increasing instructional strategies of learner-centered method. Students had access to educational content and teaching. Students were engaged in learning and the exchange of knowledge and ideas. The results will contribute to the development of cognitive skills.

From the above mentioned issue, the researcher believed that higher education learners were an important target group which should be developed cognitive skills. This was because the present society was the age of the pursuit of self-knowledge and lifelong learning. Higher education has to prepare students to be ready for technology as well as future profession effectively. The knowledge gained from this research will contribute to the advancement of student learning and the teaching of instructors. Also, it will contribute to the advancement of academic field of technology and communication studies by developing e-Learning in virtual learning environment to enhance cognitive skill for learners. It will be a model of integrating educational technology and pedagogy. The e-Learning system in virtual learning environment to enhance cognitive skill for learners will be new knowledge and answer to the mission in developing graduates' quality.

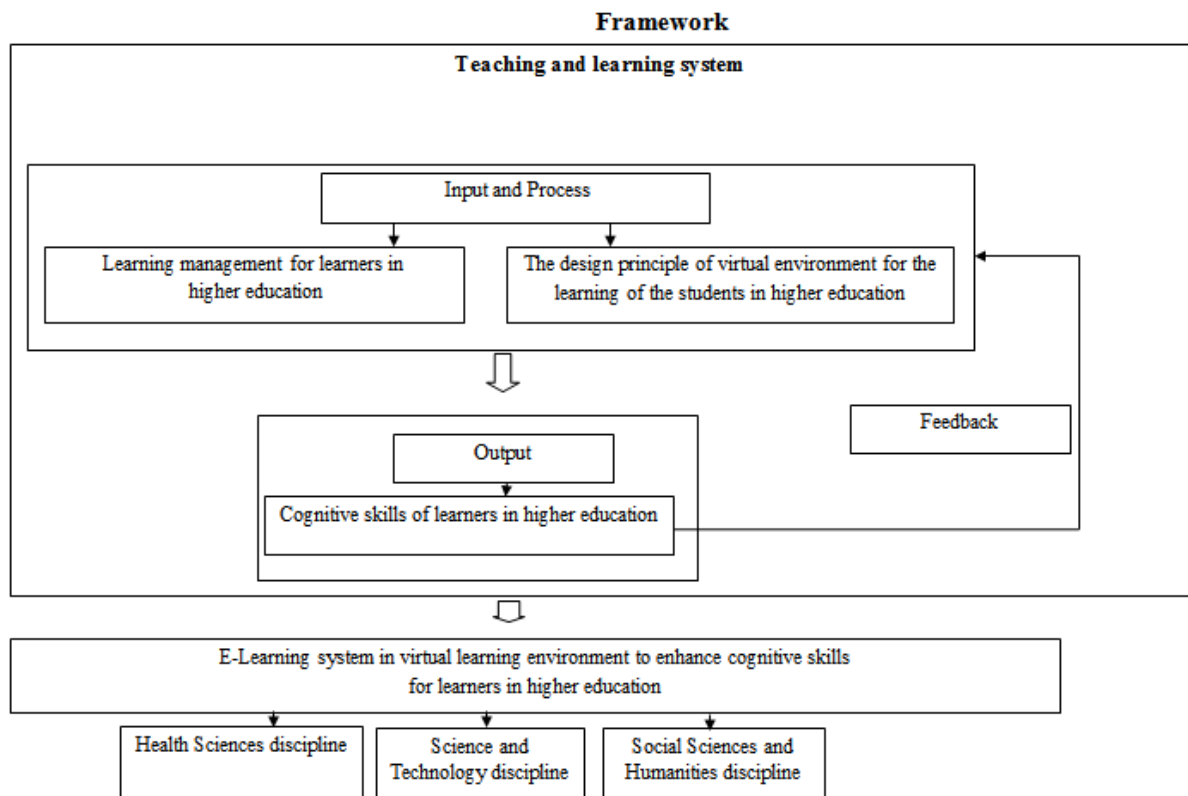
## **Research Objectives**

### General Objective

To develop e-Learning system in virtual learning environment to enhance cognitive skills for learners in higher education.

### Specific Objectives

1. To study the input which was the process of e-Learning system in virtual learning environment to enhance cognitive skills for learners in higher education.
2. To create e-Learning system in virtual learning environment to enhance cognitive skills for learners in higher education.
3. To study the output of e-Learning system in virtual learning environment to enhance cognitive skills for learners in higher education.
4. To present e-Learning system in virtual learning environment to enhance cognitive skills for learners in higher education.



## Research Method

Phase 1: Study, analyze, and synthesis concepts, theories, and researches on all variables and opinions of instructors on e-Learning using a multistage random sampling. The study was conducted by collecting opinions of 400 higher education instructors. The formula of Taro Yamane to calculate the sample size (n) with an acceptable random sampling error is  $\pm 5\%$  (Yamane, 1973) was used to study the input which is the process of teaching and learning.

Phase 2: Create a prototype of e-Learning system in virtual learning environment by using the result of phase 1. The interviews with 7 experts were conducted to get suggestions and approval of the prototype. The design of e-Learning system in virtual learning environment was to design learning and teaching on website and focused on virtual world using open source software such as open simulator and Moodle learning environment system (LMS).

Phase 3: Study the result of the test of e-Learning system in VLE. The sample group in the research was selected by purposive sampling method. The group included volunteer undergraduate students in the institutes under OHEC which had readiness in ICT. The sample group consisted of 120 students, including 40 students in Health Sciences discipline, 40 students in Science and Technology discipline, and 40 students in Social Sciences and Humanities discipline.

Phase 4: Present e-Learning system in VLE to enhance cognitive skills for learners in higher education. The results from the study of the use of e-Learning in VLE were used to improve the system. The system was presented to the focus group of 15 experts to be approved.

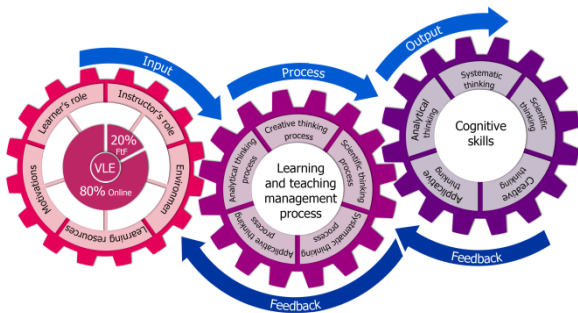
## Research instruments and analysis

1. The instruments in this research consisted of: 1) e-Learning system in VLE on Opensim simulator and Learning Management System (LMS) with instruction manual, 2) the learning activities' plans, 3) the cognitive skills test, and 4) the learners' observation record form.

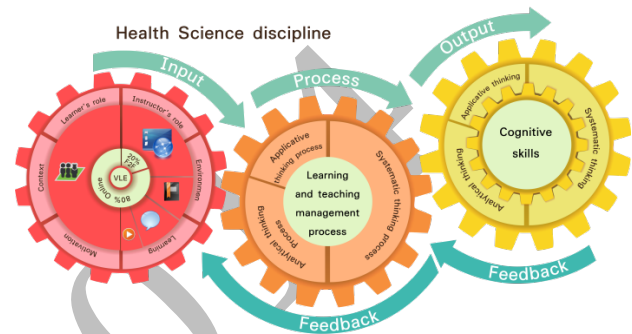
2. Analysis of the results of the sample group as follows.

- 1) Data analysis of cognitive skill test of the sample group using the t-test statistics.
- 2) Data analysis of average scores of learning behavior assessment by self- assessment and assessment from classmates, instructors, or observers

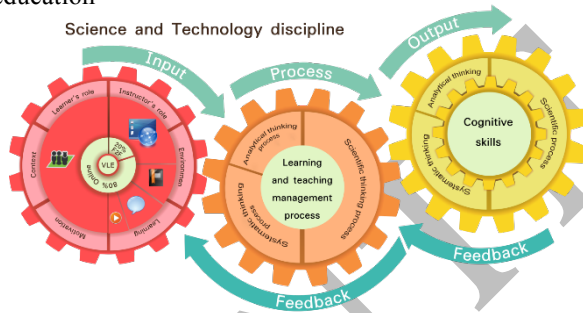
## Research results



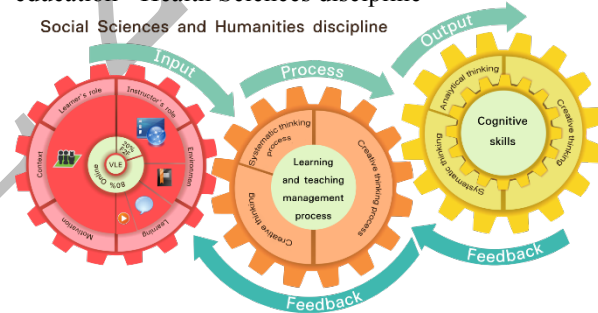
E-Learning system in virtual learning environment to enhance cognitive skills for learners in higher education



E-Learning system in virtual learning environment to enhance cognitive skills for learners in higher education - Health Sciences discipline



E-Learning system in virtual learning environment to enhance cognitive skills for learners in higher education - Science and Technology



E-Learning system in virtual learning environment to enhance cognitive skills for learners in higher education - Sciences and Humanities discipline

### Research result of e-Learning system in virtual learning environment to enhance cognitive skills for learners in higher education.

E-Learning system in VLE to enhance cognitive skills for learners in higher education is a research to develop e-Learning system. The system included (1) Input which was elements such as learner's role, instructor's role, learning environment, learning resources, and motivation. (2) Process which was the process of teaching management in three disciplines. Health Sciences included systematic thinking process, analytical thinking process, and applicative thinking process. Science and Technology included scientific process, systematic thinking process, and analytical thinking process. Humanities and Social Sciences included creative thinking process, systematic thinking process, and applicative thinking process. (3) Output which was cognitive skills. Cognitive skills for learners in Health Sciences included thinking, analytical thinking, and applicative thinking. Cognitive skills for learners in Science and Technology included scientific process, systematic thinking, and analytical thinking.



Cognitive skills for learners in Humanities and Social Sciences included creative thinking, systematic thinking, and applicative thinking. (4) Feedback which was the system assessment. The detail is as follows.

Teaching and learning system

1. **Input** included the principle of e-Learning system in VLE to enhance cognitive skills for learners in higher education. Elements and tools in teaching and learning management to enhance cognitive skills for learners in higher education included the followings:

1.1 Elements in teaching and learning management to enhance cognitive skills for learners in higher education included the followings;

1.1.1 **Learner's role:** learners should be ready for future technology which was Virtual Learning Environment Tool, including opensimulator which supported learning anywhere and anytime.

1.1.2 **Instructor's role:** instructors should have the experience and expertise in virtual environment. They can give advice for learners to use tools and guide students during the learning as a facilitator for to the learner.

1.1.3 **Learning Environment:** providing learning environment focusing on online learning. Learners can think, criticize and study from this learning environment. The virtual environment must be ready to respond to the learning.

1.1.4 **Resources:** instructors prepared resources and information source for learners. It included contents and opinion exchange tools. It should accommodate virtual technology to encourage learners to use tools and contents to develop cognitive skills.

1.1.5 **Reinforcement and Motivation:** in virtual environments instructors and learners must interact in an online environment. Therefore, instructors had to motivate and encouragement learners to study in the virtual environment. Also, instructors had to support the interaction between instructors and learners and between learners and learners. In the process of learning, instructors had to motivate learners to participate in activities using both internal and external reinforcement.

1.1.6 **Context and Technology Tools:**

- Curriculum context referred to elements that were different in each discipline and objectives of each course which focused on different cognitive skills.

- Management context referred to e-Learning management that accommodated technology skills of instructors. There were supporters who were technical staff in e-Learning management to support instructors for effective teaching.

1.2 Tools for teaching and learning management to enhance cognitive skills for learners in higher education included;

- Virtual learning environment which was a model that allowed students to participate in the virtual environment that was similar to a classroom using software that created content and exchange learning such as Virtual World/3D Animation.

- Learning Management System (LMS) which was learning management system via network. The system contained tools and elements for instructors, learners, and administrators, including course management system, content creating system, learner management system, content delivery system, and communication and interaction tool system such as chat room, e-mail, webboard, attendance record system, and report system.

- Social Media Presentation was used to deliver content via electronic media so that learners can study anytime and anywhere via online social media. Instructors can record the lecture and upload to the system for students to review such as Slideshare.

- Electronic books (E-Book) were books that were in electronic format or that were stored as electronic file. They were readable by electronic devices such as notebook computers, tablets, and mobile phones.

- Streaming Video referred to technology that allowed the transfer of multimedia data over the internet and displays it on a short time without waiting to download the file to a computer as it took time to download the whole multimedia file. Therefore, streaming video allowed many users to receive information at the same time.

2. **Process** was learning and teaching management process for learners in higher education which were (1) teaching science, including teaching models, teaching methods, and teaching techniques, and (2) learner's role,

instructor's role, and supporter's role. Considering teaching science and the roles, learning activities were created for learners in three disciplines; 1) Health Sciences with activities that developed systematic thinking process, analytical thinking process, and applicative thinking process, 2) Science and Technology with activities that developed scientific thinking process, systematic thinking process, and analytical thinking process, (3) Humanities and Social Sciences with activities that developed creative thinking process, creative thinking, and systematic thinking process.

3. **Output** was cognitive skills for learners in higher education in three disciplines 1) Health Science: systematic thinking, analytical thinking, and applicative thinking, (2) Science and Technology: scientific process, systematic thinking, analytical thinking, and (3) Humanities and Social Science: creative thinking, systematic thinking, analytical thinking.

4. **Feedback** was an assessment which can be divided into:

4.1 Formative Assessment means the assessment during the study period by observing learning in virtual environment and evidences of behaviors in online context that is relevant to thinking process of each discipline.

4.2 Summative Assessment or overall assessment is cognitive skills assessment of each discipline using pre-test and post-test.

## References

- Badrul H. Khan (Ed.), (1997). **Web-based instruction** (pp. 221-224). Englewood Cliffs, NJ: Educational Technologies Publications,
- Kalay, Yehuda E.(2004) Virtual Learning Environments. **ITcon** Vol.9
- Klopfer, L.E. (1971). Evaluation of Learning in Science. **Handbook on Formative and Summative Evaluation of Student Learning**. New York : McGraw – Hill Book Company ,574 – 580.
- Marquardt, Michael J. (1997). **Insights into World Class Learning**. Brussels : WILL Publishing.
- Sclater,N (2009) **Principles of future VLE/LMS development**. <http://sclater.com/blog/?p=210>
- The UK Centre for Legal Education (2010) **Virtual leaning Environment a higher educationacademic**  
<http://www.ukcle.ac.uk/resources/enhancing-learning-through-technology/vles-faq/seven/>
- The Office of the National Education, (1999) **The National Education Act B.E. 1999**. Office of the Prime Minister.
- Torrance, E.Paul. (1962). **Guiding Creative Talent**. Englewood Cliffs, N.J.: Prentice-Hall, Inc.
- University of Leeds (2008) **Seven Principles of Good Practice for teaching with the VLE** (20 June 2011)
- Wallach, M. A., & Kogan, N. (1965). **Modes of thinking in young children**. New York: Holt, Rinehart & Winston.
- Wong, M.R. (1971) Integrative Reconciliation in Meaningful Learning. **Cognitive Psychology**, 2, 325-329.  
<http://std.kku.ac.th/4970500126/sara5.html> (20 June 2011)
- Songkram Noawanit (2012) the blended learning model with active learning for knowledge construction and creative problem solving ability for undergraduate students in higher education. **Proceedings of The Asian Conference on Education Osaka Japan 2012**
- Songkram Noawanit (2013) **Field trip and virtual field trip for active learning**. Faculty of Education , Chulalongkorn university.
- Songkram Noawanit (2013) Effect of organizing active learning and hybrid learning on design of virtual field trip and to enhance creativity for undergraduate education students. **Journal of Education**. Silapakorn university (10) vol.2

# E-learning system to enhance cognitive skills for learners in higher education

Noawanit Songkram<sup>a,\*</sup> Jintavee Khlaisang<sup>b</sup>  
Bundit Puthaseranee<sup>c</sup> Maneerat Likhitdamrongkiat<sup>d</sup>

<sup>a</sup>Associate Professor <sup>b</sup>Associate Professor <sup>c</sup>Computer Technical Officer <sup>d</sup>Lecturer

<sup>ab</sup>Department of Educational Technology and Communication Faculty of Education, Chulalongkorn University, Bangkok and 10330, Thailand

<sup>c</sup>Thailand Cyber University Project, Office of the Higher Education Commission, Ministry of Education, Bangkok and 10400, Thailand

<sup>d</sup>Department of Multimedia Technology, Rajamangala University of Technology Isan,, Nakhon Ratchasima, and 30000, Thailand

---

## Abstract

The objective of this research study was to develop the e-learning system to enhance cognitive skills. The system comprised two sub systems: (1) e-learning system in Blended Learning Environment (BLE), and (2) e-learning system in Virtual Learning Environment (VLE). Both systems were tested by 240 higher education students categorized in three major disciplines including health science, science and technology, and social sciences and humanities. Afterwards, the systems were approved by the experts. The results showed that the systems should consist of four core elements: input, process, output, and feedback, as detailed in the article.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

**Keywords:** E-Learning System, Cognitive Skills, Higher Education

---

## Introduction

The National Education Act B.E. 2542 (1999) introduced education reform focusing on student-based learning to allow students to be able to develop their full potential, develop self-learning behavior, and acquire knowledge throughout their life. The reform emphasized on student-based learning using technology to support suitable learning process to students. Also, it focused on enabling students to gain knowledge by themselves continuously throughout their life using technology (The Office of the National Education, 1999). Accordingly, the Office of Higher Education set out Thailand Qualifications Framework for Higher Education to support such National Education Act. The Framework defines three qualifications for higher education.

An important qualification was to support students to have knowledge and specialize in their discipline, create and apply knowledge to develop them, and work to develop country for a global competitiveness. The qualification was also relevant to the standard in creating and developing knowledge-based society. Therefore, higher educational institutes have to change teaching methods to respond to the above mentioned qualification (Ministry of Education, 2009; Office of Higher Education Commission, 2009).

The Thai Qualifications Framework for Higher Education (TQF: HEd) focused on enhancing learner's cognitive skills. According to the academic disciplines (Bureau of Higher Education Standards and Evaluation, 2004), Health Sciences discipline consists of Medical Sciences, Dentistry, Medical Technology, Pharmacy, Allied Health Sciences,

---

\* Noawanit Songkram Tel.: +6681-848-5490; fax: +662-218-2644.

E-mail address: noawanit.s@chula.ac.th

Nursing, Public Health sciences, Sport sciences, Physical education, Health education. Science and Technology Science discipline consists of Physical and Biological and sciences, Engineering, and Architecture. Social sciences and Humanities discipline composes of Business Administration, Finance, Accounting, Management, Tourism, Economics, Education, Arts, and Fine Arts. According to the TQF: HEd, cognitive skills for learners in Health Sciences include problem solving, systematic thinking, analytical thinking, and scientific process. Cognitive skills for learners in Science Technology include problem solving, analytical thinking, creative thinking, and critical thinking. Cognitive skills for learners in Humanities and Social Sciences include problem solving, analytical thinking, creative thinking, and applicative thinking (Bureau of Higher Education Standards and Evaluation, 2009)

It can be seen that e-Learning can respond to the TQF: HEd. E-learning can be divided into two systems according to the context of education: (1) e-Learning system in Blended Learning Environment (BLE) that combines the benefit of classroom and online learning, and (2) e-Learning in Virtual Learning Environment (VLE) that focuses on self-paced learning. Both systems of e-Learning can be appropriately applied to the context of higher education. E-Learning system in BLE combines the benefit of classroom and online learning in content delivery, activities, and measurement and evaluation. BLE has become widespread in higher education because of its flexibility for instructors to integrate educational technology in teaching. Also, instructors can offer more effective teaching by implementing student-centered method. Students can access and study contents anywhere and anytime. They can also participate and exchange ideas in classroom and learning social media. Therefore, instructors can improve learner's cognitive skills and necessary learning attitudes in the classroom period.

There are six important elements for the designing of this teaching method: electronic contents, learning management system, communication, evaluation, instructor's role, learner's role, supporter's role, and teaching method. The ratio of the teaching method is online teaching at 30-79% and classroom teaching 21-70% (Jintavee Khlaisang, 2010; Bonk & Graham, 2006; Waterhouse, 2005; Wilson & Smilanich, 2005; Sloan Consortium Foundation, 2005). E-Learning in VLE is learning via website focusing on activities that allow students to participate in like a real classroom to enhance learner's capacities. Students can study anywhere and anytime, promoting 'self-paced learning' which is the goal of education – to develop learners for lifelong learning. E-learning in VLE not only develops cognitive skills for learners, but also encourages learners for self-learning and self-direct. At present, global education focuses on world class standard program, emphasizing on digital literacy from primary school to secondary school (Upper Secondary Education Bureau, Ministry of Education, 2010). Therefore, higher education should support the learning continuously because learners in higher education is a new generation who will bring country to the development and will be developed to be a professional. Therefore, instructors in higher education should have an insightful knowledge, deep understanding, broad digital literacy, and skillful online learning management to accommodate the advancement and the preparation for learners in 21st century (Noawanit, 2011; Agudo-Peregrina, Á.F. and et.al, 2014, Kalay, 2004; Hodhod and et.al, 2010).

According to the above issues, the researcher concluded that higher education students were an important target group that should be developed cognitive skills to respond to education reform, self-paced learning, lifelong learning that emphasized on preparing learners for technology, and the TQF: HEd. on cognitive skills development. Knowledge gained from this research will contribute to the advancement of academic discipline on technology and communication studies by developing e-Learning system to enhance the cognitive skills of higher education learners. The research will be used as an example for the integration of education technology and education science because there has not been any e-Learning system to enhance cognitive skills for higher education yet. Therefore, it is needed to develop e-Learning system to enhance cognitive skills for higher education which will be applied in higher education.

## **Objective**

To develop e-Learning system to enhance cognitive skills for learners in higher education.

## Research Question

What and how are the input, process, output, and feedback of e-Learning system to enhance cognitive skills for learners in higher education.

## Hypothesis

1. After students in higher education study in e-Learning system in Blended Learning Environment, they will have cognitive skills significantly higher comparing to that before studying.
2. After students in higher education study in e-Learning system in Virtual Learning Environment, they will have cognitive skills significantly higher comparing to that before studying.

## Research Method

### **Phase 1: Study of the input which is the process of e-Learning system to enhance cognitive skills for learners in higher education.**

The study was conducted by collecting opinions of 400 higher education instructors out of 153,499 of under the Office of Higher Education Commission (Bureau of General Administration, Office of Higher Education Commission, 2010). The formula of Taro Yamane to calculate the sample size (n) with an acceptable random sampling error is  $\pm 5\%$  (Yamane, 1973) was used to study the input which is the process of teaching and learning using e-Learning system to enhance cognitive skills for learners in higher education to get a beta system.

### **Phase 2: Develop e-Learning system to enhance cognitive skills for learners in higher education**

2.1 A beta e-Learning system to enhance cognitive skills for learners in higher education was reviewed by seven experts in enhancing cognitive skills in TQF: HED of learners. The experts examined the input, process, output, and feedback of meaning transferring, content covering, and the appropriateness of using the system. Also, comments were made about e-Learning system to enhance cognitive skills for learners before testing.

2.2 Designing e-Learning system to enhance cognitive skills. This phase is divided into two sub projects: 1) e-Learning system in Blended Learning Environment, and 2) e-Learning system in Virtual Learning Environment and were monitored by ten experts.

### **Phase 3: Examine the result of using e-Learning system to enhance cognitive skills for learners in higher education.**

E-Learning was tested in students in higher education as follows: e-Learning system in Blended Learning Environment (BLE) was tested by 120 students in Health Science, Science and Technology, and in Social Sciences and Humanities disciplines in one semester of the academic year 2012. Meanwhile, E-Learning system in Virtual Learning Environment (VLE) was tested by 120 students in Health Science, Science and Technology, and in Social Sciences and Humanities disciplines in one semester of academic year 2012. The subjects used in the research were selected by purposive sampling method with the required qualifications.

Research result was found that both analyzing of mean ( $\bar{x}$ ), standard deviation (SD), and comparing result of the average scores of cognitive skills pre-test and post-test of 120 students that studied with the BLE and 120 students that studied with the VLE had the average scores of the cognitive skills post-test in these two groups were statistical significantly higher than the average pre-test scores at .05.

### **Phase 4: Propose e-Learning system to enhance cognitive skills for learners in higher education**

After collecting experimental results and comments from the subjects, the researcher improved the system. The system was approved by 15 experts in the field before achieving the final e-Learning system to enhance cognitive skills for learners in higher education.

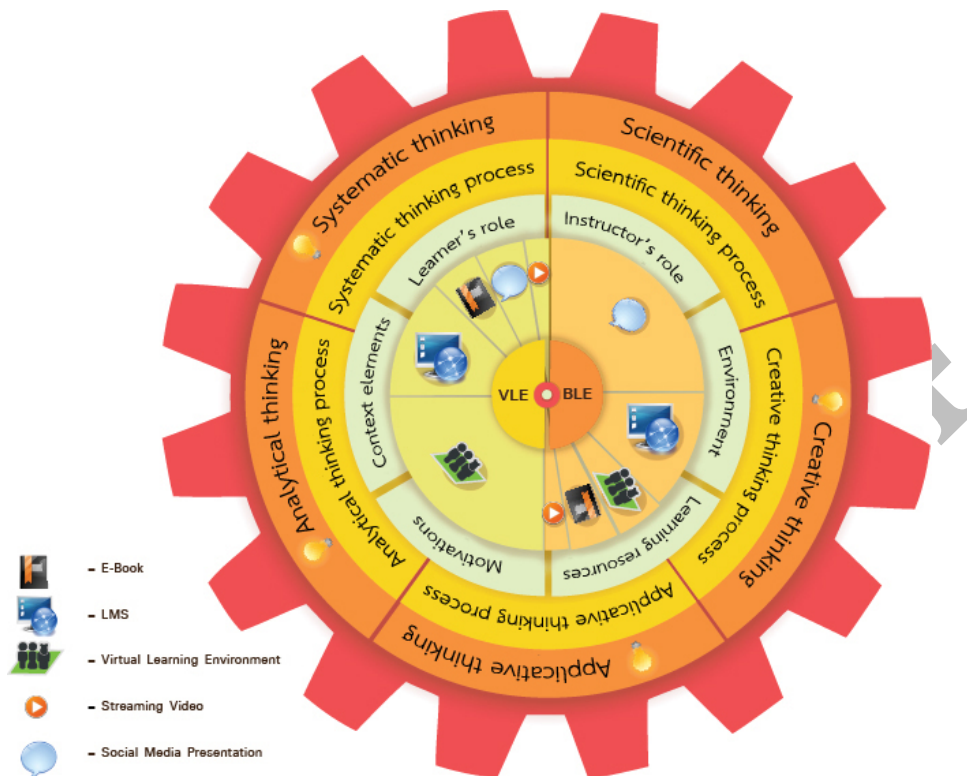


Fig. 1 e-Learning System to Enhance Cognitive Skills for Learners in Higher Education

Research result can answer research questions as follows:

E-Learning system to enhance cognitive skills for learners in higher education is a research to create e-Learning system. The system includes: (1) Input which consists of elements including learner's role, instructor's role, learning environment, learning resources, and motivations, (2) Process which is the process of instruction including analytical thinking process, creative thinking process, scientific thinking process, systematic thinking process, and applicative thinking (this process will take the result of e-Learning system in BLE and e-Learning in VLE of sub projects to analyze and develop the proper e-Learning system), (3) Result which is cognitive skills, and (4) Feedback which is the evaluation of the system.

**Input** includes the principle of e-Learning system to enhance cognitive skills for learners in higher education. This research divided teaching and learning process into two systems: e-Learning system in BLE and e-Learning in VLE. Elements and tools in such teaching and learning process to enhance cognitive skills for learners in higher education include the followings:

### 1.1 Elements in teaching and learning process to enhance cognitive skills for learners in higher education include the followings;

1.1.1 Learner's role: learner will individually pursue for knowledge and learning their own pace.

1.1.2 Instructor's role: focusing on evaluating of the actual learning which emphasizes on learning output and learning process, such as, evidence of the system that reflects on the development of cognitive skills of each discipline.

1.1.3 Learning Environment: innovative tools and equipment have to accommodate the system. Additionally, appropriate tools for learners, such as, social media are available to motivate learning.

1.1.4 Resources: instructors prepare resources and information for learners including computers, Internet, books, or information data to facilitate learning and encourage students to develop cognitive skills. Resources are divided into human resources or supporters, and information communication and technology resources.

1.1.5 Reinforcement and Motivation:

1.1.5.1 Internal motivation, such as, attitudes towards learning and aptitude in the discipline.

1.1.5.2 External motivation, such as, students assist each other to learn, while instructors and supporters facilitate students to achieve their goal of learning.

1.1.6 Context and Technology Tools:

1.1.6.1 Curriculum context refers to elements that are divergent in each discipline and objectives of each course which focuses on different cognitive skills.

1.1.6.2 Administration context refers to e-Learning management that accommodates technology skills of instructors. There are supporters who are technical staff in e-Learning management to support instructors for effective teaching.

**1.2 Tools for teaching and learning process to enhance cognitive skills for learners in higher education include:**

1.2.1 Virtual learning environment which is a model that allows students to participate in the virtual environment that is similar to a classroom such as Opensimulator, Secondlife.

1.2.2 Learning Management System (LMS) which is the management system focusing of learning via network. The system contains tools and elements for instructors, learners, and administrators, including course management system, content creating system, learner management system, content delivery system, and communication and interaction tool system, such as, chat room, e-mail, webboard, attendance record system, and report system.

1.2.3 Social Media Presentation is used to deliver content via electronic media so that learners can study anytime and anywhere via any online devices. Instructors can record the lecture and upload to the system for students to review for self-study, such as, Slideshare.

1.2.4 Electronic books (e-Book) are books that are in electronic format or that are stored as electronic file. They are readable by electronic devices, such as, notebook computers, tablets, and mobile phones.

1.2.5 Streaming Video refers to technology that allows the transfer of multimedia data over the Internet and displays it on a short time without waiting to download the file to a computer as it take time to download the whole multimedia file. Therefore, streaming video allows many users to receive information at the same time.

**2. Process** is learning and teaching process for learners in higher education which are: (1) teaching science, including teaching models, teaching methods, and teaching techniques, and (2) learners' role, instructors' role, and supporters' role. Considering teaching science and the roles, learning activities were created for learners in three disciplines: (1) Health Sciences with activities that develop systematic thinking process, analytical thinking process, and applicative thinking process, (2) Science Technology with activities that develop scientific thinking process, systematic thinking process, and analytical thinking process, and (3) Humanities and Social Sciences with activities that develop creative thinking process, creative thinking, and systematic thinking process.

**3. Output** is cognitive skills for learners in higher education in three disciplines: (1) Health Science including systematic thinking, analytical thinking, and application, (2) Technology Science are scientific process, systematic thinking, and analytical thinking, and (3) Humanities and Social Science consists of creative thinking, analytical thinking, and systematic thinking.

#### 4. Feedback

4.1 Evaluation can be divided into:

4.1.1 Formative Evaluation means the assessment during the study period by observing learning in face-to-face context and evidences of behaviors in online context that is relevant to thinking process of each discipline.

4.1.2 Summative Evaluation or overall assessment is cognitive skills assessment of each discipline using pre-test and post-test.

4.2 Assignments and activities were handed out each week. Student's behaviors were observed every week by instructors or research assistants.

4.3 Teaching plans and activities were improved to be relevant to each discipline's context and learners. Additional innovative tools include social web application and 3D virtual world.

#### Acknowledgements

This paper was a part of the project funded by the National Research Council of Thailand (NRCT) in 2012. The author would sincerely thank to NRCT. Sincerely thanks must also go to Chulalongkorn University and Thailand Cyber University Project who are the supported institutes. Special thanks also go to all advisors, scholars, and experts for their help and support in creating new knowledge via this paper to strengthen the educational technology and communications field.

#### References

- Agudo-Peregrina, Á.F. and et.al (2014) Can we predict success from log data in VLEs? Classification of interactions for learning analytics and their relation with performance in VLE-supported F2F and online learning **Computers in Human Behavior** Volume 31, Issue 1, February 2014, Pages 542-550.
- Bureau of General Administration, Office of Higher Education Commission (2010) **Discussion the TQF related to the quality of higher education**. Available online: [http://www.moe.go.th/mobile1/viewNews.php?nCatId=news2&moe\\_mod\\_news\\_ID=16818](http://www.moe.go.th/mobile1/viewNews.php?nCatId=news2&moe_mod_news_ID=16818)
- Bureau of Higher Education Standards and Evaluation (2004) **Compendium of Programs Fields of Study, and Degrees, Awarded by State Institutions of Higher Education Commission on Higher**. Office of The Higher Education Commission. Online Available: [http://www.mua.go.th/users/bhes/front\\_home/book\\_program.pdf](http://www.mua.go.th/users/bhes/front_home/book_program.pdf)
- Ennis, R.H. (1985). A Logical Basis for Measuring Critical Thinking Skills. **Educational Leadership**. 43 (October 1985) : 45 - 48
- Hiltz, S. R. (1993). **The virtual classroom: A new option for learning via computer networking**. NorwoodNJ: Ablex.
- Hodhod, R and et.al (2010) **Issues of Choosing the Suitable Virtual Learning Environment**.
- Khan, Badrul H (1997). **Web-Based Instruction**. Englewood Cliffs, New Jersey : Educational Technology Publications.
- Khlaisang, J. (2013). Analysis of the Cultural Factors Affecting the Proper Design of Website and Electronic Courseware for e-Learning in ASEAN. Asian Association of Open Universities (AAOU) **Journal: Expanding the Frontiers of Knowledge though Open and Distance Learning in Changing Societies**, 8(2) September 2013.
- Khlaisang, J. (2012). **Final Report of Research Project on E-Learning System in Blended Learning Environment to Enhance Cognitive Skills for Learners in Higher Education**, funded by the National Research Council of Thailand 2012.
- Khlaisang, J. and Songkram, N. (2013). E-Learning System to Enhance Cognitive Skills for Learners in Higher Education: A Review of Possibly Open Education. **International Journal of the Computer, the Internet and Management**, 21(1) January-April, 17-23.
- Khlaisang, J. (2012). Development of Pedagogical Blended E-Learning Model Using Cognitive Tools Based Upon Constructivist Approach for Knowledge Construction in Higher Education. **Proceedings of the Fourth International e-Learning Conference 2012**, organized by the Thailand Cyber University Project, Office of the Higher Education Commission, Bangkok, Thailand, June 14, 2012.
- Khlaisang, J; Koraneekij, P. (2012). Development of Blended E-Learning Model Using Online Interactive Reflective Learning Logs to Enhance Faculty of Education Students' Inquiring Mind and Retention at Chulalongkorn University. **Proceedings of the Fourth International e-Learning Conference 2012**, organized by the Thailand Cyber University Project, Office of the Higher Education Commission, Bangkok, Thailand, June 14, 2012.



- Khlaisang, J. (2010). Proposed Models of Appropriate Website and Courseware for E-Learning in Higher Education: Research Based Design Models. **Proceedings of the E-LEARN 2010 – World Conference on E-Learning in Corporate, Government, Healthcare & Higher Education** organized by the Association for the Advancement of Computing in Education, Orlando, Florida, October 18-22, 2010.
- Monsakul, J. (2008). A Research Synthesis of Instructional Technology in Higher Education. **Proceedings of the Society for Information Technology & Teacher Education (SITE)** International Conference, organized by the Association for the Advancement of Computing in Education, Las Vegas, Nevada, March 3-7, 2008.
- Klopfer, L.E. (1971). Evaluation of Learning in Science. **Handbook on Formative and Summative Evaluation of Student Learning**. New York : McGraw – Hill Book Company ,574 – 580.
- Ministry of Education (2009). **Thai Qualifications Framework for Higher Education (TQF: HEd) 2009** . Office of The Higher Education Commission. Online available <http://www.mua.go.th/users/tqf-hed> [July 6, 2011]
- Office of The Higher Education Commission (2009). **Royal Thai Government Gazette: Thai Qualifications Framework for Higher Education (TQF: HEd)** .Ministry of Education.Online Available online <http://www.mua.go.th/users/tqf-hed>
- Roberta B. Ness. (2012). **Innovation Generation: How to Produce Creative and Useful Scientific Ideas**. New York :Oxford University Press.
- Songkram, N. (2011). The Blended Learning Model with Team Learning and Creative Promotion Processes for Innovation Creation in Undergraduate Students. **Proceedings of Global Learn Asia Pacific 2011** - Global Conference on Learning and Technology, Australia, 1894 – 1899.
- Songkram, N. (2011). The Project -based Learning and Collaborative Learning Model for Innovative knowledge Creation for Undergraduate Students in Higher Education Institutions. **Proceedings of Global Learn Asia Pacific 2011** - Global Conference on Learning and Technology, Australia, 1079 – 1084.
- Songkram, N. (2012). The blended learning model with active learning for knowledge construction and creative problem solving ability for undergraduate students in higher education. **Proceedings of the Fourth Asian Conference on Education 2012**, October 24-28 2012, Osaka, Japan
- Songkram, N. (2012). **Final Report of Research Project on E-Learning System in Virtual Learning Environment to Enhance Cognitive Skills for Learners in Higher Education**, funded by the National Research Council of Thailand 2012.
- Songkram, N. and Khlaisang, J. (2012). **Final Report of Research Program on E-Learning System to Enhance Cognitive Skills for Learners in Higher Education**, funded by the National Research Council of Thailand 2012.
- Songkram, N. (2013). Effect of organizing active learning and hybrid learning on design of virtual field trip and to enhance creativity for undergraduate education students. **Journal of Education, Silpakorn University** 10 ( 2) (Nov.2012 – March 2013)
- The Office of the National Education, (1999) **The National Education Act B.E. 1999**. Office of the Prime Minister.
- Torrance, E.Paul. (1962). **Guiding Creative Talent**. Englewood Cliffs, N.J.: Prentice-Hall, Inc.
- Upper Secondary Education Bureau, Ministry of Education (2010). **Digital Literacy World-Class Standard School**. The Agricultural Co-operative Federation of Thailand, Limited Press.
- Weller, Martin (2007). **Virtual Learning Environments: Using, Choosing and Developing your VLE**. Oxford, UK: Routledge.
- Wong, M.R. (1971) Integrative Reconciliation in Meaningful Learning. **Cognitive Psychology**,2, 325-329.  
<http://std.kku.ac.th/4970500126/sara5.html>
- Yamane, T. (1973). **Statistic: An Introductory Analysis**. 3 rd ed. New York: Harper and Row.

# Elementary students' motivation towards informatics course

Saša Mladenović<sup>a\*</sup>, Žana Žanko<sup>b</sup>, Monika Mladenović<sup>c</sup>

<sup>a</sup>Faculty of science, University of Split, Teslina 12, Split 21000, Croatia

<sup>b</sup>Elementary school "Mejaši", Mejaši 20, Split 21000, Croatia

<sup>c</sup>Elementary school "Blatine-Škrape", Na Križice 2, Split 21000, Croatia

---

## Abstract

Job market is increasingly demanding jobs in all fields of Computer science. Besides that, most jobs require computer literacy and computer fluency. Students should get these skills through elementary education. In the Republic of Croatia computer science is part of informatics course which is elective course for students from 5th to 8th grade. Because of that, students have to be motivated to elect such course. To investigate motivation and attitude towards elective course of informatics we conducted survey among 1462 8th grade elementary students as a special form of non-experimental research. Results of the research is presented in this paper.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

**Keywords:** computer science; elementary school; motivation; attitude; survey

---

## Introduction

Computer literacy or Information technology (IT) literacy is ability of using computer and technology (U.S. Congress, Office of Technology Assessment, OTACIT-235, 1984, p. 234). It includes many aspects of using computers like word processing, spreadsheets, internet, programming and problem solving etc. IT fluency is understanding of fundamental IT concepts and ability to apply IT in complex and sustained situations. Most jobs today requires IT fluency (National Research Council Committee on Information Technology Literacy, 1999) therefore children should gain these skills through school. Computational thinking should be fourth analytical ability, next to reading, writing and arithmetic (Wing, 2008). Digital competency, which includes IT fluency, is considered one of the eight basic competencies in European Union (European Reference Framework, 2007) as in Republic of Croatia (Ministarstvo znanosti, obrazovanja i športa, 2011).

Computers and technology are a large part of everyone's daily life (Verbick, 2002.) so IT fluency is a skill that everyone should master today. Although jobs in computing are outnumbering graduates with the necessary skills to fill them (Frieze & Quesenberry, 2013.), enrolment in Computer science degree programs has steadily declined (Uludag, Karakus, & Turner, 2011.) (Denning & McGettrick, 2005.) since 2001, women and minorities are underrepresented, many K–12 students have a negative perception of computing, and reports say the innovation rate in the field has decreased (Violino, 2009).

Most students develop contemporary IT skills in computer literacy programs that are commonly found in country's public schools in the USA (Werner, Campe, & Denner, 2005). In the Republic of Croatia these skills should be covered by Informatics course in elementary and high schools. Problem arises due to fact that the Informatics is elective course offered in elementary school from 5<sup>th</sup> to 8<sup>th</sup> grade (Ministarstvo znanosti obrazovanja i

---

\* Corresponding author. Tel.: +385-21-385-286.

E-mail address: sasa.mladenovic@pmfst.hr

športa, 2006). Since the children voluntarily join the course they have to be motivated to do so. Through our research we tried to identify motivation factors for 8<sup>th</sup> grade students in different parts (three regions) of the Republic of Croatia. By determining motivation factors we may well act in the future to increase enrolment to informatics course. According to all mentioned above research questions arise:

- Is there a difference in motivation between genders?
- Is there a difference in motivation between regions?

## **Background and motivation for research**

Various definitions of motivation exist (Kleinginna & Kleinginna, 1981), but none deny the most basic one defined in the *Cambridge International Dictionary of English*: Motivation is enthusiasm for doing something (Cambridge University Press, 2008). To be motivated means indeed to be moved to act (Ryan & Deci, 2000.). Taking all mentioned into account the study of motivation and interest appears to be a crucial and many researchers have dealt with it. Unfortunately, while these topics continue to be in focus of educational psychologists, they have been according relatively little attention in the learning sciences community (Hickey, 2004.).

However, according to Centra and Gaubatz, students' perceptions are seen to have some relation with student achievement (Centra, 2000). A study from Berg and Anders found that motivation influences the attitude of a student where the motivated student will change to a positive attitude (study hard and not give up even when failing) while the less motivated students will be transformed into a negative attitude. (Berg & R., 2005.).

Numerous educational researchers in many disparate domains have studied the positive motivational characteristics of interesting instructional content. The motivational aspects of this approach are rapidly being explored, and in many situations found to be a powerful educational tool (DeClue, 2003.). According to Ryan and Deci, students are more motivated and stay motivated, driven by intrinsic rewards such as constructive criticism than extrinsic, such as good grades because the intrinsic rewards give more satisfaction than the extrinsic rewards (Ryan & Deci, 2000.).

Motivation towards a subject plays an important part in influencing learner understanding of subject knowledge and their achievement in the subject. Motivated learners are more eager to attempt challenging tasks, overcome any difficulty and enjoy their achievement. Learners with positive attitudes are also more likely to put more effort into their learning and involvement in learning tasks. (Liu, 2005.)

According to ITiCSE 2010 Working Group Report, motivation is the key to success (Carter, et al., 2010.). In recent decades, it has become evident that CS is having a profound and pervasive impact on a range of other scientific disciplines, opening a way to interdisciplinary courses offered within CS programs and research projects, from which many CS students can gain tremendous benefits (Sahami, Aiken, & Zelenski, 2010), (Zhang, Lundak, Lin, Gegg-Harrison, & Francioni, 2007). Students who have experienced such first-hand connections between CS and other disciplines become more aware of the breadth and richness of career and study opportunities, which can be a significant factor in increasing their motivation and interest in the discipline.

Jenkins has divided the motivation into four types (Jenkins, 2001.):

- Extrinsic - the primary motivation is career / awards that will influence success.
- Intrinsic - the primary motivation is strong interest in something for his own satisfaction.
- Social - the primary motivation is to fulfill other parties needed.
- Achievement - the primary motivation is "doing best" for personal satisfaction.

## **Methodology**

The purpose of this research was to explore motivation of students for enrolment in informatics course, and to explore relations between motivation, gender, geographical location and technical requirements in classrooms. For research purpose online questionnaire is used to obtain data from respondents. Questionnaire is composed of 28

questions and designed by one of the researchers. Students filled questionnaire anonymously and voluntarily in their classrooms during the last two weeks of the school year. This paper will discuss the results of only certain parts of the questionnaire related to motivation. Quantitative data obtained has been analyzed using the descriptive statistics and comparative analysis.

### *Participants*

Sample involved 1462 final year elementary students from seven counties (three regions) across the Republic of Croatia during school year 2011./2012. Students filled survey during informatics class. Sample size is satisfying sample size requirements (Krejcie & Morgan, 607-610). Sampling was non-probability, purposive (Cohen, Manion, & Morrison, 2011) because the goal was to examine students involved in informatics during four years consequently they didn't quit from informatics course.

### *Assessment Instruments*

The data was collected by using online survey created by one of the researchers. Survey was composed of 28 questions of which 6 related to motives for choosing informatics as elective course (Table 1) of Likert-type.

Table 1 Survey questions used for measuring motivation for choosing informatics

Q1	I'm interested in course content
Q2	I think that my knowledge and skills gained on informatics will be used in future schooling and work
Q3	I enrolled in Informatics because I want to learn programming and problem solving
Q4	I enrolled in Informatics to spend more time with my friend beyond ordinary classes
Q5	I enrolled in Informatics to spend more time on playing games and other fun contents
Q6	I enrolled in Informatics to improve my average school score

### *Statistical Analysis*

Non-parametric tests are used for analysis. Mann Whitney U and Kruskal-Wallis is used in this research for Likert-style questions. Since observed data are ordinal parametric test can't be used. Non-parametric tests are used instead. Kruskal-Wallis test is use to determine if a differences between groups exists and Mann-Whitney U test is used to compare differences between groups if existent. All analyses were performed using PSPP 0.8.1.1.statistical software.

### **Results and discussion**

Analysis of the results obtained has been realized in two stages. The first stage used descriptive analysis to get the frequencies of the answers, and during the second stage the relation in motivation towards informatics between genders and geographical location has been analyzed.

### Background of respondents

Among 1462 students, 764 students were male and 698 students were female. Gender percentage is shown in Figure 1.

When it comes to geographical location, students from three regions in Croatia were participating in this survey. Regions are: Dalmatia, Kvarner and city of Zagreb including surroundings. These regions are covering seven counties. Region percentage is shown in Figure 2.

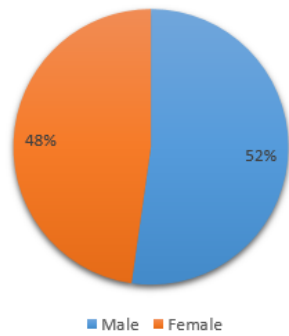


Fig. 1 Respondents gender percentage

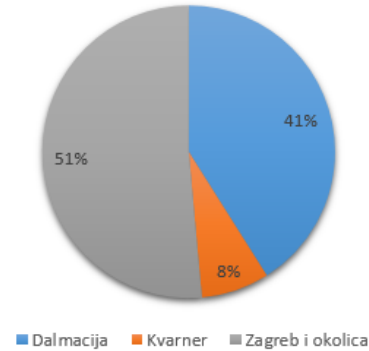


Fig. 2 Respondents region percentage

### Motivational questions

According to Jenkins motivation classification, questions from questionnaire are fitting into that frame. Questions Q5 and Q6 are related to extrinsic motivation, Q1 and Q3 are related to intrinsic, Q4 is related to social and Q2 is related to achievement. Figure 3 shows frequencies of answers to questions.

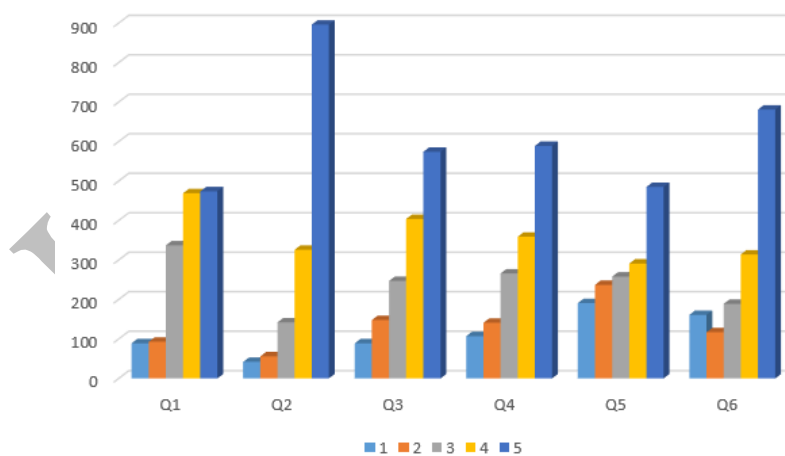


Fig. 3 Respondents frequencies of answers on motivational questions

As showed in the figure 3, more respondents were reported to have positive perception at achievement motivation type (Q2). Extrinsic motivation (Q6) is dominant for most respondents. Descriptive statistic for motivational questions is showed in Table 2.

Table 2. Descriptive statistic.

Question	Mean	St Dev
Q1 - intrinsic	3.78	1.15
Q2 - achievement	4.35	1.00
Q3 - intrinsic	3.84	1.22
Q4 - social	3.81	1.26
Q5 - extrinsic	3.44	1.42
Q6 - extrinsic	3.85	1.31

As showed in the Table 2 achievement motivation (Q2) is found to be most dominant. Extrinsic motivation (Q6) is found to be dominant when the motive is improving average school score, but also at least dominant when the motive is playing games and other fun stuff. The explanation of this results could be that students are aware of importance informatics in high school or generally, later in life, and they also care for their school achievement because they have an impact on average school score required for choosing high school. On the other hand, idea of playing games using school computers is not dominant, probably since almost all children have computer(s) at home where they can play games, so this is not in their motivation anymore.

#### *Is there a difference in motivation between genders?*

To analyze differences in motivation between genders Mann-Whitney test is used. Results showed that there is statistically significant difference between genders for Q1, Q2, Q3 and Q5. For those questions cross-tabulations are prepared to find differences between groups. Cross-tabulations are presented in tables 3-7.

Table 3. A cross-tabulation for a Mann-Whitney U test for Q1

		1	2	3	4	5	Total
Q1	Male	Count	48	48	157	242	269
		%	6,3%	6,3%	20,5%	31,7%	35,2%
	Female	Count	41	45	180	227	205
		%	5,9%	6,4%	25,8%	32,5%	29,4%
	Total	Count	89	93	337	469	474
		%	6,1%	6,4%	23,1%	32,1%	32,4%

Cross tabulation (Table 3) showed that boys ( $f=764$ ) are more interested in course ( $U=249579.5$ ,  $p=.027$ ) therefore, more intrinsically motivated than girls ( $f=698$ ).

Table 4. A cross-tabulation for a Mann-Whitney U test for Q2

			1	2	3	4	5	Total
Q2	Male	Count	23	37	78	188	438	764
		%	3,0%	4,8%	10,2%	24,6%	57,3%	100,0%
	Female	Count	19	19	64	138	458	698
		%	2,7%	2,7%	9,2%	19,8%	65,6%	100,0%
	Total	Count	42	56	142	326	896	1462
		%	2,7%	2,7%	9,2%	19,8%	65,6%	100,0%

Results from cross-tabulation showed in Table 4 indicates that when it comes to achievement, girls ( $f=698$ ) are more motivated than boys ( $f=764$ ). They are more aware that attending course of informatics could help them in future scholar achievement ( $U=244303$ ,  $p=.001$ ).

Table 5. A cross-tabulation for a Mann-Whitney U test for Q3

			1	2	3	4	5	Total
Q3	Male	Count	42	63	109	208	342	764
		%	5,5%	8,2%	14,3%	27,2%	44,8%	100,0%
	Female	Count	47	85	138	196	232	698
		%	6,7%	12,2%	19,8%	28,1%	33,2%	100,0%
	Total	Count	89	148	247	404	574	1462
		%	6,1%	10,1%	16,9%	27,6%	39,3%	100,0%

Cross tabulation (Table 5) showed that boys ( $f=764$ ) more want to learn programming and problem solving ( $U=229149.5$ ,  $p=.00$ ) which again indicates that boys are more intrinsically motivated than girls ( $f=698$ ).

Table 6. A cross-tabulation for a Mann-Whitney U test for Q5

			1	2	3	4	5	Total
Q5	Male	%	83	102	121	156	302	764
		Count	10,9%	13,4%	15,8%	20,4%	39,5%	100,0%
	Female	%	108	135	137	135	183	698
		Count	15,5%	19,3%	19,6%	19,3%	26,2%	100,0%
	Total	%	191	237	258	291	485	1462
		%	13,1%	16,2%	17,6%	19,9%	33,2%	100,0%

Cross-tabulation (Table 6) showed that boys ( $f=764$ ) are also more interested in course so they could play games and having fun contents ( $U=220224.5$ ,  $p=.00$ ) which indicates that boys are more extrinsically motivated than girls ( $f=698$ ).

*Is there a difference in motivation between regions?*

Survey is conducted among three regions so Kruskal-Wallis test is used to examine if a difference between regions exists. Results of the analysis indicated that there is indeed a difference in intrinsic motivation (Q1) ( $\chi^2=9.749.11$ ,  $df=2$ ,  $p\leq.01$ ), with a mean ranks: 712.29 for Dalmatia region ( $f=600$ ), 646.38 for Kvarner region ( $f=110$ ) and 759.28 for Zagreb with surroundings ( $f=752$ ). Results also showed that there is a difference in social motivation (Q4) when it comes to spending more time with school friends beyond ordinary classes ( $\chi^2=7.468.11$ ,  $df=2$ ,  $p\leq.02$ ), with a mean ranks: 765.68 for Dalmatia region ( $f=600$ ), 693.36 for Kvarner region ( $f=110$ ) and 709.81

for Zagreb with surroundings ( $f=752$ ). To determine differences between groups, cross-tabulations are prepared. Results are showed in Tables 7 and 8.

Table 7. A cross-tabulation for a Q1

		1	2	3	4	5	Total	
Q1	Dalmacija	%	46	44	136	184	190	600
		Count	7,7%	7,3%	22,7%	30,7%	31,7%	100,0%
	Kvarner	%	10	6	33	35	26	110
		Count	9,1%	5,5%	30,0%	31,8%	23,6%	100,0%
	Zagreb with	%	33	43	168	250	258	752
	surroundings	Count	4,4%	5,7%	22,3%	33,2%	34,3%	100,0%
	Total	%	89	93	337	469	474	1462
		%	6,1%	6,4%	23,1%	32,1%	32,4%	100,0%

A cross-tabulation, presented in Table 7, indicates that students from Zagreb with surrounding region are more intrinsically motivated than student from other regions.

Table 8. A cross-tabulation for a Q4

		1	2	3	4	5	Total	
Q4	Dalmatia	%	38	46	106	148	262	600
		Count	6,3%	7,7%	17,7%	24,7%	43,7%	100,0%
	Kvarner	%	8	10	28	24	40	110
		Count	7,3%	9,1%	25,5%	21,8%	36,4%	100,0%
	Zagreb with surroundings	%	61	85	132	187	287	752
		Count	8,1%	11,3%	17,6%	24,9%	38,2%	100,0%
	Total	%	107	141	266	359	589	1462
		%	7,3%	9,6%	18,2%	24,6%	40,3%	100,0%

A cross-tabulation, presented in Table 8, found that students from Dalmatia region are more socially motivated than student from other regions.

## Conclusion

Despite the need for formal computer science education to increase IT literacy but also IT fluency, and despite the fact that demanding jobs in computer science area are increasing, motivation for joining computer science courses on all educational levels are decreasing. In Croatia, primary education is obligatory. However, as part of that education some subjects are mandatory and some are elective. Informatics, as computer science course, is one of the elective courses implicating that each year students can choose whether to enroll the course or not. That is the biggest reason why motivation is particularly significant when it comes to informatics. It is very important to identify and understand the motives which encourage students to decide to enroll in this course in order to attract and retain as many as possible students.

Four types of motivation are analyzed in this research; intrinsic, achievement, social and extrinsic. Descriptive statistic revealed that dominant motivations are achievement and extrinsically motivation, confirming trends from other countries, demonstrating that student are not enough intrinsically motivated to enroll in computer science courses. Research questions have been shaped to determine if there are differences in motivation based on gender or geographical location. The research proved that, when it comes to gender, boys are more intrinsically but also



extrinsically motivated for informatics course. On the other hand, girls are more motivated by achievement than boys.

When it comes to geographical location, there are some statistically significant differences between regions. Students from three regions participated in this research. Zagreb is the capital city of Croatia therefore offering more possibilities when it comes to extracurricular education. A lot of programming clubs exists where students can practice programming and other computer skills beyond what is offered by elementary school informatics course. As of that, it is not a surprise that students from that area are more intrinsically motivated compared to other two regions. When it comes to socially motivated students, results showed that Dalmatian students are more motivated than students from other regions.

In the next period, based on the results presented in this research, a number of events should be organized in different regions to increase the awareness of both students and parents about growing demand for jobs in computer science and the importance of formal education. Further investigation is required to determine how a change in the informatics curricula could positively impact the motivation of students taking into account new expectations of students and parents.

## References

- National Research Council Committee on Information Technology Literacy. (1999). *Being fluent with information technology*. Washington: National Academy Press.
- Berg, C., & R., A. (2005.). Factors related to observed attitude change toward learning chemistry among university students. Cambridge University Press. (2008). *Cambridge Advanced Learner's Dictionary*. Cambridge University Press. Retrieved March 14, 2014., from British English Dictionary and Thesaurus - Cambridge Dictionaries Online: [http://dictionary.cambridge.org/dictionary/british/motivation\\_1?q=motivation](http://dictionary.cambridge.org/dictionary/british/motivation_1?q=motivation)
- Carter, J., White, S., Fraser, K., Kurkovsky, S., McCreesh, C., & Wieck, M. (2010.). ITiCSE 2010 working group report motivating our top students. New York, NY, USA: ACM.
- Centra, J. G. (2000). *Students perceptions of learning and instructional effectiveness in college courses*. NJ.
- Cohen, L., Manion, L., & Morrison, K. (2011). *Research Methods in Education citation*. London: Routledge.
- DeClue, T. H. (2003.). Pair programming and pair trading: effects on learning and motivation in a CS2 course. *Journal of Computing Sciences in Colleges*, Volume 1,8 Issue 5.
- Denning, P. J., & McGettrick, A. (November 2005.). Recentering computer science. *Communications of the ACM*, 48, str. 15-19.
- European Reference Framework. (2007). *KEY COMPETENCES FOR LIFELONG LEARNING*. Luxembourg.
- Frieze, C., & Quesenberry, J. L. (2013.). From difference to diversity: including women in the changing face of computing. ACM.
- Hickey, D. T. (2004.). Design theories of interest, motivation, and engagement for the learning sciences. International Society of the Learning Sciences.
- Jenkins, T. (2001.). The motivation of students of programming. ACM.
- Kleinginna, P. R., & Kleinginna, A. M. (1981). A categorized list of motivation definitions, with a suggestion for a consensual definition. *Motivation and Emotion*, 263-291.
- Krejcie, R. V., & Morgan, D. W. (607-610). Determining sample size for research activities. *Educational and Psychological Measurement*, 30, 1970.
- Liu, M. (2005.). Motivating Students Through Problem-based Learning.
- Ministarstvo znanosti obrazovanja i športa. (2006). *Hrvatski nacionalni obrazovni standard*. Zagreb: Ministarstvo znanosti obrazovanja i športa.
- Ministarstvo znanosti, obrazovanja i športa. (2011). *Nacionalni okvirni kurikulum za predškolski odgoj i obrazovanje*. Zagreb: Ministarstvo znanosti, obrazovanja i športa RH.
- Ryan, R. M., & Deci, E. L. (2000.). Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. *Contemporary Educational Psychology*.
- Sahami, M., Aiken, A., & Zelenski, J. (2010). Expanding the frontiers of computer science: designing a curriculum to reflect a diverse field. New York, NY, USA: ACM.
- U.S. Congress, Office of Technology Assessment, OTACIT-235. (1984). Computerized Manufacturing Automation: Employment, Education and the Workplace. In *Computerized Manufacturing Automation: Employment, Education and the Workplace*. Washington D.C.: U.S. Congress, Office of Technology Assessment, OTACIT-235.
- Uludag, S., Karakus, M., & Turner, S. W. (2011.). Implementing IT0/CS0 with Scratch, App Inventor for Android, and Lego Mindstorms. *SIGITE '11: Proceedings of the 2011 conference on Information technology education*. West Point, NY, USA.
- Verbick, T. (February 2002.). Women, technology, and gender bias. *Journal of Computing Sciences in Colleges*, Volume 17, Issue 3, str. 240-250.
- Violino, B. (2009). Time to reboot. *Communications of the ACM*, 19-19.
- Werner, L. L., Campe, S., & Denner, J. (2005). Middle school girls + games programming = information technology fluency. *Proceedings of the 6th conference on Information technology education*. Newark.
- Wing, J. (2008). Computational thinking and thinking about computing. 366(1881).

Zhang, M., Lundak, E., Lin, C.-C., Gegg-Harrison, T., & Francioni, J. (2007). Interdisciplinary application tracks in an undergraduate computer science curriculum. New York, NY, USA: ACM.

INTE 2014

# Elicited learning strategy through students' mal-intended notes

Faranak Abbaszad Tehrani \*

*Faculty of Science and Literature, Usak University, Usak 64200, Turkey*

---

## Abstract

The purpose of this study was to investigate the effect of using the notes prepared by learners as memory assistance sheet. More specifically, the study sought to find out the effect of using such materials as a learning strategy on reducing their stress and panic before final examination and their attitude towards performance on the final examination. The participants were 106 ELT students in the European University of Lefke, Turkey. It had been felt that most of the students in this group were more inclined to cheat. The teacher made them use learning strategies by using made notes before exam. At the end of the fall semester of 2009, an attitude questionnaire was administered to elicit the students' thoughts about the effectiveness of such strategy in their final examination results. This study was a pilot study and the researcher tried in an attempt to predict an appropriate sample size and improve upon the study design prior to performance of a full-scale research project. Data from the questionnaire was analyzed using SPSS software, the Cronbach's alpha reliability was estimated for the questionnaire. The Bartlett's chi-square was performed to clarify the homogeneity of the variance. The tentative results of the study indicated that the reliability was .84 suggesting that the items have relatively high internal consistency. For a pilot study and with the present limited number of subjects the results were promising. It should be emphasized that the main study will be done again by revised Items and when administered to a larger sample, better results are expected. Therefore, it is hoped that ELT instructors could benefit from the findings of the current study by attempt using students' notes as an effective learning strategy. Such a strategy may result in engaging the students in using their notes in a positive way as a learning strategy before their final examinations.

Click here and insert your abstract text.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* memory assistance sheet, learning strategy

---

## Introduction

In the era of language learning globalization progress, learning strategies have gained an unprecedented status. Language learning strategies are classified through different ways by researchers. Anderson (2003) classifies language learning strategies into seven major categories:

- cognitive strategies,
- metacognitive strategies,
- mnemonic or memory related strategies,
- compensatory strategies,
- affective strategies,
- social strategies, and
- self-motivating strategies

Language learning strategies are the conscious steps or behaviors used by language learners to enhance the acquisition, storage, retention, recall, and use of new information (Oxford, 2011).

Since the mid-1970s, learning strategies have been at the center of attention in L2 learning (Anderson, 1991, 2003; Cohen, 1990, 1998; Hosenfeld, 1979; Macaro, 2001; O'Malley and Chamot, 1990; Oxford, 1990, 1993,

---

\* Corresponding author. Tel.: +905376767601.  
E-mail address: abbaszadtehrani@gmail.com

2002; Rubin, 1975; Stern, 1975; Wenden, 1991, 2002). Learning strategies are defined as techniques for understanding, remembering, and using information that are intentionally used and consciously controlled by the learner (Pressley & McCormick, 1995; Bialystok, 1978; Oxford, 1990, 1996).

In language learning area metacognition can be called as the ability to be conscious of one's mental processes, and during years it has been proved that the use of metacognitive strategies has been rare among language learners (Rahimi & Katal, 2011). Research shows that metacognitive learners who take conscious steps to understand what they are doing when they learn tend to be the most successful learners.

In addition to using metacognitive strategies, there is one other factor that should be considered and researchers have begun to recognize that it is teachers who apart from the methods and materials they may use, are central to improving English language teaching (Freeman, 2001; Johnson, 1992a; Richards & Nunan, 1990) and of course it is important that teachers strive to develop students' own metacognition and teach them how to use strategies that they find effective for the kinds of tasks they need to accomplish in the process of language learning (Goh, 2008). This recognition has led a shift from language instruction toward the needs of individual learners. In addition, language teachers have become aware that learning is a process and the role of the teacher is to facilitate that process. Thus, language learning strategies and factors influencing their usage have been the focus of recent studies (O'Malley and Chamot 1990; Oxford 1990; Cohen 1998; Chamot et al, 1999; Chamot 2005, Griffiths, 2007).

## **Research Methodology**

### *Sample*

This research was carried out on the sample of 106 students who participated in the study. All of them were ELT students in the European University of Lefke, Turkey. It had been felt that most of the students in this group were more inclined to cheat. The teacher made them use learning strategies by using mal-intended notes before exam. It was done in two parts; one part before mid-term exam and the other part before final exam. The students learned how to make and use their notes before exam. They made summarized notes with highlighted keywords of whole course in just one sheet of paper. It made them the process of learning easy. So they did not need to use that notes during their exam because the notes made them ready for the exam and reduced their stress.

### *Instrumentation*

Data were gathered from a questionnaire which was designed according to Oxford (1990) on six categories of second language learning strategies including cognitive strategies, metacognitive strategies, memory-related strategies, compensatory strategies, affective strategies, and social strategies. It was not piloted and through this study it has been piloted and some items are required to be modified and revised for the future main study.

### *Data collection and Data analysis*

Data collected from the questionnaire was analyzed using SPSS software. At first the data gathered through questionnaire were analyzed by using reliability statistics to pilot the questionnaire. Then the construct validity of questionnaire was measured. A factor analysis through varimax rotation is carried out to underlying construct of the 20 items of the questionnaire. The correlation matrix used to probe the underlying structure of the tests was appropriate. And finally the SPSS extracted six factors as the underlying construct of the 20 items of the questionnaire.

## Results

According to reliability Statistics the Cronbach's alpha reliability for the questionnaire is .84 suggesting that the items have relatively high internal consistency. Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability.

Table 1

Reliability Statistics

Cronbach's Alpha	N of Items
.844	20

The results of item statistics (Table 2) indicated that item 2 had a low item total correlation ( $.21 < .30$ ). The omission of none of the items had changed the reliability index significantly (last column).

Table 2

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q1	76.67	82.360	.379	.839
Q2	76.51	84.005	.218	.845
Q3	76.89	80.280	.367	.840
Q4	76.78	80.624	.388	.838
Q5	76.86	78.507	.508	.833
Q6	76.78	78.602	.459	.835
Q7	76.83	78.365	.516	.833
Q8	77.03	80.729	.343	.841
Q9	76.90	79.979	.356	.840
Q10	77.03	78.167	.509	.833
Q11	76.24	81.265	.402	.838
Q12	76.54	79.801	.521	.834
Q13	76.48	79.915	.421	.837
Q14	76.80	78.229	.457	.835
Q15	76.41	79.705	.488	.834
Q16	76.98	75.617	.524	.832
Q17	76.67	77.910	.447	.836
Q18	76.62	81.316	.335	.841

Q19	76.53	82.409	.321	.841
Q20	76.38	79.901	.531	.833

### Construct Validity of the Questionnaire

A factor analysis through varimax rotation is carried out to underlying construct of the 20 items of the questionnaire. The assumptions of sampling adequacy and sphericity were met. As displayed in Table 3 the KMO index of .75 was higher than the criterion of .60. Thus it can be concluded that the present sample size was adequate for the factor analysis.

Table 3

*KMO and Bartlett's Test*

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.756
Bartlett's Test of Sphericity	Approx. Chi-Square	551.490
	df	190

The correlation matrix used to probe the underlying structure of the tests was appropriate. The Bartlett's chi-square of 551.49 was significant ( $p = .000 < .05$ ). The SPSS extracted six factors as the underlying construct of the 20 items of the questionnaire. This six-factor solution accounted for 47.48 percent of the total variance.

Table 3

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.231	26.156	26.156	4.755	23.775	23.775	2.481	12.404	12.404
2	1.976	9.878	36.034	1.595	7.973	31.748	1.710	8.552	20.956
3	1.547	7.736	43.769	.995	4.973	36.721	1.605	8.027	28.983
4	1.406	7.031	50.800	.963	4.813	41.534	1.563	7.815	36.798
5	1.141	5.704	56.504	.631	3.153	44.687	1.323	6.615	43.413
6	1.072	5.359	61.863	.559	2.794	47.481	.814	4.068	47.481
7	.926	4.629	66.492						
8	.868	4.338	70.830						
9	.808	4.040	74.870						
10	.736	3.678	78.548						
11	.692	3.458	82.006						
12	.679	3.393	85.399						
13	.629	3.145	88.545						
14	.459	2.296	90.841						
15	.448	2.238	93.078						
16	.355	1.776	94.854						
17	.337	1.684	96.538						
18	.256	1.282	97.820						
19	.237	1.187	99.007						
20	.199	.993	100.000						

Extraction Method: Principal Axis Factoring.

And finally Table 4 displays the factor loadings. The items loading under a single factor belong to the same family, i.e. they measure the same underlying construct. For example; items (1, 5, 14, 15, 16 and 20) loaded under the first factor. Thus it can be concluded that they were measuring the same construct.

Table 4

*Rotated Factor Matrix<sup>a</sup>*

	Factor					
	1	2	3	4	5	6
Q15	.925					
Q14	.700					
Q16	.527				.396	
Q1	.469					
Q20	.381			.356		
Q5	.331					
Q7		.831				
Q6		.794				
Q12			.807			
Q13			.482			
Q4			.414			
Q11			.308			
Q8				.605		
Q18				.493		.326
Q10	.337		.307	.450		
Q9				.420		
Q2				.370		
Q19					.644	
Q17					.642	



Some of the items showed multiple loadings (items 16, 20, 18, 10). These items need to be modified. Item 3 loaded alone on the sixth factor should also be revised.

## Conclusion

The purpose of this study was to investigate the effect of using the notes prepared by learners for supposedly cheating purpose on their learning. More specifically, the study sought to find out the effect of using such materials as a learning strategy on reducing their stress and panic before final examination and their attitude towards performance on the final examination. For a pilot study with the present limited number of subjects the results are promising. It should be emphasized that the main study will be done again by revised items and when administered to a larger sample, better results are expected. Therefore, it is hoped that ELT instructors could benefit from the findings of the current study by attempt using students' notes as an effective learning strategy. Such a strategy may result in engaging the students in using their notes in a positive way as a learning strategy before their final examinations.

## Recommendations

Since the current investigation was restricted to ELT group, generalization is limited. The study gathered information through whole group in the class, however the students who use mal-intended notes may have different aims in using them. Some students use them because they are not ready for exam, but the others may use for guaranty. Further studies should consider these two apart. Also it may conclude differently according to students' gender.

## References

- Anderson, N. J. (1991). Individual differences in strategy use in second language reading and testing. *Modern Language Journal*, 75, 460-472.
- Anderson, N. J. (2003). Metacognitive reading strategies increase L2 performance. *The Language Teacher*, 27, 20-22.
- Bialystok, E. (1978). A theoretical model of second language learning. *Language Learning*, 28(1), pp.69-83.
- Chamot, A. U., Barnhardt, S., El-Dinary, P. B., and Robbins, J. (1999). *The learning strategies handbook*. New York: Longman.
- Chamot, A. U. (2005). *The Cognitive Academic Language Learning Approach (CALLA): An update*. In P. A. Richard-Amato & M. A. Snow (Eds.), *Academic success for English language learners: Strategies for K-12 mainstream teachers* (pp. 87-101). White Plains, NY: Longman.
- Cohen, A. D. (1990). *Language learning: Insights for learners, teachers, and researchers*. New York: Newbury House.
- Cohen, A.D. (1998). *Strategies in learning and using a second language*. Harlow: Longman.
- Freeman, D. (2001). *Second language teacher education*. In R. and Nunan, D. *The Cambridge Guide to Teaching English to Speakers of Other Languages*. Cambridge: Cambridge University Press.
- Goh, C. (2008). Metacognitive instruction for second language listening development: Theory, practice and research implications. *Regional Language Centre Journal*, 39(2), 188-213.
- Griffiths, C. (2007). Language learning strategies: students' and teachers' perceptions. *ELT Journal*, (61), 2, pp: 91-
- Hosenfeld, C. (1979). A learning-teaching view of second language instruction. *Foreign Language Annals*, 12, 51-57.
- Johnson, K. E. (1992a). Learning to teach: Instructional decisions of pre-service ESL teachers. *TESOL Quarterly*, (26) 3, 507-535.99.
- Macaro, E. (2001). *Learning strategies in foreign and second language classrooms*. London: Continuum
- O'Malley, J. M., and Chamot, A. U. (1990). *Learning strategies in second language acquisition*. New York: Cambridge University Press.
- Oxford, R. (1990). *Language learning strategies: What every teacher should know*. New York: Newbury House.
- Oxford, R. (1993). Research on second language learning strategies. *Annual Review of Applied Linguistics*, 13, 175-187.
- Oxford, R. (1996). *Language learning strategies around the world: Cross-cultural perspectives*. Manoa: University of Hawaii Press.
- Oxford, R. (2002). *Language learning strategies*. In R. Carter and D. Nunan (Eds.), *The Cambridge guide to teaching English to speakers of other languages* (pp. 166-172). Cambridge: Cambridge University Press.
- Oxford, R. (2011). *Teaching & researching: Language learning strategies (applied linguistics in action)*. Pearson ESL, England.

- Pressley, M., and McCormick, C.B. (1995). *Advanced educational psychology for educators, researchers, and policymakers*. New York: HarperCollins.
- Rahimi, M. & Katala, M (2011). Metacognitive strategies awareness and success in learning English as a foreign language: an overview, *Procedia - Social and Behavioral Sciences* 31 (2012) 73 – 81
- Richards, J.C & Nunan, D (1990). *Second language teacher education*. Cambridge, England: Cambridge University Press.
- Rubin, J. (1975). What the “good language learner” can teach us? *TESOL Quarterly*, 9, 41-51.
- Stern, H. H. (1975). What can we learn from the good language learner? *Canadian Modern Language Review*, 34, pp. 304-318.
- Wenden, A. (1991). *Learner strategies for learner autonomy: Planning and implementing learner training for language learners*. New York: Prentice Hall.
- Wenden, A. (2002). Learner development in language learning. *Applied Linguistics*, 23, 32-55.

# Embodied processes between maths and gross-motor skills

Rio Laura<sup>a</sup>, Damiani Paola<sup>b</sup>, Gomez Paloma Filippo<sup>a</sup>

<sup>a</sup> Department of Human, Philosophical and Education Science, University of Salerno, Italy

<sup>b</sup> Department of Philosophical and Education Science, University of Turin, Italy

---

## Abstract

Over the last fifteen years, in several research areas, there has been a lot of studies about "embodied" cognition, ie the emerging view that considers cognitive processes deeply rooted in the interaction of the body with the world (Lakoff & Johnson, 1999). Starting from this theoretical framework and from a previous study that evaluated the possible correlations between gross motor skills and marks at school, the aim of this study was to evaluate the possible correlation between Maths and TGMD (Dale Ulrich, 1992) results. Through statistical analysis, the results showed some interesting positive correlation between these two variables, confirming the results of previous research and opening up some interesting reflections on the introductory basis theories.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords: embodied cognition; school; Maths; gross-motor skills*

---

## 1.Introduction

Until the last two decades, the most significant approach in cognitive science meant the mind as the software of a computer: it was important to analyze only the operation, without investigating the relations with the hardware, the brain and the body (Borghi & Iachini, 2002). Today, gradually, it has come to the conviction that the mind is influenced by the brain, and especially by the body; at the same time, it has been creating a strong relationship between three fundamental processes that previously were constantly split off from each other, ie the perception, the action and the cognition. In 1998 Susan Hurley regarded the mind as a "mental sandwich", in which perception and action are considered marginal to cognition, defined as the pulp. According to this theory, the mind is considered as a sandwich with two slightly proteic ends: the sensory and the motor, and at the center the meat, or cognitive processes.

Over the past fifteen years there have been several studies and research about "embodied" and "grounded" cognition without neglecting the setting of the traditional cognitive science. In fact, there is no single "embodied" theory, but there are different: some highlight the radical importance of the experience and perceptions, other of the body and action. Depending on the pre-eminence of one or other, there are two main models of Embodied Cognition: in the case the enhancement of perception prevails, the model is "phenomenological", in case prevails motor action, however, the model is "pragmatic". Several scholars, even contemporaries, have given greater rise to perception: such as the "Phenomenology of Perception" by Merleau-Ponty in 1945, the analysis of touch by Husserl in 1952, until the recent record found in the mentions of Gallagher and Zahavi (2009).

\* Corresponding author. Tel.: +0-000-000-0000.

E-mail address: riolaura@alice.it

1877-0428 © 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

Different, however, is the logic adopted by the pragmatic model, where the supremacy of the action can be reviewed using different keys approach: American pragmatism (Dewey, 1949), for example, intends the concepts not as mere representations of objects, but as a set of instructions useful to the interaction with objects finalized to the action (F. Caruana, A. Borghi, 2013); furthermore, the ecological approach of Gibson is based primarily on the "affordance" concept, ie all the physical qualities of an object that suggest appropriate actions to manipulate it. Each object has its affordances, as well as the surfaces, events and places; the individual does not perceive only a copy of what the outside world refers him, but captures a wealth of information useful for its action (Paloma Gomez F., 2013).

Several models in the world have used embodied cognition as a scientific approach to teaching (in literature, music, art, technology ...). Ellen Esrock (2012), for example, spoke about "embodiment in literature and visual art," telling the story of the particular reading of a novel: the author focused, first, on the description of the hand of a dressmaker who was moving along the waves of a soft fabric, then on the observation of the painting of a woman who was embroidering his handkerchief. In both cases, Esrock said, it is as if it could perceive the physical tension of the fingers or the tactile properties of the fabric, feeling somehow corporeally dipped in the description and in the observation. It's as if it was happening a simulation of what is represented with images or told with words.

At the same time to the recent scientific neuro psychobiological discoveries, a series of legislative changes have been implemented in the educational field showing a strong interest in the importance of the body and movement: an example is the Indicazioni Nazionali per il curricolo della Scuola dell'Infanzia e del Primo Ciclo d'Istruzione (2012). The Infant School aims to develop gradually in the child the ability to read and understand messages from its and others body, respecting it and taking care. It aims also to develop the ability to express themselves and communicate through the body to reach and refine perceptual skills and knowledge of objects, the ability to orient themselves in space, to move and communicate with imagination and creativity. In the Primary School, however, the student is led to the acquisition of different motor patterns, to recognize and assess trajectories and distances, to develop and perform simple sequences of movement, to participate actively in various forms of sports activities respecting the game and behavior rules.

In addition to adopting the "Embodied Cognition" lodging as psycho-pedagogical paradigm to operate didactically, is necessary to use also well-constructed and standardized tools that include basic motor skills. In education the focus is not so much aimed at achieving results in motor performance, but the qualitative evaluation of the harmonic sequence of the development of gross motor skills. Williams (1983) defined the gross motor development as the use progressively more skillful of the entire body in an activity that involves large muscle groups and that requires spatial and temporal coordination of the simultaneous movement of various body segments.

## **2.Objective**

Starting from this theoretical framework and from a previous study that evaluated the possible correlations between gross motor skills and marks at school, the aim of this study was to evaluate the possible correlation between Maths and TGMD (Dale Ulrich, 1992) results.

## **3.Method**

The context in which this empirical research was carried out is a school in Salerno where physical activity is not performed regularly; it was selected following a positive feedback from a previous training course with the principal and the teaching staff of the school. The sample is composed of about 90 students from five different age groups (from 1st to 5th class) and duly authorized to test administration and access of the profit marks of the second quarter in Maths by the parents of each. With the help of the Physical Education teacher, was given the TGM (Test of Gross Motor Development, Dale Ulrich, 1992) at the end of the activities of the Second Quarter.

The Test of Gross Motor Development is a test with an individual administration, which evaluates the gross motor function of children aged between 3 and 10 years. It measures 12 gross motor skills that are grouped into two subtests, each of which, through some items, assesses different aspect of the gross motor development: locomotion and object control.

With the help of a representative teacher it was possible to access to all Maths marks (in compliance with laws on privacy) to later operate on the possible correlations.

Since the teachers are different, they could adopt different parameterizations of vote, so it was made a correlations to standardize them, according to " $\text{standardized rating} = (X - \text{average}) / \text{DS}$ ", where X is the single mark, the average is the average for the class and DS is the standard deviation. The statistical analysis was made, however, using two different types of correlation index: the Pearson coefficient correlation, which expresses the index of a possible relationship of linearity between two statistical variables, and the Spearman correlation index R for ranks, ie the non-parametric statistical measure of correlation that expresses any monotonic relationship of the variables.

#### 4.Results

Table 1. Pearson's correlation - with standardization

	Subtest 1	Subtest 2	Test average
Maths	0.9805***	0.9827***	0.9931***

Table 2. Pearson's correlation - without standardization

	Subtest 1	Subtest 2	Test average
Maths	0.9805***	0.9663***	0.9894***

Table 3. Spearman's correlation - with standardization

	Subtest 1	Subtest 2	Test average
Maths	0.9906***	0.9711***	0.9905***

Table 4. Spearman's correlation - without standardization

	Subtest 1	Subtest 2	Test average
--	-----------	-----------	--------------

Maths	0.9994***	0.9628***	0.9923***
-------	-----------	-----------	-----------

Table 5. Pearson's correlation – Subtest 1

	Class 1	Class 2	Class 3	Class 4	Class 5
Maths	0.9846***	0.9837***	0.9811***	0.9713***	0.9828***

Table 6. Pearson's correlation – Subtest 2

	Class 1	Class 2	Class 3	Class 4	Class 5
Maths	0.9599***	0.9491***	1.000***	1.000***	1.000***

Table 7. Pearson's correlation – Test average

	Class 1	Class 2	Class 3	Class 4	Class 5
Maths	0.9866***	1.000***	0.9944***	0.9911***	0.9947***

Table 8. Spearman's correlation – Subtest 1

	Class 1	Class 2	Class 3	Class 4	Class 5
Maths	1.000***	1.000***	1.000***	0.9966***	1.000***

Table 9. Spearman's correlation – Subtest 2

	Class 1	Class 2	Class 3	Class 4	Class 5
Maths	0.9668***	0.9782***	1.000***	1.000***	1.000***

Table 10. Spearman's correlation – Test average

	Class 1	Class 2	Class 3	Class 4	Class 5
Maths	1.000***	1.000***	1.000***	0.9966***	1.000***

## 5. Discussion/Conclusion

All tables show the results of the Pearson and Spearman correlation coefficient. These were made first between mathematics marks and the two subtests separately and sequentially with the average between the two. Finally, it was also made a correlation for all classes and for the single classes.

From Tables 1 to 4 the correlations were made considering the whole sample and making a standardization of the results of Maths and those of tests (because the marks were given to different classes and by different teachers).

In general, the correlation between mathematics marks and the test is very high. In particular, in the analysis for each class there are some cases in which the correlation is even 1.000 so, there is a perfect correlation.

In a previous research this positive result has been justified by the theory of Decision Making (Iannello et al. 2007), which implies the need for an initial analysis and a subsequent decision-making for the execution of one or more gross motor skills (belonging to subtests 1), as in the case of the disciplines of mathematics (eg problem solving) or music (eg. a new musical instrument approach or a new score).

In view of an introductory theoretical framework where has been affirmed the importance of embodied cognition, which is the emerging view that considers cognitive processes deeply rooted in the interaction of the body with the world, and a statistical analysis between Maths marks and gross motor skills, considered the first group of skills acquired in the developmental age, the conclusions are positive and promising.

## References

- Barsalou, L.W. (2010), Grounded cognition: Past, present, and future. *Topics in Cognitive Science*, 2, 716-724.
- Borghi, A.M., Iachini, T. (2002), (a cura di), *Scienze della mente*, Bologna: Il Mulino
- Caruana, F., Borghi, A.M. (2013), *Embodied Cognition, una nuova psicologia*, *Giornale Italiano di Psicologia*
- Cozzolino, M. (2003), *La comunicazione invisibile. Gli aspetti non verbali della comunicazione*. Modica: Amore
- Dewey, J. (1949), *Esperienza e natura*. Torino: Paravia
- Esrock, E., Turner, A., Dalton, R.C., van Noorden, L., Leman, M. (2012), Four Applications of Embodied Cognition. *Topics in Cognitive Science*
- Fischer, H. M. (2012), A hierarchical view of Embodied Cognition, *Psychonomic Bulletin & Review*, 9 (4)
- Gallagher, S., Zahavi, D. (2009), *La mente fenomenologica. Filosofia della mente e scienze cognitive*. Milano: Cortina Raffaello Editore
- Gallahue, D.L. (1982), *Understanding motor development in children*. New York: Wiley and Sons
- Gamelli, I. (2006), *Pedagogia del corpo*. Roma: Meltemi
- Gomez Paloma, F. (2013), *Embodied cognitive Science. Atti incarnati della didattica*. Roma: Edizioni Nuova Cultura
- Gomez Paloma, F. (2009), *Corporeità, didattica e apprendimento. Le nuove neuroscienze dell'educazione*. Salerno: Edisud
- Hurley, S. (1998), *Consciousness in actions*, Cambridge: Harvard University Press
- Husserl, E. (1952), *Ideen zu einer reinen Phanomenologie und phanomenologischen Philosophie. Zweites Buch. Phanomeno-logische Untersuchungen zur Konstitution*, a cura di M. Biemel, Den Haag, Martinus Nijhoff; trad. it. Di E. Filippini, a cura di V. Costa Torino, Einaudi, 2002.
- Iannello, P. & Antonietti, A. (2007), Relationship between decision styles and thinking styles. In: *Abstract of the Workshop on Cognition and Emotion In Economic Decision Making*, Università di Trento, gennaio 2007, 49,50
- Indicazioni Nazionali per il Curricolo della Scuola dell'Infanzia e del Primo ciclo d'Istruzione (2012), Ministero dell'Istruzione, dell'Università e della Ricerca
- Le Boulch J., *Lo sviluppo psicomotorio dalla nascita a sei anni. Conseguenze educative della psicocinetica nell'età prescolare*, Armando Editore, Roma, 1999
- Merleau-Ponty, M., (1945), *Phénoménologie de la perception*. Paris: Librairie Gallimard. Tr. Ita (2003), *Fenomenologia della percezione*. Milano: Bompiani
- Robertson, M.A., Halverson, L.E. (1984), *Developing children. Their changing movement*. Philadelphia: Lea and Feiber
- Rosati, L. (2005). *Il metodo della didattica*. Brescia: La Scuola
- Ryle, G., (1976), *The concept of mind*, Chicago: The University of Chicago Press; trad. Ita. (2007), *Il concetto di mente*, Bari: Editori Laterza
- Seefeldt, V., Haubenstricker, J. (1982). Patterns, phases, or stages: an analytical model for the study of developmental movement. In J.A.S. Kelso & J. E. Clark. *The development of movement control and coordination*. New York: John Wiley & Sons
- Siegel, D.J. (2001), *La mente relazionale. Neurobiologia dell'esperienza interpersonale*. Milano: Raffaello Cortina Editore
- Ulrich D.A. (2002), *TGM. Valutazione delle abilità grosso-motorie*. Trento: Erickson

Williams, H.G. (1983), Perceptual and motor development., New York: Englewood Cliffs

Zaichkowsky, L., Martinek, T. (1980), Growth and development: The child and physical activity. St. Louis, MO: The C.V. Mosby Company

INTE 2014



# Emotional intelligence factor in creation of the polemics in printed media: An analysis over the master and doctorate students

Ceyda Ilgaz Büyükbaykal \* Seda Çakar Mengü \*\* Murat Mengü \*\*\*

\* Assist.Prof.Dr., Department of Journalism, Communication Faculty, Istanbul University.

\*\* Prof.Dr. Department of Public Relations and Advertising, Communication Faculty, Istanbul University.

\*\*\* Assist.Prof.Dr., Department of Media and Communication Systems, Communication Faculty, Arel University.

---

## Abstract

Loaned from Greek to French as *polemique*, the term of polemic denotes a literary controversy or disputation. Polemic, which can also be defined as way of expressing ideas, is rather seen in newspapers and magazines. Today, the debates that have begun with the competition among newspapers may sometimes easily turn to polemics. Polemic is created not only as a method of increasing the circulation rate in printed media, but also as an intention of journalists to become well-known or popular. Journalists are resolved to present the information to individuals for the purpose of enabling them to free and govern themselves. At this point, emotional intelligence factor that depends on positive socialization and solidarity arises and the polemic that is done correctly can even be useful for the readers. Emotional intelligence that comprises the concepts of emotion and intelligence, aims at combining cognitive skills and emotions. The purpose of this study is to assert how the media, the main purpose of which is to create a public society by maintaining the benefit of the public, gets dysfunctional because of polemic as well as the repercussions of it by presenting the role of the components of emotional intelligence in printed media. These texts will be analyzed with regard to emotional intelligence, emotional perfection and professional ethics. Thus, a situational analysis has been administered to master and doctorate students in communication faculties.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** Emotional intelligence, polemic, education.

---

## 1. Introduction

Today the polemic among the authors who provide the continuity of the circus culture manipulating the masses is one of the most important indicators of whether or not those who write and edit texts have emotional competence.

The media, the main responsibility of which is to control the government and be the voice of society, cannot perform this function effectively. The polemic created among authors causes the issues to get devoid of the real content and to be mediatized; as a result, the masses can easily be directed and readers are simply objectified. Therefore, news or the important issues in the agenda are degraded as commodities. The media functions to inform the public neutrally, clarify the social values and objectives as well as educate and socialize.

Emotional intelligence is both the reason and the result of the polemics committed consciously or

---

\* Corresponding author. Tel.: +090-212 440 00 00  
E-mail address: ceydailgaz@hotmail.com

unconsciously by authors. It is the reason because it is created by the authors having no emotional intelligence; it is the result because communication unavoidably undergoes to the process of the corrosion of personal values after polemic is raised. Thus, showing empathy and evaluating only the messages just disappear, and consequently, lack of communication and unethical actions emerge. "If somebody does not head for production and activity and avoid getting into contact with the others, it is quite clear that her or she cannot develop the abilities intrinsic to human beings" (Horney, 1996: 11). Thus, individuals can develop themselves only when they really perform their responsibilities. Aspects and communication culture of a country changes with the influence of the media; however, political culture and institutions continue their functions as the conditions and skeleton of a political system (Meyer, 2004: 91).

Columnists have also assumed important responsibilities as they set role models for society. The individuals in a society emulate the people they like and identify themselves with those people. Columnists are to some extent opinion leaders and sources of reference. Therefore, they should be aware of the distresses and inflictions of their periods. They should turn their hands to the deprived and aggrieved segments of society and put them on the agenda. Moreover, columnists should feel themselves responsible towards not only all human beings, but also the nature. As a result of all these responsibilities, columnists should have a developed social consciousness and ability to think emphatically (Örs, 2007: 772).

Being beneficial to social life is one of the fundamental stands of professional ethics. Journalists have certain responsibilities towards their societies with respect to professional ethics and they should act in accordance with this consciousness. First and foremost, journalists should try to make public understand the facts. It should be noted that while conveying the facts, they have to use the mass media properly; otherwise, society will be not only misinformed, but also misdirected. The relationship of the journalists who deviate from professional ethics with their readers will unavoidably create a confidence crisis.

Thus, in this study, some prominent polemics that arose recently have primarily been taken into consideration and analyzed with respect to language, symbol and behavior. Then, these polemics have been shared with master and doctorate students majoring in journalism and public relations without any subjective comments and in-depth interviews have been held with them for their evaluations related to the respective issue. During these interviews, the students were asked to assess the polemics in printed media as well as on TV with regard to emotional competence, professional ethics and emotional intelligence.

## **2. Emotional Intelligence Concept**

Recent studies indicate that apart from cognitive intelligence, emotional intelligence plays a significant role in the achievements of individuals throughout their lives. "Salovey and Mayer define Emotional intelligence as a sub-form of social intelligence as a sub-form of social intelligence related to the ability of individuals to understand the feelings of themselves as well as the others, differentiate between these feelings and use the information obtained from this process in their thoughts and behaviors" (qtd. in Doğan & Şahin, 2007: 232). On the other hand, Daniel Goleman defined emotional intelligence as "the ability to motivate oneself, keep on going despite mishaps, delay satisfaction by controlling the stimuli, regulate the mood, blocking the problems preventing thinking soundly and put oneself in somebody's shoes" (1998: 51). The nervous centers of our brain are not totally pushed to secondary place in our thoughts and logic. These centers are indispensable parts of our thoughts, logic and intellect. Emotions are very essential and necessary to be able to make the best decisions against problems and keep up with changes without wavering. The four emotional aptitudes constituting the building blocks of the Emotional Intelligence manager are as follows:

1) Establishing proper communication with people, recognizing feelings, defining the feeling of the others clearly and conveying our feelings to the others with the same clarity. 2) Assuming the appropriate mood. Emotions direct our attention to important points, prepare us for particular situations and help us determine the direction of our thoughts while solving problems. 3) Predicting the future of emotions or understanding emotions. 4) Behaving as one feels and managing emotions. Emotions carry information and influence our thoughts. Therefore, we have to know how to blend our emotions reasonably with our logic, our approach to problems, judgments and behaviors (Caruso & Salovey, 2007: 61).

Generally, we behave as we think. Thus, our thoughts affect our emotions and in turn, our emotions

influence our behaviors. The meanings that individuals attribute to the events, people or discourses they encounter or their thoughts and interpretations about them lead to the demonstration of certain emotions and actions. Needless to say, particularly during the periods of fury and anger, it is wrong to pass the responsibility of our actions to the others and allege their actions as a reason for a wrongdoing. This situation also indicates that such individuals do not possess the constituents of emotional intelligence. Emotions can be regarded as follows: they are formed depending on the changes around us. They emerge instinctively by themselves. They create changes in the mood. They change our point of attention and way of thinking. They prepare individuals to get ready to act. They evoke personal feelings. They may disperse quickly. They help us survive the life and stand as well as improve ourselves (Caruso & Salovey, 2007: 40).

### **Polemic in Printed Media and Emotional Competency**

Functioning as a means of the dominant discourse, the media leads to the formation of the value judgments about 'the other' in society apart from the creation of 'the other.' By realizing this formation covertly or overtly, it structures the public opinion as desired. Eight functions of mass communication are mentioned in The MacBride Report, prepared by UNESCO Commission:

1) Providing news and information. 2) Socialization 3) Motivation 4) Creating discussion platforms 5) Education 6) Contribution to the development of culture. 7) Entertainment. 8) Unification. As a result, the unifying function of the media is fulfilled accordingly (Yüksel, 2001:7-8).

According to Hakkı Devrim (2008), a well-known Turkish journalist, polemic is a form of discourse having traditions. However, when polemic is mentioned, only the texts in which opposite ideas and views are expressed should not be thought. In correspondence, the context is also very important. Considering the issue with respect to the Declaration of the Rights and Responsibilities of Turkish Journalists as well as the regulations, there should not be any violation of personal rights. Particularly encouraging and defending violence indicates an approach totally contradictory to professional ethics. Therefore, correspondences have to be evaluated correctly. It is a must to be respectful to personal rights.

The concept, "*polemic is derived from a Greek word 'polemo' meaning to combat, surround, blockade and siege. Loaned from Greek to French as polemique, this concept refers to war of words, arguments, bitter discussions and also aggressive, belligerent and quarrelsome people* (Aydoğan, 2001, s.98). As the media companies are established by big capital structures, political and economic interests forestall the intentions to inform public. Hence, those who have the power in newspaper companies can easily exert pressure on the editors and authors and even interfere in their activities. In the triangle of the media, commerce and politics, the media seems to have forgotten its real responsibility along with its responsibilities towards society. "The main objective of journalism is to provide the information that is needed by people to become free and also to govern themselves" (Kovach & Rosensteil, 2007: 20).

"Although news discourse is not particularly designed with an assertive style, it may have a persuasive dimension as well. Even though it does not seem to be defending an idea, a journalist, above all, wants to 'convince' and feel that he or she is 'conveying the truth' through a text" (Özerkan, 2002: 69). Being one of the elements of emotional intelligence, self-consciousness necessitates individuals to realize their strong and weak points, be aware of the dynamics influencing their performances and also know themselves in all aspects. Therefore, it would be appropriate for an author to answer the question about the dynamics affecting work performance. As another constituent of emotional intelligence, self-governance is related to controlling one's feelings, knowing what to do and why and tip the scales in one's favor (Weisinger, 1998: 47). In this regard, authors should know that they are writing not only in behalf of themselves, but also society.

One of the most important principles of journalism is the desire to draw the interest of people. "Along with the principle of appealing to people, journalism has gained a new dimension and turning to the emotions of individuals have come into prominence in breaking news as well as relating the events, views and ideas" (Tokgöz, 1994:28). While news is structured with 'language,' the practices and ideologies of social structure are re-produced. "Media texts function as a sensitive barometer indicating socio-cultural changes and thus, create a very valuable source for the studies on change. Social and cultural changes demonstrate themselves in the heterogeneous and continuously differentiating discursive practices" (Fairclough, 1995: 52).

According to Fuller (1996: 101), the task of columnists is to change the minds from the level of indifference to the level of knowledge, which refers to the acquisition of the art of conveying messages to people, namely rhetoric. Evaluation of events shows difference according to countries. This situation is related to cultural values. The power-status relations in a society, the structure of that society as well as language are the main factors determining culture. "As a means utilized by political and local authorities as well as pressure groups, the media influences the public opinion molded throughout a country and also in small groups. In other words, the media can be a determining factor for the public opinion formed around both special and general issues" (Atabek & Dağtaş, 1998: 202-203). Therefore, the language used by journalists while writing news is very important. Columnists too have to be aware of the features for the formation of public opinion while writing their texts.

### **Purpose and Method**

In this study, prominent polemics between the columnists in printed as well as visual media and the participants of TV programs particularly in recent in history and today were chosen and analyzed with respect to language, symbols and behaviors. Then, the respective polemics were shared with the master's and doctorate students and without any subjective comments, in-depth interviews were held with them to determine their views and evaluations about those polemics and they were also asked to fill in questionnaires. During the in-depth interviews, the postgraduate students were required to evaluate the polemics in printed media and on TV with regard to emotional competence, professional ethics and emotional intelligence. Meanwhile, the questionnaire; was formulated according to the Likert scale. The starting point in this study is based on the following questions:

1. Do the columnists provide clarification for the social values and objectives and contribute to the developments through a platform of discussion or display an approach which is inappropriate to professional customs and practices?
2. How much responsibility do the columnists assume with respect to their being role models for society?
3. How do the postgraduate students in journalism relate the polemics of today with emotional intelligence?

### **Findings and Evaluation**

75 % of the respondents have stated that the sides in polemics cannot control their feelings. Likewise, 51.7 % of those postgraduate students have mentioned that they disagree with the expression; "authors write and discourse upon not only themselves, but also the public opinion" and 52.6 % of them are strongly disagree with this idea. Moreover, 53.5 % of the respondents are disagree with the situation indicating that "authors grasp the viewpoints and needs of the opposite parties and act accordingly," and 24.1 % of them are strongly disagree with it.

Furthermore, 39.2 % of the participants disagree that the sides in polemics try to change the views of the opposite parties through persuasion instead of totally rejecting or blackening them, and % 32.1 of the respondents are strongly disagree with it. Emotional literacy is the ability of an individual to perceive the feelings of the others, lend an ear to their requirements as well as fulfill them. The level of emotional literacy leads to the perception and making sense of the world and the conveyed messages pragmatically. Thus, 59.2 % of the respondents think that the sides of the polemics today are not emotionally literate.

Next, 53.3 % of the postgraduate students have indicated that the sides of polemics do not have the due abilities for constructive solutions. While the ratio of those who disagree with the idea that the parties of polemics perform the function of providing news and information is 42.8 %, the ratio of those who agree is only 28.5 %. It is a fact that as an important function of journalists, socialization is a crucial factor for enabling individuals to continue their existence in society. Interestingly enough, 62.9 % of the respondents have stated that the sides of polemics do not fulfill this function. In addition, 25.9 % of them have checked 'indecisive' about the respective issue. In the discussions held without taking the emotional intelligence factor into consideration, the audience get confused as they are pacified instead of enabled to comprehend the given information correctly and interpret it.

Meanwhile, the ratio of agreement with the expression; “the polemics today contribute to the clarification and development of the social values and objectives conveyed to individuals is only 3.5 %. On the contrary, 57.1 % of the respondents have expressed their disagreement. Moreover, 50 % of the postgraduate students disagree with the idea that the polemics today help improve the knowledge level and abilities of individuals in society; likewise, 39.2 % of them strongly disagree with it.

Today the polemics play an important role for the development of culture along with the protection of cultural heritage. In this regard, the ratio of the respondents who disagree with the view that “today the polemics develop the relations among individuals and groups in societies and provide an atmosphere enabling them to know and understand not only each other, but also their societies” is 50 % while the ratio of strong disagreement is 46.4%. In terms of Habermas, this ‘compassion ethics’ arises from the mutual recognition processes that are clearly seen in personal relations and in preliminary socialization processes (Benjamin qtd. in Stevenson, 2006: 118,119).

Hochschild’s concept of “emotional labor” concept can easily be observed as a part of work role and it constitutes the desirable face and body signs (the effort as well as the ability of planning and controlling in order to display the emotions required in professional relations). Most of the respondents in this study have pointed out that the sides in polemics today do not perform the labor role; probably as they are not equipped well enough or do not intend to show any efforts for that. Furthermore, they have remarked insincere, peremptory and aggressive manners. Generally speaking, the sides in a discussion tend to outmaneuver each other with a defensive instinct instead of promoting understanding. Therefore, the process of mutual dialogue process is stagnated.

## Conclusion

Responsibility towards society cannot be mentioned if there is no ethical responsibility. Thus, authors should lead their discussions by being conscious of their responsibilities; in addition, express the facts neutrally and clearly without agitating the public opinion and be respectful towards themselves, their interlocutors as well as public within the framework of ethical principles. Otherwise, informing can easily be substituted by tabloidism and vulgarity. Sometimes columnists assume a surly attitude of **discussing the topics negatively, diverting them or simply getting involved in polemics. “Emotional intelligence, social consciousness and empathy are also quite significant in journalism as a profession necessitating close relations with individuals and society. In other words, journalism is one of the professions which is closets to and intertwined with individuals and society as a whole, so it is rather important for journalists to feel the emotions, sorrows, anxieties and problems of a society and be able to think through their perspectives”** (Örs, 2007: 769). Thus, by putting themselves in the position of their audience, journalists should try to prepare enlightening texts reflecting social problems and avoid personal conflicts as well as the attitudes devoid of professional ethics. In this respect, defining the social dimension of emotional intelligence, the concepts of social consciousness and social awareness are of vital importance. Thanks to social consciousness and social awareness, journalists can assess their societies better and in return convey their emotions and thoughts with the same sensitivity.

“In order to get a beneficial result, the discussions should be on intellectual level, views and suggestions should be expressed over different dimensions of issues and above all, mutual understanding and respect should attentively be observed. Nevertheless, what is experienced here (in Turkey) is to believe the correctness of our thoughts firmly and surmise that different views are certainly wrong...mostly opposite parties do it to excess of accusing each other” (Güreli, 2004: 94).

There seems to be an intention in the media to exert control over people by using the entertainment factor. In this sense, creating polemics can be regarded as one of the auxiliary factors to exercise control over people. Such a control is seen as a part of the circus culture in the structuring of media in modern world. Like the fights between gladiators in ancient Rome, the columnists use their writings to create polemics, which is a noticeable burden for democracy. “Democratic governing process is egalitarian. Each individual who can make sense of the events and phenomena correctly by getting involved in them directly with his or her emotions do not experience alienation” (Witt, 1980: 144-145). While creating polemics, the media members neither bring social values and objectives into open with the discussion atmospheres they create through polemics not they contribute to the development of individuals at all. The texts in which the columnists continuously accuse each other and express their personal problems emerge, in a way, as elements of vulgarization.

The media members of today shoulder heavy responsibilities as the role models for the students majoring in journalism theoretically and practically as the independent representatives of public opinion in the future. These students adopt the views of the journalists they like, emulate their practices and even associate themselves with those journalists. Therefore, being opinion leaders, media members will manage to address greater audience as long as they act with social consciousness and awareness. The postgraduate students who took part in this study have pointed out that the media members certainly do not have emotional intelligence and also highlighted it as a negative point for communication and professional ethics. It is quite important that the media students consider the current polemics with a critical approach. The media members who handle polemics wrongly get discredited after a while and also get away from being role models. Emotional competence is the ability to recognize feelings as well as to control and direct them. Emotional intelligence indicates how all these feelings should be controlled and also enables individuals to realize their feelings and manage them. It is possible to say that an author may become obliged to resort to polemics in the media at times; however, as long as he or she has emotional intelligence involving being conscious of the responsibilities all the time and making no concessions from ethical principles, he or she will do it intellectually and discreetly

## References

- Alemdar, Z. (1990). *Oyunun Kuralı Basında Özdenetim*, Ankara: Bilgi Yayınevi.
- Atabek, N. & Dağtaş, E. (1998), *Kamuoyu ve İletişim*, Eskişehir: Etam Matbaacılık.
- Aydoğan, B. (2001). Servet-i Fünun Dönemindeki Edebiyat Üzerinde Oluşan Polemikler, *Çukurova Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, Sayı:7, Cilt: 7, 97-106.
- Caruso, D.R. & Salovey, P. (2007). *Duygusal Zeka Yöneticisi*, Hale Kayra (Çeviren), İstanbul: Crea Yayıncıları/Yönetim Dizisi. (Orijinal kitabın basım yılı 2004)
- Doğan, S. & Şahin, F. (2007). Duygusal Zeka: Tarihsel Gelişimi ve Örgütler İçin Önemine Kavramsal Bir Bakış, *Çukurova Üniversitesi Sosyal Bilimler Dergisi*, Cilt:16, Sayı:1, 231-252.
- Dökmen, Ü. (1998). *İletişim Çatışmaları ve Empati*, İstanbul: Sistem Yayıncılık.
- Gürel, N. (2004). *Şu Bizim Medya*, İstanbul: Bas-Haş Türkiye Gazeteciler Cemiyeti Yayınları.
- Horney, K. (1996). *Nevrozlar ve İnsan Gelişimi: Öz Gerçekleştirme Kavgası*, Selçuk Budak (Çeviren), İstanbul: Öteki Yayınları. (Orijinal kitabın basım yılı 1991)
- Kovach, B. & Rosenstiel, T. (2007). *Gazeteciliğin Esasları*, Ankara: ODTÜ Yayıncılık (Orijinal kitabın basım yılı 2001)
- Meyer, T. (2004). *Medya Demokrasisi*, Ahmet Fethi (Çeviren), İstanbul: Türkiye İş Bankası Kültür Yayınları. (Orijinal kitabın basım yılı 2002)
- Örs, F. (2007). Gazetecilik Mesleğinde Sosyal Bilincin (Empati) Önemi 'Bekir Coşkun'un Yazılarının Sosyal Bilinç Açısından Değerlendirilmesi, *Uluslararası Duygusal Zeka ve İletişim Sempozyumu*, İzmir: Ege Üniversitesi İletişim Fakültesi Yayınları, 768-777.
- Özerkan, Ş. (2002). Medya, Dil ve İdeoloji. *İstanbul Üniversitesi İletişim Fakültesi Dergisi*, Sayı: 12, Cilt:1, 63-76.
- Stevenson, N. (2006). *Medya Kültürleri*. Ankara: Ütopya Yayınları.
- Taşkıran, N. Ö. (2007). *Medya Okuryazarlığına Giriş*, İstanbul: Beta yayınları.
- Tokgöz, O. (1994). *Temel Gazetecilik*, Ankara: İmge Kitabevi.
- Yüksel, E. (2001). *Medyanın Gündem Belirleme Gücü*, Konya: Çizgi Kitabevi.
- Weisinger, H. (1998). *İş Yaşamında Duygusal Zeka*. Nurettin Süleymangil (Çeviren), İstanbul: MNS Yayıncılık.
- Witt, J. (1980). *Democracy, Authority, Alienation*, London: The University of Chicago Press.

# Enhancing students' critical thinking skills through teaching and learning by inquiry-based learning activities using social network and cloud computing

Patamaporn Thaiposri<sup>a,\*</sup>, Panita Wannapiroon<sup>b</sup>

<sup>a</sup>Lecturer, Division of Information Technology, Faculty of Science and Technology, Nakhon Pathom Rajabhat University, Nakhon Pathom, 73000, Thailand

<sup>b</sup>Assistant Professor, Division of Information and Communication Technology for Education, Faculty of Technical Education, King Mongkut's University of Technology North Bangkok, Bangkok, 10800, Thailand

---

## Abstract

The purposes of this research study were: 1) to design inquiry-based learning activities to enhance students' critical thinking skills through teaching and learning using social network and cloud computing and 2) to evaluate these learning activities. The research methodology is divided into two steps. The first step involved designing the learning activities and the second step involved evaluation. The study sample was purposively selected and consisted of ten experts in higher education instructional design, inquiry-based learning activity design, social network, cloud computing and enhancing critical thinking skills. This sample either held a doctoral degree or at least three years of experience in relevant fields. This research describes the learning activities and assesses appropriateness using an evaluation form. Data were analyzed using the mean ( $\bar{X}$ ) and standard deviation. The research findings were as follows: the learning activities consisted of three main steps: 1) pre-teaching and learning preparation, 2) enhancing students' critical thinking skills through teaching and learning by inquiry-based learning activities using social network and cloud computing and 3) measurement and evaluation. The sample judged the learning activities as highly appropriate and applicable to real practice.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** Cloud Computing; Critical Thinking Skills; Inquiry-Based Learning Activities; Social Network

---

## Introduction

A framework for 21<sup>st</sup> century learning developed by the Partnership for 21<sup>st</sup> Century Skill outlines a vision of a successful student functioning in the new global economy. This framework presents an overview of 21<sup>st</sup> century teaching and learning techniques and explores relevant outcomes across three key areas: 1) content knowledge, 2) specific skills and 3) expertise and literacies. For success in today's world, students require core academic subject knowledge and understanding, in addition to other skills such as critical thinking and problem solving, creativity and innovation, communication and collaboration.

Critical thinking has been defined as an important educational goal and is understood to mean reasonable reflective thinking that is focused on deciding what to believe or do. In this research study, critical thinking skills were specified in six elements according to Norris and Ennis (1989). These elements include 1) determining the credibility of sources and observations, 2) inferring and judging deductive conclusions, 3) definitions and

---

\* Corresponding author. Tel.: +66-081-376-0988.  
E-mail address: p.thaiposri@gmail.com

identification of assumptions, 4) planning induction experiments and predicting probable consequences, 5) inferring and judging inductive conclusions and 6) semantics (Wannapiroon, 2008).

Previous research has shown that students' critical thinking abilities are significantly higher when these skills are taught through inquiry-based learning than traditional teaching methods (Wongkam et al.). In the current study, critical thinking skills were taught using the BSCS 5E instructional model. This model consists of five phases as follows: 1) engagement: the teacher assesses the student's prior knowledge and engages the student's interest in new concepts through short activities that promote curiosity and elicit prior knowledge, 2) exploration: the teacher provides a number of cooperative exploration activities designed to help the student to use their prior knowledge to generate new ideas, explore questions and possibilities and to design and conduct an investigation, 3) explanation: this phase focuses on the student's exploration, provides opportunities to demonstrate conceptual understanding and processing skills or behaviors and gives the teacher an opportunity to guide the student toward deepening their understanding, 4) elaboration: the teacher challenges and extends the student's conceptual understanding through new experiences. The student is then able to develop a deeper and broader understanding and apply this to other activities. Finally, 5) evaluation: this phase encourages the student to assess their understanding and abilities and provides opportunities for the teacher to assess progress towards educational objectives (Bybee et al.).

Information and communication technologies and social network can be used as effective tools to improve instructional approaches and enhance critical thinking skills using the online environment (Haghparsat et al., 2013). Social network are defined as any site or service that allows people to connect with each other, to inform others about events and activities and to share news, photos, videos and other items of interest. Social networking is a relatively new way to communicate and share information (Poore, 2013). The current study used Facebook as the social networking tool of choice given that 85% of the 21 million social network accounts in Thailand are Facebook accounts (Zocialinc).

Cloud computing can help educational institutions to resolve a number of their common challenges, including cost reduction, enabling quick and effective communication, security and privacy and ensuring flexibility and accessibility (Alshuwaier et al., 2013). Cloud computing contributes to the growing number of useful services that are now available on the internet and provides a range of services useful to students and teachers, such as direct access to different academic resources, research applications and higher education tools. Cloud computing enables the user to access a network of ubiquitous, convenient and on-demand configurable computing resources such as networks, servers, storage applications and services (Mell & Grance).

The learning steps and activities of social learning environment as inquiry-based on cloud technology were appropriate for developing the student's critical thinking skills (Meepian & Wannapiroon, 2013).

The aim of the present study was to explore if students' critical thinking skills could be improved through teaching and learning by inquiry-based learning activities using social network and cloud computing. This approach is seen as a potentially effective way to facilitate learning in the 21<sup>st</sup> century learning.

## **Purpose of the study**

The purposes of this research study were;



To design inquiry-based learning activities to enhance students' critical thinking skills through teaching and learning using social network and cloud computing.

To evaluate the inquiry-based learning activities using social network and cloud computing.

### Scope of the study

#### *Population*

The population in this research study consisted of experts in higher education instructional design, inquiry-based learning activity design, social network, cloud computing and enhancing critical thinking skills.

#### *Sample Groups*

The sample comprised ten experts in higher education instructional design, inquiry-based learning activity design, social network, cloud computing and enhancing critical thinking skills. This sample either held a doctoral degree or at least three years of experience in related fields. A purposive selection method was used.

#### *Variables of the research*

The independent variable was inquiry-based learning activities to enhance students' critical thinking skills through teaching and learning using social network and cloud computing and the dependent variable was results of the appropriateness evaluation of learning activities.

### Conceptual Framework

The conceptual framework for enhancing students' critical thinking skills through teaching and learning by inquiry-based learning activities using social network and cloud computing is shown in Figure 1.

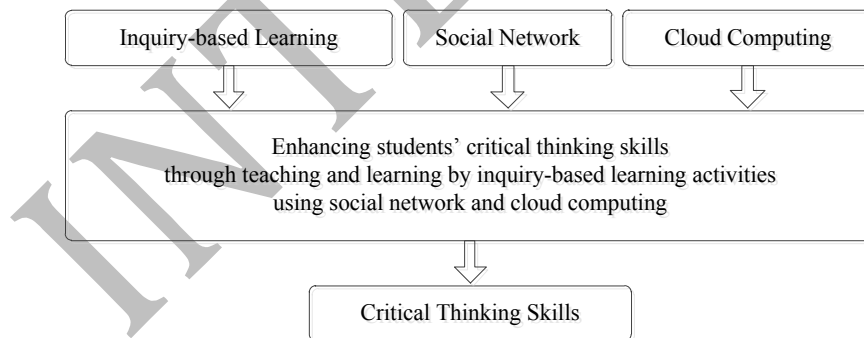


Fig. 1. conceptual framework.

## Research Methodology

*The aim was to design inquiry-based learning activities to enhance students' critical thinking skills through teaching and learning using social network and cloud computing.*

Relevant articles and research papers were analyzed and synthesized.

Five experts were interviewed to gather and analyze data about learning activities. These experts were asked to provide data on students' ICT literacy for learning, learning styles and cognitive styles.

Research instruments were designed as follows: 1) inquiry-based learning activities to enhance students' critical thinking skills through teaching and learning using social network and cloud computing and 2) an appropriateness evaluation form.

Learning activities were verified and appropriateness evaluation forms were filled in by the five identified experts.

*The aim was to evaluate the effectiveness of inquiry based learning activities for enhancing students' critical thinking skills through teaching and learning using social network and cloud computing.*

The learning activities were evaluated by the five experts.

The learning activities were modified based on the advice of the experts.

The learning activities were evaluated using diagrams and a written essay.

The results of the appropriateness evaluation were analyses using mean ( $\bar{X}$ ) and standard deviation (S.D.). Five criteria for evaluation were considered using Likert scales anchored with the terms highest, high, moderate, low and lowest.

## Result

*Inquiry-based learning activities to enhance students' critical thinking skills through teaching and learning using social network and cloud computing are illustrated in Figure 2.*

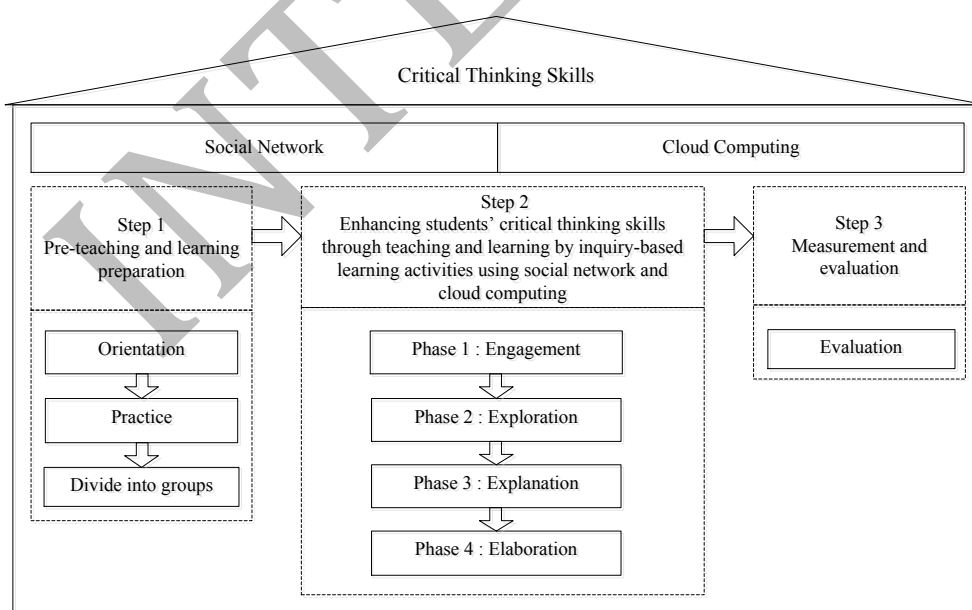


Fig. 2. Enhancing students' critical thinking skills through teaching and learning by inquiry-based learning activities using social network and cloud computing.

The learning activities consisted of three main steps:

*1) Pre-teaching and learning preparation*

1.1) Orientation

1.1.1) Teachers recommend courses, learning objectives, learning methods, learning activities, ways to send and verify assignments, communication channels and measurement and assessment procedures through Learning Management System (LMS).

1.2) Practice

1.2.1) Students register on LMS, Facebook and cloud computing and begin their practice. Students can use Facebook single sign on to share information with other social network.

1.3) Divide students into groups

1.3.1) Students are divided into groups. Each group consists of five people. Group names are created, the roles of group members defined and a group leader and secretary nominated.

*2) Enhancing students' critical thinking skills through teaching and learning by inquiry-based learning activities using social network and cloud computing.*

This step can be divided into four phases:

2.1) Engagement

2.1.1) Teachers spark students' interests and curiosity using short activities or examples that link to prior knowledge by sharing documents, data, photos, audio clips or videos on a Facebook wall.

2.1.2) Teachers ask questions that spark students' interests and raise questions using Facebook comment functions. This activity aims to help students to determine the credibility of sources and observations.

2.1.3) Teachers examine students' prior knowledge using the Facebook comment function.

2.1.4) Teachers and students identify questions and issues that they are interested to inquire together using Facebook comment or Facebook discussion functions. This activity aims to help students to determine the credibility of sources and observations, and infer and judge deductive conclusions.

2.2) Exploration

2.2.1) Students clarify their understanding by using Facebook discussion functions to develop questions and issues that require answers. This activity assists in definitions and identification of assumptions.

2.2.2) Students plan their exploration and investigation via document sharing. This activity enhances the definitions and identification of assumptions.

2.2.3) Students set up hypotheses, define possible alternative hypotheses and discuss and share opinions with group members using Facebook discussion functions. During these activities, students can record and share data via document sharing. This activity enhances definitions and identification of assumptions.

2.2.4) Students search for data and conduct experiments, join in with fieldwork activities or test hypotheses. During these activities, they search for data using search engine which they can then be collected in various formats

using document, file, data, photo, audio and video sharing. This activity can help students to determine the credibility of sources and observations.

2.2.5) Students verify hypotheses, develop new knowledge, discuss and share opinions with group members using Facebook discussion functions. They record new knowledge and cite data from various resources using document, file, data, photo, audio or video sharing. This activity can enhance planning induction experiments and predicting probable consequences.

### 2.3) Explanation

2.3.1) Students analyze, interpret and draw conclusions from the data obtained via document sharing. This activity aims to enhance inferring and judging inductive conclusions.

2.3.2) Students explain and present believable results in various formats using web tool. They cite data sources using document, file, data, photo, audio or video sharing. This activity enhances determining the credibility of sources and observations, and facilitates the planning induction experiments and predicting probable consequences.

2.3.3) Teachers and students share opinions between groups. They ask questions and offer suggestions to facilitate understanding using comment functions incorporated in web tools. This activity helps to determine the credibility of sources and observations.

2.3.4) Students in each group develop and present new knowledge using web tools and cite data from various resources via document, file, data, photo, audio or video sharing. This activity enhances definitions and identification of assumptions and semantics.

### 2.4) Elaboration

2.4.1) Teachers present new experiences, new situations or new questions to help students to apply and expand upon their knowledge more widely. This is done via document, data, photo, audio or video sharing on Facebook walls.

2.4.2) Students expand new knowledge more widely and discuss and share additional opinions with group members. Their understanding can be facilitated using Facebook comment or Facebook discussion functions. This activity can help to enhance determining the credibility of sources and observations, assist definitions and identification of assumptions, and semantics

2.4.3) Teachers ask students to clarify certain points and link prior and new knowledge using Facebook comment functions.

2.4.4) Students apply new knowledge in other contexts, present their results using web tool and cite data from various resources by document, data, photo, audio and video sharing. These activities enhance semantics.

## 3) *Measurement and evaluation*

### 3.1) Evaluation

3.1.1) Students self-assess their learning development, understanding and group working performance via document sharing.

3.1.2) Students assess the group working performance of other group members via document sharing.

3.1.3) Students evaluate teaching and course content via document sharing.

3.1.4) Students take examinations to measure and assess their learning outcomes via document sharing. This activity aims to enhance determining the credibility of sources and observations, assist with inferring and judging deductive conclusions, help to define and identify assumptions, plan induction experiments and predict probable consequences, infer and judge inductive conclusions, and semantics.

3.1.5) Teachers assess learning, development and students' participation in learning activities using Facebook and web tool.

*Evaluation the effectiveness of enhancing students' critical thinking skills through teaching and learning by inquiry-based learning activities using social network and cloud computing*

Table 1 shows that the sample perceived that enhancing students' critical thinking skills through teaching and learning by inquiry-based learning activities using social network and cloud computing was highly appropriate ( $\bar{x} = 4.7$ , S.D. = 0.50).

Table 1. Results of the appropriateness evaluation of enhancing students' critical thinking skills through teaching and learning by inquiry-based learning activities using social network and cloud computing

Evaluation Lists	Results		Level of appropriateness
	$\bar{x}$	S.D.	
1. Pre-teaching and learning preparation			
1.1 Orientation	4.80	0.45	Highest
1.2 Practice	4.80	0.45	Highest
1.3 Divide students into groups	4.60	0.55	Highest
2. Enhancing students' critical thinking skills through teaching and learning by inquiry based learning activities using social network and cloud computing			
2.1 Engagement	4.60	0.52	Highest
2.2 Exploration	4.72	0.49	Highest
2.3 Explanation	4.70	0.50	Highest
2.4 Elaboration	4.65	0.52	Highest
3. Measurement and evaluation			
3.1 Evaluation	4.76	0.47	Highest
Summary	4.7	0.50	Highest

Table 2 shows that the sample perceived that enhancing students' critical thinking skills through teaching and learning by inquiry-based learning activities using social network and cloud computing was highly applicable to real practice ( $\bar{x} = 4.5$ , S.D. = 0.55).

Table 2. Results of the appropriateness evaluation of enhancing student's critical thinking skills through teaching and learning by inquiry-based learning activities using social network and cloud computing for apply in real practice

Evaluation Lists	Results		Level of appropriateness
	$\bar{x}$	S.D.	
1. Teaching and learning by inquiry based learning activities using social network and cloud computing is appropriate to enhance critical thinking skills	4.6	0.55	Highest
2. Enhancing students' critical thinking skills through teaching and learning by inquiry-based learning activities using social network and cloud computing is possible to apply in real practice	4.4	0.55	High
Summary	4.5	0.55	High

## Conclusion

These research findings show that information and communication technologies play an important role in student developments in 21<sup>st</sup> century learning. In this study, students used social network to communicate and collaborate with each other during learning activities. They used cloud computing to collect, manage, share and present data. Cloud computing provides a variety of useful services available on the internet.

Enhancing students' critical thinking skills through teaching and learning by inquiry-based learning activities using social network and cloud computing is appropriate for application to real practice and helps student to develop the knowledge and skills that they will require to achieve success in the information age.

## Discussion

According to the results of the appropriateness evaluation, the researcher found that:

The exploration step was considered to be highly appropriate according to Haghparast et al., who notes that information-seeking behaviors can be helpful in cultivating the critical thinking of higher education students.

When designing learning activities, the researcher focused on group activities, sharing information and discussion in line with Wei, who suggests that critical thinking is facilitated through the incorporation of others' ideas and when reflecting on and synthesizing credible information

Social network were used as a tool in inquiry-based learning activities following Ractham & Firpo, who note that social networking sites such as Facebook have the potential to expand teaching and learning possibilities beyond the classroom. These sites provide users with familiar and easy to-use technologies that can be easily adapted for use in educational settings. Facebook can be used as a tool to enhance communication and collaboration amongst course members.

The use of cloud computing as a tool in inquiry-based learning activities is supported by Eteokleous & Ktoridou, who note that a 'community of inquiry' (CoI) could be developed and sustained through cloud computing, ensuring virtual communication, collaboration and authoring between students. The innovative use of cloud resources, asynchronous communication and collaboration and authoring opportunities offers students and lecturers an appropriate context in which to enhance experience, construct knowledge and extend learning. More specifically, the adoption of an inquiry-based learning approach in CoI ensures that students develop skills such as problem solving, critical thinking, self-directed learning, communication, collaboration and knowledge construction. These are essential for professional success.

The design of the inquiry-based learning activities was informed by Ma et al., who presents five steps to facilitating students' learning as follows: 1) situating learning in an authentic context and stimulating students' interest, 2) encouraging self-directed learning, 3) solving and resolving problems through collaborative learning, 4) expanding the learning experience through individual-based learning and 5) presenting and assessing learning outcomes. The current research shows that students in the inquiry-based class achieved better content knowledge and technical skills than the students in the didactic instruction class. Most of the students expressed positive and favorable feelings towards their learning attitudes, learning abilities and to the online learning environment.

## References

- Alshuwaier, F.A., Alshwaier, A.A. & Areshey, A.M. (2012). Applications of Cloud Computing in Education. *Proceeding of 2012 8th International Conference on Computing and Networking Technology (ICCNT)*. pp. 26-33.
- Bybee, R.W. et al. (February 2014). [Online]. The BSCS 5E Instructional Model: Origins, Effectiveness, and Applications. Available: [http://bscs.org/sites/default/files/\\_legacy/BSCS\\_5E\\_Instructional\\_Model-Executive\\_Summary\\_0.pdf](http://bscs.org/sites/default/files/_legacy/BSCS_5E_Instructional_Model-Executive_Summary_0.pdf)
- Ennis, R.H. (February 2014). [Online]. Critical Thinking Assessment. Available: <http://www3.qcc.cuny.edu/WikiFiles/file/Ennis%20Critical%20Thinking%20Assessment.pdf>
- Eteokleous, N. & Ktoridou, D. (2012). Community of Inquiry Developed through Cloud Computing for MIS Courses. *Proceeding of 2012 IEEE Global Engineering Education Conference (EDUCON)*. pp. 1-4.
- Haghparast, M., Hanum, N.F. & Abdullah, N. (2013). Modeling an E-Learning Tool to Cultivate Critical Thinking in Students based on Information Needs and Seeking Behavior. *Proceeding of 2013 IEEE International Conference on Teaching, Assessment and Learning for Engineering (TALE)*. pp. 521-526.
- Ma, C., Xiao, R., Wei, Y. & Yang, H.H. (2011). An Inquiry-Based Learning Approach on a Educational Technology Course. *Proceeding of 2011 IEEE International Symposium on IT in Medicine and Education (ITME)*. pp. 422-424.
- Meepian, A & Wannapiroon, P. (June 2013). [Online]. Design of Social Learning Environment as Inquiry-Based on Cloud Technology for Enhancing the Critical Thinking Skill and Collaborative Learning. Available: <http://www.ijeeec.org/Papers/234-ET1018.pdf>
- Mell, P. & Grance, T. (September 2011). [Online]. The NIST Definition of Cloud Computing. Available: <http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf>
- Partnership for 21st century skill. (April 2014). [Online]. Framework for 21st century learning. Available: [http://www.p21.org/storage/documents/1.\\_p21\\_framework\\_2-pager.pdf](http://www.p21.org/storage/documents/1._p21_framework_2-pager.pdf)
- Poore, M. (2013). Using social media in the classroom a best practice guide (1st ed.). U.K.: SAGA Publication 2013. pp. 79-91.
- Ractham, P. & Firpo, D. (2011). Using Social Networking Technology to Enhance Learning in Higher Education: A Case Study using Facebook. *Proceedings of the 44th Hawaii International Conference on System Sciences*. pp. 1-10.

- Wannapiroon, P. (2008). Development of a Problem-Based Learning Model to Develop Undergraduate Student's Critical Thinking Skill, Ph.D. dissertation, Dept. Curriculum, Instruction, and Educational Technology, Chulalongkorn Univ., Bangkok, Thailand.
- Wei, G.W. (2012). The Use of Wiki to Facilitate Critical Thinking. *Proceeding of IEEE International Conference on Teaching, Assessment, and Learning for Engineering (TALE)*. pp. H3C-1-H3C-3.
- Wongkam, N., Pinsuwan, D., & Chaowakeeratipong, N. (February 2014). [Online]. The Effects of Using the 7Es Learning Management Approach Emphasizing Critical Thinking Activities in the Topic of Homeostasis on Learning Achievement and Critical Thinking Ability of Mathayom Suksa IV Students at Piriyalai Changwat Phara School in Phare Province . Available:  
[http://www.stou.ac.th/thai/grad\\_stdy/Masters/%E0%B8%9D%E0%B8%AA%E0%B8%AA/research/2nd/FullPaper/SS/Oral/O-SS%20022%20%E0%B8%99%E0%B8%B2%E0%B8%87%E0%B8%99%E0%B8%87%E0%B8%99%E0%B8%B2%E0%B8%8E%20%20%E0%B8%A7%E0%B8%87%E0%B8%84%E0%B9%8C%E0%B8%84%E0%B8%B3.pdf](http://www.stou.ac.th/thai/grad_stdy/Masters/%E0%B8%9D%E0%B8%AA%E0%B8%AA/research/2nd/FullPaper/SS/Oral/O-SS%20022%20%E0%B8%99%E0%B8%B2%E0%B8%87%E0%B8%99%E0%B8%87%E0%B8%99%E0%B8%B2%E0%B8%8E%20%20%E0%B8%A7%E0%B8%87%E0%B8%84%E0%B9%8C%E0%B8%84%E0%B8%B3.pdf)
- Zocialinc. (December 2013). [Online]. Interesting information for marketing about social network of Thailand. Available:  
<http://blog.zocialinc.com/%E0%B9%80%E0%B8%9C%E0%B8%A2%E0%B8%82%E0%B9%89%E0%B8%AD%E0%B8%A1%E0%B8%B9%E0%B8%A5%E0%B9%80%E0%B8%94%E0%B9%87%E0%B8%94%E0%B8%9A%E0%B8%99%E0%B9%82%E0%B8%A5%E0%B8%81-social-network-%E0%B8%82%E0%B8%AD/>

# Environmental views and awareness of preschool teacher candidates

Elif Celebi Oncu <sup>a \*</sup>, Esra Unluer <sup>a</sup>

<sup>a</sup>*Faculty of Education, University of Kocaeli, Kocaeli, 41380, Turkiye*

---

## Abstract

Environmental pollution is today's one of the main problems in the world. Many countries spend serious time to solve and try to avoid environmental problems. From early years on the importance of Environmental Education (EE) arose and teachers are the key point of EE. This study takes place in Kocaeli; one of the cities of Turkey which is industrially developed and heavily polluted. This study aims to investigate views and awareness of preschool teacher candidates' from University of Kocaeli, about environmental issues and especially environmental pollution. Two hundred and thirty students' views were collected by an inquiry. Data were processed according to gender, class and the settlement of the candidates' families.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* Preschool teacher candidates, environment, environmental awareness

---

## 1.Introduction

Environmental pollution is today's one of the main issues in the world. Many countries spend serious time to solve and try to avoid environmental problems. From early years on the awareness and the importance of Environmental Education (EE) arose. Recent educational studies drew attention on EE from preschool period. As it is commonly accepted, Environmental Education was officially established in the 70's by the significant International Conferences held in different countries and in one of them it was stated that the Environmental Education should start from preschool age and have to continue throughout the school years (Tsekos, Christoforidou, Tsekos, 2012). In EE, teachers play an important role. Turner et al. (2009) argued that teachers create students who are environmentally literate but, at first they should be environmentally knowledgeable as well as they should have positive attitudes towards the environment and show concern for environmental problems. In Turkey pre-service teachers tended to have positive feelings and values about the environment when they had a high sense of responsibility towards the environment and were positively inclined towards environmentally responsible behavior.

This study aims to investigate views and awareness of preschool teacher candidates' from University of Kocaeli, regarding environment. Environmental awareness is important for teachers and teacher candidates, because it is seen as observations, attitudes, wishes, fears, and appreciations concerning the natural environment, our cultural environment and any relationships between them. A person who is aware of environmental issues has descriptive and interpretive knowledge about separate facts and phenomena and cause-response relationships in the environment. She/he understands ecological problems and the latter is aware of the effect of human beings on the environment (Jeronen & Kaikkonen, 2002).



## 2. Method

The study takes place in Kocaeli; one of the cities in Turkey which is industrially developed and heavily polluted. One hundred and ninety four volunteered students' views were collected by an inquiry (n=54 first grade, n=57 second grade, n=36 third grade and n=47 fourth grade).

The inquiry consisted of two sections. In the first section, in order to examine the views and awareness of students, there were 11 close ended questions and there were environmental symbols and abbreviations of environmental NGOs, in the second section, open ended questions were designed to examine the awareness of students. In the first section students' answers were scored. They got 1 point for the positive answers and 2 points for the negative answers.

## 3. Findings and Result

Findings of this study are shown in the following tables.

Table1. Total scores of the inquiry

		Number of questions	Maximum Points	Mean	Std. Deviation
Gender	Female	11	22	18,1	1,8
	Male			17,6	2,0
Class	1 <sup>st</sup> grade	11	22	17,7	1,8
	2 <sup>nd</sup> grade			18,8	1,6
	3 <sup>rd</sup> grade			17,2	1,9
	4 <sup>th</sup> grade			18,3	1,8
Hometown of Students	Village/town	11	22	18,2	2,0
	City			17,9	1,7

In this table it can be seen that males have got lower points than females, 1<sup>st</sup> grade and 3<sup>rd</sup> grade students have got lower points than the other classes and teacher candidates who have been living in the city got lower points than the others who live in the village/town from the section on environmental view and awareness (11 close ended questions related to the use of environmentally friendly products, recycling applications and environmental problems etc.). According to the results it can be said that environmental awareness of low-rated teacher candidates' is more than the others. In contrast to another study conducted by Ozden (2008); female teacher candidates had more positive attitudes in all dimensions of environmental attitudes. This may be due to the characteristic of the study group.

Table 2. The Main Environmental Problems in Kocaeli According to Preschool Teacher Candidates

	Gender				Class								The settlement of families			
	Female		Male		1		2		3		4		Village/town		City	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
Air/sea pollution	75	44,1	8	33,3	15	27,7	26	45,6	17	47,2	25	53,2	53	54,6	22	22,6
Industry	70	41,1	11	45,8	23	42,5	21	36,8	15	41,6	22	46,8	38	39,1	46	47,4
The others	6	3,5	4	16,6	4	7,4	6	10,5	0	,0	0	,0	4	4,1	9	9,
Don't know	19	11,1	1	4,1	12	22,2	4	7,0	4	11,2	0	,0	2	2,2	20	2,
Total	170	100,	24	100,	54	100,	57	100,	36	100,	47	100,	97	100,	97	100,

Teacher candidates' views aroused that the most important environmental issues in Kocaeli are sea, air and industrial pollutions. This result is not surprising because Kocaeli is one of the significant industrial regions in Turkey. Therefore, we can see intensive pollution in the sea and air. In this research a major number of the first graders replied that they did not know about environmental issue in Kocaeli. The reason for that may be they are new in the city. Berberoglu and Tosunoglu (1995) found that population growth; nuclear energy, energy conservation and environmental problems were seen as the important environmental issues for university students in

Turkey. The researchers also found that university students did not have sufficient awareness and sensitivity towards environmental issues. Esa (2010) also found that most of teachers agreed that humankind is responsible for pollution of water resources.

Table 3. Preschool Teacher Candidates' Solutions for the Environmental Issues in Kocaeli

	Gender				Class								The settlement of families			
	Female		Male		1		2		3		4		Village/town		City	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
Afforestation	15	8,8	1	4,1	4	7,4	5	8,7	2	5,5	5	10,6	10	10,3	6	6,1
Education	41	24,1	8	33,3	10	18,5	17	29,8	10	27,7	15	31,9	13	13,4	36	37,1
Control	50	29,4	6	25,	17	31,4	9	15,7	11	30,5	20	42,5	31	31,9	25	25,7
The others	7	4,1	4	16,6	2	3,7	3	5,2	1	2,7	5	10,6	10	10,3	2	2,
Don't know	57	33,5	5	20,8	21	38,8	23	40,3	12	33,3	2	4,2	33	34,	23	23,7
Total	170	100,	24	100,	54	100,	57	100,	36	100,	47	100,	97	100,	97	100,

Many teacher candidates suggested that, environmental education and setting control mechanisms like checking factories periodically are important for solving the environmental issues in Kocaeli. Teacher candidates strongly believed that one of the vital environmental issues in Kocaeli is industry. Therefore, Teacher candidates may be thinking that if control mechanisms for factories are set, then one of the major environmental issues of Kocaeli will be solved.

Table 4. Preschool Teacher Candidates' Knowledge about the Environmental NGOs

		Gender				Class								The settlement of families			
		Female		Male		1		2		3		4		Village/town		City	
		f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
ÇEKÜL	K*	16	8,2	8	33,3	2	3,7	0	,0	12	33,3	10	21,3	11	13,9	13	13,4
	U**	154	90,6	16	66,7	52	96,3	57	100	24	66,7	37	78,7	86	86,1	84	86,6
ÇEVKO	K*	66	38,8	11	45,8	24	44,4	18	31,6	15	41,7	20	42,6	34	68,7	43	44,3
	U**	104	61,2	13	54,2	30	55,6	39	68,4	21	58,3	27	57,4	63	53,9	54	46,2
TEMA	K*	116	68,2	15	62,5	26	48,1	42	73,7	33	91,7	30	63,8	65	68,4	66	68,0
	U**	54	31,8	9	37,5	28	51,9	15	26,3	3	8,3	17	36,2	32	31,6	31	32,0
TURMEPA	K*	3	1,8	1	4,2	0	,0	2	3,5	1	2,8	1	2,1	3	3,8	1	1,0
	U**	167	98,2	23	95,8	54	100	55	96,5	35	97,2	46	97,9	94	96,2	96	99,0
TURÇEV	K*	25	14,7	5	20,8	4	7,4	9	15,8	7	19,4	10	21,3	15	31,9	15	31,9
	U**	145	85,3	19	79,2	50	92,6	48	84,2	29	80,6	37	78,7	82	78,1	82	78,1

\* Known \*\* Unknown

In this research we also asked students about the environmental NGO's logos and abbreviations. In Turkey the most known environmental NGOs are TEMA and ÇEVKO. Moreover, this research indicates that teacher candidates know what these abbreviations stand for. In the recent years TEMA represented a well designed preschool environmental program called Preschool TEMA Program and some of the preschools in Kocaeli implemented this program. In other words TEMA is a well known NGO among preschool teacher candidates..

Table 5. Preschool Teacher Candidates' Knowledge about the Environmental Symbols

		Gender				Class								The settlement of families			
		Female		Male		1		2		3		4		Village/town		City	
		f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
	K*	14	8,2	1	4,2	5	9,3	6	10,5	2	5,6	2	4,3	7	7,2	8	8,2



U**	156	91,8	23	95,8	49	90,7	51	89,5	34	94,4	45	95,7	90	92,7	89	91,8
K*	100	58,8	15	62,5	31	57,4	31	54,4	22	61,1	31	66,	55	56,7	60	61,9
U**	70	41,2	9	37,5	23	42,6	26	45,6	14	38,9	16	34,	42	43,2	37	38,1
K*	18	10,6	2	8,3	3	5,6	5	8,8	8	22,2	4	8,5	12	12,3	8	8,2
U**	152	89,4	22	91,7	51	94,4	52	91,2	28	77,8	43	91,5	85	87,6	89	91,8
K*	121	71,2	19	79,2	29	53,7	46	80,7	25	69,4	40	85,1	66	68,	74	76,3
U**	49	28,8	5	20,8	25	46,3	11	19,3	11	30,6	7	14,9	31	31,9	23	23,7
K*	52	30,6	8	33,3	11	20,4	23	40,4	9	25,	17	36,2	26	26,8	34	35,1
U**	118	69,4	16	66,7	43	79,6	34	59,6	27	75,0	30	63,8	71	73,1	63	64,9

\* Known \*\* Unknown

A significant numbers of teacher candidates are aware of the symbols of radiation and recycling. For many years as a governmental obligation the recycling symbol were ought to put on most of the packages. The teacher candidates from hometown showed different characteristics in terms of environmental problems. Teacher candidates who lived in urban area had more positive attitude towards environmental problems than the ones who lived in rural area.

The views of the candidates about the deliberate harm to the environment demonstrated that a significant number of females (45,8%) and males (45,8%) saw the harm equal to the injury of a man. The candidates also saw the harm as murder (female 26,4% and male 25, %) and theft (female 16,4 and male 16,6%).

It was also found that only 5,9% females and 8,3% males were members of an environmental NGO. This result is cynical, because it can be considered that membership of NGO could arise awareness and voluntary work. It is important for teacher candidates to be aware of environmental issues and work voluntarily for being a good model of their future students and for the future of the world. Esa (2010) proved that there were also not many teachers involved in actions such as, joining environmental organizations or voicing their opinions in public.

#### 4. Conclusion and Recommendation

It can be concluded from recent research that; teacher candidates' knowledge and awareness is not enough and it was showed that there were no significant differences between groups. Some studies illustrated that males are more aware and sensitive to environmental issues than females (Hes-Quimbata and Pavel, 1996) while some other researchers (Davidson & Freudenburg, 1996; Gardos & Dodd, 1995; Tikka *et al.*, 2000) have found the opposite results. Nevertheless, some studies such as Eagles and Demare (1999) concluded that there was no relationship between gender and environmental sensitivity and awareness, but their results showed that females have more moralistic attitudes towards the environment than males do.

In order to increase students' level of knowledge and awareness towards environmental issues; NGOs working about environment, should invite education faculties so that they could introduce their aims, ambitions and works to teacher candidates. This kind of introduction could be more effective when increasing of members from teacher candidates. Further to that, teacher candidates could have a chance to be active participants in environmental solutions. For instance, in their practices candidates could be encouraged to use recycled and/or excessive materials. Besides of these implications; selective or obligatory lessons about environment and nature education could be required in education faculties program.

It can also be implicated that, in order to increase the awareness of the residential district; cooperation with municipalities and local communities working on environmental issues should be encouraged.

## References

- Davidson, D. and Freudenburg, W. (1996) Gender and environmental risk concerns: A review of available research. *Environment and Behavior* 28, 302–339.
- Eagles, P.F.J. and Demare, R. (1999) Factors influencing children's environmental attitudes. *The Journal of Environmental Education* 30(4), 33–37.
- Esa, N. (2010) Environmental knowledge, attitude and practices of student teachers. *International Research in Geographical and Environmental Education*, 19 (1).
- Hes-Quimbata, G. and Pavel, M. (1996) Assessing an Environmental Attitude Development Model: Factors Influencing the Environmental Attitudes of College Students. Eric Document
- Jeronen, E.; & Kaikkonen, M. (2002). Thoughts of Children and Adults about the Environment and Environmental Education. *International Research in Geographical and Environmental Education*, 11 (4), 341-353.
- Özden, M. (2008). Environmental Awareness and Attitudes of Student Teachers: An Empirical Research. *International Research in Geographical and Environmental Education*, 17 (1), 40-55.
- Tsekos, C. A.; Christoforidou, E. I.; Tsekos, E. A. (2012). Planning an Environmental Education Project for Kindergarten under the Theme of "the Forest". *Review of European Studies* 4 (2), 111-117.
- Tikka, P.M., Kuitunen, M.T. and Tynys, S.M. (2000) Effects of educational background on students' attitudes, activity levels, and knowledge concerning the environment. *The Journal of Environmental Education* 31 (3), 12–19.
- Tuncer, G., Tekkaya, C., Sungur, S., Cakiroglu, J., Ertepinar, H., & Kaplowitz, M. (2009). Assessing pre-service teachers' environmental literacy in Turkey as a mean to develop teacher education programs. *International Journal of Educational Development*, 29, 426–436.
- Palmer, J. (1998). *Environmental Education for the 21st Century*. London: Routledge.

# E-portfolio model development for the professional practice bachelor of teaching (PISMP) in Malaysia

Tajul Ashikin, Hashim <sup>a\*</sup> Ruhizan, Mohammad Yasin <sup>a</sup> Rohani, Seman<sup>b</sup>

<sup>a</sup> Universiti Kebangsaan Malaysia,  
43600 Universiti Kebangsaan Malaysia, Selangor, Malaysia

<sup>b</sup> Institut Pendidikan Guru Kampus Perlis,  
01000 Kangar, Perlis, Malaysia

---

## Abstract

In line with the development of technology, awareness arose of how technology affects human life. E portfolio is becoming increasingly important in the learning process particularly involves the production of new teachers at the Institute of Teacher Education Malaysia. Along with the latest technological developments, future teachers must have the ability, knowledge, and information technology skills to adapt the use of e-portfolio involving teaching and learning well as teaching. This concept paper discusses the conceptual framework and methodological development of the e-portfolio model Professional Practice Bachelor of Teaching (PISMP) in order to integrate technology for the teacher education system in Malaysia.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* E-portfolio, Professional Practice, Bachelor of Teaching (PISMP)

---

## Introduction

Initial reports on Education Development Plan 2013-2025 (Ministry of Education. 2012) shows Malaysian student achievement in the eyes of the world has declined significantly and is in the bottom third cohort of the education system in the world. Further, improvements are needed for access, equity and efficiency that these elements have to be driven to improve quality, which also leads to an increase in the quality of teachers, especially new fresh teachers in driving education into the 21st century. In order to produce quality fresh teachers, the Education Development Master Plan (PIPP) 2006-2010 Ministry of Education has set the thrust core to enhance the teaching profession as a measure of achievement. The thrust focuses into five Focuses on five core implementation strategies include upgrade the selection system of teacher candidate, improve teacher training, strengthening the teaching profession, improve the work environment and the welfare of teachers and improve the planning and management of human resources. Bachelor of Teaching (PISMP) program is a pre-service teacher training to train primary school teachers who graduated under the national education system. The program offers 16 courses in 27 Malaysian Institute of Teacher Education (IPGMs) throughout the country in accordance with the approval of the Cabinet on July 31st, 2005 in which agreed to upgrade the college to a teacher education institution that may award first degree. The program was first offered in June 2005 and 2000 students were selected whereby they are required to attend a preparatory course for three semesters at IPG which is set as a prerequisite for the PISMP program.

---

\* Corresponding author. Tel.: +6-019-4754543; fax: +6-04-9772743.  
E-mail address: tajul1968@yahoo.com

Officially the first cohort PISMP program began in January 2007 intake. The students will be awarded the degree with honors after finishing 8 semesters of their study (Division of Teacher Education 2008; Mohammed Sani, 2007).

Teacher Education Division (2009) has requested Bachelor of Teaching (PISMP) students to provide a portfolio of professional practice involving school-based experience, teaching and internship. The purpose of the portfolio is firstly to document the skills and knowledge through experience in professional practice. It means that the portfolio of professional practice must identify each student's ability. Secondly, as a platform of communication between students (trainees), lecturers and mentors. It means the portfolio must be useful media for bilateral relation between the trainees, lecturers and mentors to each trainee they supervised. Thirdly is professional development of trainees. Portfolio has a goal of reviewing the progress / development of each student's ability in a teaching period. Fourthly, provide space room for the trainees student teachers to reflect and gain new knowledge and experience. The existence of the portfolio provides an opportunity for each student to improve and advance enhance their knowledge on the development of the discipline / science time. Fifth, develop and document the process of gathering information in a systematic and professional manner. Although the use of ICT in education provides many advantages but its implementation in the teaching and learning process is not as easy as expected (Coutinho & Bottentuit Junior 2008; Gathercoal et al. 2005; Sidin & Mohamad, 2007). Following the improvement in the quality of teachers, the rapid development of the country's industrial development and information technology can help improve the use of conventional technology and innovation towards upholding world class education system and human capital development of students (Ahmad & Tamuri, 2010). Rapid changes in the education system in Malaysia are the impact of globalization in the field of information technology and such impact catalyzes the employing of computers in teaching and learning process (Kamarul Azmi et al., 2011). These changes have resulted in a variety of applications in which created the opportunities to advancing human life.

Various applications involving development of information technology has been used for the successful transformation of education. As an improvement to the use of common portfolio, electronic portfolio has been widely used in teacher education programs (Ayan. D. & Seferoglu. G 2011; Soyoz 2010). Electronic portfolios have created variations and articulation of learning through a variety of electronic sources including power point presentations, sound, images, photographs, videos, etc. (Hartnell-Young and M. Morris, 2007). The advantages of e-portfolios in developing competency in teachers include (a) develop an understanding of the production of effective teachers, (b), develop methods and instructional activities, (c), enhance grammatical skills, (d), to facilitate an understanding of the lesson content, (e), enhance ICT skills, and (f), to realize a change in thinking (Muhammad Kamarul. K. & Mahbub. AK, 2012). Soyoz (2010) states in teacher training and development, e-portfolios are used as a platform to showcase their work, skills, efficiency and creativity of teachers to have an online space to help teachers plan their development, using information technology effectively and provide a positive impact on students. Mayfield and Mitchell (2009) found that by documenting their skills and professional development, e-portfolios facilitate ongoing performance reviews, recognition of prior learning and reflection on professional reading. The main advantage of e-portfolio is the ability to integrate the material in the formats and multimedia environments and enables connections between formal and informal learning. e-portfolio has been introduced into the teacher education program in order to replace the traditional portfolio and to promote cooperative learning by creating a line of communication and collaboration between pre-service teachers with mentor teachers and supervisors (Queirós et al., 2010). Barrett (2007) noted changes in traditional paper-based portfolio of web-based electronic portfolio, the focus should be on supporting and influencing the purpose of the portfolio, with emphasis on the portfolio as a way to carry out an evaluation. e-Portfolio is one of the latest valuation techniques for new learning environment in which students present artifacts, products and projects in progress in their learning process, especially for project-based learning, e-portfolio is one of the best valuation techniques that can be used (Gulbahar & Tinmaz 2006).

Kim and Baylor (2008) expressed concern of pre-service teachers in adapting the technology that involves awareness of the existence of technology, information on the technology, capabilities and roles, technical challenges, the influence of technology on students and collaboration with partners. Electronic portfolio is the biggest innovation in educational technology shows a system across a range of disciplines, institutions and

applications (Lorenzo and Ittelson, 2005). Teo (2008) suggests the future research include a systematic examination of all aspects of teacher education and interaction to obtain the optimum effect on pre-service teachers, acceptance, and use of computers as tools for teaching and professional development. Use of e-portfolio is able to improve the accountability and management Practicum unit in each IPG Kampus in order to improve the implementation of the Professional Practice advisor to teacher trainees. The use of e-portfolios in education programs had supported the philosophical rational of education in the learning and the development of students' professionalism. Moreover in faculty of education, e-portfolio use is legal accountability process and allows lecturers to charting the development of students over a four-year course (Pelliccione et al., 2005).

### Research conceptual framework

A frame or model in need in order to develop an e-portfolio advisor to Professional Practice PISMP. The development of e-portfolios requires an appropriate model to meet the needs of the education system (Albert 2006; DiMarco 2006; Hartnell-Young, 2007). The Learning Portfolio Model (Zubizarreta 2009) and The Assessment Triangle model (Pellegrino et al., 2001) is adopted and adapted to Malaysia in the development process model of e-portfolio advisor to Professional Practice. IS Success Model from DeLone and Mclean (1992), adapted to test the e-portfolio model produced illustrated in Figure 1.1 below.

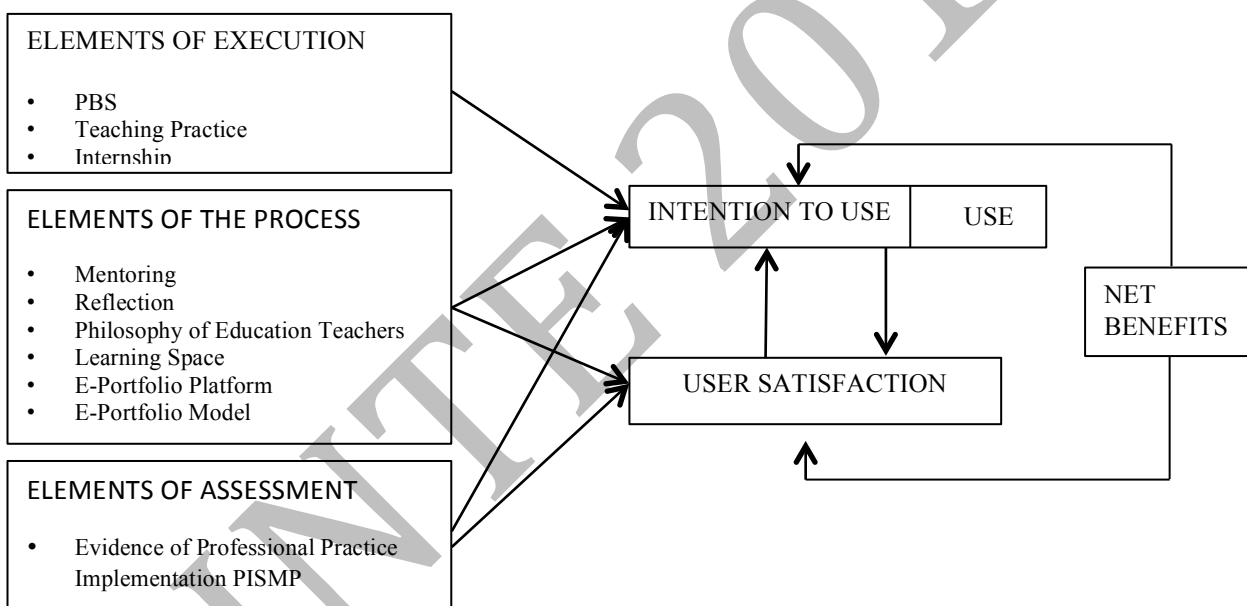


Fig 1: Conceptual Framework of the study

The main motive in the learning portfolio is to enhance student learning by providing a systematic structure to students from time to time to develop talents, skills, and dispositions toward critical thinking (Zubizarreta, 2009). Therefore, he stated three basic components, namely collaboration, documentation and reflection. Evaluation is the process of reasoning the evidence presented in the portfolio advisor to the Professional Practice of existing RBT. The Assessment Triangle introduced in the evaluation process with three main components, namely cognitive, observation and interpretation (Pellegrino et al., 2001). Cognitive refers to the thinking and learning of the subject domain, observation involves the tasks and activities of students and the interpretation is a process or method of preparation of evidence. Testing the elements of the e-portfolio model Professional Practice using the model of IS Success developed by DeLone and Mclean (1992) to examine the relationship between the variables. Balaban et al.(2013) state model of IS Success is an appropriate theoretical framework for assessing the success of an e-portfolio system. There are three key elements in developing a model of e-portfolio advisor to the Professional

Practice, but in this concept paper will only discuss about the implementation elements and processing elements. Six key factors in the processing elements include mentoring, reflection practice, Philosophy of teacher education, learning space, Platforms e-portfolio and available e-portfolio model.

### **Process elements**

Six key factors in the process element of Professional Practice PISMP of e-portfolio model include mentoring, reflection practice, Philosophy Teacher Education, learning space, Platforms e-portfolio and available e-portfolio model.

#### *Mentoring*

Mentoring in teacher training, especially teacher training is a process of personal development that requires the involvement and commitment of the mentor and mentee (student teachers). According to Hezlett (2005), in the beginning mentee will learn through observation related matters, then through explanation or description from the mentor and by interaction with mentors who are also using a variety of approaches to study it. The feedbacks from a mentor or mentors are very important to enable the student teachers to re-evaluate and improve their teaching practices (Hudson et al. 2005; Jarvis et al., 2001). Mentoring in teacher education involves personal interaction complex "carried out under different conditions in different schools and undefinable" (Wildman et al. 1992). Without an agreed definition, the development of the knowledge base in education mentor becomes irregular (Hiiffman & Leak, 1986). However, developments in the world of education to facilitate the development of the role of mentor and clarify issues related to mentoring. Most importantly, the relationship one-to-one with a mentor should be focused on the needs of the mentee (Soutter et al., 2000).

#### *Reflection*

Reflection is the process of thinking, analyze problems, reasoning, recommendations and actions to improve the application where the reflection in teaching practice will improve their ability to evaluate and improve the process of teaching (Brockbank & McGill, 2007). Reflection thinking can be enhanced by the effort and intense focus among student teachers through a tool that is capable of triggering and encouraging them to think critically as observation, discussion with peers, and portfolio development. Reflection is the "heart and soul" of a portfolio, and is essential for brain-based learning (Brockbank & McGill 2007; Kolb 1984; Zull 2002) in which the development strategy is needed to support reflection towards improving the learning process (Barrett 2010).

#### *Philosophy of Teacher Education*

Philosophy of Teacher Education (FPG) was enacted in 1982 as a guide in the implementation of the National Philosophy of Education to outline the types of teachers needed by the State our country. (Tajul Ariffin & Mohammed Sani, 2007). Statement of Teaching Philosophy Teachers are as follows:

"Teachers who are honorable, positive and scientific-looking, ready to uphold the aspirations of the nation and honor the cultural heritage of our country State, to ensure the development of individuals and preserve a community that is united, democratic, progressive and disciplined"

The main goal of the Philosophy of Teacher Education is to produce teachers who possess professionally, high resilience, ethical, creative thinking, practice values, skillful and technology oriented. Analysis of the Philosophy of Education Teachers to be applied in the e-portfolio model must be viewed from two perspectives, namely the branches of philosophy and the elements contained therein. Among those present in the branch of philosophy is metaphysics, epistemology, logic and axiology.



### *The learning spaces*

The learning environment represents the vision and philosophy of the institution is closely related to educational and learning spaces. The vision of a learning environment of educational institutions in which they account for learning spaces including students and educators in implementing the plan to achieve the learning goals. In addition, the learning space should reflect the values and strategic direction, and proactive, but, despite growing educational institutions, they are bound by budget reduction, concerns on the lack of student enrollment, and the seating capacity in its class (Harvey & Kenyon 2013). Nunez et al. (1998) specifies the virtual learning is the technique learning environment that uses computers where students can get all necessary information and then summarize the four key elements in the development of a virtual learning space knowledge, collaboration space, a consulting and space experiments. Virtual learning space designed to support and enhance the learning process by offering a space for presenting documents, room for a discussion forum, chat room, choice of communication and etcetera's. This web-based learning environment allows students to undergo a process of learning without limits of time and place to access program information, course content, teacher aid, document sharing and learning system (Pereira et al., 2000; Van Raaij & Schepers, 2008). Overall it can be concluded that the concept of learning spaces will provide benefits in the development process of e-portfolio model PISMP RBT and an emphasis on the factors: (i) the freedom of his trainees to access unlimited time and distance; (ii) a discussion between student teachers and lecturers; (iii) documents handling in order for them to graduate.

### *e-Portfolio Platform*

The process of developing an e-portfolio requires a platform or device used as foundations for the e-portfolio to be developed. There are a number of different platforms that can be used to create an e-portfolio, from free online platform until a comprehensive management system e-Portfolio. Choosing a platform for ourselves is very different from choosing a tool for community or organization (Epic Newsletter 2012). Accordingly, the selection of an e-portfolio platform professional practice takes into account suggestions and (Ittelson Lorenzo, 2005) and (Sweat-Guy & Buzzetto-More, 2007) has identified four types of electronic portfolio platform and explain the pros and cons of each option as follows: (i) Local Portfolio (homegrown portfolio) is one created by the institution and tailored to meet the unique needs of the institution, however, the creation process can be expensive, time consuming, and onerous, (ii) portfolio of open source is one that is provided without payment and the source code is available for customization. Open source is risky portfolio where developers or institutions to bear the cost that may come from the need for customization, support, or upgrading the e-portfolio, (iii) Commercial Portfolio (Commercial portfolio) can be bought from vendors, are well developed, including technical support, however, it may be more expensive to purchase support services, and (iv) the common software created using software such as Front Page, MS Word, MS Publisher, and / or PowerPoint to support the creation of an electronic portfolio. The cost is reasonable but this software is the most difficult for students to design portfolios though it can be a simple structure.

### *e-portfolio model*

Bhattacharya and Hartnett (2007) found that the design and development of e-portfolios require a suitable platform which is to provide an integrative learning, where students can describe the relationship between the concepts they have learned to real-life situations. Three models of e-portfolios serve as the basis of the construction process indicators and the development of e-portfolio model namely PISMP Professional Practice advisor to this, the 21st Century model portfolio (Barrett, 2007) pentagonal model of e-portfolio (Buzzetto-More & Alade, 2008) and model Ufolio was developed by (Me & Wen-Chih 2011). 21st Model of Century Portfolio was developed by Barrett (2007) focusing on four elements in the development of e-portfolios as learning and innovation skills, information technology skills, life skills and career as well as the core subjects and 21st century themes. These elements include the areas of standards and assessments, curriculum and instruction, professional development and learning spaces. Model of Pentagonal e-portfolio developed by Buzzetto-More and Alade (2008) introduced the five stages of e-portfolio and used to develop an e-portfolio in the business of higher education programs and career planning in the

United States. The five stages of the model consist of (i) to identify the needs, (ii) the determination of expenditures, (iii) planning and selection, (iv) development and (v) development and implementation. Ku and Wen-Chih (2011) has developed an e-portfolio model, Ufolio, as a platform for learning and assessment system. Three key objectives outlined in the production Ufolio namely: (i) to produce a multi-purpose portfolio, (ii) learning environment everywhere and (iii) produce a variety of evaluation systems for teachers and students.

### **Elements of execution**

#### *School Based Experience*

School Based Experience Assessment (PBS) is one of the components for the Professional Practice Bachelor of Teaching Ministry of Education. (Teacher Education Division, 2009). The implementation of PBS can provide early insight into student teachers about the school environment from the perspective of a teacher. PBS also provides an opportunity for students to understand the school as an educational institution, the role of the teacher in the classroom through observation, analysis of documents, reflections and interactions with teachers and school community.

#### *Teaching Training*

Practicum or teaching training is an important and necessary component in teacher training. Practicum gives students the opportunity to practice the knowledge, skills and values for reflective teaching in actual classroom situations (Division of Teacher Education. 2009; Fallin & Royse 2000, Lydia 2007; Nor Azian 2011; Comments Zohara. 2011). University of Alberta (2012) using the 'Collaborative School Model' during teaching practice by combining four essential components of professional students, teachers acting as mentors, school administrators, university professors as facilitators in order to strengthen teaching practice. Integration of certain components such as pre-teaching in teacher training and experience in the inside and outside classroom exposure, technology adaptation and development of personality traits that conforming to teaching profession can help the ministry to produce professional teachers.

#### *Internship*

Internship is a professional transition stage which has the objective to correlate during PBS and practicum experience from professional teacher student to fresh professional teacher (Teacher Education Division. 2009). Karen and Dennis reported that internship experience from rural school able to develop confidence and new knowledge as respect to the experience that they have gained. Kathryn et al., (2011) found that the experience obtained from internship programmed gives them useful exposure and valuable experience in their development as a perfect teacher student. Internship involves skills usage, knowledge and goals to be achieved in school. Student teachers should develop their intern through practice so that they can reach a level where they find themselves productive and ready for any challenge in school with minimum monitoring.

### **Conclusion**

Integration of e-portfolios in education field contributes to the variation of learning process and evaluation aspect of course work. Turhan and Demirli (2010) describes recent development in computer technology has transformed traditional portfolio using handwriting to electronic environment. Despite having all features of traditional portfolio, e-portfolio is more informative and comprehensive in enhancing student population. Goldsmith (2007) discusses some advantages of e- portfolio as respect to traditional portfolio. E-portfolio reduces significantly usage of files, flexible, manageable and accessible. These advantages become key points in their rapid progress in recent year. Genc and Tinmac (2010) found that the e-portfolio based assessment becomes more important in online based

learning. The student teachers should possess high level of skills, abilities, and knowledge in all important aspects include development, application and evaluation. When an organization chooses to apply e-portfolio, it is important to define and understand concepts and e-portfolio elements needed to meet with organization objectives. (Sweet-Guy & Buzzetto-More 2007). The process of designing e-portfolio that integrates technology requires very detailed planning. Hence, a detailed development model is crucial to ensure that under developed e-portfolio meet the needs of teaching community and education institutions. The process of creating e-portfolios that integrate technology, it requires very careful planning. Hence the development of a detailed model is needed to ensure the e-portfolio developed to meet the needs of consumers, and educational institutions.

## References

- Ahmad, S. F. & Tamuri, A. H. 2010. Persepsi Guru Terhadap Penggunaan Bahan Bantu Mengajar Berasaskan Teknologi Multimedia Dalam Pengajaran J-Qaf. *JIAE: Journal of Islamic and Arabic Education* 2(2): 53-64.
- Albert, K. A. 2006. An E-Portfolio Model for Learning, Assessment, and Employment in Teacher Education At. Tesis University of Delaware.
- Ayan, D. & Seferoglu, G. 2011. Using Electronic Portfolios to Promote Reflective Thinking in Language Teacher Education. *Educational Studies* 37(5): 513-521.
- Bahagian Pendidikan Guru. 2008. *Buku Panduan Program Ijazah Sarjana Muda Perguruan Dengan Kepujian Sesi 2007/2008*. Kemeterian Pelajaran Malaysia.
- Bahagian Pendidikan Guru. 2009. *Garis Panduan Amalan Profesional Program Ijazah Sarjana Muda Perguruan Dengan Kepujian*. Putrajaya Bahagian Pendidikan Guru.
- Bahagian Pendidikan Guru. 2010. *Dokumen Standard Guru Malaysia*. Kementerian Pelajaran Malaysia.
- Balaban, I., Mu, E. & Divjak, B. 2013. Development of an Electronic Portfolio System Success Model: An Information Systems Approach. *Computers & Education* 60(1): 396-411.
- Barrett, H. C. 2007. Researching Electronic Portfolios and Learner Engagement: The Reflect Initiative. *Journal of Adolescent & Adult literacy* 50(6): 436-449.
- Byrne, B. M. 2013. *Structural Equation Modeling with Amos: Basic Concepts, Applications, and Programming*. Routledge.
- Coutinho, C. P. & Bottentuit Junior, J. B. 2008. The Use of Web 2.0 Tools to Develop E-Portfolios in a Teacher Training Program: An Exploratory Survey.
- Delone, W. H. & Mclean, E. R. 1992. Information Systems Success: The Quest for the Dependent Variable. *Information systems research* 3(1): 60-95.
- Dewan Bahasa Dan Pustaka. 2005. *Kamus Dewan Edisi Keempat*. Empat, Dewan Bahasa dan Pustaka.
- Dimarco, J. 2006. *Web Portfolio Design and Applications*. Idea Group Publ.
- French, P., Ho, Y. & Lee, L. 2002. A Delphi Survey of Evidence-Based Nursing Priorities in Hong Kong. *Journal of Nursing Management* 265-273.
- Gathercoal, P., Love, D. & Mckean, G. 2005. Establishing the Culture and Realizing the Promise of Webfolios in Education. *Journal of Interactive Instruction Development* (17):3-18.
- Gene, Z. & Tinmaz, H. 2010. A Reflection of Preservice Teachers on E-Portfolio Assessment. *Procedia-Social and Behavioral Sciences* (9):1504-1508.
- Goldsmith, D. J. 2007. Enhancing Learning and Assessment through E-Portfolios: A Collaborative Effort in Connecticut. *New Directions for Student Services* 2007(119): 31-42.
- Gulbahar, Y. & Tinmaz, H. 2006. Implementing Project-Based Learning and E-Portfolio Assessment in an Undergraduate Course. *Journal of Research on Technology in Education* 38(3): 309.
- Hair, J., Black, W., Babin, B. Y. A., Anderson, R. & Tatham, R. 2010. *Multivariate Data Analysis. A Global Perspective*, Pearson Prentice Hall.
- Hair Jr, Joseph F Black, William C./Babin, Barry J./Anderson & E., R. 2010. *Multivariate Data Analysis, a Global Perspective*, . 7th. Boston: Allyn and Bacon.
- Hartnell-Young, E. 2007. *Digital Portfolios: Powerful Tools for Promoting Professional Growth and Reflection*. Corwin-volume discounts.
- Hartnell-Young, E. & M. Morris. 2007. *Digital Portfolios: Powerful Tools for Promoting Professional Growth and Reflection*. 2nd. Thousand Oaks, CA: Corwin Press.
- Helmer, O. 1983. *Looking Forward : A Guide to Futures Research*. Beverly Hills: Sage Publications.
- Kamarul Azmi, J., Mohd Faez, I., Ab Halim, T. & Mohd Izham, M. H. 2011. Amalan Penggunaan Bahan Bantu Mengajar Dalam Kalangan Guru Cemerlang Pendidikan Islam Sekolah Menengah Di Malaysia. *JIAE: Journal of Islamic and Arabic Education* 3(1): 59-74.
- Kementerian Pelajaran Malaysia. 2012. *Pelan Pembangunan Pendidikan Malaysia 2013 - 2025*. Kementerian Pelajaran Malaysia.
- Kim, C. M. & Baylor, A. L. 2008. A Virtual Change Agent: Motivating Pre-Service Teachers to Integrate Technology in Their Future Classrooms. *Educational Technology & Society* 11(2): 309-321.
- Lorenzo, G. & Ittelson, J. 2005. An Overview of E-Portfolios. *EDUCASE Learning Initiative, Çevrimiçi sürüm* (9):2011.
- Mayfield, G. & Mitchell, P. 2009. Me, My Future and My Technology. *ALLA National Library and Information Technicians conference 2009, Adelaide Convention Centre*. [http://educationau.edu.au/jahia/webdav/site/myjahiasite/shared/papers/alia\\_tech\\_confMM.pdf](http://educationau.edu.au/jahia/webdav/site/myjahiasite/shared/papers/alia_tech_confMM.pdf). Accessed May, hlm. 2010.
- Mohammed Sani, I. 2007. Evolusi Pendidikan Guru Di Malaysia. Dlm. Norzaini Azman. & Mohammed Sani, I. (pnvt). *Profesion Perguruan*, hlm. 23-54. Bangi: Fakulti Pendidikan.

- Muhammad Kamarul. K. & Mahbub. A.K. 2012. Assessing Pre-Service English Language Teachers' Learning Using E-Portfolios: Benefits, Challenges and Competencies Gained. *Computer & Education* (58):1007-1020.
- Noar, S. M. 2003. The Role of Structural Equation Modeling in Scale Development. *Structural Equation Modeling* 10(4): 622-647.
- Pellegrino, J. W., Chudowsky, N. & Glaser, R. 2001. *Knowing What Students Know: The Science and Design of Educational Assessment*. National Academies Press.
- Pelliccione, L., Dixon, K. & Giddings, G. 2005. A Pre-Service Teacher Education Initiative to Enhance Reflection through the Development of E-Portfolios. *Balance, fidelity, mobility: Maintaining the momentum in proceedings of the 22nd Annual Conference of the Australasian*, hlm.
- Queirós, P., Silva, P., Martins, I. & Matos, Z. 2010. Using Technology in a Pre-Service Teacher Education Program in University of Porto: An Experience with E-Portfolios. *EDULEARN10 Proceedings* 1999-2004.
- Sidin, R. & Mohamad, N. S. 2007. Ict Dalam Pendidikan: Prospek Dan Cabaran Dalam Pembaharuan Pedagogi. *Jurnal Pendidikan Malaysia* (32):139-152.
- Soyoz, S. 2010. The Pros and Cons of E-Portfolios in Pre-Service Teacher Training *eLearning Papers*. 2010 (10): 2.
- Sweat-Guy, R. & Buzzetto-More, N. A. 2007. A Comparative Analysis of Common E-Portfolio Features and Available Platforms. *Informing Science: International Journal of an Emerging Transdiscipline* 4(1): 327-342.
- Teo, T. 2008. Pre-Service Teachers' Attitudes Towards Computer Use: A Singapore Survey. *Australasian Journal of Educational Technology* 24(4): 413-424.
- Turhan, M. & Demirli, C. 2010. The Study on Electronic Portfolios in Vocational Education: The Views of Teachers and Students in United Kingdom, Denmark, Romania and Turkey. *Scientific Research And Essays* (5):1376-1383.
- Turoff, M. 1975. The Policy Delphi. Dlm. Linstone.H.A. & Turoff.M (pnyt.). *The Delphi Method : Techniques and Application*, hlm. 80-96. Reading: Addison Wesley.
- Zubizarreta, J. 2009. *The Learning Portfolio: Reflective Practice for Improving Student Learning*. John Wiley & Sons.

# "Ethics and Ethic Codex in the Teaching Process."

"Katarína Nováková"

*"Department of ethnology and world studies, Faculty of Arts, University of Ss Cyril and Methodius, Trnava Slovakia, katarina.novakova@ucm.sk"*

---

## Abstract

The author discusses the current situation in research ethics, interpretation of research results and implementation of ethic codes in the teaching of ethnology and cultural anthropology in Slovakia. Research ethics is a hot topic constantly resonating in the teaching process and research work of universities. We feel that ethics in ethnology and in the academic setting has not been paid as much attention as it requires and deserves at present.

The issue of ethics has two levels in the field of ethnology – on the one hand, it can be a subject of its research interest and on the other, the principles of ethics should be an inseparable part of all stages of research for an ethnologist – from the selection of research problem through field research, its processing, to final interpretation and publication of the results.

The research of the issue of research ethics in Slovakia began at the beginning of the 1980s. After the political and economic changes in 1989 previously marginalized or taboo topics were opened through the optics of ethics. The needs of education at the university departments of ethnology, the work with archive materials, the requirements of various scholars, media or people interested in information about the traditional culture which is available at the academic or pedagogical institutions inevitably lead to a formulation and acceptance of rules at this field. And finally, the declaration of adherence to rules of ethics is a complementary part of projects applying for a support from abroad.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* "Ethics; ethic codex; ethnology; Slovakia; teaching process"

---

## Main Text

This paper is divided into two parts. In the first part, we summarize the activities in this field with the emphasis on the existing activity of Slovak Ethnological Society (NSS) and the current state of affairs of preparation of ethical codex of the Slovak Association of Social Anthropologists. (SASA). In the second part we focus on the specific application of issues of research ethics, and interpretation of research results from the viewpoint of education at individual ethnology departments in Slovakia as they are available in public domains such as department websites and other materials.

As far as research is concerned, the issue of ethics was opened at the beginning of the 1980s. After the political and economic changes in 1989 new, previously marginalized or taboo topics were opened through the optics of ethics. The need to pay attention to various aspects of ethics in ethnology was initiated by the case of a "Roma history book" (Mann, 2001). It was a textbook that became infamous as the first banned book in Slovakia after 1989. The chronology and analysis of this "case" were a topic of a bloc of articles in *Etnologické rozpravy*, a journal of Slovak Ethnological Society. The case was initiated by a reaction of one of the descendants of great Roma musicians, who was by the author of the textbook presented as a positive example worth following. The agency, Plenipotentiary for the Protection of Personal Information in Computer Systems, became involved in the case and for a period of time, distribution of the book to bookshops was stopped.

On the other hand, renewed discussion about ethical questions in science was associated with repeated critical reflection of scientific discipline and followed up to the previous ideas from the 1960s and 1980s. In these thoughts

about the state of the discipline, questions came to the forefront about the moral responsibility of a scientist towards the object of knowledge which, in the case of ethnology is represented by concrete people, social groups and societies (Kiliánová, 2010). The focus on ethical questions in ethnology can be associated with a number of initiatives which were at the same period established at international forums and global institutions. The European Group on Ethics in Science and New Technologies was founded in 1998 and it advises the European Commission and similarly, since 1998 there has been UNESCO's programme of Ethics of Science and Technology.

In 2000, the academic journal *Slovenský národopis* published a Slovak translation of the *Code of Ethics of American Anthropological Association* as a first attempt to open this previously neglected topic in the academic forum. The *Code* addresses the issues of ethics from the viewpoint of: 1. Research, 2. Educational process, 3. Application and, most importantly, it is of recommending, not sanctioning character. In 2002 in Svidník (East part of Slovakia), the 15th General Assembly of NSS took place, where a separate panel was held on the topic of ethics in ethnographic research. The following issues were discussed (Hlôšková and Nováková, 2014):

- the influence of changes after 1989 on the paradigm and methodology of the discipline
- the change of the position of the ethnologist – researcher towards the object of research and the “contractor” of the research
- the change of relation of researcher as well as academic and cultural institutions to the information resources acquired by ethnological research
- the change of relation to informants regarding the publication of information acquired from them
- changes in legal environment, particularly the existence of Protection of Personal Data Act
- generational change in society and also a change in the level of education, overall breadth of vision, preferences of values and expectations of the informants
- changes in objects of research such as character and impact of transformation processes on rural areas, issues of poverty and its ruralisation, minority issues and group identities, ethnicity, nationalism and ethnic conflict, holocaust, causes and consequences of social structure changes, local elites, confessional division of society, socio-cultural background of electoral behavior and political culture, social movements etc.
- in the framework of “new topics” – current issues of changing society interested in recent past which overlaps and significantly influences lives of contemporaries

As for legal aspects (Protection of Personal Data Act), the viewpoint of two elementary factors of ethnographic research has been pointed out:

- protection of informant (as a source of information)
- protection of academic institution and the discipline itself and the representation of its natural interests in relation to acquisition, processing, protection, use and publication of information and data acquired by ethnographic research. (Podoba, 2002).

The discussion pointed to a complexity and an uneasy acceptance of unambiguous rules of ethics of work in ethnology, for example with the issue of anonymization of informants or localities researched, “authorship” of folklore, validity of so-called informed consent, publication of acquired data etc.

And how about our “neighbors”? SASA – Slovak Association of Social Anthropology has been active in Slovakia for five years. Committee for Ethics is one of SASA's committees. According to the chairman of the association, the preparation of the Code of Ethics of SASA is in progress, but there is currently no deadline for either discussion about it among the members of SASA or its approval. Such state of affairs of ethics or ethical codex in Slovak ethnology is surely unflattering so it is crucial to take into consideration such issues as soon as possible.

Ethics in research as a current topic constantly resonates in the educational process and research work of university departments. We feel that ethics in ethnology is not given as much attention as it should deserve and requires in academia. Ethics in ethnographic research is one of the most important values and at the same time a norm which a researcher must follow in his/her work in the field and academic activity. According to Sirotová (Sirotová, 2014: 129 a n.), the educational process of a university has a significant and irreplaceable role in the

formation of the preference of values and value orientation of the students. If we want to influence the process of its formation, it is necessary to know which values students consider to be important in their lives.

Currently, there are four departments of ethnology/anthropology in Slovakia which offer degrees at all three levels – bachelor, masters and doctoral. These are the Department of Ethnology and Museology of Faculty of Arts, Comenius University in Bratislava, Department of Ethnology and Folk Studies of University of Constantine the Philosopher in Nitra, Department of Ethnology and Non-European Studies of Faculty of Arts, University of Saints Cyril and Methodius in Trnava and the Institute of Social Anthropology of Faculty of Social and Economic Sciences of Comenius University in Bratislava. These departments significantly differ in their specializations; however, they face the issues of ethics, ethical approach and ethical processing of gathered data from field research on a daily basis.

Courses named *Methods and Techniques of Research* (or different variants of the name) serve as a springboard and basis for fieldwork and research. These courses are usually taken in the first year of bachelor's degree. In higher grades, students face the issues of research and work with acquired material at various courses and seminars (such as thesis seminars or text seminars) as well as in their work on their graduation theses. In these courses, we try to familiarize our students with the issues of research ethics, pitfalls, current problems and trends. A discussion about ethical questions appears at every stage of work with students. Therefore we find it essential to involve the issues of ethics in the education and we feel an increasing need to discuss such issues with students not only in their lectures and seminar but also in larger forums, and more frequently.

One of the main ideas and values that should be followed in education and preparation of field researchers who work with informants and information is ethics and ethical approach. We try to explain to the students that as a researcher, a student works with people and publishes about people and therefore it is crucial to respect ethical rules of research. These are a norm of behavior, which the students should follow in their research work.

On the contrary to other countries (UK or USA), there has been no codification in Slovakia of a code of ethics of a researcher. This does not mean that students should conduct their research unethically. We inform them about the existing codes and organizations involved in research's ethical issues. In the above mentioned countries, these are the American Educational Research Association (AERA) and the British Educational Research Association (BERA).

For our needs, we formulate following minimal ethical principles which our students have to follow in their research:

1. Protection of the informant:
  - a) Voluntary participation of subjects in the research. The researcher cannot force the inquired persons to participate in the research. He/she cannot use open or hidden pressure to make them agree to participate in the research. (In the case of collective research projects, teachers check the voluntarily participation of informants, i.e. informants are chosen prior to the research or recommended by village officials, and/or teachers supervise the research and help in locating suitable respondents.)
  - b) Informing about the research. The researcher must, in an understandable way and to an adequate extent, inform inquired persons about their role in the research and temporal and other conditions of the course of the research. He/she will also inform them about how the results will be published. The student must clearly formulate why he/she is conducting the research, what are the goals and where the information will be available or published.
  - c) Written consent, or at least recorded consent, to the research and use of the data.
  - d) Protection of confidentiality of information about the participants. The researcher must consider personal information about the respondents to be confidential and cannot make it public in the research report or any other document. Among the confidential data are for example first or last names of the respondents, or the name of a business or institution. If the researcher needs to distinguish among the respondents, he/she will assign a code or a pseudonym to them.
2. Protection of information:
  - a) Correct processing of data by the researcher. The researcher cannot modify the data or selectively

leave out or forge any information. This is a frequent problem of the research reports and materials handed in by our students. They work with modified responses; they adjust the responses to their needs and necessary conclusions.

3. Responsibility to scientific community

- Under responsibility we understand so called ethical behavior in the field. By non-ethical behavior, a researcher can make further research impossible for their colleagues and build distrust towards the entire academic community

Always, and in every circumstance, we try to consider all requirements of the respondents. However, in many cases questions arise as to what level research ethics should be met and whether respondents should be informed about the details of the research – how the information would be used or published since it frequently complicates the situation and can make working with the data impossible. In several cases, the informants claimed that *“if it was just for you, for some academic articles, I don't care, but for a book about the village, where everyone can read it, no, I could get into trouble, though everything I said is true!”*

Publication of personal data, names of particular localities and respondents is questionable. In advance the respondents are briefed about the form of publication of their personal data and they have to consent to that form. One possibility of how to avoid troubles with the misuse of published data or protection of respondents is to anonymize the respondent, to use a pseudonym of the informant or locality.

We notify our students about this and we modify actual requirements and types of assignments. As far as materials from field research which are archived at the departments and are not accessible to public are concerned, full names, dates of birth, confessional religious?? affiliations etc. are listed only after written or oral consent of respondents. If the information is used in a graduation thesis, usually initials, dates of birth or sex are indicated, or indication male/female respondent (50 years); or just the number of the respondent with date of birth and sex is used. If necessary, occupation is indicated, rarely, if the topic requires it, also confessional affiliation. Graduation theses are uploaded to the Central Registry of Theses, information from them is available to general public so there is a possibility of a misuse of personal information.

This is why we should lead discussions with students about whether the researcher is just a “gatherer” or also a creator of data, and how research methods influence the character of data and information.

The needs of education at the university departments of ethnology, the work with archived materials, the requirements of various scholars, media or people interested in information about traditional culture which is available at the academic or pedagogical institutions inevitably leads to a formulation and acceptance of rules at this field. And finally, the declaration of adherence to rules of ethics is a complementary part of projects applying for support from abroad. ( At present, these are mostly: Act no. 428/2002 Coll on Protection of Personal Data, No. 602/2003 Coll., Act no. 576/2004 Coll. and Act. no. 90/2005 Coll. on Copyright and Rights Related to copyright amended in 2013).

## References

Mann, A. (2001): *Rómsky dejepis*. Bratislava: Kaligram.

Kiliánová, G. ( 2010): Terénny výskum a otázky etiky. In: *Doiserbia*. online:

<http://www.doiserbia.nb.rs/img/doi/0350-0861/2010/0350-08611002094K.pdf>. open 8.6.2014

Hlôšková, H.-Nováková, K. (2014): K stavu prípravy etického kódexu na pôde národopisnej spoločnosti Slovenska.

In: *Etika a etnologie*. Brno, in press

Podoba, J. (2002). Na okraj diskusie o využívaní informačných etnografických prameňov. In: *Etnologické rozpravy*, č. 2, s. 65-69.

Sirotová, M. (2014): *Vysokoškolský učiteľ v edukačnom procese*. Trnava: UCM.

*UNESCO Programme Ethics od Science nad Technology*



# Ethics Committees in Turkish universities

Subhan Eksioglu<sup>\*</sup> Hatice Beyza Mercan Sezer<sup>†</sup> Fatma Gozalan Cicek<sup>‡</sup>

<sup>a</sup>Sakarya University, Faculty of Education, Department of Educational Sciences, Hendek/Sakarya 54300 Turkey

<sup>b-c</sup>Gazi University, Gazi Education Faculty, Department of Educational Sciences, Teknikokullar/Ankara 06500 Turkey

---

## Abstract

Ethics committee's are committees which reviews and evaluates ethics related situations and events, and consists of members specialized in the field. Nowadays, ethics committees hold an important place in ensuring scientists conduct accurate studies and help construct a better future, and ensuring universities are of high quality and efficiency in terms of scientific study. In this regard, analyzing ethics committees in universities will be both helpful scientifically and also in giving a description of the current state of university ethics committees. Consequently, in this study, the number, variety and structure of ethics committees in 108 government and 71 foundation universities across Turkey were examined through their web sites. The result of such examination found that there was no set universal standard in ethics committees and that there were a huge variety of ethics committees. Starting from this point of view, university ethics committees need to be improved through both quantitative and qualitative research and a standard in regards to the scientific field they provide services to ought to be set.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* ethics, ethics committees, university

---

## 1. Introduction

Ethics in simple terms is the branch of knowledge that deals with moral principles. The word "ethics" originates from the Greek word "ethos" which means habit, custom or character. It can further be defined as the moral principles that govern a person's behavior or the conduct of an activity. In philosophy, ethics defines the responsibilities of individuals to themselves and towards society (that is, what is best for the individual and what is best for society) (Iskit, 2005). Ethics is a notion that we have heard often in recent years, one that continues to be debated in daily life and in almost all occupational groups. The ethics of public administration, ethics of medicine, ethics of informatics, work ethics, Professional ethics, legal ethics, environmental ethics, personal ethics, corporate ethics, bioethics, political ethics, information ethics, ethics of economy, ecological ethics, and peace ethics are just some notions of ethics used often in daily life (Aslan and Akay, 2012).

TUSIAD (2005) defines ethics as a living and organic study of individuals, and the continuously developing acts of judgment and reasoning like righteousness, goodness and justice, it is not a discipline that is stuck in the past. The main difference between the words ethics and character, which has often been used together as synonyms, is that the character of ethics is a branch of philosophy. Scientific thought does not need to be ethical. Ethics is not something that makes our job hard, rather, after many research, it is a philosophy of life (Inci, 2009). According to Yıldırım

---

<sup>\*</sup> Corresponding author. Tel: +902642956920  
E-mail address: eksioglu@sakarya.edu.tr

and Kadioğlu (2007), an ethics committee is “a formation which analyses and evaluates ethics related situations, processes and events from a broad perspective, and one which consists of nonhomogeneous members.” According to Ortaş (2004), ethics committees can be useful formations in universities in increasing scientific performance and quality. The Ethics Committee Instructions in universities have been prepared under the 14th and 42nd articles in statute number 2547. While some only note article 14, others note both articles 14 and 42 as the basis for the formation of ethics committees.

The structure of ethics committees in various Turkish universities have been expressed as follows:

*Anadolu University:*

- Five lecturers in the fields of health sciences, physical sciences, social sciences, educational sciences and fine arts and one vice-chancellor chosen by the senate forms the ethics committee.
- The period in office for ethics committee members is three years.
- Committee meetings take place under the presidency of the vice-chancellor.
- If found to be necessary, ethics committee can decide in forming sub ethics committees.
- The committee meets every month.
- When submissions are made to the committee, it is examined within 6 months and a conclusive report is prepared.
- The decisions of the ethics committee are based on qualified judgments. Statements regarding decisions made by the committee can be made by the rector's office.

*Ege University:*

- Five lecturers in various fields of study form the ethics committee. It is ensured that members of the ethics committee are not functional managers of the university. To deal with ethics issues involving students, a student council representative can be invited, and to deal with ethics issues involving administrative staff, the university general secretary representative can be invited for consultation.
- The period in office for ethics committee members is three years.
- Committee meetings take place under the presidency of the vice-chancellor.
- The committee meets if and when there is an application made or when there is demand.
- The decisions of the ethics committee are final and cannot be objected to.

*Hacettepe University:*

- Two members in each of the fields of science, health, fine arts, and social sciences, one member from the faculty of law and Hacettepe University Women's Issues Research and Implementation Centre (HÜKSAM), and one member from the university academic staff dealing with ethics or a professional in the field of ethics forms the ethics committee.
- The period in office for ethics committee members is three years.
- Academic ethics committee members choose from amongst themselves a president, vice president and a rapporteur.
- Upon the invitation of the president, the committee meets every two months.

*Middle East Technical University (METU):*

- In ODTÜ, there is the Research Centre for Applied Ethics. This body consists of a president, board of managers, and an advisory committee as its central unit.
- The Centre consists of three different units including human research, animal testing and Ombudsman.

*OMBUDSMAN:*

- The Ombudsman Office is open to all METU members (including students, administrative and technical personnel, professors and assistant professors and alumni), student families, individuals and institutions who work in the fields involving METU.
- The Functions of METU Ombudsman:
  - Deals with complaints. Listens to complaints, concerns, and misunderstandings, speaks to the right people when necessary, sets out and evaluates solutions to involved parties, and serves as an objective mediator when solving problems and misunderstandings.
  - Provides information. Provides information and resources regarding METU politics, processes,

services and programs.

- Serves as a consultant. Organizes information sessions regarding the workings of the Ombudsman Office and recommends changes regarding improvements to the stages applied at METU.

TUBA (2002) notes that according to the information gathered from world academics, in some countries, non-ethical behavior was addressed within a foundational body, for example, by university ethics committees. However in some countries like China, Holland and Sweden, there have been practices and searching for a universal information ethics committee. This type of committee needs to determine principles without going into the bureaucracy of the matter, and prepare necessary regulations, provide support to existing ethics committees, and to conclude non-ethical behavior that exceeds them.

The rate of success of ethical committees will increase when members are selected from amongst courageous and intelligent people who have experience and reputation in their field. In a research study conducted on 70 people in a state university in Ankara, Köklü (2003) asked the reason why non-ethical behavior was disclosed. One of the answers given was because of the existence of ethics committees in university faculties. According to Üstündağ and Durmuş (2012), for ethical principles and values to be embodied and adopted by society and in the workplace, ethical principles and values need to be examined in an environment open to debate, and they need to be adapted around existing problems. This can only be so if ethics committees are reach a level of quantity and quality. Consequently, in this research, the existence and quantity of ethics committees in Turkish universities aims to be examined.

## 2. Method

### 2.1. Method of Research

In the research examining the ethics committees in universities, a “descriptive survey model” was used. The descriptive survey model is a method of research that has been used in the past and one that is still being used today, one which portrays an existing situation exactly as it is. In research such as this, existing events and situations are researched in detail and such research is known as survey research (Erkuş, 2005).

### 2.2. Population/Sample

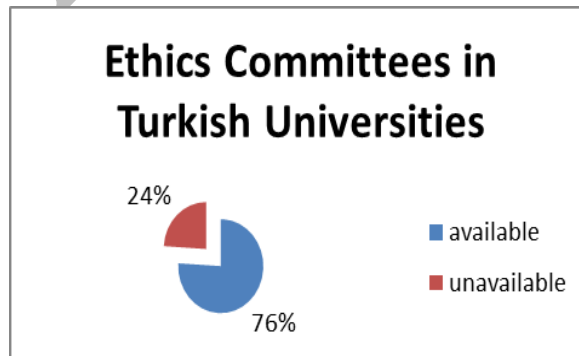
In the research that aims to examine the existence and quantity of university ethics committees, without analyzing the entire population, samples were not taken. Out of the entire population of universities, 108 are state and 71 are foundation universities.

### 2.3. Data collection tools

The existence, quantity, variety and structure of ethics committees were examined from the university websites and search engines.

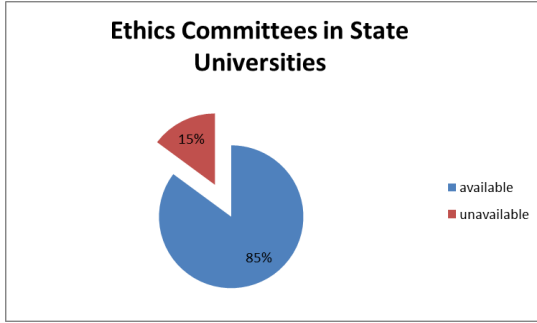
## 3. Findings

### 3.1. The availability of ethics committees

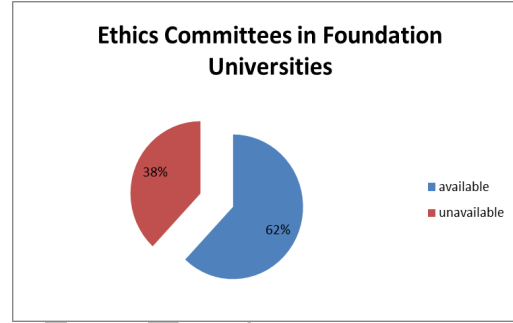


Graphic 1: The availability of ethics committees in Turkish Universities

There are 179 higher education institutions recognized by the Council of Higher Education (YÖK). As it can be seen graphic 1, out of the 179 higher education institutions, 136 (76%) have an ethics committee available, 43 (24%) do not have an ethics committee.



Graphic 2: The availability of ethics committees in state universities



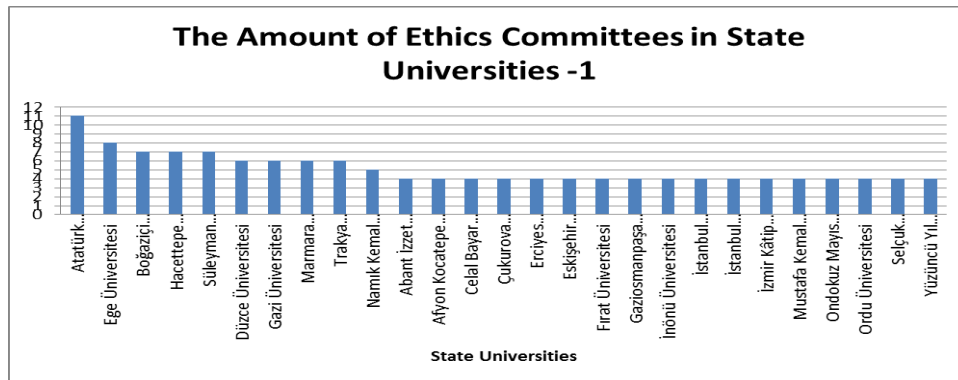
Graphic 3: The availability of ethics committees in foundation universities

In 108 state universities, 92 (85%) have ethics committees while 16 (15%) do not have ethics committees available (see graphic 2). As it can be seen in graphic 3, in 71 foundation universities, 44 (62%) have available ethics committees while 27 (38%) do not.

### 3. 2. The Amount of Ethics Committees

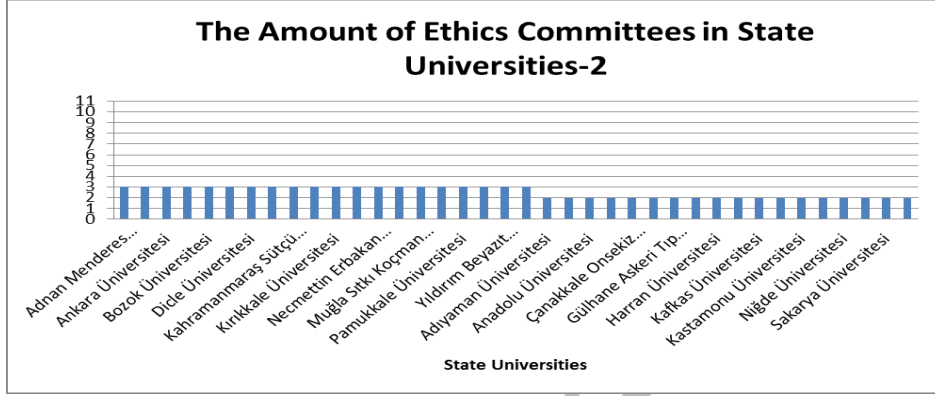
When the amount of ethics committees in both state and foundation universities were analyzed, 260 state universities had ethics committees available while 91 foundation universities had ethics committees available, which makes a total of 351 ethics committees.

#### 3.2.1. State Universities

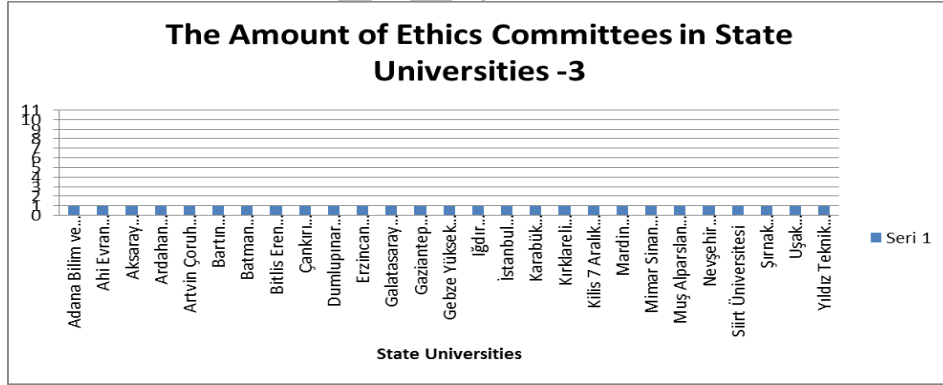


Graphic 4. The amount of Ethics Committees in State Universities -1

As it can be seen in graphic 4, from amongst 108 state universities, the university with the most ethics committees is Atatürk University with 11 in total. Following in second place with 8 committees is Ege University, followed by Boğaziçi, Hacettepe and SüleymanDemirel University with 7 ethics committees. Düzce, Gazi, Marmara and Trakya Universities had 6 ethics committees while Namık Kemal University had 5 ethics committees. In the following 17 universities 4 ethics committees were found.



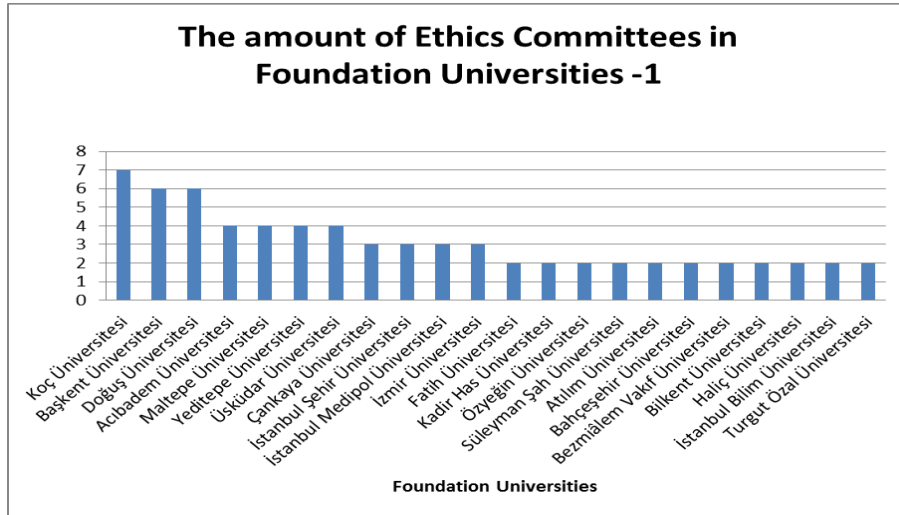
Graphic 4 (continuation): The amount of Ethics Committees in State Universities -2



Graphic 4 (continuation): The amount of Ethics Committees in State Universities -3

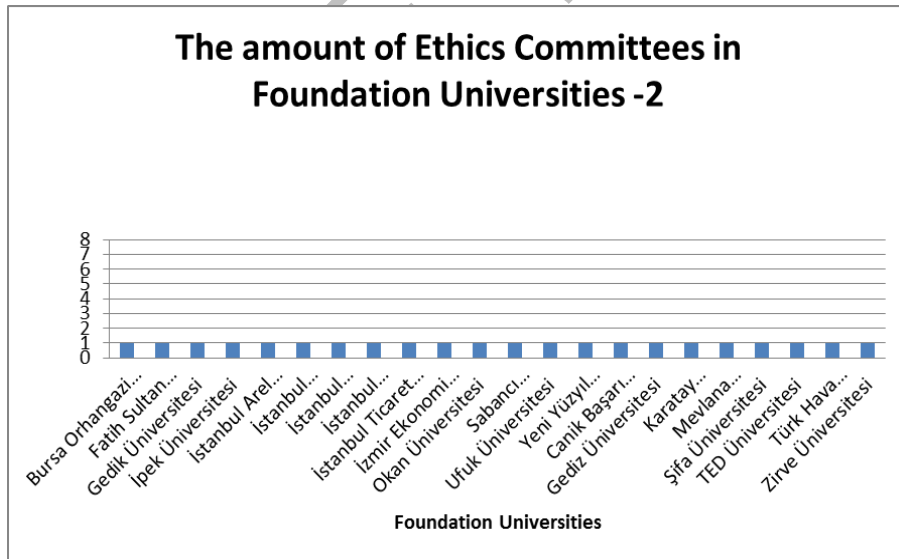
In 27 universities only 1 ethics committees was noted as available. In 16 universities no ethics committees were found.

### 3.2.2. Foundation Universities



Graphic 5: The amount of Ethics Committees in Foundation Universities -1

When graphic 5 is closely analyzed, it can be seen that amongst foundation universities, the university with the most ethics committee is Koç University. This university had 7 ethics committees. Following in second place with 6 ethics committees were Başkent and Doğuş universities. Acıbadem, Maltepe, Yeditepe and Üsküdar universities each had 4 ethics committees. In 4 foundation universities 3 ethics committees were found, and in 11 foundation universities 2 ethics committees were found.



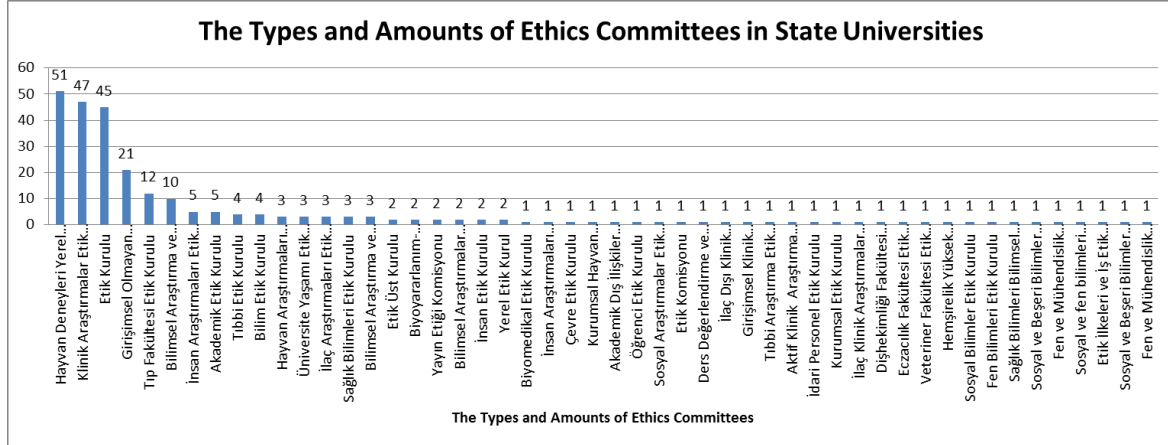
Graphic 5 (continuation): The amount of Ethics Committees in Foundation Universities -2

Once again as it can be seen in graphic 5, in 22 universities only 1 ethics committee was found. In the remaining 27 universities no committee was found.

### 3.3. Types of Ethics Committees

When ethics committees are analyzed from a variety point of view, in state universities 50 different varieties and in foundation universities 29 different varieties of ethics committees were found. When the total numbers of universities in Turkey are considered, a total of 55 different types of ethics committees can be found.

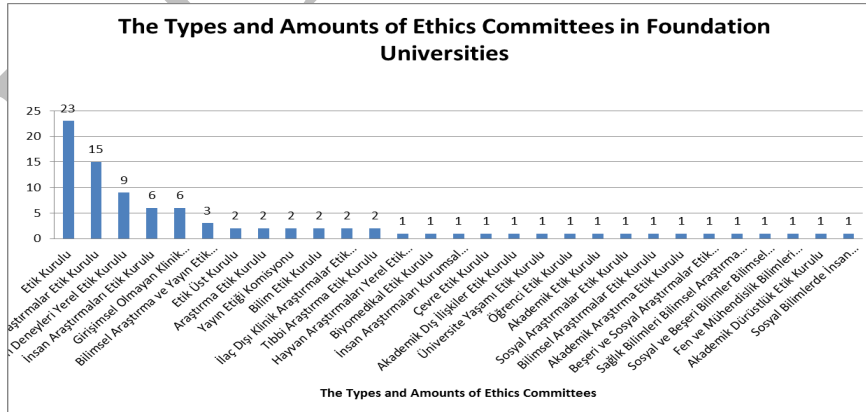
#### 3.3.1. State Universities



Graphic 6: The Types and Amounts of Ethics Committees in State Universities

In state universities, there are 50 different types of ethics committees in a total of 260 ethics committees. As it can be seen in graphic 6, the most common university ethics committee is the Local Animal Testing Committee (n=51). The Clinical Research Ethics Committee follows this with 47, ethics committee with 45, Non-invasive Clinical Research Ethics Committee with 21, Faculty of Medicine Ethics Committee with 12, Scientific Research and Broadcast Ethics Committee with 10. The remaining 44 types of ethics committees were 5 and below 5. The ethics committee with only 1 amount was noted as 29.

#### 3.3.2. Foundation Universities



Graphic 7: The Types and Amounts of Ethics Committees in Foundation Universities

As it can be seen in graphic 7, in foundation universities a total of 29 different types of ethics committees from among a total of 91 ethics committees were found. The most was found to be university ethics committee with 23. Following this was Clinical Research Ethics Committee with 15, Local Animal Testing Ethics Committee with 9, Human Research Ethics Committee and Non-invasive Clinical Research Ethics Committee with 6 each.

#### 4. Results and Comments

From the findings acquired, the following results were reached:

Generally speaking, the first striking result is the huge variety of ethics committees in universities. However, because most of these committees are similar to one another in regards to their structure and operation, it shows that there is no universal standard for ethics committees. As noted by Karakaya and Örs (1994), the most important role of professionals working in the field of ethics is categorizing ethics committees in a proper way and to ensure that committees are more understandable in nature.

The most common type of ethics committee found in Turkish universities is the “University Ethics Committee” (n=68). Following this is the Clinical Research Ethics Committee (n=62), Local Animal Testing Ethics Committee (n=60), and Non-invasive Clinical Research Ethics Committee (n=27). From these results it can be noted that university ethics committee being the most common means that university committees are more general in structure. In the ranking of committee types, general ethics committees being most common shows the important role of the faculty of medicine in initiating the opening of ethics committees. Parallel to this result, Iskit (2005) and Yıldızeli et al (2009) also note that the faculty of medicine gives the most support to ethics committees. According to Demir and Büken (2010), the ethics committees in Turkey becoming more structured after the publishing of “Management Regarding Medicine Research” in 1993 also supports the above results.

As emphasized in the research study by Kansu (2012), commitment to scientific and occupational ethics is indispensable for both the world of science and occupation. In this context, it can be considered that the amount of Scientific Research and Production Ethics Committees being a mere 3.7% (n=13) is the greatest deficiency that can be seen.

While the amount of ethics committee per foundation universities is 1.28, the amount is 2.40 in state universities. The reason why foundation universities have less ethics committees per university compared to state universities can be because most foundation universities are newly established and newly being structured.

Apart from these, some universities do not have detailed information regarding their ethics committees on their websites, and some do not have a website at all. The only way to understand whether a university has an ethics committee is through the help and instruction of ethics committees or through the member’s personal webpages. The reason for this could be because ethics committees are not compulsory for universities. Although according to Karakaya and Örs (1994), ethics committees are different to all other committees in that it has a structure that is more functional and active.

After detailed examination, it can be seen that there is no universal standard set for ethics committees and that there is a variety in the types of ethics committees in universities. Consequently, the ethics committees in universities need to be improved through quality and quantity, and they need to reach a universal standard in the area of service they provide.

#### 5. Recommendations

Following from these results, the following recommendations can be made:

- The uncertainty regarding breach of ethics need to be cleared.
- A universal and standardized discipline guidebook needs to be prepared regarding breach of ethics and scientific research principles.
- There must be work made towards the formation of a Universal Scientific Ethics Committee. Local ethics committees need to become standardized and audited.
- University ethics committees need to be independent. An example to follow could be ODTÜ ethic committee structure.



- Universities and institutions should give in-company education courses about scientific research ethics.

## References

- Aslan,G.,Akay,K. (2012). Etik Paranoyası. Multidisipliner Etik Kongresi.
- Erkuş, A. (2005). Bilimsel araştırma sarmalı. Ankara: Seçkin Yayıncılık.
- İnci, O. (2009). Bilimsel yayın etiği ilkeleri, yanıltmalar. Yanıltmaları önlemeye yönelik öneriler. Sağlık Bilimlerinde Sürekli Yayıncılık. 69-89.
- İskit, A.B. (2005). Etik kurulların oluşumu, gelişimi ve işlevleri. *Hacettepe Tıp Dergisi*. 36.129-134.
- Kansu,E.(2012). Bilimsel araştırma ve yayınlarda etik ilkeler.Multidisipliner Etik Kongresi, 50-54, Niğde.
- Karakaya,H. ve Yaman,Ö. (1994). Dünyada ve türkiye'de etik kurulları. *ANKARA TIP MECMUASI (THE JOURNAL OF THE FACULTY OF MEDICINE)* Vol. 47 : 713-722, 1994
- Köklü, N. (2003). Akademisyenlerin Araştırma Etiği Konusundaki Görüşleri. *Eğitim Bilimleri ve Uygulama*. 2(4),137-151.
- TÜBA(2002). Bilimsel Araştırmada Etik ve Sorunlar. Ankara:Türkiye Bilimler Akademisi Yayınları.
- TUSIAD(2005).Devlette Etikten Etik Devlete: Kamu Yönetiminde Etik. Cilt 1, İstanbul.
- Türkiye'deki üniversiteler listesi (2014).  
Erişim Tarihi,14 Mayıs 2014,[http://tr.wikipedia.org/wiki/T%C3%BCrkiye'deki\\_%C3%BChiversiteler\\_listesi](http://tr.wikipedia.org/wiki/T%C3%BCrkiye'deki_%C3%BChiversiteler_listesi)
- Üstündağ,N.,Durmuş,S.(2012). Etik kavramı ve türleri.Multidisipliner Etik Kongresi, 153-154, Niğde.
- Yıldırım, G.,Kadioğlu,S. (2007).Etik ve Tıp Etiği Temel Kavramları. C.Ü. Tıp Fakültesi Dergisi 29 (2): 7-12.
- Yıldızeli,A., Çolaklar,H.,Güneş,G.(2009).Web'den tıp fakülteleri etik kurullarının incelenmesi.  
<http://ueam.metu.edu.tr/ia-basvuru>, Available at: 04/30/2014  
<http://www.aek.med.ege.edu.tr/>, Available at: 04/30/2014  
<http://www.anadolu.edu.tr/kurullar>, Available at: 04/30/2014  
<http://www.etikkurul.hacettepe.edu.tr/>, Available at: 04/30/2014

# **EVALUATION OF THE CANDIDATE TEACHERS' PREPARING QUESTION EXPERIENCE BY USING ALTERNATIVE ASSESSMENT TECHNIQUES**

**Assist. Prof. Dr. İrfan ŞİMŞEK**

Istanbul University, Hasan Âli Yücel Faculty of Education, Computer Education and Instructional Technologies  
irfan@istanbul.edu.tr

The purpose of this study , alternative assessment methods used by teachers and to what extent teachers in this process is to identify the problems they face . For this purpose, Istanbul University, Hasan Ali Yücel Faculty of Education Measurement and Evaluation of studying and of course the teachers will be asked to prepare an alternative question. Questions square taking in the preparation process monitoring method using screen recording experience will be observed. In addition to this, teachers will be conducted semi-structured interviews with candidates. At the end of the study, all teachers can use effectively Experts Questions Alternative Preparation System will be obtained and will be made available to all teachers. As a result, teachers associated with alternative assessment methods for implementation of theoretical knowledge as well as practical information, including the granting of additional training will be offered. At the same time faculty members and to foster communication between teachers and the course will ensure that more effective and efficient.

# Evaluation levels in education

Vít Dočekal<sup>a\*</sup>, Miroslava Dvořáková<sup>b</sup>

<sup>a</sup> Palacký University, Faculty of Arts, Křížkovského 8, 771 47 Olomouc, Czech Republic

<sup>b</sup> Palacký University, Faculty of Arts, Křížkovského 8, 771 47 Olomouc, Czech Republic

---

## Abstract

The text discusses evaluation in adult education with the focus on further professional education. Selected models of evaluation, namely approaches to the models of evaluation, are introduced; separate phases of evaluation, their specificities and mutual interrelations are discussed in detail.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* Evaluation; evaluation models; anticipation of utilization; evaluation of learning; evaluation of behavior; evaluation of results

---

## Evaluation in Education

People always evaluate. Each of us evaluates the world around us all the time, we assess everything we come into contact with, including ourselves, from the perspectives of usefulness, efficiency, fairness, entertainment, acceptability, moral or esthetic standards etc. Human beings simply are like that – they cannot stop evaluating.

Just as we keep assessing everything around us in our everyday lives, so we practically constantly evaluate also the field of education. “The lecturer was pretty awful.” “Such a bore.” “Using the overhead projector was a good idea indeed.” “I didn’t get it at all.” “It was too hot in there.” “It was completely useless, I didn’t learn anything new at all.” “I made a pretty bad teacher today.” “It was the best lecture I have ever attended.” Many such statements we hear both from the participants and the lecturers and organizers of every educational program or course.

For the educators or performers of the educational activities, some of these evaluating judgements seem to be more important, some less. Their effort to assess the more important judgements and utilize them in planning and performing similar activities is called evaluation. Therefore, evaluation is understood as the act of assessing value of an educational activity according to specific criteria, as well as collecting and analyzing the information, based on which such assessment may be carried out.

## Approaches and Models of Evaluation

Already in 1930s did the social scientists start to apply accurate scientific methods for evaluation of social programs in various fields; during 1960 evaluation started to become institutionalized as an independent field of activities and its theory was established (Smith, 2006). By the end of 1960 Donald L. Kirkpatrick created his four-level model of evaluation applicable in the domain of corporate training, which is accepted as the basic tool for performing evaluation and as such has been utilized ever since. Kirkpatrick identified four levels of evaluation of educational program: (1) Reaction (2) Learning, (3) Behavior, (4) Results. Every level is based on the previous one and follows from the information gained in the previous level. This model offers the potential of a feedback exploitable for modifying the course or educational activity on several levels. At the level of Reaction we ask

---

\* Corresponding author. Tel.: +420-585-63-3658.

E-mail address: vit.docekal@upol.cz

whether the participants have enjoyed the activity; at the level of Learning we ask whether the participants have learned the contents explained. The level of Behavior is the actual transfer into practice, where the main question is, whether the graduate really applies the gained knowledge, skills and habits in his/her working life. In the last level we elicit, what Results this behavior brings to the given corporation. (Kirkpatrick & Kirkpatrick, 2006)

Kirkpatrick's approach states clearly the sequence of levels. Those are actually not only the levels of evaluation, but also the successive steps in any learning or training. Thus in the Kirkpatrick's model we find not only the sequence of levels of evaluation, but also the steps of the process of acquisition and applying knowledge or skills. First, the content imparted on us affects us and incites a Reaction. Then after the Learning process, when the content is acquired, the implementation follows, when we transfer the learned contents into the sphere of real Behavior. The outcome is the Results. It is hard to imagine that any of the steps could skip the preceding one; there are no Results without a Behavior (with learned content only), there is no Learning without a positive Reaction. Also an efficient change in Behavior cannot be caused only by the (a)effect of the Reaction. Therefore, this model can be utilized both from the perspective of evaluation itself, but also from the perspective of phases of learning and education, which strongly affect the outcomes of evaluation. These phases and reasons, which may influence the outcomes, will be closely discussed in the following text.

Several years later A. C. Hamblin created an alternative, however equally popular, five-level model. He basically adopted without any change the Kirkpatrick's first three levels of evaluation (Reaction, Learning, Behavior); however he divided the fourth level (Results) into two separate ones: Organization and Ultimate value. Hamblin (1974), just as Kirkpatrick, believes that these levels create some sort of a chain of causes and consequences; the educational course causes Reactions, those cause Learning, that causes changes in the working Behavior, that leads to changes in Organization, which cause changes in achieving the Ultimate value.

In 1970s Michael Scriven created a new model of evaluation, so called goal-free evaluation, which is not related to goals, but to the needs (Alkin, 2004). The fulfillment of the goals of the educational program is not essential any more, what is evaluated is the level of how much the requirements of the participants were met (Hendl, 2005). By the end of 1970 a new model of evaluation focused on the user (utilization-focused evaluation) was created by Michael Quinn Patton. This approach emphasizes close cooperation between the evaluator and the users of evaluation results in all phases of its planning, implementation and utilization of its results (Hendl, 2005). In the same time period yet another model, CIRO, was created by Warr et al. This model consists of the following levels of evaluation: (1) Context (understood as identifying educational and development needs), (2) Inputs (possible sources for education and development), (3) Reaction (of the participants, either instant or in hindsight), (4) Outcomes. Thus the authors add to the Kirkpatrick's model the level of defining what is necessary to transform by learning and development (1), and the level of Outcomes (4) is divided into the levels called Learning, Behavior and Results by Kirkpatrick. Using the Warr et al. terminology they become the level of immediate, intermediate and ultimate outcome of learning and development. (Sadler-Smith, 2006)

Compared to the boom of the previous two decades, 1980s saw a relative attenuation, however since 1990s there has been an increase in the interest in the field of evaluation. We should mention the model by Bramley, who emphasizes measuring the level of Behavior, with the key element measured before and after the learning and development program. His approach is similar to the methodology of Balanced Scorecard mainly because the desired behavior is defined already in the phase of identifying educational and development needs; this target is viewed as priority when defining knowledge, skills and attitudes, which will lead to this behavior (Bramley, 2003). It is not the case that other authors would be in opposition to this approach, e.g. Warr et al include the definition of the goal into their phase of evaluating the context – nevertheless others do not deal with the process of development in such a wide context as Branham explicitly does.

Another model is Phillips's approach, which also develops on some of the original Kirkpatrick's levels. We consider his supplement of the level of Reaction by so called planned action as significant; it describes the anticipated utilization of the learned contents and the developed skills (Phillips, 2003). The affective component of the evaluation is supplemented by a calculation of utility, which adds a rational component to the affective part of the level of Reaction. In thus supplemented level it is not only the feelings of pleasure/resentment that matter, but

also the contribution to the learning and development. Phillips also divides the level of Results into Business Results and Return on Investment (Phillips, 2003).

Eugene Sadler-Smith (2006) summarized comprehensively the key models in the theory of evaluation. His summary will be introduced below; we will try to outline the possibilities of applying the resulting model in the field of further professional education.

	Kirkpatrick (1967)	Hamblin (1968)	Warr, Bird and Rackham (1970)	Bramley (1991)	Phillips (1996)	Summary
<i>Before the educational activity</i>			Context			Context
			Input			Input
<i>During and at the end of educational activity</i>	Reaction	Reaction	Reaction		Reaction and planned action	Affective Reaction
						Utility reaction
	Learning	Learning	Immediate outcome	Changes in knowledge	Learning	Learning
				Changes in skill		- Gained knowledge
				Changes in attitude		- Gained skills
<i>After the educational activity</i>	Behavior	Job behavior	Intermediate outcome		Applied learning on the job	Changes in attitudes
	Results	Organization	Ultimate outcome		Business results	Job behavior
		Ultimate Value			ROI	Organizational Results
						ROI
						Ultimate Value

Figure 1 Taxonomy of the evaluation steps (Sadler-Smith, 2006)

The basis of this model is Kirkpatrick's approach to evaluation, which is enriched with further elements. Separate steps or levels of evaluation are successive, i.e. each level follows the previous one and should not be skipped. Only so can we get sufficient information enabling comprehensive evaluation of the whole educational program.

### **Comprehensive Model of Evaluation**

In Figure 1 above we can see that the separate levels of evaluation are usually implemented in different phases of planning and performing the educational activity which should be evaluated. Before the educational activity we implement evaluation on the level of Context and Input, during and by the end of the activity we assess at the level of Reaction and Learning, after the educational activity is over, we assess the level of Behavior, Results, Return on Investment and Ultimate Value.

Now we shall discuss the above listed levels in more detail.

#### *Context and Input*

Context and Input are both part of the Warr, Bird and Rackham's theories, therefore we unite them in one paragraph. It can be stated that evaluation of Context is basically interconnected with so called preparatory phase of learning and development, which precedes the very implementation phase (Vodák & Kucharčíková, 2007). According to Sadler-Smith, Context deals with evaluation of the process of identification and analysis of educational needs (Sadler-Smith, 2006). The same preparatory phase encompasses so called Inputs – specifically inputs from the perspective of educational or development project, e.g. methods, providers, organizational methods (Sadler-Smith, 2006). Both these phases are carried out before the beginning of the course and evaluate chiefly the starting points that determine the goals of the educational program and the adequate organizational support including the choice of methods for conveying the educational contents.

#### *Anticipating the Utility and (Affective) Reaction*

The Reaction phase is included in all the theories (except of Bramley's) displayed in Figure 1, which hints at the importance of this evaluation phase. This level of evaluation searches for the answer to the question of how the participants enjoyed the educational activity. It is considered the basic and most frequently implemented; what is more, it has the highest rate of return on particular evaluation techniques (Phillips, 2003), which means it is a phase where it is relatively simple to obtain information. Kirkpatrick considers surveying at the level of Reaction as analogous to surveying customer satisfaction, and connects it tightly to motivation for learning. Simultaneously he claims that this phase, namely the positive or negative Reaction is crucial for the following phases (Kirkpatrick & Kirkpatrick, 2006). At this point he divides from the other theorists, who do not view the relationship between Reaction, Learning and Behavior as evincible. Alliger and Janak demonstrated the results of their research focused on correlation between these variables, quoted by Sadler-Smith. They figured correlation of 0.07 between Reaction and Learning, and correlation of 0.05 between Reaction and Behavior (Sadler-Smith, 2006), which could in certain cases be considered a statistical error.

There is a sub-level of Reaction coming into play, which is Anticipation of Utility. It is detached by Sadler-Smith from Phillips' level of Reaction and implementation plan (Sadler-Smith, 2006). Sadler-Smith determines Anticipation of Utility at the level of implementation plans – defined as the level of educational content relevancy to the work performed and the extent up to which the educational content may increase the working efficiency.

As we can see, if we divide the level of Reaction into the Anticipated utility part and affective Reaction part, we may overcome the discrepancies between the Kirkpatrick's model and the other models, which do not find the level of Reaction relevant to the levels of Learning and Behavior. Accepting solely the affective Reaction would allow only the positive Reaction as a feasible option of evaluation at this level in order to enable proceeding efficiently

---

\* It is certainly not imperative to implement evaluation on all these levels in all educational activities carried out.

into further level. However if we accept the above mentioned arguments, namely that not every educational program must unconditionally bring positive affective Reaction, and add the results of research by Alliger and Janak, the anticipation utility concept seems to be the clue to the apparent paradox.

At this level of evaluation motivation of the participants plays a vital role. Motivation is considerably dependent on utility anticipation, and influences the evaluation results at the level of Reaction (composed of affective evaluation and utility anticipation). Kirkpatrick, among others, elaborates on motivation stating that if the participants react negatively, they probably will not be motivated for learning (Kirkpatrick & Kirkpatrick, 2006). We may approach this fact from a more sophisticated perspective of particular motivation theories, and apply e.g. the more popular ones by Herzberg, Maslow or Alderfer. Even in educational programs there exist certain elements (in Herzberg's terminology hygiene factors or dissatisfactors), which may be utilized for preventing dissatisfaction, nevertheless they do not incite satisfaction themselves (e.g. the facility where the educational activity is located and its equipment, relationships with other learners, keeping the time schedule, alternating working and rest time, personality and attitude of the lecturer etc.). Other elements (motivators, satisfactors) may positively influence the satisfaction of the participants (e.g. success, respect, professional growth etc.) (Kermally, 2005). If we apply Maslow's theory, we would certainly find specific needs (physiological needs – adequate sensory stimulation in this case, need for security – in case of education it is not only physical, but also psychic security), which must be fulfilled first in order to be able to advance to higher needs; in this case probably self-satisfaction (Schneider, Alderfer, 1973). Finally another situation may occur – during the educational activity we may get strongly focused on the dimension of relationships, more than the training achievement itself; i.e. not being able to satisfy the needs for growth we search for satisfying our social needs (e.g. Bělohávek, 1996). Hamblin confirms these statements stating that the participants do not respond only to the educational content, lecturer and the method applied, but also to the settings of conditions and to one another (Hamblin, 1974).

Among other factors that may play a role, i.e. may influence the Reaction of the participants to the particular educational activity, belong for example quality of the surroundings, facility where the educational process is carried out (light, warmth, ventilation possibilities, enough space, setting of chairs and tables, undisturbed possibility to see the lecturer, quality and quantity of refreshments etc.) applied methods and tools (their attraction, clarity, intelligibility), the lecturer (his/her professional, didactic, communicative and rhetoric competencies, his/her personality, approach to the participants), other learners (their relationships, communication methods, "intruders" of educational process) and obviously the expectations that the participants have regarding the educational activity. Expectations are one of the key categories of evaluation on the level of Reactions. That is to say if the participants' expectations\* are excessive, we may justly predict that the evaluation will be partially distorted – in case of too low expectations, the participants will express more positive reactions, in case of too high expectations, the reactions will be substantially more negative than if the expectations were adequate.

It is evident therefore from the above listed arguments that the level of Reaction, and mainly its affective sub-level, may play a crucial role in evaluating the educational contributions, and the causes incurring such reaction are worth careful attention – they become a sort of a gateway into the whole process, which (with the above mentioned role of motivation in the calculation formula for the total effect taken into account) determines how much of the inputs imparted by the lecturer the participant acquires and in what quality. That determines, with reference to the interconnection of the separate levels, how much of the imparted content will the participant be able to transfer into the level of Learning and subsequently implement in the level of Behavior. The influence of these transfers on the final level of Results need not be further emphasized.

---

\* It is necessary to differentiate between expectations and the above mentioned anticipation of utility, although both categories may partially overlap. In case of anticipation of utility it is mainly the applicability of the learned content in profession what is concerned; expectations may cover also the personality of the lecturer, methods used, facilities.

## *Learning*

As we can see in the summarizing Figure 1, learning is the second category or level of evaluation, which is mentioned by all the theorists. In Bramley's approach it is split into three areas, namely acquired knowledge, skills and changes in attitudes (differentiation of these categories corresponds to the classification of educational goals into cognitive, psychomotor and affective). At this level of evaluation we assess whether the participants have really learned during the educational activity what had been planned.

To be able to reply to this question, we perform this level of evaluation at the end of the educational activity (so called summative evaluation). To ensure efficient progress of learning it is desirable to perform this assessment also already during the educational activity (so called formative evaluation). That allows us to check the progress of learning (acquiring new knowledge, skills and changes of attitudes). If any problems are detected we may adapt the process of educational activity so that learning proceeds in the most efficient way.

Sequence with the next level of evaluation, i.e. further steps in learning, is completely obvious here. If the participants have acquired new knowledge and skills and possibly changed their attitudes, we may suppose that they may be applied professionally; if they have not acquired the knowledge and skills, it is clear that those cannot be utilized.

Factors influencing the quality of Learning include foremost the goals set (their rationality, attainability, consequentiality to the educational needs analysis performed), content (its conformity to the goals, adequacy), methods and tools applied (their appropriateness) and adherence to the didactic principles (mainly adequacy, persistence, activity, clearness, systematics).

## *Behavior*

The interconnection between the learning situation and the application of the acquired contents brings us to the phase of Behavior. That phase is an interface between the participant and her background, which either facilitates or hinders application of the knowledge or skills gained in the phase of Learning. This phase of the learning process and the following evaluation is considered as longer-term, from the perspective of the time taken for reflection in Behavior, and its effects. This fact is assumed in the model by Warr, Bird and Rackham, who use the term intermediate outcome for this phase, reflecting the authors' effort to interpret the change of working Behavior as gradual.

The learners cannot change their behavior unless they have the opportunity to do so (Kirkpatrick & Kirkpatrick, 2006), transfer of the learned contents may be facilitated or hindered by various factors, including conditions of the working environment (enabling/disabling application of the learned content professionally), supportive attitude of managers and/or colleagues, some benefit for the achievements (increase in salary, promotion, respect, simplification of work, acceleration of work etc.).

## *Results*

The phase of Results enables us to determine whether the Behavior is efficient for the corporation – determine the final contribution of participating in the educational program (Kirkpatrick & Kirkpatrick, 2006). This phase is a completion of the whole evaluation process; nevertheless some authors divide the phase into several sub-steps. We can come across categories of Business Results, Return on Investment, Ultimate Value. In our view this division is not considered to be so beneficial to be systematically utilized, we shall retain one integral category of Results.

The final feedback in the form of Results enables us to assess whether the program leads to the fulfillment of the goals the corporation have set, throughout the previous phases of Behavior, Learning and Reaction. Based on this information we may identify changes that need to be made in the educational program. Different authors take different approaches, summarized in the Figure 1. Original Kirkpatrick's level of Results has been split into Business Results on the verge between the level of Behavior and Results, and Return on Investments (Phillips, 2003), which corresponds exactly to the Kirkpatrick's level of Results. Hamblin also divides this level into



contribution to the Organization and Ultimate value (Hamblin, 1974). Phillips (2003) proposes various methods for comparing the contributions to the costs invested into the education and development. We may exploit several metrics of Return on Investments: Return on Assets (ROA), Return on Owners' Equity (ROE) and Return on Capital Employed (ROCE).

Measuring at this level is most complex, most time-consuming and least reliable, as it is difficult to determine whether the change at this level has really been caused by the educational activity performed or by other factors.

## Conclusion

Evaluation is a very complex process; its individual phases or levels are mutually interconnected just as with other factors out of the educational and development programs. Therefore, it is not sufficient to perform the evaluation only during the learning and development process. It is necessary to evaluate (or identify the educational needs and the current stage of participants' development) before the beginning of education and development and after it has been completed, in order to define its contributions for the corporation or stakeholders. It is also crucial to realize that the evaluation outcomes may be distorted by external factors (e.g. by concurrent influence of development of organization and personal processes of participants). This text serves as an introduction into the issue and demonstration of different approaches to the individual phases of evaluation.

## References

- Alkin, M. C. (2004). *Evaluation Roots: Tracing Theorists' Views and Influences* (1st ed.). Thousand Oaks: Sage Publications.
- Bělohlávek, F. (1996). *Organizační chování* (1st ed.). Olomouc: Rubico.
- Bramley, P. (2003). *Evaluating Training* (2nd ed.). London: Chartered Institute of Personnel and Development.
- Hamblin, A. C. (1974). *Evaluation and Control of Training* (1st ed.). London: McGraw-Hill.
- Hendl, J. (2005). *Kvalitativní výzkum: základní metody a aplikace* (1st ed.). Praha: Portál.
- Kermally S. (2005). Chapter Six: Frederick Herzberg (1923-). In *Gurus on People Management* [e-book] (pp. 43–50). Ipswich: Thorogood Publishing.
- Kirkpatrick, D. L. & Kirkpatrick J. D. (2006). *Evaluating Training Programs: the Four Levels* (3rd ed.). San Francisco: Berrett-Koehler Publisher.
- Phillips, J. J. (2003). *Return on Investment in Training and Performance Improvement Programs* (2nd ed.). London: Butterworth-Heinemann.
- Sadler-Smith, E. (2006). *Learning and Development for Managers: Perspectives from Research and Practice* (1st ed.). Oxford: Blackwell.
- Schneider, B. & Alderfer, C. (1973). Three Studies of Measures of Need Satisfaction in Organizations. *Administrative Science Quarterly*, 18(4), 489–505.
- Smith M. K. (2006). *Evaluation in The Encyclopaedia on Informal Education*. Available at <http://www.infed.org/biblio/b-eval.htm> [20. 2. 2007].
- Vodák, J. & Kucharčíková, A. (2007). *Efektivní vzdělávání zaměstnanců* (1st ed.). Praha: Grada.

# Evaluation of achieving the goals of education for all (EFA) in Sudan: A case study of basic education

Abdelrahman Elhadi Ahmed Abdallah\*

*Department of Deploma, College of Community Service and Continuing Education, Umm-AlQura University, Mecca, Saudi Arabia  
Postcode 21955*

---

## Abstract

This is a case study model which has applied descriptive analytical approach. The study aims to evaluate the reality of achieving the goals of Education for All (EFA) in Sudan by the mid-term of Dakar commitment deadline (2000-2008-2015). The Basic Education was chosen as a case for the study; a list of thirteen indicators was used as standard instrument to compare the situation between the schooling year of 2001-02 which represented the kick-point (2001) and the schooling year of 2008-09 which represented the mid-term of the commitment for the whole Sudan. The analysis of data, including percentages and rates, was conducted through SPSS 20 for Windows. The findings showed that Sudan can't reach the majority of the set targets such as Intake, Enrolment, Transition Rate from Basic to Secondary, Pupil/Teacher Ratio, and Expenditure Rates by 2015, which represent the 60% of the goals of EFA. However, they will reach the academic and transfer rates such as Promotion, Repetition, Dropouts and Survival Rate to Grade5. In addition, there were no statistically significant differences between boys and girls in achieving the set goals, except for pupil/teacher ratio in basic education.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya rate of pupils/teacher towards the girls. University.

*Keywords: Education for All( EFA); Basic Education; Indicators.*

---

## Introduction

In 2000, the international community met at the World Education Forum in Dakar, Senegal; an event which drew 1100 participants world-wide. The participants committed themselves to providing a compulsory, free and good quality education for all the children, youth and adults by 2015. So to cater for this need, they formulated six goals of education for all, targeted to be achieved by 2015. Moreover, they also established twelve strategies for the implementation stage. The eleventh strategy urges the countries to provide a regular on-going assessment. It also underscores the need to evaluate the progress towards achieving those goals and strategies for the effective participation on the conference, which aims to develop a global education agenda beyond 2015. Moreover, they provided some technical guidance for the national scope of the assessment process, the content, outline of the reports, indicators, and a timetable. Therefore, the researcher is trying to give an image of the situation in Sudan at the mid-term of Dakar commitment, in accordance with the indicators of the technical guidance provided.

## Objectives of the study:

This study investigates the following objectives:

---

\* Corresponding author. Tel.: +966-538587454; fax: :+966-125530325.  
E-mail address: abuhai9@hotmail.com

- 1 - The situation of Basic Education in Sudan in 2001, Key EFA.
- 2 - The situation of Basic Education in Sudan in 2008, Mid-term of Dakar commitment
- 3- The extent to which they achieved the EFA goals by 2008.
- 4 - The level that can be achieved by 2015, a limit of Dakar commitment.
- 5 – The differences in genders with regard to achieving the set goals.

### **Basic Education:**

Basic education was defined in the World Conference on EFA 1990 as "The whole range of educational activities, taking place in various settings that aim to meet basic learning needs as defined in the World Declaration on Education for All (Jomtien, Thailand, 1990). According to ISCED standard, basic education comprises primary education (first stage of basic education) and lower secondary education (second stage). It also covers a wide variety of non-formal and informal public and private activities intended to meet the basic learning needs of people of all ages".(World Conference on EFA: Meeting Basic Learning Needs, Jomtien, Thailand,1990)

### **Basic Education in Sudan**

The educational system of Sudan aims at the preparation of the country's youth for effective participation in social, economic and political life, taking into account that it provides for a longer and a lower cost of general education. To cater for this, the system is structured on two main levels, Basic Education level and Secondary Education level.

The Basic education level is a level of a consecutive eight years of schooling, targeting the children aged 6-13 years. At the end of this level, students sit for the Basic level certificate examination which qualifies them for admission to secondary school for three years of schooling or else the labour market. (Ministry of General Education of Sudan, 2008, 25).

### **Goal of Education for all concerning Basic Education**

As was introduced previously, the Dakar Framework 2000 identified six key measurable education goals called "The Goals of Education for all", the goals aim to meet the learning needs of all children, youth and adults by 2015 targeting the early childhood, children at Basic Education age, young people and adults literacy,gender, and the quality of education. So, the second goal concerning Basic Education was mentioned "Ensuring that by 2015 all children, particularly girls, children in difficult circumstances and those belonging to ethnic minorities, have access to, and complete free and compulsory primary education of good quality".(UNESCO,2009).

**Table 1. Sub-Statistical Background for whole Sudan**

Whole Sudan	2001	2008
Total Population (000)	31,081	39,155
Annual population growth rate (%)	2.63	2.5
Sex ratio (women per 100 men)	*98.52	*95.31
Population aged 6 (000)	895	1,249
Population aged 6 (%)	2.8	3.2
Population aged 6-13 (000)	6.138	8.744
Population aged 6-13 (%)	19.2	22.3
Total number of enrolment (Basic Education)	3,537,279	5,800,829
Total number of Teachers (Basic Education)	128,483	161,345
Total number of Schools (Basic Education)	12,085	18,052
GDP (current US\$ million)	**13.182.872.555	**54.082.389.393

### Methodology:

The researcher perceives this study to be a very important study of its kind; it is a prototype study which could be used in the educational policies. Due to this reason, the researcher adopted the analytical approach. He mainly analysed Sudan MoE yearly statistical books that were issued in 2001 and 2008 and then he made the statistical projections till 2015 on thirteen quantitative indicators for both boys and girls in basic education. Furthermore, he made comparisons among the boys and girls per year as well as within both boys and girls.

### Data Analyses:

Table 1. . Boys Indicators in 2001, 2008 and the Statistical projections by 2015

Indicators	2001	2008	Difference of rates 2008/2001	Expected by 2015	Standard	Result
Gross Intake Ratio in Basic Education (GIR)	72.9	77.6	4.7	82.3	100	not reach
Net Intake Rate in Basic Education (NIR),	..	..	..	..	100	..
Gross Enrolment Ratio (GER)	61.8	67.4	5.6	73	100	not reach
Net Enrolment Rate (NER)	..	..	..	..	100	..
Promotion Rate	90.4	94.6	4.2	98.8	100	≈ reach
Repetition Rate	5.7	4.2	-1.5	2.7	0	≈ reach
Dropout Rate	3.9	1.2	-2.7	-1.5	0	reach
Survival Rate to Grade 5	88.8	94.4	5.6	100	100	reach
Transition Rate from Basic to Secondary (TR)	68.7	74.5	5.8	80.3	100	not reach
Percentage of Trained Teachers in Basic Education	65.9	63.7	2.2	61.5	100	not reach
Pupil/Teacher Ratio in Basic Education	1:28	1:50	22	1:72	1:40	not reach
Public Expenditure on Education as a Percentage of GDP	...	...	...	...	...	...
Public Expenditure on Education as a Percentage of Total Government Expenditure	...	...	...	...	...	...
Public current expenditure on Basic education per pupil (US\$ PPP)	...	...	...	...	...	...

Figure 1: Boys Indicators in 2001, 2008

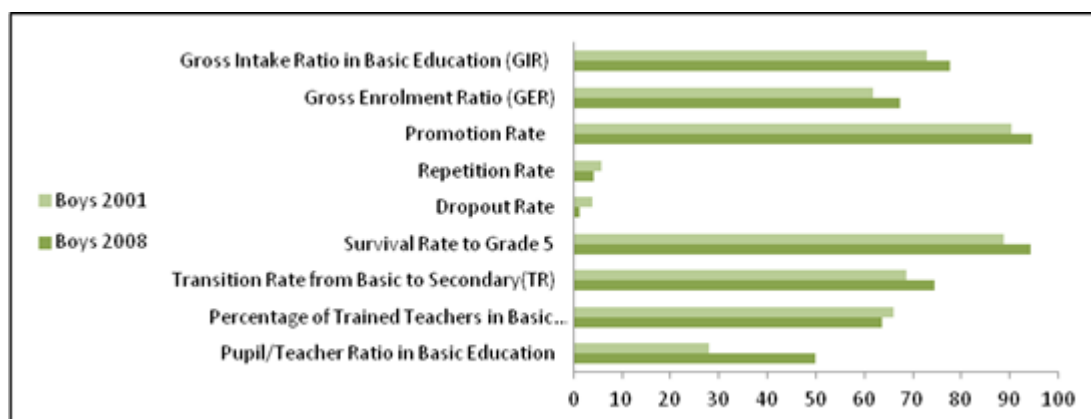


Table (1) and chart (1) show that the Gross Intake Ratio in Basic Education (GIR) for boys is 72.9% in 2001 (Key EFA), and it increases by a rate equal to 4.7% per seven years to reach 77.6 % in 2008 (mid-term EFA). So if we assume that the same rate continues for the next period of seven years, the expected Intake ratio by 2015 must be 82.3 % which is less than the standard point of 100 % .This indicates that the boys can't reach EFA goal concerning the Intake Ratio by 2015. This also applies to the Gross Enrolment Ratio (GER) which increases by 5.6% from 61.8 to 67.4 then to 73 by 2015 which is also less than the standard point. However, they will nearly reach EFA goal concerning the promotion rate according to the kick-point of 90.4% in 2001 which is already very high and increases by the rate of 4.2% to reach 94.6 % by 2008 and then 98.8 % by 2015. This means that the Repetition and Dropout rates should be very low because the promotion rate is very high as we see in table (1), indicating that the boys may reach the standard point of the Repetition and Dropout rate which is supposed to be almost zero. This result complies with Survival Rate to Grade 5 which grows up by 5.6 % to equal 100% by 2015; although, we are disappointed with the Transition Rate from Basic to Secondary (TR) which is very far from the standard with a gap equal to 20% by 2015.

Concerning the teaching rates, the percentage of trained teachers in Basic Education doesn't not exceed beyond 61.5%. At the same time, pupil/teacher ratio will be 72 pupils per teacher by 2015 which is not proportionate to the standard of 40 pupils per teacher.

Table 2. Girls Indicators in 2001, 2008 and the Statistical projections by 2015

Indicators			Difference of rates 2008/2001	Expected by 2015	Standard	Result
Gross Intake Ratio in Basic Education (GIR)	61.9	74.8	12.9	87.7	100	not reach
Net Intake Rate in Basic Education (NIR),	..	..	..	..	100	..
Gross Enrolment Ratio (GER)	53.2	64.6	11.4	76	100	not reach
Net Enrolment Rate (NER)	..	..	..	..	100	..
Promotion Rate	*89.1	*94.2	5.1	99.3	100	≈ reach
Repetition Rate	*6.8	4.4	-2.4	2	0	≈ reach
Dropout Rate	*4.1	1.4	-2.7	-1.3	0	reach
Survival Rate to Grade 5	*89.7	94.3	4.6	98.9	100	≈ reach
Transition Rate from Basic to Secondary (TR)	69.1	73.1	4	77.1	100	not reach
Percentage of Trained Teachers in Basic Education	58.7	57.2	-1.5	55.7	100	not reach
Pupil/Teacher Ratio in Basic Education	1:28	1:27	-1	1:26	40	reach
Public Expenditure on Education as a Percentage	...	...	...	...	...	...

of GDP						
Public Expenditure on Education as a Percentage of Total Government Expenditure	...	...	...	...	...	...
Public current expenditure on Basic education per pupil (US\$ PPP)	...	...	...	...	...	...

Figure 2: Girls Indicators in 2001 , 2008

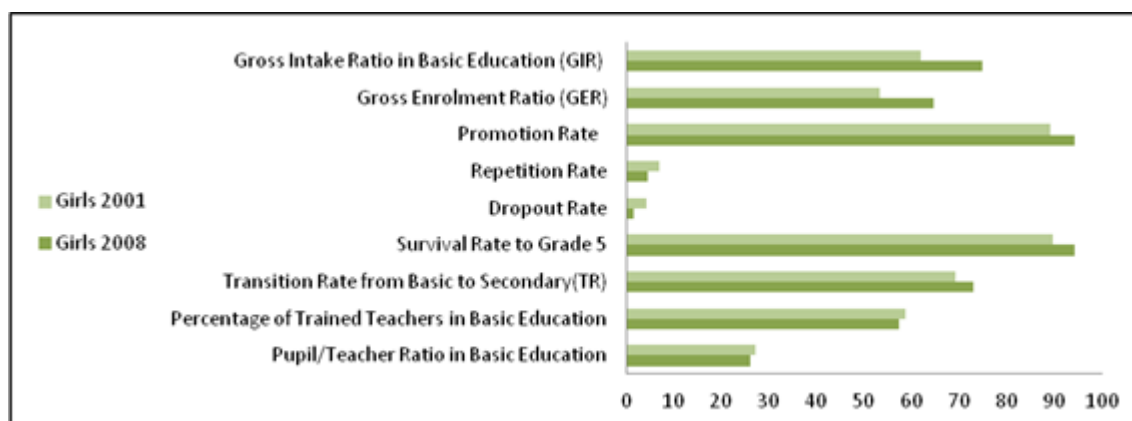


Table (2) and chart (2) show that the Gross Intake Ratio (GIR) in Basic Education for girls is 61.9% in 2001, and it jumps to 74.8 % in 2008 by a rate equal to 12.9% per seven -year to reach 87.7% by 2015; however, it's less than the standard point of 100 %. This indicates that the girls can't reach EFA goal concerning the Intake Ratio by 2015 as well. The same also applies to the Gross Enrolment Ratio (GER) which increases by a high rate, equal to 11.4%, to reach 76 % by 2015 which is also less than the standard point. But they will approximately reach EFA goal concerning the promotion rate according to the kick-point of 89.1% in 2001 and 99.3 % by 2015. This means that the Repetition and the Dropout rates will approach to zero by 2015, and the girls will also reach the standard point for Survival Rate to Grade 5, which grows up by rate equal to 5.1%.

Concerning the Transition Rate from Basic to Secondary (TR), the girls also will not reach the standard point because they may stop on a point of 77.1 % by 2015, which is very far from the standard with a gap of 22.9%.

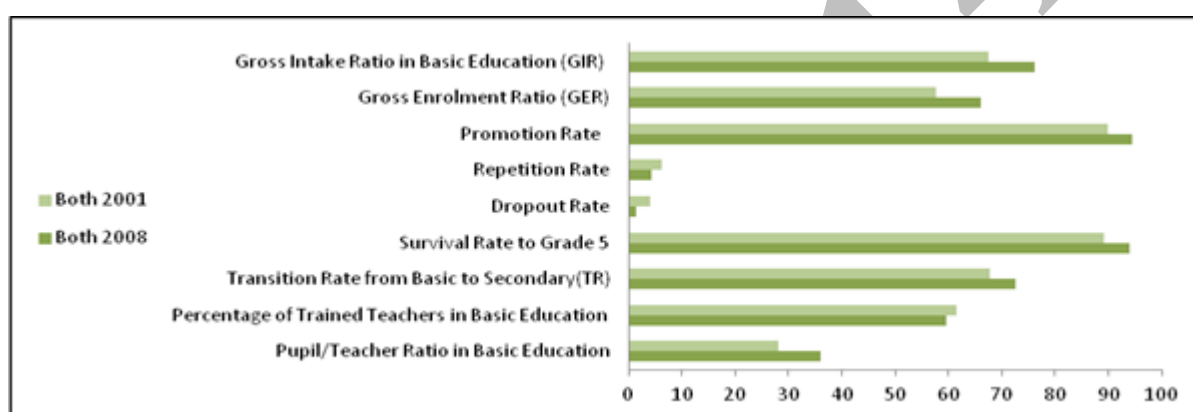
For the teaching rates among the girls teachers, the percentage of their training is weaker than the boys one, it does not exceed 58.7% in 2001; moreover, it decreases by a ratio equal to 1.5% ,which leads to a percentage of less than 56% by 2015, although the ratio of girls pupils/ teacher is not greater than 28 per teacher in 2001 and 27 pupils in 2008 which will not be more than 1:26 by 2015(The rate in the developed Arabic countries is 1:25).

Table 3: Both boys and Girls Indicators in 2001, 2008 and the Statistical projections by 2015

Indicators	2001	2008	Difference of rates between 2008/2001	Expected by 2015	Standard	Result
Gross Intake Ratio in Basic Education (GIR)	67.5	76.3	8.8	85.1	100	not reach
Net Intake Rate in Basic Education (NIR),	..	..	..	..	100	..
Gross Enrolment Ratio (GER)	57.6	66.1	8.5	74.6	100	not reach
Net Enrolment Rate (NER)	..	..	..	..	100	..
Promotion Rate	*89.8	*94.4	4.6	99	100	≈ reach
Repetition Rate	*6.3	4.3	-2	2.3	0	≈ reach

Dropout Rate	*4.0	1.3	-2.7	-1.4	0	reach
Survival Rate to Grade 5	*89.2	94.1	4.9	99	100	≈ reach
Transition Rate from Basic to Secondary(TR)	67.7	72.5	4.8	77.3	100	not reach
Percentage of Trained Teachers in Basic Education	61.6	59.7	-1.9	57.8	100	not reach
Pupils/Teacher Ratio in Basic Education	28:1	1:36	8	44	40	not reach
Public Expenditure on Education as a Percentage of GDP	6.9	...	...	...	25	not reach
Public Expenditure on Education as a Percentage of Total Government Expenditure	...	...	...	...	...	...
Public current expenditure on Basic education per pupil (US\$ PPP)	...	...	...	...	...	...

Figure 3: Both boys and Girls Indicators in 2001 , 2008



In general, Table (3) and chart (3) show that Sudan cannot reach the majority of the goals of EFA for both genders such as Gross Intake Ratio (GIR), Gross Enrolment Ratio (GER), Transition Rate from Basic to Secondary (TR), Percentage of Trained Teachers in Basic Education, and the Public Expenditure on Education as a percentage of GDP which is less than 7% as we see in 2001. So it can be concluded that they (Sudan) can only reach the academic and transfer's rates such as Promotion rate, Repetition, Dropout and Survival Rate to Grade 5, which represent only 40% of the total mentioned indicators.

Table 4: Boys/Girls Indicators in 2001, 2008 and the Statistical projections by 2015

Indicators	2001		2008		2015		Result	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Gross Intake Ratio in Basic Education (GIR)	72.9	61.9	77.6	74.8	82.3	87.7	not reach	not reach
Net Intake Rate in Basic Education (NIR),	..	..	..	..	..	..	..	..
Gross Enrolment Ratio (GER)	61.8	53.2	67.4	64.6	73	76	not reach	not reach
Net Enrolment Rate (NER)	..	..	..	..	..	..	..	..
Promotion Rate	90.4	*89.1	94.6	*94.2	98.8	99.3	reach	reach
Repetition Rate	5.8	*6.8	4.2	4.4	2.6	2	not reach	not reach
Dropout Rate	3.9	*4.1	1.2	1.4	-1.5	-1.3	reach	reach
Survival Rate to Grade 5	88.8	*89.7	94.4	94.3	100	98.9	reach	reach
Transition Rate from Basic to	68.7	69.1	74.5	73.1	80.3	77.1	not reach	not reach

Secondary(TR)								
Percentage of Trained Teachers in Basic Education	65.9	58.7	63.7	57.2	61.5	55.7	not reach	not reach
Pupil/Teacher Ratio in Basic Education	1:28	1:28	1:50	1:27	1:72	1:26	not reach	reach
Public Expenditure on Education as a Percentage of GDP	...	...	...	...	...	...	...	...
Public Expenditure on Education as a Percentage of Total Government Expenditure	...	...	...	...	...	...	...	...
Public current expenditure on Basic education per pupil (US\$ PPP)	...	...	...	...	...	...	...	...

Figure 4: Boys/Girls Indicators in 2001

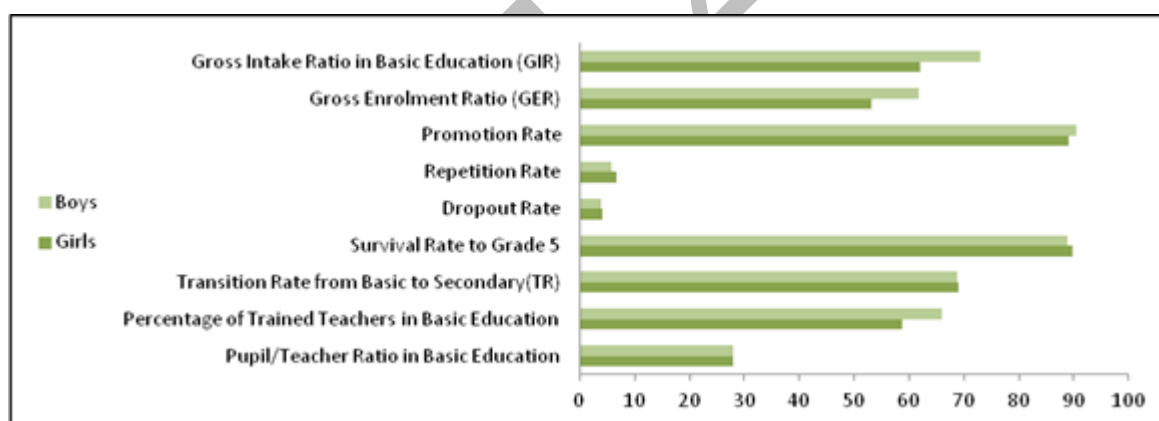


Figure 5: Boys/Girls Indicators in 2008



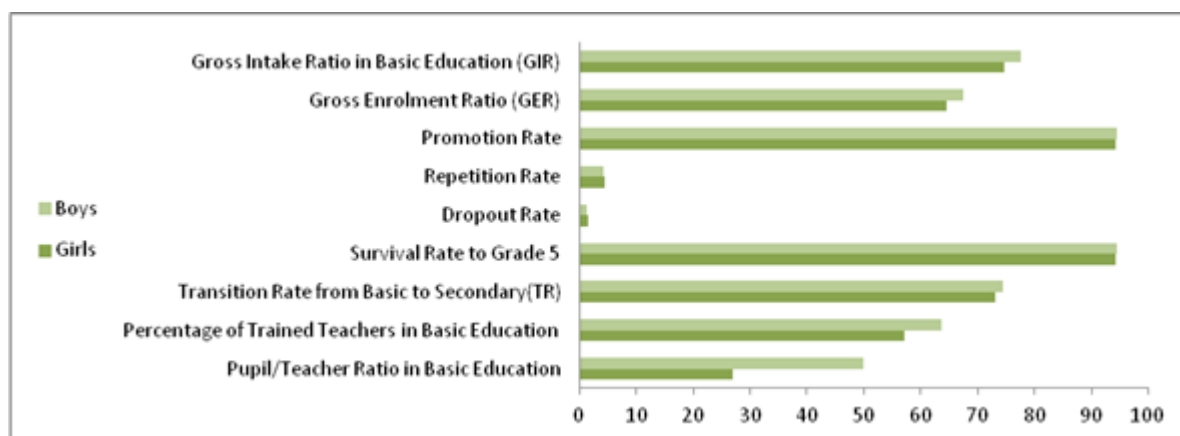


Figure 6: Boys/Girls Indicators in 2015

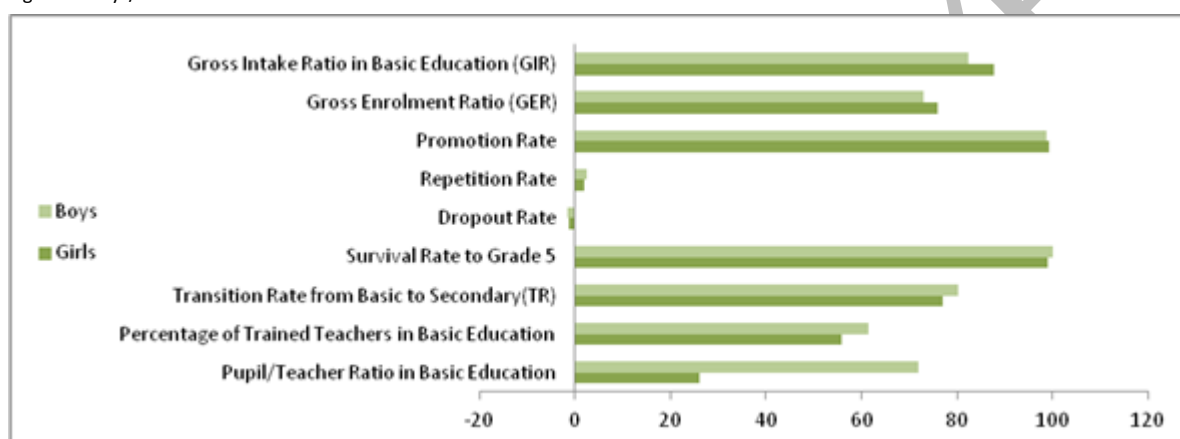


Table 4 and charts 4, 5 & 6 show that there were no statistically significant differences among boys and girls in achieving the set goals except for pupil/teacher ratio in basic education where the girls will reach the desired ratio of 1:26; while the ratio of pupil/ teacher for boys will be 1: 72 by 2015 which is far from the desired target.

## Appendix

*	Researcher calculation
**	World Bank estimation
...	No data available
..	Not applicable

## References

- Ministry of General Education , Statistical book, (2001) ,Sudan.  
 Ministry of General Education , Statistical book, (2008) ,Sudan.  
 Central Bureau of Statistics, Census (1993), Sudan.  
 Central Bureau of Statistics, Census (2008), Sudan.  
 Sudanese PCBS website, <http://www.cbos.gov.sd/node/253>.  
 UNESCO website, [http://www.unesco.org/ar/education\\_ar/resources/](http://www.unesco.org/ar/education_ar/resources/)  
 UNESCO website, <http://unesdoc.unesco.org/images/0013/001365/136541ab.pdf>  
 World Bank website,[http://search.worldbank.org/data?qterm=Public+Expenditure+2008&\\_topic\\_exact%5B%5D=Education,GDP;](http://search.worldbank.org/data?qterm=Public+Expenditure+2008&_topic_exact%5B%5D=Education,GDP;)  
 World Bank website,<http://databank.albankaldawli.org/data/views/reports/tableview.aspx>.  
 WorldBankwebsite,[http://data.worldbank.org/indicator/NY.GDP.MKTP.CD?order=wbapi\\_data\\_value\\_2004+wbapi\\_data\\_value+wbapi\\_data\\_value-first&sort=asc&page=1](http://data.worldbank.org/indicator/NY.GDP.MKTP.CD?order=wbapi_data_value_2004+wbapi_data_value+wbapi_data_value-first&sort=asc&page=1)  
 Middle-East Journal, Issue 8091,January 2001.

INTE 2014

# Evaluation of current applications on legal education

Huriye Kubilay<sup>76</sup>

*Izmir University of Economics Faculty of Law, C Blok No. 736 Sakarya Cad. No: 156, 35330 Balçova, İzmir - Turkey*

---

## Abstract

The main purpose of this paper is to evaluate current applications of legal education in Turkey. Bologna Process has brought about a new approach; not only the students but also the professors are adapting themselves to this new situation. Besides, the integrated education provides law students with the opportunity to attend some postgraduate courses during their undergraduate education. On the other hand, the use of foreign language in legal practice therefore, education in foreign language has become increasingly important. In this paper, a harmonized legal education in foreign language will be analyzed for both its positive and negative aspects.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* Legal Education; Bologna Process; integrated education; foreign language; gradual education.

---

## 1. Introduction

Legal education in Turkey has a history of about 150 years. Istanbul University Faculty of Law had introduced legal education in 1874 as “Mekteb-i Hukuk-ı Sultani” in “Darülfünun-ı Sultani”. The first law faculty of the Republic of Turkey -“Ankara Adliye Hukuk Mektebi”- was opened by Mustafa Kemal Atatürk in Ankara on November 5th, 1925. Now, it continues to serve under the name of Ankara University Faculty of Law.

Improvement of legal education has always been one of the main issues faced by the jurists in Turkey. Besides the basic legal training, this covers the importance of law in society and the functions of law, the technique and the methods of rules of law applicable to the situations form the basis of legal education in Turkey.

As of the year 2013, 75 law faculties grant legal education in Turkey in total. There are 31 law faculties in 103 state universities and 44 law faculties in 62 private universities, which have 40000 law students in total.

## 2. Bologna Process in Law Faculties

Turkey has participated in Bologna Process in 2001. Since that day, faculties of law in Turkey have been trying to harmonize their current graduate and postgraduate programmes in the framework of Bologna Process. 15 of the 25 higher education institutions in Turkey, of whose application have been evaluated by the European Commission in 2013 were granted with “ECTS Label”. Besides, 29 of the 90 higher education institutions, of whose application have been evaluated by the European Commission in 2013 acquired “Diploma Supplement Label”. Most of these higher education institutions have faculties of law.

---

\* Corresponding author. Tel: +00902324888400; Fax. +00902322792626.  
E-mail address: huriye.kubilay@ieu.edu.tr

According to the competence profiles of the National Qualifications Framework for Higher Education in Turkey, 240 ECTS is required for legal education which is equal to 30 ECTS per semester. The professors have criticized the hours of lectures and demanded more for their lectures. However, there are many opportunities for students who would like to deepen their knowledge; they can improve their skills by study hours out of class, preparation of presentations, participation in seminars, making research and implementation of precedents. The special course titled “Internship After 3rd Year” which may be taken during summer time will help them decide on their future career. In their 4th year, legal and criminal procedure may also be taught in various legal practices courses during which case studies take place by taking into account current legislation and court precedents.

### **3. Mutual /Concurrent Education**

Although their high scores from the Student Selection and Placement Exam, the students of other faculties cannot take legal education as a double major program or a minor program. Although we do not recommend it, law students can enroll in double major programs. Minor programs, on the other hand, are highly recommended to law students since they may help them gain expertise in law.

### **4. Integrated Education**

In the past, in İstanbul University Social Sciences Institute, graduate students, who wanted to obtain a Ph.D., could have attended the seminar lectures of the Doctorate Program. In Ankara University Faculty of Law, seminars are being organized during graduate education since 1940. Those seminars to which students were able to participate starting from their 2nd year, have been very helpful for them in getting used to research. In this system, 3 seminar certificates were required to be enrolled in the Ph.D. Program.

Recently, an integrated program has been offered to the 4th year class/last year students who have 2,00 GPA and higher. Those students attend the lectures of a master’s program in “Private Student Status”. In this system, the lectures taken in the context of the integrated program will be adopted as the lectures of a master’s program. Students, who also attend other lectures of a master’s program, will acquire the right to receive the “Diploma of Master’s Without Thesis”. The students who would like to attend a “Program of Master’s With Thesis” are required ALES (Entrance Examination for Academic Personnel and Postgraduate Education) score.

### **5. Foreign Language in Legal Education**

The use of foreign languages in legal practice has become increasingly important for a long time. Therefore, education in a foreign language comprises an important part of legal education.

Like many universities in Turkey, İzmir University of Economics Faculty of Law, offers its students, who cannot submit any valid certificate (i.e. TOEFL) proving their proficiency with the English language, a one year compulsory “English Preparatory Course”. In case they fail from respective final exams, the students have the option to repeat this course again for one year or they can start their legal education right away. However, successful completion of this course is required for graduation. During their legal education, the students take “Legal English Course” each semester during their 4 year educational period. In the context of those courses, the students learn basic legal terms, legal correspondence like litigation petition and responsive petition and furthermore, they learn how to implement foreign legislation and international conventions into practice.

Finally, law students can take lectures on the second foreign language as elective courses during their education.

### **6. Mobility of Students and Professors**

Students’ and lecturers’ mobility can be realized through ERASMUS programs in many Turkish universities. Students can take advantage of getting education in a foreign country during both their graduate and postgraduate education.

Besides, many students and professors from foreign countries have visited Turkish law faculties in “Visiting Student Status” or “Visiting Researcher Status” in order to conduct research and to give seminars and conferences.

## **7. Conclusion**

Current applications have altered the classic legal education which is mainly based on lectures given by professors. This change is the outcome of the information era. Both professors and students, who can easily access the information, should together take active role in legal education.

Realization of active participation in the education of law students in accordance with the Bologna Process, provides that their acquired knowledge and experience will be permanent.

Mobility of students and professors improves international relationships and assists us in truly understanding different legal systems.

“English Preparatory Course” and “Legal English Courses” which are available each semester during whole legal education and “Second Foreign Language Courses” as elective courses will enable law students make international research and contribute in resolving international disputes.

## **References**

- Gedikli, Fethi, 2011. İstanbul Üniversitesi Hukuk Fakültesi Ne Zaman Kuruldu?, İÜHFM, C.LXIX, S.1-2, s. 91-104.
- Gehring, Axel, 2004. ABD’de Hukuk Öğretimi, Hukukçu ve Eğitimi ve Sorunları, Hukuk Öğretimi ve Hukukçunun Eğitimi, Uluslararası Toplantı 9-11 Ocak 2003, Türkiye Barolar Birliği, Ankara, s. 156-165.
- Kubilay, Huriye, Gökdemir, Nurser, 2005. Hukuk Eğitiminde Aktif Eğitim Uygulamaları ve Denizcilik Eğitimine Yansımaları, II. Aktif Eğitim Kurultay Kitabı, II. Aktif Eğitim Kurultayı 4-5 Haziran 2005, s. 108-114.

# Evaluation of new primary education curriculum based on constructivist learning approach through the viewpoints of teachers

Mehmet Arif Özerbaş<sup>1</sup>

<sup>1</sup>Assoc. Prof. Dr. Gazi University, Gazi Faculty of Education,  
Department of Primary Education Teknikokullar/Ankara/Turkey  
ozerbas@gazi.edu.tr

---

## Abstract

This study aims to determine the implementation levels of common basic skills in the new curriculum based on constructivist learning approach specified by Ministry of Education from the viewpoints of teachers. The scope of the study is limited to the implementation levels of eight common basic skills and the viewpoints of 713 teachers working at first and second grade of primary education. At the study, descriptive method was used. According to the findings, while no significant difference was found at any aspect of the study regarding with the gender variable, according to the variable of institution from which they were graduated, the teachers graduated from faculties of vocational education are better than the other teachers graduated from other schools, and according to the variable of seniority, it is observed that the novice teachers adopt better than the experienced ones and according to the teaching field, classroom teachers are more successful than the other field teachers in implementing new program.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* Constructivist learning, Information Technologies, Curriculum, Teacher, Primary Education

---

## Introduction

In this era, in which information is produced and spread quickly and continuously, the future of the individual and society depends upon our ability to utilize and produce information. Acquiring and maintaining these abilities requires contemporary education based on information production, not rote-learning. Turkey has made extensive attempts to implement an efficient learning model, especially during the previous few years.. These attempts concentrate on developing a perception of our educational system based on multiple causes and multiple effects rather than routinized logic.. In the information age, when traditional educational approaches are inadequate, the constructivist learning approach has become prominent. In constructivist learning, the intention is for the individual to acquire information through interaction with events and objects surrounding him/her and this information shall be constructed as new information by relating it with previous information that already exists (Bodner, 1986; Fosnot, 1996; Limon, 2001; Sherman, 2000; Özden, 2005). This viewpoint presupposes that the individual does not have a blank state of mind and that while acquiring information, he/she interprets new information through the lens of his/her present perception. It emphasizes that the student is inclined to learn by choosing the issues that can be added to the ones that already exist in his/her mind and efficiently re-construct and reinterpret new information. . The important thing here is to help the student develop intellectual abilities and construct information with a learner-centered approach, rather than changing a learners' behavior with a teacher-centered approach.

Today, to compete with developed countries, there is a need for individuals who can accomplish genuine learning, test their information, correct their mistakes, and put forth new ideas without hesitation. Due to these requirements, the Ministry of Education conducted a radical program change and launched a pilot program

at new elementary education programs based on the constructivist approach in the 2004-2005 school year. Following this successful pilot study new elementary education programs based on the constructivist learning approach were implemented in all of the elementary schools around the country in the 2005-2006 school year. In order to prepare new education programs, a concept analysis of the courses was performed and a special expertise group for each course and interdisciplinary special expertise groups were evaluated through the workshops in which the field specialists and the practitioners participated. In the beginning, some parts of the program that did not function well were determined by implementing a pilot application of the new programme at 120 schools in nine provinces. Appropriate course books and materials were prepared by reviewing the new program in direct accordance with the feedback acquired through the pilot application.

Along with a new program of sports, health, environment, consultancy career, entrepreneurship, and disaster consciousness were placed at the backbone of the program with an inter-disciplinary approach; the mutual causality principle was implemented in the place of dominant linear thinking; and knowledge, skill, perceptions and attitudes were implemented instead of surface behaviour expression. In other words, the new teaching program puts the philosophy of “learning to learn” at the center of the teaching philosophy rather than “how to teach”. The constructivist learning approach applies notions of “how learning occurs” instead of focusing on “how to teach”. In this approach the individual plays an active role- as a participant in learning and constructs knowledge both physically and symbolically. As the individual has to transfer his own understanding to others, he constructs the knowledge socially. At the same time, the individual trying to explain knowledge that he does not understand constructs the knowledge theoretically. A curriculum forms the structure of an educational system and the curriculum designer is required to answer questions regarding who will participate in the teaching process, along with what and when they will learn. Thus educational reforms often concentrate on the existing curriculum (Korkmaz, 2008). A curriculum defines the duties and responsibilities of students and teachers participating in the program as well as the subject areas and disciplines to be learned. For this reason, the roles of the teachers and students within the program are re-defined during the restructuring process of the curriculum. Whether the new primary school curricula successfully realizes the objectives depends on the physical characteristics of the classes where new curricula shall be implemented and the training of teachers who will carry out the implementation.

Otherwise, the time-consuming restructuring process of these programs may simply return to rote-learning of information on course materials and a teacher-centered approach and fail, which occurred in the attempt to restructure the 1968 educational system. In fact, in a review of research relating to this issue, Danişoğlu (2006) determined that acquisition towards humorous literary types which are present in 1st and 5th grade primary school Turkish curriculum are not reflected sufficiently when level of development, expectation and attitudes of students are taken into consideration. According to research carried out by Epçaçan and Okçu (2008), it was determined that classroom teachers “neither agree[d] nor disagree[d]” about the adequacy of Turkish course books. Elvan (2007) has specified that a great deal of teachers adopted Turkish Syllabus (grades 1-5) but the level of adoption, assessment, and evaluation on the part of the program is under 50 percent. Şahinel (2005:218) pointed out that in the new Turkish curriculum, traditionally dominant rote-learning methods have been replaced by skills such as researching, experimenting, and being solicitous and inquisitive. According to the research done by Kan (2007), it was determined that curricula of social studies and Turkish in the acquiring of eight basic skills (being accurate, efficient and good speakers of Turkish and critical thinking, creative thinking, communication, problem-solving, research, decision making, using information technologies and entrepreneurship skills). Öztalay (2007) specified that activities involving problem-solving, establishing semantic relationships between texts, being able to use information technology efficiently and consciously, entrepreneurship, and creativity, all defined as high-level skills, were not adequately present in Turkish coursebooks with the research upon using basic skills aimed to be acquired by the students in the curriculum of Turkish courses at primary school in 1st grade. Tekişik (2005:13) stated that teachers and supervisors intending to implement the curriculum should be sufficiently trained in order to ensure that the objectives of the new school curricula be executed. To accomplish this, he proposed that in-service training centers be established in

states and provinces. Furthermore, he suggests that a council should be created for training teachers and evaluating and monitoring the curriculum implementation. In addition, he points out that an information and documentation center ought to be established within the Ministry of Education, for the purposes of monitoring and documenting the findings from these evaluations. In his research, Coşkun (2005) pointed out that teachers thought in-service trainings regarding the new curriculum were inadequate in terms of duration, organization, sample activities, and occasionally frustrated by a lack of materials. Almost all of the aforementioned research concerns only one dimension of the program. The following questions are worth further investigation:

What are the viewpoints of the teachers applying the curriculum in a real sense? Do the teachers think they have sufficiently implemented the program? What kind of difficulties do they encounter? As teachers are the ones who apply the theoretically developed, their viewpoints and experiences about the level of application of the program in the program's adequacy in the classroom are highly essential. Between the 2005-2006 school year and today, there have been few studies done to investigate these questions. Thus, this study aims to solve this lack of investigation and research regarding the adequacy of application and implementation of the new elementary school curriculum in Turkey.

### **Objective**

The objective of the study is to determine the viewpoints of primary school teachers concerning the applicability of new primary school curriculum based on the constructivist approach, classroom characteristics, and how their level of realization of these activities differs according to variants such as the teacher's: Gender, Institution of graduation, Seniority, Teaching field and Province.

### **Method**

Models of descriptive statistics have been used to define the form of this study.

### **The scope of study**

The scope of the study consists of 713 teachers, including 309 males and 404 females working in elementary schools in Ankara, Adana, Adıyaman, Denizli, Erzurum, Sakarya and Sivas.

### **Data Collection Tools**

The data obtained through the study was collected by the scale called "The analysis scale of teachers' viewpoints about the curriculum based on the constructivist learning approach" (STVECC) developed by (Ozerbas, 2012). In order to compose the items of the scale, a preliminary study was carried out and within this scope 143 teachers working in Ankara elementary schools were reached. A form developed by the researcher was distributed to the teachers and they were required to list positive and negative aspects regarding the primary school curriculum based on a five year period of application of the constructivist approach. Then a content analysis was performed for each objective stated by the teachers and similar statements were combined. As a result, a list including 46 different positive and negative attitudes was composed. As the last stage a draft of the scale was prepared for preliminary application. The scale developed is an assessment tool of five-part Likert scale, consisting of 39 items. Items were scaled according to "Strongly disagree", "Disagree", "Neither Disagree nor Agree", "Agree", "Strongly Agree" and are marked with 1,2,3,4 and 5 respectively. The scale consists both personal items and items regarding the elementary school curriculum. The researcher conducted a pilot application of a draft of the scale, with a respondent/participant total of 490 teachers working in elementary schools in Ankara, Kırkkale, Düzce and Yozgat. According to the factor analysis done with pilot data, seven of 46 items in the scale were excluded as they had multiple factors or a low factor load. 39 items were distributed to six factors. The first factor, consisting of six items, is regarding "Accurate, efficient and good speakers of Turkish". The second factor consists of seven items and is titled "Teacher adopting constructivist learning approach". The third factor, containing eight items, is called "Physical characteristics of the classroom". The



fourth factor, “Societal values and democracy” possesses five items. The fifth factor is defined as “Level of using information Technologies” and contains six items and the sixth factor, “Program (teaching-learning process)”, has seven items. Factor loads of items within the first factor fluctuated between .75 and .66 and this factor describes 23.5 % of the total variance. Factor loads of the items within the second factor have values between .77 and .62 and this factor describes 11.9 % of the total variance. The items of the third factor had factor loads between .76 and .65. and describe 10.4 % of the total variance. The factor loads of items within the fourth factor describe 7.3 % of the total variance. Factor loads of the items within fifth factor fell between .71 and .46 and this factor describes 6.9% of the total variance. Factor loads of the items within the sixth factor fell between .69 and .48 and this factor describes 5.4 % of the total variance. These six factors describe nearly 63.9 % of the total variance. Internal consistency reliability of these factors (Cronbach’s Alpha) is .81, .84, .84, .81, .76 and .78 respectively.

## Data Analysis

Data obtained was analysed by using the SPSS programme. *T*-tests and one-way analysis of variance (ANOVA) were used as statistical analysis techniques. When the *F* value obtained as the result of variance analysis was significant, the Scheffe test was used after variance analysis in order to find out which group (level) caused this difference. The level of significance was accepted as .05.

## Findings

**1st sub-problem:** Do the viewpoints of teachers regarding implementation levels of the new elementary school curriculum based on the constructivist learning approach differ according to the variant of gender?

**Table 1**

*T-test Results of the Viewpoints of Teachers According to Gender*

Scales	Gender				t	p
	Male (n=309)		Female (n=404)			
	X	S	$\bar{X}$	S		
Accurate, efficient and good speakers of Turkish	3,65	,70	3,63	,66	,388	,702
Societal values and democracy	3.27	.66	3.17	.64	2.12	.334
Level of using information technologies	2,28	,63	2,31	,80	,580	,562
Program (teaching-learning process)	3,56	,68	3,52	,66	,766	,444
Physical characteristics of the classroom	2,34	,78	2,30	,80	,696	,487
Characteristics of constructivist teacher	3,93	,57	4,03	,66	2,17	,330

As seen in Table 1, regarding the implementation levels of the constructivist learning approach curriculum, there is no significant difference between gender and the teacher’s viewpoints. We may therefore conclude that the viewpoints of teachers regarding this implementation do not differ according to gender.

**2nd Sub-Problem:** Do teacher’s viewpoints of teachers regarding implementation of the constructivist learning approach into the new elementary school curriculum differ according to their institutions of graduation?

**Table 2**

*ANOVA Results of Points About Factors According to the Institution of Graduation \**

Factors	Fac. Of Education. (n = 461)		Inst. of Education. (n = 145)		Out of Field (n = 107)		F	p	Difference (Scheffe)
	$\bar{X}$	S	$\bar{X}$	S	$\bar{X}$	S			
Accurate use of Turkish	3.61	.69	3.76	.63	3.57	.66	3.27	.339	
Societal values.	3.19	.68	3.27	.59	3.24	.60	.855	.426	
Using information Technologies.	2.51	.68	2.44	.70	2.21	.97	9.58	.000	1>2; 1>3
Program	3.51	.58	3.62	.68	3.50	.59	1.93	.145	
Classroom characteristics	2.22	.76	2.50	.77	2.46	.96	9.06	.000	2>1
Char. Of Const. Teacher	4.02	.53	3.87	.61	4.05	.69	4.53	.011	1>2

\* Totally 713 teachers replied to (STVECC) Scale.

When the analysis results in Table 2 are examined, there is a significant difference between the viewpoints of teachers from different types of institutions of graduation in terms of three aspects (Information Technologies, classroom characteristics and the characteristics of teachers adopting constructivist approach) while there is no significant difference in the other three aspects. We may then conclude that there is a significant difference between teachers' levels of using information technologies in their classrooms and their institutions of graduation [ $F_{(2,710)} = 9.58$   $p < .05$ ]. According to the Scheffe test results, there is a significant difference between the teachers who graduated from faculties of education and the ones who graduated from institutes of education, with teachers who graduated from faculties of education ending up with the higher mean (Scheffe .2268  $p < .05$ ). Teachers that graduated from faculties of education stated that they use information technologies in classrooms according to the subject more effectively at the medium level than the ones who graduated from institutes of education and other types of institutions. There is also a significant difference between the viewpoints of teachers about the physical characteristics of their classrooms and the institutions of graduation according to one-way variance analysis [ $F_{(2,710)} = 9.06$   $p < .05$ ]. According to the Scheffe test results, conducted to identify between whom there was a significant difference, there was a significant difference in arithmetic means between the teachers that graduated from institutes of education and those that graduated from faculties of education and other educational institutions (Scheffe .2787  $p < .05$ ). The teachers who graduated from institutes of education stated that the physical materials of their classrooms are sufficient at medium-level to implement the new elementary school curriculum based on the constructivist approach. There is a significant difference between levels of having appropriate attitudes for constructivist learning approach and the institutions of graduation [ $F_{(2,710)} = 9.58$   $p < .05$ ]. According to Scheffe test results, there is a significant difference on behalf of teachers who graduated from faculties of education between arithmetic means between the teachers graduated from faculties of education and the ones graduated from the institutes of education (Scheffe .14733  $p < .05$ ).

**3rd Sub-Problem:** Do viewpoints of teachers regarding successful implementation of the new curriculum differ due to their seniority level?

**Table 3**  
ANOVA Results of Points About Factors According to Seniority\*

Factors	0-5 years (n = 200)		6-10 years (n = 161)		11-15 years (n = 142)		16-20 years (n = 82)		21 and more (n = 128)		F	p
	$\bar{X}$	S	$\bar{X}$	S	$\bar{X}$	S	$\bar{X}$	S	$\bar{X}$	S		
Accurate use of Turkish	3.56	.68	3.62	.68	3.65	.74	3.80	.56	3.70	.64	2.16	.071
Societal values.	3.17	.67	3.11	.66	3.31	.68	3.27	.58	3.28	.59	2.61	.034
Using information Technologies.	2.18	.73	2.15	.67	2.33	.77	2.43	.63	2.55	.73	7.80	.000
Program	3.50	.65	3.48	.65	3.58	.75	3.62	.64	3.55	.66	.93	.441
Classroom characteristics	2.28	.82	2.18	.73	2.25	.85	2.50	.71	2.49	.78	4.31	.002
Char. Of Const. Teacher	4.09	.50	3.94	.57	3.90	.61	3.95	.44	4.00	.69	2.795	.025

According to the analysis results in Table 3, seniority level caused no significant difference in teacher viewpoints in two aspects (accurate and efficient speakers of Turkish and the new primary school curriculum based on the constructivist approach), while there are significant differences in the other four aspects. There is a significant difference in implementation and attitudes due to the seniority of the teacher [ $F_{(4,708)} = 2.613$   $p < .05$ ]. Specifically, there is a significant difference between the viewpoints of teachers that have worked from 11-15 years and the viewpoints of those that have from 6-10 (Scheffe .2067  $p < .05$ ).

There is also a significant difference between levels of using information technologies and the teachers' seniority level [ $F_{(4,708)} = 7.804$   $p < .05$ ]. According to the results of the Scheffe test, there is a significant difference in viewpoints of the teachers that have worked 0-5 years and 6-10 years with those that have worked more than 21 years (Scheffe .3671.  $p < .05$ ), (Scheffe .4020.  $p < .05$ ). We can therefore conclude that the teachers who have

worked less than 10 years see themselves undervalue their utilization of technology in the classroom. On the other hand, we can conclude that the teachers who worked for 21 years or more interpret their implementation of information technologies more positively than those with less experience. The results of one-way variance analysis reveals that teachers' seniority levels caused a significant difference in their viewpoint regarding the physical characteristics of their classrooms [ $F_{(4-708)} = 4.317$ ,  $p < .05$ ]. Specifically, there was a significant differences observed between teachers that worked 21+ years and those that had only worked from 0-5 years, in favor of those that had 21+ years of experience (Scheffe .3164,  $p < .05$ ). This finding indicates that experienced teachers found the physical characteristics and equipment of their classrooms adequate at the medium-level in terms of aiding the implementation of the new curriculum. On the contrary, less-experienced teachers found the physical characteristics and materials of their classrooms inadequate at the medium-level in aiding the implementation of the new curriculum. From this finding, we may conclude that the goals and expectations of novice teachers are higher than experienced teachers, perhaps due to the qualified training they acquired from the faculty of education. Finally, via the results of one-way variance analysis, the teachers' seniority level also caused significant differences in the teacher's viewpoints of their success in implmting the duties associated with the [ $F_{(4-708)} = 2.795$ ,  $p < .05$ ]. According to the results of the Scheffe test, there is a significant difference between the teachers that have worked 0-5 years and the teachers that have worked 11-15 years, in favor of those that have worked 0-5 years (Scheffe .1902  $p < .05$ ).

**4th Sub-Problem:** Do viewpoints of teachers regarding implementation levels of the constructivist learning approach-based elementary school curriculum differ according to their teaching field? There is a significant difference between the viewpoints of teachers only about the fourth variant (implementing teaching tasks according to the constructivist learning approach) [ $F_{(7-705)} = 5.557$ ,  $p < .05$ ], while there is no significant difference in all other aspects. According to the Scheffe test results, there is a significant difference science teachers and classroom teachers, in favor of classroom teachers (Scheffe .3659  $p < .05$ ).

**5th Sub-Problem:** Do viewpoints of teachers regarding implementation levels of the constructivist learning approach into the new elementary school curriculum differ according to the provinces within which they work?

**Table 5**  
*ANOVA Results of Points About Factors According to Provinces\**

Factors	Ankara (n = 128)		Sivas. (n = 77)		Denizli (n = 97)		Erzurum (n = 115)		Adana. (n = 119)		Sakarya (n = 85)		Adiyaman (n = 92)		F	p
	$\bar{X}$	S	$\bar{X}$	S	$\bar{X}$	S	$\bar{X}$	S	$\bar{X}$	S	$\bar{X}$	S	$\bar{X}$	S		
Accurate using of Turkish	3.49	.70	3.68	.68	3.52	.63	3.52	.71	3.82	.66	3.69	.64	3.83	.60	4.913	.000
Societal values.	3.08	.68	3.19	.67	3.15	.65	3.35	.54	3.29	.65	3.28	.53	3.21	.75	2.124	.069
Using information Technologies.	2.32	.91	2.30	.82	2.21	.80	2.39	.42	2.31	.65	2.31	.60	2.25	.73	.562	.761
Program	3.76	.56	3.60	.67	3.55	.67	3.41	.64	3.66	.69	3.44	.65	3.38	.56	4.610	.000
Classroom characteristics	2.47	.95	2.39	.85	2.25	.78	2.18	.82	2.39	.71	2.38	.70	2.22	.65	4.199	.002
Char. Of Const. Teacher	4.20	.69	4.16	.54	4.16	.50	3.89	.47	3.99	.56	3.85	.54	3.63	.42	13.621	.000

An analysis of the one-way variance results was conducted to identify the relationship between the viewpoints of teachers and the provinces within which they work. There were significant differences revealed in all of the aspects, except for two (Societal Values and Level of using Information Technologies). Significance was revealed in the aspect of "accurate use of Turkish" and three provinces in which the teachers [ $F_{(6-706)} = 4.913$ ,  $p < .05$ ]. According to the results of the Scheffe test, there is a significant difference in accurate use of Turkish between teachers working in Adiyaman and those working in Ankara, in favor of those working in Adiyaman (Scheffe .34216,  $p < .05$ ). There was a similarly significant difference in accurate use of Turkish found between

teachers working in Adana and those working in Ankara, in favor of those working in Adana (Scheffe .32594,  $p < .05$ ). However, when the difference between arithmetic means in Table 5 is examined, there are similar results in terms of acquiring accurate and efficient Turkish speakers, almost all at the medium level. This is surely the result of the program being applied in almost all schools by the teachers in the provinces included with the research. This shows that the program is efficient in acquiring good speakers of Turkish. Another significance was identified between the provinces in which the teachers are working and the aspect of the their opinions regarding the “curriculum (learning-teaching processes)” as the fourth aspect in Table 5 [ $F_{(6-706)} = 4.610$ ,  $p < .05$ ]. According to the results of the Scheffe test, more teachers working in Ankara stated that they implement the new curriculum in accordance with its objectives than the teachers working in other provinces, particularly in comparison to teachers working in Adıyaman (Scheffe .3718,  $p < .05$ ), (Scheffe .3435,  $p < .05$ ).

## Discussion

The first sub-problem of the study explored whether teacher implementation of the new constructivist learning approach-based elementary school curriculum differed according to gender. According to the teacher responses, in terms of the (STVECC) scale, there is no significant difference in neither sub-dimensions of the scale nor in the whole. This finding shows that the variant of gender plays a very slight role in terms of causing variance in teacher implementation of the new curriculum. This parallels the findings of Osborne (2003). Additionally, it goes parallel with the results of research that concluded that “gender is not an important variant that makes change” in the studies of Çakır and fellows (2007), Gürkan and Gökçe (2000) and Çakır, Kan and Sümül (2006). These results show that gender does not have a significant effect over (STVECC) of teachers. In other words, it we can conclude that the teachers, regardless of gender, have similar opinions about the implementation of the new constructivist learning approach-based elementary school curriculum.

The second sub-problem of the study explored whether the responses and results from the (STVECC) scale differ according to the variant of institution of graduation. According to the findings, the teachers who graduated from programs of education stated that they used information technologies in their classrooms at the “medium-level”. The teachers who graduated from institutes of education and other educational institutions stated that they did not use information technologies sufficiently in their classrooms. While teachers who graduated from institutes of education and other educational institutions state that equipment in the classroom is adequate at medium-level, the teachers who graduated from faculties of education stated that they are inadequate. We can conclude that teachers who graduated from faculties of education use information technologies at the medium-level due to the curriculum implemented in during their studies at faculties of education, in which they were taught what information technologies are, where and how they are used, the quality of tools used in learning-teaching processes, and the teaching style of their trainee teacher.

Teachers who graduated from faculties of education become teachers through four-year initial teacher training programs in the interest and intention of of being a teacher throughout the period of their education, while teachers who graduated from other programs (Degrees in Arts and Sciences etc.) become teachers through shorter teacher-training programs after completing an education based on a specialization. Bandura (1977,1995,1997) states that beliefs of self-efficacy grow in conjunction with one’s own life experiences. From this point of view, the cause of the strong self-assessment of teacher’s that graduated from four-year teacher training programs can be assumed to be the result of the experiences they acquired during that four-year period. In addition, teachers that graduated from programs of education have been exposed to classes, speakers, and trainer feedback focused on increasing the efficacy of their teaching. In contrast, the teachers that graduated from other degree programs may have had comparatively little exposure to feedback and coursework regarding the efficacy of teaching. Due to this lack of education-based exposure, they may have a low self-assessment of their ability to implement information technologies and the other components of the constructivist learning approach involved in the new elementary school curriculum. These results are in accordance with the findings of Bandura (1977, 1986), in which he concluded that “verbal persuasion, which is one of the informing sources for self-efficacy and evaluations of one’s own self regarding job success, considerably the behaviours of people.” It is

undeniable that positive and realistic approval from other people in each aspect of life increases the self-esteem of an individual.

The third sub-problem of the study explored whether teacher's viewpoints, in terms of the (STVECC) scale, differ according to their seniority. From the results, we can conclude that as a teacher's seniority level increases, their perceptions about using information technologies and the equipment in the classroom also increase. Bandura (1977, 1995, 1997) indicates that self-confidence and self-efficacy rise as the result of successful experiences in one's own life. From this point of view, it is possible that the higher the seniority level – and therefore, the longer experience one has as a teacher – the greater the level of a teacher's self-efficacy. It can further be assumed that a teacher will have a great amount of successful experiences as a teacher as their number of years as a teacher increases. Teachers working for 21 years or more found the physical characteristics of their classrooms more sufficient than the teachers working between 6-10 years. While novice teachers found them insufficient. This result is in accordance with the results of a study done by Çakıroğlu et al. (2008). Experienced teachers stated that they implement teaching duties (coaching) in accordance with constructivist learning approach and find their ability to implement these duties to be adequate and scored higher than novice teachers in this aspect. Another interesting finding from this study is in regards to teacher's perceptions of the number of students in the classroom and how the number of students affects their ability to implement the constructivist learning approach.

The fourth sub-problem of the study explored the effect of the teacher's field/subject on teachers' self-assessment of curriculum implementation. The results reveal that teachers of science and math had significantly lower levels of self-assessment than general classroom teachers. According to research about the ability of teachers working in elementary education schools in Turkey and their needs for in-service training (Yıldırım, Koçak and Kirazcı 2001), teachers from different teaching fields find themselves insufficient in using computers and other information technologies. When the new elementary school curriculum based on constructivist learning approach is analysed, information technologies are used most efficiently at first grade level of elementary education. As there are mostly classroom teachers working at this grade, this is in accordance with the findings of this study, in which classroom teachers saw themselves as more adequate than the teachers from other teaching fields. The fifth sub-problem of the study explored the effect that a teacher's province has upon their perceptions and implementation of the new curriculum. There are significant differences in four of the six aspects/factors. The first of the common basic skills intended with the new curriculum is the aim of "producing individuals who use Turkish accurately and efficiently, think critically and creatively, are able to use and produce information, attach importance to personal and social values" (MEB, 2005). The teachers working in Adıyaman stated that the constructivist learning approach-based curriculum realized its objective and the children became efficient and good speakers of Turkish after the curriculum. Şahinel (2005:218) points out that in the new Turkish curriculum, the traditionally-dominant rote learning format has been replaced to impart upon students the ability to conduct research and experiments and be inquisitive and solicitous.

## References

- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*. 84,191-125.
- Bandura, A. (1986). *Social foundations of thought and action: A social theory*. Englewood Cliffs, NJ: Prentice Hall.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W.h. Freeman.
- Coşkun, E. (2005). İlköğretim Dördüncü ve Beşinci Sınıf Öğretmen ve Öğrencilerinin Yeni Türkçe Dersi Öğretim Programıyla İlgili Görüşleri Üzerine Nitel Bir Araştırma, *Kuram ve Uygulamada Eğitim Bilimleri Dergisi*, Cilt- 5, Sayı: 2, <http://www.edam.com.tr>
- Çakıroğlu, Ü., Güven, B. ve Akkan, Y. (2008). Matematik Öğretmenlerinin Matematik Eğitiminde Bilgisayar Kullanımına Yönelik İnançlarının İncelenmesi. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, Sayı 35, 38-52.
- Danışoğlu, H. (2006). Eğlendirici Yazınsal Türklerin Türkçe Öğretiminde Kullanımı ve Bu Çerçeve 2004 – 2005 Türkçe Öğretim Programının Değerlendirilmesi, Yayınlanmamış Yüksek Lisans Tezi, İzmir: Dokuz Eylül Üniversitesi Eğitim Bilimleri Enstitüsü.
- Epçaçan, C. Okçu, V. (2008.b) "İlköğretim Türkçe Ders Kitaplarının Öğretmen Görüşleri Doğrultusunda Değerlendirilmesi", *Uluslararası*

- Türkçe Eğitimi ve Öğretimi Sempozyumu, 27-28 Mart 2008 Gazimağusa – KKTC.
- Kan, A. Ü. (2006), Yeni İlköğretim Programında Öngörülen Temel Becerileri Kazanmada Beşinci Sınıf Sosyal Bilgiler ve Türkçe Derslerinin Etkilerine İlişkin Öğrenci Görüşlerinin Değerlendirilmesi, Yayınlanmamış Yüksek Lisans Tezi, Elazığ, Fırat Üniversitesi Sosyal Bilimler Enstitüsü.
- MEB. (2007).Bilişim Teknolojileri Öğretmen Kılavuz Kitabı. İlköğretim 4,5. Basamak. Devlet Kitapları, Birinci Baskı, Ankara.
- Özatalay, H. (2007) İlköğretim I. Kademe Türkçe Öğretim Programında Öğrencilere Kazandırılması Hedeflenen Temele Becerilerin Türkçe Ders Kitaplarında Kullanılmasına İlişkin Durum Çalışması, Yayınlanmamış Doktora Tezi, İstanbul: Marmara Üniversitesi Eğitim Bilimleri Enstitüsü.
- Özerbaş, M. A. (2007) Yapılandırmacı Öğrenmenin Akademik Başarı ve Transfer Becerilerine Etkisi, Türk Eğitim Bilimleri Dergisi. Güz dönemi, cilt: 5, Sayı: 4, Ankara.
- Şahinel, M. G. (2005), Yeni Türkçe Öğretim Programına Göre Öğrenme Öğretme Ortamının Düzenlenmesi, Eğitimde Yansımalar: VIII Yeni İlköğretim Programlarını Değerlendirme Sempozyumu, Kayseri: 14 –16 Kasım 2005, Erciyes Üniversitesi Sabancı Kültür Merkezi.
- Tekışık, H.H. (2005), Yeni İlköğretim Programlarının Uygulanmasına Öğretmenlerin Hazırlanması, Eğitimde Yansımalar: VIII Yeni İlköğretim Programlarını Değerlendirme Sempozyumu, Kayseri: 14 – 16 Kasım 2005, Erciyes Üniversitesi Sabancı Kültür Merkezi.
- Yıldırım, S., Koçak, S. Ve Kirazcı, S. (2001).Computers Are Ready But How About Teachers: An Assessment Of Turkish Basic Education Teachers'Inservice Training Needs. Paper Presented At The 12th Annual İnternational Coference Of Society Fot İnformation Techonology & Teacher Edducation. Association Fort He Advancement Of Computing İn Education (AACE), Orlando, Florida, April 2001.

# Examination of anger levels of prospective teachers of physical education and sports

Elif Karagün77

*\*Kocaeli Üniversitesi Beden Eğitimi ve Spor Yüksekokulu Umutepe Kampüsü-41380-İzmit Kocaeli Türkiye*

---

## Abstract

The purpose of this descriptive research is to determine the anger levels of prospective teachers of physical education and sports. For this purpose, State Trait Anger Scale was applied on total 264 prospective teachers, 94 of whom were 1<sup>st</sup> year students, 152 of whom were final year students at Physical Education and Sports Teaching Department of Kocaeli University. As a result of the scale applications, significant differences were observed in anger-out subscale in terms of gender variable and in anger control subscale in terms of age variable in the final year students. On the other hand, in the first year students was found a significant difference in anger-in subscale only in terms of income status.

*Keywords:* Prospective teacher, anger, physical education and sports teacher

---

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

## Introduction

Anger, which is stated to differ across cultures, is viewed as a universal feeling that has an important place in daily life. It is also defined as a strong feeling that leads to eliminate the stimulants disturbing an individual related to the cognitions formed because of frustration, threat and injustice (Balkaya and Şahin, 2003; Biagio, 1989). It was stated that contrary to common belief, there was no direct relationship between external events and anger and that anger arousal is caused by the thoughts and beliefs, that is, cognitive processes, of an individual and the feeling of anger can reduce with the change in illogical beliefs (Ellis, 1992; Robins & Novaco, 1999; Taylor, 1988). It was mentioned that angry people used different ways to reflect their anger and they particularly used expressions in the form of words, crying and direct aggression very often (Köknel, 1999). According to Spielberg (1991), the tendency to suppress angry thoughts and feelings is defined as “Internalized Anger”; the tendency to behave aggressively to people and objects around is defined as “externalized anger”; the ability to prevent and control anger is defined as “Anger Control/Management” (cited by: Bridewell & Change, 1997). Aggression, one of the forms of anger expression, is said to arise from the feeling of anger. (Balkaya & Şahin, 2003; Weiner, 1993). It was stated that even those who are not aggressive can show aggressive reactions when they believe the others are ill-intentioned, and anger and aggression in children and adolescents is one of the most important problems of the teachers and school counselors (Akdeniz, 2007; Cenkseven, 2003; Duran & Eldeklioğlu, 2005; Weiner, 1993). When considered in view of the need that teachers have to consult their students at school, and considering the importance of relaxation and exercise to get rid of the feelings of anger, it is important to encourage children and young people to do sports. Explanations about the fact that as well clearly experiencing the anger related to a situation with the displacements of feelings such as suppressed anger or rage, one can move away from the exasperating situation and turn to relaxing physical activities to remove anger (Geçtan, 1998) constituted the starting point of this study. One of the important things that can be replaced with anger at schools of adolescents and children is sports. The ones who manage sports activities at schools are

---

\* Corresponding author. Tel.: +90262303368; fax: +902623033603  
E-mail address: elif.karagun@gmail.com

physical education and sports teachers. Physical education teachers are in a supportive position to eliminate negative feelings such as anger at schools. All this information and the research results in the literature reporting that “the likelihood of helping others decreases when the feeling of anger arises” (Aktaş and Coştur, 2007; Tekinsav, Aydın and Sorias, 2010), and physical education teachers managing sports which is recommended to get rid of anger ranked five at a rate of 12,2% among the educators who were prone to violence (Çiftçi, 2006) necessitated to do detailed studies about the subject. As exercise helps foster relaxation, the anger levels of prospective teachers of physical education and sports managing sport activities which are important to eliminate anger have become a concern. In this regard, this study investigates the anger levels of prospective teachers of physical education and whether the determined anger changes depending on the variables such as grade, gender, age and number of years spent doing sports.

### *1.1.Problem Statement*

Everyone knows that activities such as sport are promoted to prevent anger which is stated to have been prevalent in recent years and that each student takes physical education and sports lesson at schools. Considering the fact that each individual takes this course and the contribution of it in terms of emotional well-being, the question arouse as to what the anger levels of prospective physical education teachers who manage sports are. Considering this basic question, it was aimed to compare the anger levels of prospective physical education teachers who were in their first year of education and those in their final year of education before starting their profession. It was also aimed to seek an answer to the questions as to whether their anger levels differ depending on the variables such as the grades attended, age, gender, economic situation, number of years spent doing sports if the prospective teachers of physical education who are in their first and final year at university experience anger.

## **2. Methodology and Data**

*2.1.Participants:* This is a descriptive research. It began with totally 344 students, 213 of whom were 1<sup>st</sup> year students, 141 of whom were final year students at Physical Education and Sports Teaching Department of Kocaeli University and lasted for two years, including the academic years 2012-2013 and 2013-2014. Considering only the valid questionnaires of those attending university and voluntarily participating in the questionnaires during the administration period, the study was completed with 246 students in total, including 94 (38.2%) first-year students and 152 (50.8%) final year students.

### **2.2. Measures**

*2.2.1. “State-Trait Anger Scale” (STAS):* It is a four-point Likert-type scale developed by Spilberger (1983) and adapted to Turkish by Özer (1994) measuring the feeling and expression of anger. The scale consists of four subscales including “state-trait anger”, “anger-in”, “anger-out” and “anger control”, and 34 items. Since it was stated that the studies about the state anger scale had not yet been completed (Savaşır&Şahin, 1997), the state anger scores were not computed in this study. In addition, the scale does not have a final total score; it is comprised of the total scores of the four subscales. Trait anger expresses how an individual usually feels about himself and the anger level he experiences. The lowest score in the trait anger scale is 10 and the highest score is 40. High scores show that the anger level is high. The lowest score for each subscale including anger-in, anger-out and anger control is 8, and the highest score is 32. High anger control scores show that anger can be controlled; high anger-out subscale scores show that anger can easily be expressed; high anger-in subscale scores show that anger is suppressed (Özer, 1994; Savaşır and Şahin, 1997). The reliability analysis of the scale in this study was found to be  $\alpha = ,742$ .

*2.2.2. Personal Information Form:* A five-question information form was prepared and used by the researcher in order to determine the prospective physical education teachers’ grades, age, gender, monthly income levels and number of years spent doing sports.

### **2.3.Data Analysis**

The data obtained from the study was analyzed statistically and its significance was tested at the level of 0.05. During the statistical analysis, descriptive frequency and percentage distribution of the personal characteristics of the prospective physical education teachers were determined. Mean and standard deviation values were used to determine the scores obtained from the State-Trait Anger scale. According to the test of normality, it was determined that the data showed normal distribution, and independent group t test was used for



the two-set comparisons or one way analysis of variance (one way-ANova) was used for three or more-set comparisons.

### 3. Findings

In this part, the mean scores and standard deviations the prospective physical education and sports teachers got from the anger subscales, and their frequency and percentage distribution are given in tables.

**Table 1. Anger Score Mean and Standard Deviation Values of the Prospective Teachers Who Participated in the Research According to the Grades They Attend**

VARIABLES		Total N (%)	Year Mean± SD	P Value
Trait Anger	1st Year	94 (38.2)	21.25±5.77	,188
	4 <sup>th</sup> Year	152(61.0)	20.26±5.69	
Anger -in	1st Year	94 (38.2)	15.18± 3.80	,301
	4th Year	152(61.0)	15.71±3.94	
Anger-out	1st Year	94 (38.2)	16.24±4.13	,894
	4th Year	152(61.0)	16.17±3.61	
Anger Control	1st Year	94 (38.2)	22.53±4.95	,134
	4th Year	152(61.0)	21.58±4.69	

When examining Table 1, no significant difference was found in terms of the grade the prospective physical education teachers included in the scope of the research attend at university and the subscales of the anger scale.

**Table- 2 Sample Group Mean and Standard Deviation Values of Anger Levels by Gender**

VARIABLES		Total N (%)	1st Year Mean ± SD	4th Year Mean ± SD	Total Participants Mean ± SD
Trait Anger	Female	121 (38.2)	21.98±6.18	20.16±5.82	20.97±6.03
	Male	125(61.0)	20.27±5.08	20.19±5.55	20.32±5.43
	P		0.157	,976	0,371
Anger-in	Female	121 (38.2)	15.761± 3.85	15.26±3.90	15.48±3.87
	Male	125(61.0)	14.40±3.65	15.92±3.92	15.52±3.93
	P		,087	,307	0,935
Anger –out	Female	121 (38.2)	16.07±4.31	15.46±3.56	15.48±3.87
	Male	125(61.0)	16.47±3.97	16.67±3.8	15.53±3.93
	P		,645	,039*	,058
Anger Control	Female	121 (38.2)	22.66±4.59	21.67±4.71	22.11±4.66
	Male	125(61.0)	22.35±5.47	21.48±4.72	21.78±4.95
	P		0.761	0.807	0.589

When Table-2 is examined, no significant difference was found in terms of trait anger, anger-in and anger control by the gender variable in neither 1st nor 4th year students. At the level of anger-out, the mean scores of anger-out of female and male students in their 1st year were the same, whereas a significant increase in the scores of anger-out in female students in the 4th year was observed.

**Table 3. Mean and Standard Deviation Values of Anger Scores By Age**

VARIABLES		N (%)	1st Year Mean ± SD	4th Year Mean ± SD	Total Participants Mean ± SD
Trait Anger	Under 20 yrs	63(25.6)	21.10±6.11	23.33±5.39	21.32±6.04
	21-25 yrs	160(65.0)	21.63±5.31	20.23±5.81	20.62±5.74
	26-30 yrs	23(9.3)	19.00±5.65	18.95±4.59	18.95±4.54
	P		0.756	0.240	0.239

<b>Anger-in</b>	<b>Under 20 yrs</b>	63(25.6)	15.463±3.90	18.66±5.39	15.47±4.14
	<b>21-25 yrs</b>	160(65.0)	15.34±3.32	15.59±3.92	15.61±3.82
	<b>26-30 yrs</b>	23(9.3)	13.50±10.60	15.00±3.13	14.86±3.77
	<b>P</b>		0.798	0.296	0.693
<b>Anger-out</b>	<b>Under 20 yrs</b>	63(25.6)	15.91±4.16	16.50±3.27	15.96±4.064
	<b>21-25 yrs</b>	160(65.0)	16.77±4.081	16.31±3.76	16.45±3.84
	<b>26-30 yrs</b>	23(9.3)	16.50±6.36	15.00±2.34	15.13±2.65
	<b>P</b>		0.629	0.296	0.256
<b>Anger Control</b>	<b>Under 20 yrs</b>	63(25.6)	22.86±4.88	24.50±4.42	23.02±4.83
	<b>21-25 yrs</b>	160(65.0)	21.94±5.23	21.048±4.69	21.26±4.81
	<b>26-30 yrs</b>	23(9.3)	23.50±0.707	23.76±4.01	23.74±3.83
	<b>P</b>		0.668	<b>0.014*</b>	<b>0.008*</b>

Considering Table-3, according to the age variable of the 1st and 4th year students included in the study, no significant result was found in terms of trait anger, internalized and externalized anger scores. Considering in terms of anger control, it was seen that there was a significant difference between the age and anger control scores for the 4th year students. When the ages were examined, the anger control score means of the ones under 20 and over 26 were found to be close to each other, and when the 1st and 4th year students included in the study were taken into consideration as a whole, a significant difference was found in terms of age, particularly in favor of the group below 20.

**Table 4. Mean and Standard Deviation Values of Anger Scores by Economic Situation**

VARIABLES		N (%)	1st Year Mean ± SD	4th Year Mean ± SD	Total Participants Mean ± SD
<b>Trait Anger</b>	<b>1000TRY and below</b>	63(25.6)	23.23±5.35	20.81±5.71	21.62±5.67
	<b>1001-1500TRY</b>	67(27.2)	20.34±4.53	19.42±5.94	19.82±5.36
	<b>1501-2000TRY</b>	80(32.5)	20.11±6.31	20.54±5.69	20.55±5.92
	<b>2001TRY and more</b>	36(14.6)	22.05±6.85	19.27±4.93	20.66±6.052
	<b>P</b>		0.208	0.604	0.359
<b>Anger-in</b>	<b>1000TRY and below</b>	63(25.6)	16.52±3.73	16.12±4.09	16.25±3.95
	<b>1001-1500TRY</b>	67(27.2)	14.93±3.36	16.32±3.79	15.72±3.65
	<b>1501-2000TRY</b>	80(32.5)	13.65±4.26	14.57±3.77	14.45±4.062
	<b>2001TRY and more</b>	36(14.6)	16.22±3.24	16.11±3.77	16.16±3.47
	<b>P</b>		<b>0.038*</b>	0.118	<b>0.023*</b>
<b>Anger-out</b>	<b>1000TRY and below</b>	63(25.6)	16.95±3.99	16.40±3.74	16.58±3.80
	<b>1001-1500TRY</b>	67(27.2)	15.55±2.91	15.15±3.071	15.32±2.99
	<b>1501-2000TRY</b>	80(32.5)	16.04±4.36	16.40±3.70	16.36±3.93
	<b>2001TRY and more</b>	36(14.6)	16.83±5.57	16.77±3.81	16.81±4.70
	<b>P</b>		0.609	0.272	0.157
<b>Anger Control</b>	<b>1000TRY and below</b>	63(25.6)	21.86±4.82	22.40±4.68	22.22±4.69
	<b>1001-1500TRY</b>	67(27.2)	22.83±4.40	20.44±5.37	21.47±5.08
	<b>1501-2000TRY</b>	80(32.5)	22.88±4.80	21.86±4.25	22.22±4.41
	<b>2001TRY and more</b>	36(14.6)	22.33±6.35	21.11±4.33	21.72±5.39
	<b>P</b>		0.888	0.279	0.757

As seen in Table-4, no significant difference was found between the economic situation of the prospective physical education teachers included in the study and trait anger, externalized anger and anger control. When the 1st year students and all the participants included in the scope of the study were evaluated together, anger-in mean scores of the individuals with a monthly income level of 1000 TRY and below and 2001 TRY and over were seen to be high

**Table 5. Mean and Standard Deviation Values of Anger Scores by the Number of Years Spent Doing Sports**

VARIABLES		N (%)	1st Year Mean ± SD	4th Year Mean ± SD	Total Participants Mean ± SD
<b>Trait Anger</b>	<b>0-4 yrs</b>	62(25.2)	21.71±5.73	20.39±6.21	20.84±6.34
	<b>5-9 yrs</b>	71(28.9)	21.36±6.88	20.50±5.89	20.90±6.33
	<b>10-14 yrs</b>	89(36.2)	20.57±4.76	20.03±5.16	20.24±4.98

	<b>15-20yrs</b>	24(9.8)	23.40±5.17	20.15±6.00	20.83±5.88
	<b>P</b>		0.729	0.982	0.882
<b>Anger-in</b>	<b>0-4 yrs</b>	62(25.2)	16.33±3.81	14.66±3.98	15.22±3.97
	<b>5-9 yrs</b>	71(28.9)	15.27±4.02	15.15±3.02	15.21±3.49
	<b>10-14 yrs</b>	89(36.2)	14.55±3.45	16.64±3.75	15.82±3.76
	<b>15-20 yrs</b>	24(9.8)	14.20±4.76	16.42±5.35	15.95±5.22
	<b>P</b>		0.359	0.061	,655
<b>Anger-out</b>	<b>0-4 yrs</b>	62(25.2)	16.33±4.16	15.73±3.34	15.93±3.62
	<b>5-9 yrs</b>	71(28.9)	16.42±4.75	16.76±3.87	16.60±4.27
	<b>10-14 yrs</b>	89(36.2)	16.11±3.66	16.25±3.70	16.20±3.67
	<b>15-20yrs</b>	24(9.8)	15.60±3.91	15.73±3.43	15.70±3.44
	<b>P</b>		0.974	0.590	0,684
<b>Anger control</b>	<b>0-4 yrs</b>	62(25.2)	22.19±3.96	21.41±4.47	21.67±4.28
	<b>5-9 yrs</b>	71(28.9)	22.24±6.03	21.28±4.60	21.73±5.29
	<b>10-14 yrs</b>	89(36.2)	22.88±4.60	21.53±5.1	22.06±4.95
	<b>15-20 yrs</b>	24(9.8)	23.40±4.39	22.68±4.13	22.83±4.10
	<b>P</b>		0.912	0.744	0.753

As seen in Table- 5, no significant difference was found between the number of years spent doing sports and anger subscales.

#### 4. Discussions

In this part, the data shown in the tables were interpreted along with the data in the literature. In Table 1, when the 1<sup>st</sup> year and 4<sup>th</sup> year students were compared in terms of the feeling of anger, no significant difference was observed between the two groups of students. The reason for that was thought to be the research group's being engaged in sports and the effect of relaxation through exercise.

When the anger level was considered according to gender variable in Table 2, no significant result was seen in any anger subscale in terms of the 1<sup>st</sup> and 4<sup>th</sup> year students, whereas it was only seen in the 4<sup>th</sup> year students that externalized anger showed a significant increase in women. When the literature studies were taken into consideration, it was seen that there were studies showing there was no relationship between anger and age variable (Sharkin, 1993; Stoner and Spencer, 1987; Güleç, 2002); and there were results supporting our findings as well (Albayrak and Kutlu, 2009). Researchers state that gender is important for anger expression; men are easily perceived when they express their anger (Travis, 1982); women suppress and do not show their anger as a result of learning depending on culture; and anger is a masculine feeling (Güleç 2002; Sharkin, 1993). When the data were evaluated considering these explanations, it was thought that higher anger-out scores of men compared to women could be the result of cultural learning.

In Table 3, no significant result was found in any of the anger subscales in terms of age for the prospective teachers studying in their 1<sup>st</sup> and 4<sup>th</sup> year. It was seen that anger control scores showed a significant difference in favor of the individuals under 20 and over 26 in the 4<sup>th</sup> year students and when all the participants were taken into account together. When the studies conducted were reviewed, in contrast to our study, it was mentioned that anger, which is a function of adolescents for coping with some difficulties and adaptation, was intense and experienced frequently. Compared to young people, a positive significant difference was found in anger reactions of older individuals (Kulaksızoğlu, 1998; Stoner & Spencer, 1987). When the explanations stating that individuals learn to externalize anger in a proper way through displacement during the socialization process and that relaxation techniques are good for anger control (Köknal, 1999; Sharkin, 1988) were considered, it was considered that the participants in the study were supported in terms of socialization and relaxation by doing sports, and in this way they externalized anger in a proper way and the ways they express anger were affected. Moreover, considering the information expressing that with the increase in age towards the end of the adolescence period, the skills for coping with feelings and expressing feelings in a proper way develop (Kulaksızoğlu, 1998), it was thought that anger management skills of prospective teachers developed since they were at the end of their adolescence and in their adulthood period by age.

When the anger level was considered in economic terms in Table 4, no significant result was found in any of the anger subscales for those in their 1<sup>st</sup> and 4<sup>th</sup> year. Only when the 1<sup>st</sup> year students and all participants were taken into account together, it was observed that anger-in mean scores of the individuals with a monthly income of 1,000TRY and below and 2,001TRY and more were significantly high. When a limited number of studies

comparing anger level and economic situation in the literature were considered, it was seen that there were studies in which no association was found between socio-economic situation and anger (Bilge, 1997) and it was also seen that, in contrast to our study, there were studies reporting increase in anger-out as the family income level increased (Kısaç, 1997). Though not directly related to the economic situation, when the thoughts that university freshmen experience loneliness and they emotionally reflect anger to themselves as a result of this feeling of loneliness (Johnson et al. 2001; Cheng and Furnham, 2002), were taken into account and evaluated with our findings, it was seen that our findings supported this information in the literature since anger-in subscale scores of the prospective teachers studying their 1<sup>st</sup> year were significant. However, it was also thought that more detailed studies should be planned on the subject.

When Table 5 was considered, no significant result was found between the number of years spent doing sports and anger subscales both for those in their 1<sup>st</sup> and 4<sup>th</sup> years. It was put forward that anger prepares an individual for a struggle to cope with distress, provides energy for action, and is a support for defense. In the light of this information, this result was positively supported because the participants in both groups engaged in sports that required struggle and action. A limited number of studies indicated that those in a team had high scores in trait anger and those who were not in a team had high scores in anger control. It is suggested that there is a need for further, more detailed studies on the subject (Geen, 1990; Retzinger, 1991; Greene et al. 1995).

## References

- Akdeniz, M. (2007). *The Effect of Anger Management Training on the Anger Management Skills of High School Students*. Unpublished Master's Thesis.
- Aktaş V., Coştur, R. (2007). The Feelings of Anger and Sympathy and the Behaviors of Helping and Aggression within the Framework of Allocation of Responsibility, *Turkish Psychology Journal*, 22 (59), 15-37.
- Albayrak, B., Kutlu, Y. (2009). Anger Expression Style in Adolescents and Related Factors, *Maltepe University, Journal of Nursing Science and Art*, Volume:2, Issue:3.58-69.
- Balkaya F., Şahin, N. H. (2003). Multidimensional Anger Scale, *Turkish Psychiatry Journal*, 14(3):192-202.
- Biaggio, M. K. (1989). 'Sex Differences in Behavioral Reactions to Provocation of Anger' *Psychological Reports*, 64, 23-36.
- Bilge, F. (1997). Examination of State Trait Anger Levels and Anger Expression Styles of Educational Sciences Students by Some Variables, *Hacettepe University, Faculty of Education Journal*, 13: 75-80.
- Bridewell B.W. and Change, E.C. (1997). 'Distinguishing Between Anxiety, Depression And Hostility: Relations to Anger-in, Anger-out And Anger Control', *Personal Individual Differences*, 22(4), 587-590.
- Cenkseven, F. (2003). The Effect of Anger Management Skills Program on the Anger and Aggression Levels of Adolescents. *Journal of Educational Sciences and Practice*, 2(4), 153-167.
- Cheng, H. and Furnham, A. (2002). Personality, Peer Relations, and Self- Confidence as Predictors of Happiness and Loneliness, *Journal of Adolescence*, 25 (3): 327-340.
- Çiftçi, F. (2006). *Examination of the Levels of Physical Education Teachers' Resorting to Violence*, Mersin University Institute of Health Sciences, Department of Physical Education and Sports Unpublished Master's Thesis.
- Duran, Ö. And Eldeklioglu, J. (2005). Investigation of the Effectiveness of the Anger Management Program in the Adolescents Aged between 15 and 18. *Gazi Education Faculty Journal*, 25(3), 267-280.
- Ellis, A. (1977). *Anger: How to Live With and Without it*, New York: Carol Publishing.
- Geen, R. G. (1990). *Human Aggression*. Milton Keynes: Open University Press.
- Gençtan, E. (1998). *Being a Human*, İstanbul: Remzi Bookstore.
- Greene, A.F., Sears, S.F. & Johnson, E.H. (1995). Anger and Sports Participation. *Psychological Reports*, 72(2), 523-539.
- Güleç, Y. (2002). The Relationships between the Anger Experiences, Self-Perceptions and Academic Achievements of Adolescents, Marmara University, Institute of Education Sciences, Department of Education Sciences, *Guidance and Psychological Counseling Department*, Master's Thesis).
- Johnson, H. D., Lavoie, C. and Mahoney, M. (2001). 'Interparental Conflict and Family Cohesion: Predictors of Loneliness, Social Anxiety. Social Avoidance in Late Adolescence' *Journal of Adolescent Research*. 16 (3): 304-319.
- Kısaç, İ. (1997). "State Trait Anger and Anger Expression Levels of University Students by Some Variables" Unpublished PhD Thesis, Hacettepe University, Institute of Social Sciences, Ankara.
- Köknel, Ö. (1999). *Personality from Anxiety to Happiness*, 15<sup>th</sup> Edition, İstanbul: Altın Kitaplar Publishing.
- Kulaksızoglu, A. (1998). *Psychology of Adolescence*. İstanbul: Remzi Bookstore.
- Özer, A. K. (1994). State Trait Anger (ST-ANGER) and Anger Expression Style (ANGER-STYLE) Scales Prestudy. *Turkish Psychology Journal*, 31, 26-35.
- Retzinger, M. S. (1991). *Violent Emotions- Shame and Rage In Martial Quarrels*. London: Sage Publications.
- Robins, S., & Novaco, R. W. (1999). Systems Conceptualization and Treatment of Anger. *Journal of Clinical Psychology*, 55, 325-337.
- Sharkin, S. B. (1993). Anger & Gender: Theory, Research & Implication" *Journal of Counseling & Development*. March/April, 71, 4:386-389.
- Sharkin, S. B. (1988). The Measurement and Treatment of Client Anger in Counseling, *Journal of Counseling and Development*. 66: 361-365. April.
- Savaşır, I. & Şahin, N.H. (1997). *Assessment in Cognitive Behavioral Therapies: Frequently used Scales*. Ankara: Psychological Association Publications, No: 9.
- Stoner, B. S. & Spencer, W. B. (1987). "Age and Gender Differences With the Anger Expression Scale" *Educational and Psychological Measurement*. 47, 487-492.
- Taylor, E. (1988). Anger intervention. *The American Journal of Occupational Therapy*, 42(3), 147-155.
- Tekinsav S., Sütcü, A. A., Sorias, O. (2010). The Effectiveness of a Cognitive Behavioral Group Therapy Program to Reduce Anger and

Aggression in Adolescents, *Turkish Psychology Journal*, December, 25 (66), 57-67.  
Travis, C. (1982). *Anger: The Misunderstood Emotion*. New York: Simon & Schuster Press.  
Weiner, B. (1993). On sin versus sickness: A theory of perceived responsibility and social motivation. *American Psychologist*, 48, 957-965.

INTE 2014

# Examination of teacher candidates' problem solving skills according to several variables

Kerim Karabacak<sup>a\*</sup>, Duygu Nalbant<sup>a</sup> and Pınar Topçuoğlu<sup>a</sup>

<sup>a</sup>Sakarya University Educational Faculty, Hendek, Sakarya, Turkey

---

## Abstract

This research which has been carried out with the students of Sakarya University Educational Faculty, Guidance and Psychological Consulting, Department of Mental Disabled Teaching and Pre-School Teaching aims at presenting the problem solving skills of teacher candidates. The population of this research is formed of students of Sakarya University Educational Faculty, Guidance and Psychological Consulting, Department of Mental Disabled Teaching and Pre-School Teaching. The sample of the research has been determined with aimed sampling method, it is formed of 297 students in these departments. The collected data has been transferred to SPSS and average, Standard deviation, relative change coefficient, t-test and one way variance analysis statistical procedures have been realized. It has been determined that there is not a meaningful relationship between the departments of the teacher candidates, their levels, genders and problem solving skills.

Click here and insert your abstract text.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords: Problem, Problem Solving, Problem Solving Skill, teacher candidates*

---

## 1. Introduction

The problems confront individuals by getting more complex and different in the societies where everything changes rapidly and gets more complex. As the individuals face several problems continuously, individual lives get meaning with the solution of these problems. (Üstün ve Bozkurt, 2003; Büyükkaragöz and Çivi 1999). Because of these reasons, it is difficult to separate problems and life (Heppner, Witty and Dixon, 2004).

Problem is stated as situations which the individual cannot solve with present information when there are barriers preventing reaching the requested aims of the individual. (Bransford and Stein 1984; Açıköz 2006) Heddens and Speer (1997) state that problem is generally defined as mathematical problems based on four operations given at the end of the subjects in elementary school mathematics course books, but problem concept has a larger meaning. The events, facts or individuals who are difficult to be solved are problems. Morgan (1995) defines problem as a conflict where the individuals meet a prevention in reaching his objectives. Kalaycı (2001) thinks it as a situation whose result is indefinite and very difficult. According to him, when an individual is asked something, the thing which he cannot reply is a problem.

According to Bingham (1998), problem solving is a process requiring a series of aims related to moving some difficulties to reach a definite aim. Morgan (1995) defines problem solving as finding the best solution to reach the barriers which have been met and a process which individual feels the problem since finding a solution to it. Heppner and Krauskopf (1987) used problem solving as synonymous with coping with the problem. Generally, as every difficulty which has to be moved out is a problem, it is required for the individuals to have problem solving skills and use these skills to continue their lives effectively in their daily lives, educational lives and in all life problems.

Problem solving skill is a skill which the individual has to be an individual, getting along with his environment, living a healthy life and protect his mental health (Güçlü, 2003). Generally individual life is full of daily problems and events full of creating stress. The events which create problem can be unimportant events such as losing his key, having problems with the neighbors as daily events; on the other hand they can be important events such as divorcing, being raped, being kicked off the work, and death of a loved person (Izgar, Gürsel, Kesici and Neğiş, 2004). While some problems can be solved with the habits gained before, some of them can be solved with knowledge, experiences and skills of the individual. The problem which the individual

face with can be overcome by individuals who have problem solving skills whether they are basic or complex. (Güzel, 2004).

Bruner who evaluates the student as an individual who solves the problem actively takes new learning-teaching process helping the students exploring manageable and solvable problems. (Balay, 2004). Because, to what extent the individual solves the problems he faces, he gets succeed in orientation to life. This orientation has an importance to determine his status and place in the society (Üstün ve Bozkurt, 2003). Also problem solving skill is a teachable skill which helps finding meaningful solutions to the individuals' problems, (Conger, Rueter&Elder, 1999) problem solving skill should be given to all students in the educational system.

Problem solving is an important subject which has been an interest for long years. Problem solving skill of the individual and perception of problem solving skills show that they are effected from negative sense of self and idea and emotions about the future they have (Ağır,2002). Whereas researchers such as Gagne and Skinner (1964; 1974) are inclined to examine the individual's past as an important variable in problem solving process, researchers such as Kohler and Maier (1970) defend that the way of perceiving the situation which the individual faces is the most important element in problem solving skill. According to Burger (2006), Pervin (1996) and Ağır (2007), problem solving is a work of effort, time and exam. It is related with the aim, need, value, belief, attitude and habit of the individual. Also, inclination of the individual to problem solving is related with his wish, courage and self-confidence. The individuals who have problem solving skills have the features of being entrepreneur without having any anxiety against the events, the skill of creative thinking, self-confidence emotion and objective point of view. (Otacıoğlu, 2007).

When the literature is examined, there are many researches in or out of the country realized on problem solving skills of the individuals at different age groups and several educational levels. Forgatch (1989) in his research determined that the level of the students they are being educated effects their problem solving skills. Dündar (2009) who asserts that university education increases problem solving skills of the individuals could not find a relationship between male and female students' problem solving skills in his study in which he examined the relationship between the individual properties of university students and their problem solving skills. Also, when the classes of the university which the university students attend are taken into account, it has been determined that problem solving skills of the students at fourth grade is higher than the ones in other grades. Taylan (1990) in his study determined that there is not a meaningful difference between the students' department, class levels and genders at their problem solving skills, but there is a meaningful difference according to the curriculum. Güçray (2003) in his research determined that there is not a meaningful relationship between gender and problem solving skills. Genç and Kalafat (2010) determined that there is not a meaningful difference between problem solving skills of teacher candidates according to gender and educational type, problem solving skills of 3rd grade students is higher than 4th grade students. Also these researchers reached a result that the teacher candidates at Classroom teacher departments have more problem solving skills than the teacher candidates at Turkish Teaching, Science Teaching and English Teaching Departments. Soyer and Bilgin (2010) determined that there is not a meaningful difference according to gender, age and grades about problem solving skill perceptions of the students of university students but there is a meaningful difference according to the departments they attend. In a research which Aylar and Aksin (2011) realized on teacher candidates of Social Sciences Teaching, they determined that there is not a meaningful difference between the graduated high school, grade and problem solving skills. Yenice (2012) examined self-competence levels and problem solving skills of teacher candidates at Science teaching, Social Sciences teaching and Classroom Teaching departments. He determined that there is not a meaningful difference in problem solving skills according to the grades they take education, their gender and graduated high school of teacher candidates but there is a meaningful difference according to the departments they take education. According to the research results, it has been determined that there is difference in favor of Science teachers between Science teachers and Social Science teachers. Alver (2005) examined problem solving skills of university students and their academic success according to several variables in his research and determined that there is not a meaningful difference between problem solving skills and their location where they live mostly in their lives, their gender, their departments and socio-economic situation. He determined that there is a meaningful difference in problem solving skills of teacher candidates according to their departments, education style and classroom levels. When they are examined according to their classroom levels, it has been determined that fourth grade students have higher problem solving skills than the other students at other levels. It has been determined that the teacher candidates at first education have higher problem solving skills than second education teacher candidates and Social Sciences teacher have more problem solving skills than the students at Chemistry and Psychological Guidance and Consulting.

### *1.1. The aim of the research*

The aim of this research is to examine problem solving skills of teacher candidates at educational faculties in the context of several variables. Answers to the sub problems below will be looked for to reach this aim:

1. At what level is problem solving skills of the teacher candidates?
2. Is there a meaningful relationship between the teacher candidates' problem solving skills according to several variables (gender, educational type, their department, class and graduated high school)?

### *1.2. The importance of the research*

This research has been realized on the students of Sakarya University Educational Faculty, Guidance and Psychological Consulting, Department of Mental Disabled Teaching and Pre-School Teaching. The reason for selecting these departments is these students' target group shows difference to other departments. Especially the people employed at psychological consulting and guidance face with many problematic situations in their jobs in addition to their private lives (Özer, 1998; Paksoy, 2003; Ross, Altmaier and Russel, 1989). In addition to the ones being educated in psychological consulting and guidance, students graduated from Pre-school teaching and mental disability teaching should be taken into account when the student group they would be in relationship after they have been employed, it is expected to have their problem solving skills higher. Because of this reason, the research seems to be important in presenting problem solving skills of the teacher candidates being educated in these fields.

### *1.3. Limitations*

This research is limited with the students of Sakarya University Educational Faculty, Guidance and Psychological Consulting, Department of Mental Disabled Teaching and Pre-School Teaching. It is accepted that the participants replied questionnaire sincerely and clearly.

## **2. Method**

### *2.1. The model of the research*

This research has been realized with a survey model which aims at presenting the problem solving skills of the students at Sakarya University Educational Faculty, Guidance and Psychological Consulting, Department of Mental Disabled Teaching and Pre-School Teaching. Survey research model is a research approach aiming at describing a situation at present or in the past with its existent position (Karasar,2004).

### *2.2. Population of the research*

The population of the research includes 1284 people from the students of first and second education of Sakarya University Educational Faculty, Guidance and Psychological Consulting Department, Department of Mental Disabled Teaching and Pre-School Teaching in 2013-2014 semester. In 2013-2014 semester, totally 550 students at Guidance and Psychological Consulting Department, totally 410 students at Pre-School Teaching and totally 324 students at Department of Mental Disabled Teaching are being educated.

### *2.3. Sample of the Research*

The sample of the research has been determined by aimed sampling method. A sample formed of 312 students as "104" from Pre-School Teaching (PT), "104" from Guidance and Psychological Consulting Department (GPC), "104" from Department of Mental Disabled Teaching (MDT) has been created. However, because of the reasons such as deficient replies in the scales. Giving more than one answer to the questions, 15 scales have been omitted from the application. As a result, the data taken from 297 students are taken into evaluation. Representation rate of the sample is approximately % 23.

### *2.4. Data collection instruments*



Likert type “Problem Solving Inventory” which includes 35 items and scored between 1-6 and which has been adapted to Turkish by firstly Taylan (1990) and later adapted as a final version in Turkish by Şahin, Şahin and Heppner (1993) and has been developed as a data collection method by Heppner and Peterson (1982) has been used. During scoring, 8<sup>th</sup>, 22<sup>nd</sup> and 29<sup>th</sup> items are not included in the calculation and “1, 2, 3, 4, 11, 13, 14, 15, 17, 21, 25, 26, 30 and 34<sup>th</sup> items are the ones which have been calculated in opposite way and it is accepted that these items represent adequate problem solving skills. In this situation, the minimum score to be taken from the scale is 32, the highest one is 192. The height of the score taken from the scale shows that the individual perceives himself he does not have an adequate problem solving skill. According to this, the ones having 32-80 points have high problem solving skills, the ones who have points between 81-192 have low problem solving skills. The replies to be given to the items are “I always behave like this”, “I almost behave like this”, “I frequently behave like this”, “I sometimes behave like this”, “I rarely behave like this” and “I never behave like this”. (Savaşır and Şahin, 1997).

## 2.5. Data analysis

Descriptive statistical procedures (average, standard deviation and relative change coefficient) in data analysis and one-way variance analysis for comparing more than two groups have been realized. T-test has been used for free groups to compare their averages.

## 3. Findings

Table 1. Findings related to demographical properties of teacher candidates

Properties		f	%	Properties		f	%
Gender	Female	220	74,07	Grade	1. grade	115	38,7
	Male	77	25,9		2. grade	70	23,5
	Total	297	100,0		3. grade	73	24,5
Department	GPC	102	34,3	High School type	4. grade	71	23,9
	MDT	97	32,6		Total	297	100,0
	PT	98	32,9		Science Hi. Sc.	0	0
Education type	Total	297	100,0		Anatolian Hi. Sc.	117	39,39
	I. education	158	53,1		Anat. Teac. Hi. Sch	48	16,16
	II. education	139	46,8		Gen. Hi. Sch.	58	19,15
	Total	297	100,0		Others	74	24,9
					Total	297	100,0

Information related to the teacher candidates taking place in the sample are given in Table 1. 220 of the candidates are female (%74,07), 77 of them male (%25,9), 102 of them (%34,3) in Guidance and Psychological Consulting Department, 97 of them (%32,6) in Pre-School Teaching and 98 of them (%32,9) have been educated in Department of Mental Disabled Teaching. 115 of the students are (%38,7) at first grade, 70 of them (%23,5) have been in the second grade, 73 of them (%24,5) are in the third grade and , 71 of them have been in the fourth grade (%23,9) and 117 of them have been graduated from Anatolian High School (%39,39), 48 of them have been graduated from Anatolian Teacher High School (%16,16), 58 of them have been graduated from High School (%19,15), and others 74 of them have been graduated from other types of high schools . There are not any students graduated from Science high Schools. 158 of these students are from 1<sup>st</sup> education (%53,1), 139 of these students are from 2<sup>nd</sup> education (%46,8) .

### 3.1. Findings related to Firs Sub Problem

Reply to the question of “At what level are the problem solving skills of the teacher candidates” has been looked for and statistics related to this are given in Table 2.

Table 2. Problem solving skills of the teacher candidates

	N	$\bar{X}$	sd	V%
Total	297	114,6465	15,41519	13,45

At the result of the descriptive statistics taken according to the data from 297 teacher candidates, averagely (

$\bar{X}$ ) “114,6465”, standard deviation “15,41519” and relative change coefficient (V%) “13,45” have been taken. It can be stated according to these data that the teacher candidates have a low problem solving skill level relevant to the evaluation of the scale (81-192 points gap states low problem solving skills). Because of being relative change coefficient lower than “% 25, it has been determined that the teacher candidates did not show more distribution from this average, in other words they have been in agreement.

### 3.2. Findings related to Second Sub-problem

Reply to the question of “Is there a meaningful relationship between the teacher candidates’ problem solving skills according to several variables (gender, educational type, their department, class and graduated high school)” has been looked for and statistics related to this are given in Table 3 and Table 4 in the second sub problem of the research.

Table 3. t-test results

Free variable		N	$\bar{X}$	sd.	V%	t	df	p
Gender	Female	220	115,19	15,057	13,07	1,029	295	0,304
	Male	77	113,09	16,40	14,50			
Educational type	I. education	158	114,01	13,28	11,65	0,755	295	0,451
	II. education	139	115,37	17,55	15,21			

\*P<0,05

#### 1. Problem solving skills of teacher candidates according to their gender

When the teacher candidates’ problem solving skills are examined according to their gender, as “t=1,029” and “p=0,304” values have been taken from t-test in Table 3, it has been determined that there is not a meaningful relationship at “p<0,05” level. Also when relative change coefficients have been examined (V%), it has been determined that relative change coefficient of every two group has been lower than “%25”, in other words it has been determined that the distribution does not show difference from the average.

#### 2. Problem solving skills of teacher candidates according to their educational types

When t-test results realized according to the educational type from Table 3, it can be seen that “t=0,755” and “p=0,451” values are taken. According to these values “p<0,05”, it has been determined that there is not a meaningful difference between problem solving skills of teacher candidates and their educational types. As relative change coefficient of every two group has been lower than “%25”, it has been determined that the distribution does not show difference from the average.

Table 4. One-way variance analysis (One-Way ANOVA) Results

Dependent variables		Squares Toplamı	Sd	Squares Ort.	F	p
Department	Between groups	6,334	2	3,167	,013	,987
	In the groups	70331,545	294	239,223		
	Total	70337,879	296	242,39		
Class	Between groups	500,377	3	166,792	,700	,553
	In the groups	69837,501	293	238,353		
	Total	70337,879	296	405,145		
Graduated high sch.	Between groups	555,895	3	185,298	,778	,507
	In the groups	69781,983	293	238,164		
	Total	70337,879	296	423,462		

P<0,05

#### 3. Problem solving skills of teacher candidates according to their Departments

When one way variance analysis results have been examined in Table 4, it has been determined that there is not a meaningful difference between problem solving skills of teacher candidates and their departments ( $F=0,013$ ,  $p=0,987$ ).

#### *4. Problem solving skills of teacher candidates according to their classes*

It has been determined that there is not a meaningful difference between problem solving skills of teacher candidates and their classroom level ( $F=0,345$ ,  $p=0,847$ ), as it can be seen in Table 4, there is not a meaningful difference at “ $p<0,05$ ” level.

#### *5. Problem solving skills of teacher candidates according to their graduated high schools*

When one way variance analysis results have been examined from table 4 in order to determine the relationship between problem solving skills of teacher candidates and their graduated schools, there is not a meaningful difference at “ $p<0,05$ ” level between their problem solving skills and their graduated high schools ( $F=0,778$ ,  $p=0,507$ ).

### **4. Discussion, Result and Proposals**

#### *4.1. Results and Discussion*

Problem solving skills of university students have been examined in the frame of gender, class, department, graduated high school and educational type in this research.

Any meaningful difference could not be found at the result of comparing gender of the teacher candidates and their problem solving skills. This result emphasizing there is no difference between gender and problem solving skills is covered with the studies of Yenice (2012), Güçray (2003), Saygılı (2000), Taylan (1990), Genç ve Kalafat (2010) Yıldırım and Yalçın (2008), Alver (2005), Dündar (2009), Soyer and Bilgin (2010), Aylar and Aksin’s studies (2011), it does not correspond with the studies of Ayaydın and Özbay (2003), Tamres, Janicki, and Helgeson (2002). According to Ayaydın and Özbay (2003) and Tamres, Janicki, and Helgeson (2002), the females’ problem solving skills is higher than the males. Soyer and Bilgin (2010) relates this result with the females’ entering business world more and the change in the families’ attitude while training their children.

According to the research findings, problem solving skills of teacher candidates show a meaningful difference according to their departments. The result taken shows a parallelism with the researches of Genç and Kalafat (2010), but it has been in conflict with Yenice (2012), Alver (2005), Otacıoğlu (2007) and Taylan’s (1990) researches. Yenice (2012) determined that Science teacher candidates have more problem solving skills than Social Sciences teacher candidates. According to Alver’s (2005) research the university students at Social Sciences have more problem solving skills than the students attending at GPC and Chemistry Departments. Otacıoğlu (2007) has determined that the teacher candidates at Music department have more problem solving skills than the ones at GPC. Taylan (1990) determined that there is a difference according to the program being educated in problem solving perception. It can be thought that the reason for the difference between problem solving skills according to the educational program is sourced from the limitation of GPC, Pre-School Teaching and Mental Disabled Teaching in the research we made.

Another result taken from the research is that there is a meaningful difference in problem solving skills of teacher candidates according to class level of them. This result corresponds with the results Yenice (2012), Aylar and Aksin (2011), Taylan (1990) and Serin (2004). According to Serin (2004), problem solving skills of teacher candidates increase in upper class levels, but this increase does not exhibit a meaningful difference. But Genç and Kalafat (2010), Alver (2005) Dündar (2009), Forgatch (1989), Katkat and Mızrak (2003) state that there is a meaningful difference between class level and problem solving skills of teacher candidates. According to Alver (2005) research, problem solving skills of fourth grade students is higher than the other ones. Whereas Dündar (2009) determines that problem solving skills of fourth grade students is higher than the lower classes, Genç and Kalafat (2010) have determined that third grade students’ problem solving skills is higher than fourth grade students. They claimed that this situation is related with the concern of fourth grade students for future more. However the literature does not show a parallelism in not changing problem solving perception related with the class level in this research. This situation can be claimed that the university students’ age are close to each other and include the same period as Soyer and Bilgin(2010) stated .In another point of view, it can be thought that against Dündar’s (2009) statement, and parallel with Soyer and Bilgin’s (2010) statements, the years spent in the

university do not create a difference in problem solving success.

There is not a meaningful difference in problem solving skills of teacher candidates according to their educational types. In the same way; Aylar and Aksin (2011), Yıldırım and Yalçın (2008), Çam (1997), Saygılı (2000), Nezu (1985), Basmacı (1998), Aydın (1999), Terzi (2000), Korkmaz (2002), Taşdemir (2003), Pehlivan and Konukman (2004), Genç and Kalafat (2010) reached the result that there is not a meaningful difference in problem solving skills of teacher candidates according to their educational types. This finding reached at the end of the result shows a parallelism with the findings of the research above but it shows difference with Alver's (2005) research results. According to Alver, the students at first education have more problem solving skills than the students at second education.

Yenice (2012) could not find a difference in problem solving skills of teacher candidates who attend in Science, Social Sciences and Classroom Teaching according to their graduated high schools, also Buluç, Kuru, and Taneri (2010) could not find a difference in problem solving skills of teacher candidates who attend in Classroom Teaching. In the same way, it has been determined in this research that there is not a meaningful difference between problem solving skills of teacher candidates of Guidance and Psychological Consulting , Department of Mental Disabled Teaching and Pre-School Teaching.

There is not a meaningful difference in problem solving skills of students in the context of gender, educational type, and graduated high school. Although the problem solving skills of students do not differentiate in the frame of these variables, it is seen that problem solving point average has been between 50-162. Total score to be taken from the scale can change between 32-192 , points between 32- 80 state high problem solving skills , the points between 81- 192 state low problem solving skills .In this context, as the teacher candidates average is "114,65" , their problem solving skills can be told at low level.

#### 4.2. Proposals

1. The sample of the study is formed of teacher candidates. In this context, learning environments which provide opportunity for the teachers of the future to develop and gain problem solving skills during their university education can be provided for them.

2. The support given to the individuals for the development of problem solving skills has a great importance. This support is provided by promoting interest, discussing ideas, taking individual emotions into account and creating environments in which individualistic needs are taken into account (Bingham, 1998). In this context, creating relevant environments for university students to develop critical thinking, creativity and research is important. In the name of creating these conditions, groups in which the students will take place actively can be formed. While the students state themselves in these groups, it is important for them to develop their problem solving skills as there is a mass confirming and listening to them.

3. As problem solving skills of teacher candidates are found low, additions can be made in the content of the courses in educational faculties, any change can be realized about the systems which have been accepted as one measure in the academic success of the students. Thinking education, problem solving education, learning based on problem can be sustained in the programs by developing detailed programs related to developing problem solving skills by applying all these more systematically.

4. The research is formed of teacher candidates who take education Educational Faculty, Guidance and Psychological Consulting Department, Department of Mental Disabled Teaching and Pre-School Teaching. Researches can be realized whether there are differences between these students having education in these departments and other teacher candidates having education in another departments.

#### References

- Açıkgöz, K. Ü. (2006). *Aktif Öğrenme*. İzmir: Biliş yayınları.
- Ağır, M.(2007).*Üniversite Öğrencilerinin Bilişsel Çarpıtma Düzeyleri İle Problem Çözme Becerileri ve Umutsuzluk Düzeyleri Arasındaki İlişki*, Yayınlanmamış Doktora Tezi, İstanbul Üniversitesi Sosyal Bilimler Enstitüsü.
- Alver, B. (2005). Üniversite Öğrencilerinin Problem Çözme Becerilerinin ve Akademik Başarılarının Çeşitli Değişkenlere Göre İncelenmesi. *Marmara Üniversitesi Atatürk Eğitim Fakültesi Eğitim Bilimleri Dergisi*. 21, 75-88.
- Ayaydın, Ş. F. ve Özbay, Y. (2003). *Üniversite Öğrencilerinin problem alanları, problemlilik düzeyleri, problem Çözme becerileri ve yardım arama davranışları arasındaki ilişkilerin incelenmesi*. VII. Ulusal Psikolojik Danışma ve Rehberlik Kongresi. Malatya. 157–158.
- Aydın, O.(1999).*Denetim odakları farklı olan ergenlerin problem çözme becerilerinin karşılaştırılması*. Yayınlanmamış Yüksek lisans tezi. Atatürk Üniversitesi, Sosyal Bilimler Enstitüsü.
- Aylar F. ve Aksin, A. (2011). Sosyal Bilgiler Öğretmen Adaylarının Öz-Yeterlilik İnanç Düzeyleri ve Problem Çözme Becerileri Üzerine Bir Araştırma (Amasya Örneği). *Ahi Evran Üniversitesi Eğitim Fakültesi Dergisi*,12(3), 299-313
- Balay, R.(2004).Küreselleşme, Bilgi Toplumu ve Eğitim.*Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi*. 37 (2), 61-82.

- Basmacı, S.K.(1998). *Üniversite Öğrencilerinin Problem Çözme Becerilerini Algılamalarının Bazı Değişkenler Açısından İncelenmesi*, Yayınlanmamış Yüksek Lisans Tezi, İnönü Üniversitesi Sosyal Bilimler Enstitüsü.
- Bransford, J. andStein, B. (1984). *The IDEAL problem solver*. New York: W. H. Freeman.
- Bingham A.(1998). *Çocuklarda Problem Çözme Yeteneklerinin Geliştirilmesi*, İngilizceden Çeviren: A. Ferhan Oğuzkan. Milli Eğitim Basımevi, İstanbul.
- Buluç, B., Kuru, O. ve Taneri, A. (2010). Sınıf Öğretmenliği Anabilim dalında okuyan Öğretmen adaylarının problem çözme becerileri. 9. *Sınıf Öğretmenliği Sempozyumu*. Fırat Üniversitesi, Eğitim Fakültesi. Bildiriler Kitabı, 535-538.
- Burger M. Jerry.(2006). *Kişilik*. Kaknüs Yayınları. 1. Basım. İstanbul.
- Büyükkaragöz, S. ve Çivi, C. (1999). *Genel Öğretim Metotları*, İstanbul: Öz Eğitim Yayınları.
- Çam, S. (1997). *İletişim becerileri eğitimi programının öğretmen adaylarının ego durumlarına ve problem çözme becerisi algılarına etkisi*. Yayınlanmamış doktora tezi, Ankara Üniversitesi Sosyal Bilimler Enstitüsü, Ankara.
- Conger, R. D., Reuter, M. A., and Elder, G. H. (1999). Couple Resilience To Economic Pressure. *Journal Of Personality And Social Psychology*, 76, 54-71.
- Dündar, S. (2009). Üniversite Öğrencilerinin Kişilik Özellikleri İle Problem Çözme Becerileri Arasındaki İlişkinin İncelenmesi. *Dokuz Eylül Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 24 (2), 139-150.
- Forgatch, S. M. (1989). Patterns and Outcome in Family Problem Solving: The Disrupting Effect of Negative Emotion. *Journal of Marriage and Family*, 51(1) , 115-124.
- Güçlü, N. (2003). Lise Müdürlerinin Problem Çözme Becerileri. *Milli Eğitim Dergisi*. (160),272-300.
- Güçray, S. (2003). The Analysis of Decision Making Behaviour and Perceived Problem Solving Skills in Adolescents. *The Turkish Online Journal of Educational Technology*, 2(2): tojet.net/artciles/225.htm adresinden 14. 01. 2014 tarihinde alınmıştır.
- Genç S. Z. ve Kalafat, T. (2010). Öğretmen Adaylarının Empatik becerileri ile Problem Çözme Becerileri. *Kuramsal Eğitimbilim*, 3 (2), 135-147, 2010.
- Heddens, J. W. And Speer W. R. (1997). *Today'smathematics*. New Jersey: Prentice-Hall, Inc.
- Heppner P. P And Krauskopf C. J, (1987). An Information Processing Approachto Personal Problem Solving, *The Counseling Psychologist*. 15 (3), 371-447.
- Heppner, P.P. & Petersen, C.H. (1982). "The Development AndImplications Of A Personal Problem Solving Inventory." *Journal Of Counseling Psychology*, 29(1), 66-75.
- Heppner, P., P., Hiber, J., Neal, G., W., Weinstein, C., L, ve Rabinnowits, F., E.(1982). Personal Problem-Solving: A Destructive Study of Individual Differences, *Journal of Counseling Psychology*, 29 (6),580-590
- Heppner, P., p., Reeder, B., L. And Larson, L., M..(1987). Cognitive Variables Associated with Personal Problem – Solving Appraisal: *Implications of Counseling**Journal of CounselingPsychology*,30 ,537-545.
- Heppner, P.P, Witty, T. E. And Dixon, W.A. (2004) Problem-solving appraisal and human adjusment: A rewiev of 20 years of research using the problem solving inventory. *The Counselling Psychologist*, 32: (3), 344-428.
- Izgar H, Gürsel M, Kesici Ş ve Negiş A.(2004).*Önder Davranışların Problem Çözme Becerisine Etkisi*, XIII. Ulusal Eğitim Bilimleri Kurultayında Sunulan Bildiri, İnönü Üniversitesi Eğitim Fakültesi, Malatya,6-9 Temmuz.
- Karasar, N. (2004). *Bilimsel Araştırma Yöntemleri*. Ankara: Nobel Yayın Dağıtım.
- Kabadayı, R.(1992). Problem Çözme Süreci, Gereği ve Eğitimdeki Boyutları. *Öğretmen Dünyası*.146, 32–33.
- Kalaycı, N. (2001). *Sosyal Bilimlerde Problem Çözme ve Uygulamaları*. Ankara: Gazi Kitapevi.
- Katkat, D., ve Mızrak, Ö. (2003). Öğretmen Adaylarının Pedagojik Eğitimlerinin Problem Çözme Becerilerine Etkisi. *Milli Eğitim Dergisi*, 158, <http://yayim.meb.gov.tr/dergiler/158/katkat.htm> adresinden 19. 01. 2014 tarihinde alınmıştır.
- Korkmaz, H.B. (2002). *Fen eğitiminde proje tabanlı öğrenmenin yaratıcı düşünme, problem çözme ve akademik risk alma düzeylerine etkisi*, Yayınlanmamış doktora tezi, Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü .
- Korkut F.(2002).*Lise Öğrencilerinin Bazı Değişkenler Açısından Problem Çözme Becerilerini Değerlendirmeleri*, Hacettepe Üniversitesi Eğitim Fakültesi Dergisi. 23, 177-184.
- Morgan, C. T (1995). *Psikolojiye Giriş* (Çev. H. Arıcı vd.) 11. Baskı. Ankara: Hacettepe Üniversitesi Psikoloji Bölümü Yayınları.
- Nezu, A.M. (1985). Differences in psychological distress between effective and ineffective problem solvers. *Journal of Counseling Psychology*. 32, (1), 135-138.
- Otacıoğlu, S. G. (2007). "Eğitim Fakültelerinin Farklı Branşlarında Eğitim Alan Öğrencilerin Problem Çözme Beceri Düzeylerinin Karşılaştırılması", *Eurasian Journal of Educational Research*, 29, 73-83
- Özer, R. (1998). *Rehber öğretmenlerde tükenmişlik düzeyi, nedenleri ve çeşitli değişkenlere göre incelenmesi*. Yayınlanmamış Yüksek Lisans Tezi, Karadeniz Teknik Üniversitesi, Trabzon.
- Paksoy, Z. (2003). *Rehber ve psikolojik danışmanlarda stres kaynaklarının incelenmesi*. Yayınlanmamış Yüksek Lisans Tezi, Atatürk Üniversitesi, Erzurum.
- Pehlivan, Z. Konukman, F. (2004). Beden eğitimi öğretmenleri ile diğer branş öğretmenlerinin problem çözme becerileri açısından karşılaştırılması, *Spor metre Beden Eğitimi ve Spor Bilimleri Dergisi*, II (2) 55-60.
- Pervin, Lawrence A. (1996). *Theobience of Personality*. USA: John Wiley and Sons Inc.
- Ross, R. R.,Altmaier, E. M., & Russel, D. W. (1989). JobStress, Social Support, And Burn out Among Counselling Centre Staff. *Journal of Counselling Psychology*, 36, 464-470.
- Saygılı H.(2000). *Problem Çözme Becerisi İle Sosyal ve Kişisel Uyum Arasındaki İlişkinin İncelenmesi*, Yayınlanmamış Yüksek Lisans Tezi, Atatürk Üniversitesi, Sosyal Bilimler Enstitüsü Eğitim Bilimleri Anabilim Dalı, Erzurum.
- Serin, O. (2004) *Öğretmen Adaylarının Problem Çözme Becerisi Ve Fene Yönelik Tutum İle Başarıları Arasındaki İlişki*. Yayınlanmamış Doktora Tezi. Dokuz Eylül Üniversitesi Eğitim Bilimleri Enstitüsü.
- Soyer, M. K. ve Bilgin A. (2010). Üniversite Öğrencilerinin Çeşitli Değişkenlere Göre Problem Çözme Beceri Algıları. *International Conference on New Trends in Education and Their Implications*, 11-13 Ekim, (ISBN: 978 605 364 104 9) Antalya-Turkey, 307-314.
- Şahin, N.H ve Savaşır, I. (1997). *Bilişsel Davranışçı Terapilerde Değerlendirme*. Sık Kullanılan Ölçekler, Ankara: Türk Psikologlar Derneği Yayınları. No:9. ?
- Şahin, N., Şahin, N. H. ve Heppner, P. P. (1993). The psychometric properties of the Problem Solving Inventory. *Cognitive Therapy and Research*, 17, 379-396.
- Tamres, L. K., Janicki, D., ve Helgeson, V. S. (2002). Sex Differences in Coping Behavior: A Meta-Analytic Review and an Examination of

- Relative Coping, *Personality and Social Psychology Review*, 6(1) , 2-30.
- Taşdemir, O.M. (2003). *Üstün yetenekli çocuklarda mükemmeliyetçilik, sınav kaygısı, benlik saygısı, kontrol odağı, öz yeterlik ve problem çözme becerileri arasındaki ilişkinin incelenmesi*. Yayınlanmamış yüksek lisans tezi, Karadeniz Teknik Üniversitesi, Sosyal Bilimler Enstitüsü.
- Taylan, S.(2006). *Heppner'in Problem Çözme Envanterinin Uyarlarına, Güvenirlilik ve Geçerlik Çalışmaları*, Yayınlanmamış Yüksek Lisans Tezi, Ankara Üniversitesi Sosyal Bilimler.
- Terzi, Ş. I. (2000) . *İlköğretim okulu altıncı sınıf öğrencilerinin kişilerarası problem çözme beceri algılarının bazı değişkenler açısından incelenmesi*, Yüksek Lisans Tezi, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü.
- Thornton, S. (1998). *Çocuklar Problem Çözüyor*. (Ö.Kumrular, Çev.).İstanbul: Gendaş Yay.
- Üstün,A. & Bozkurt E.(2003).İlköğretim Okulu Müdürlerinin Kendilerini Algılayışlarına Göre Problem Çözme Becerilerini Etkileyen Bazı Mesleki Faktörler, *Kastamonu Eğitim Dergisi*, 11 (1), 13-20.
- Yenice, N. (2012). Öğretmen Adaylarının Öz-Yeterlilik Düzeyleri ile Problem Çözme Becerilerinin İncelenmesi. *Elektronik Sosyal Bilimler Dergisi*, 11 (39), 36-58.
- Yıldırım, H.İ.ve Yalçın, N. (2008) . Eleştirel düşünme becerilerini temel alan fen eğitiminin fen bilgisi öğretmen adaylarının problem çözme becerilerine etkisi, *Gazi Eğitim Fakültesi Dergisi*, 28, (3) 165-187.

# Examining technopedagogical knowledge competencies of teachers in terms of some variables

Bariş Sezer <sup>a78</sup>

<sup>a</sup>Res. Asist. Hacettepe University, Faculty of Medicine Department of Medical Education and Informatics, Ankara 06100, Turkey

---

## Abstract

This research was carried out for the purpose of investigating teachers' levels of technological pedagogical content knowledge (TPCK) competencies. In line with this aim, teachers' levels of TPCK competencies were studied in terms of gender, branch and to attend in service training programs. The findings of the study reveal that the teachers in the sample group of the study have a high level of awareness regarding their technopedagogical knowledge competencies. According to the findings of the study, based on branch and to attend in service training programs, there are statistically significant differences among teachers' awareness levels on their TPCK competencies.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

**Keywords:** Teachers' perception, technological pedagogical content knowledge, technology integration, educational technology, contemporary education;

---

## Introduction

Technology integration is defined as "Technology integration is the incorporation of technology resources and technology-based practices into the daily routines, work, and management of schools" (National Center for Education Statistics-[NCES], 2002). The process integrating the technology with education is complex and multidirectional. In the process, there are a lot of factors such as teachers, students, background, school administrators, policy determiners, parents. The greatest responsibility of the shareholders is teachers' responsibility. But domestic and foreign literature showed that teachers are not willing and adequate for technology usage (Aşkar, Altun, Şimşek & Özdemir, 2012; Becker, 1994; Bingimlas, 2009; Butler & Sellbom, 2002; Christiansen, 2002; Earle, 2002; Çağlar, 2012; Hew & Brush, 2007; Oncu, Delialioğlu & Brown, 2008; Yıldırım, 2007). Some studies (Aşkar, Altun, Şimşek & Özdemir, 2012; Çağlar, 2012; Yıldırım, 2007) showed that teachers' technology acceptance levels are not adequate, while some studies (Adıgüzel, 2010; Demir, Özmantar, Bingölbalı & Bozkurt, 2011; MEB, 2011,2012; Usluel, Mumcu & Demiraslan, 2007) showed that teachers' technology literacy are not adequate.

Many researcher continue to blame teachers for the lack of technology integration in schools; however, some researcher can't blame them without considering the context for teaching, teacher beliefs about teaching and learning, and professional development (Sandholtz, Ringstaff & Dwyer, 1997; Silverstein, Frechtling & Miyaoka, 2000). Some studies revealed that effective integration is directly associated with educational practices and revised educational curriculum (Lee, 2002; Vrasidas & McIsaac, 2001; White, Ringstaff & Kelley, 2002; Willis, 2001; cited. Hosseini & Kamal, 2012). In other words, the effective integration process is closely related to technology supported pedagogical knowledge and skills (Hew & Brush, 2007). In this regard various technology integration models have been developed. Some of these models (Concentric Circles Model, E-capacity Model, Five Stage Model for Computer Technology Integration) focus on technology, while some of these models (5W 1H Unified Integration Model, Generic Model of Pedagogy, Social Interaction and

---

\* Corresponding Author: Barış Sezer Tel.: +90-544-244-5242; fax: +90-312-305-2617.

E-mail address: barissezer13@hotmail.com

Technology, Systemic Planning Model for ICT Integration, Activity System Model, Technology Integration Model) focus on appropriate pedagogical knowledge. One of the models focus on pedagogy is Technological Pedagogical Content Knowledge - (TPCK). This model is developed by Mishra and Koller (2006).

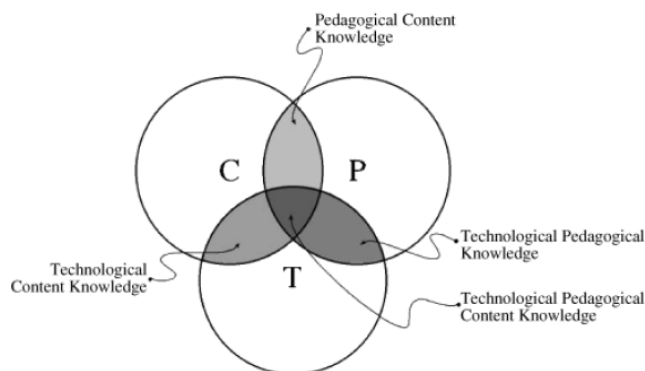


Figure 1. Pedagogical technological content knowledge. The three circles, content, pedagogy, and technology, overlap to lead to four more kinds of interrelated knowledge (Mishra & Koller, 2006).

TPCK (see Figure 1) emphasizes the connections among technologies, curriculum content, and specific pedagogical approaches, demonstrating how teachers' understandings of technology, pedagogy, and content can interact with one another to produce effective discipline-based teaching with educational technologies. According to the research literature, there are very limited studies on the issue. In this context, much more study needs to be done in this area (Archambault & Crippen, 2009; Cox & Graham, 2009; Hosseini & Kamal, 2012). In this context, it is believed that this research will contribute to the literature in Turkey and to the practices in terms of showing what kind of precautions can be taken. In this framework, the overall aim of this research is to measure teachers' level of awareness regarding their TPCK competencies. Answers to the following sub-problems are searched in order to reach this overall objective.

1. What is teachers' awareness level on TPCK competencies?
2. Does teachers' awareness level on TPCK competencies change by gender, branch and HİE status?
3. Does teachers' awareness level on TPCK competencies change by branch?
4. Does teachers' awareness level on TPCK competencies change whether in-service training is received or not?

## Method

### *Research design*

Survey method is used in this study. In this context, this research aims to determine teachers' level of awareness regarding their TPCK competencies.

### *Participants*

Snowball sampling method is used in this study. In snowball sampling, first of all one of the agents of the population is accessed. Via this agent, a second and later a third agent is accessed. Thus, the sample size grows like a snowball (Yazıcıoğlu & Erdoğan, 2004, p.45). In this study, the sample size was enlarged by reaching one teacher from each branch (mathematics, science & technology, Turkish literature and social sciences branch teachers). The teachers in the sample group work at secondary schools. Accordingly, the participants of this research were 216 teachers working at various provinces in Turkey during 2013-2014 academic year. Among these teachers 118 (54,6%) were male, 98 (45,4%) were female. 74 (34,3%) of the teachers in the sample group



were social sciences teachers, while 26 (24,0%) were mathematics teachers, 46 (21,3%) were science & technology teachers and 44 (20,4%) were Turkish literature branch teachers.

#### *Data collection instrument*

To determine teachers' awareness regarding their TPCK competencies "Technological pedagogical content knowledge scale (TPCKS)" adapted by Ozturk and Horzum (2011) was used in this study. The original scale was developed by Schmidt at all (2009a). The scale has seven factors, which was found as result of the exploratory and confirmatory factor analyses. In Turkish version of the scale alpha value was calculated as 0.96. Therefore, it can be concluded that Turkish version of the scale was reliable and valid.

#### *Data collection and analysis*

The data of the research were collected online. To this end, a database was form and the participants were given the web address to access the scale. SPSS 13 package program was used in statistical analysis of the data collected for the research. Shapiro-Wilks Normality Test was used in testing the normality hypothesis of the data. The result of Shapiro-Wilks Normality Test revealed that the data did not show a normal distribution. Therefore, Mann Whitney U and Kruskal Wallis test methods, which are nonparametric tests, were used in analyzing the data. In significance tests .05 level was based on.

### **Findings**

#### *Teachers' awareness levels regarding their TPCK competencies*

In this section, the findings obtained by analyzing the data collected from the teachers and the comments on these findings are given.

In line with the first sub-problem of the research, high arithmetic average of total points obtained from the scale shows that their awareness level on TPCK competencies is high; and low arithmetic average shows that their awareness level is low. In this framework, descriptive statistics showing teachers' awareness levels on TPCK competencies are given in Table 1.

*Table1. The breakdown of the scores of teachers' awareness levels on TPCK competencies*

Elements	N	$\bar{X}$	Sd
Technology knowledge (TK)	216	3,93	3,03
Content knowledge (CK)	216	4,43	0,98
Pedagogical knowledge (PK)	216	4,28	2,33
pedagogical content knowledge (PCK)	216	4,28	0,68
Technological content knowledge (TCK)	216	4,40	0,56
Technological pedagogical knowledge (TPK)	216	3,98	2,16
Technological pedagogical content knowledge (TPCK)	216	4,04	2,11
<b>Total</b>	<b>216</b>	<b>4,19</b>	<b>1,69</b>

According to Table 1, the average of the total score teachers got from the scale is 4.19 over 5. In terms of sub-dimensions, in Technology knowledge subdimension the mean score was 3.93, in Content Knowledge sub-dimension the mean score was 4.43, in Pedagogical knowledge subdimension the mean score was 4.28, in pedagogical content knowledge sub-dimension the mean score was 4.28, in Technological content knowledge sub-dimension the mean score was 4.40, in Technological pedagogical knowledge sub-dimension the mean score was 3.98, and in Technological pedagogical content knowledge sub-dimension the mean score was 4.04. So, it can be said that teachers' awareness level on TPCK competencies is high.

### *Differentiation of teachers' awareness levels on TPCK competencies by gender*

In line with the second sub-problem of the research, descriptive analysis of teachers' awareness levels on TPCK competencies by gender are given in Table 2. In order to determine whether this is a statistically significant difference or not, Mann Whitney U test, one of the nonparametric tests was used. Test results are given in Table 2.

Table2. Mann Whitney U-test results of teachers' awareness levels on TPCK by gender

Elements	Gender	N	Mean Rank.	Mean Sum.	U	P
Technology knowledge (TK)	Female	98	55,59	2724,00	1392,00	,739
	Male	118	53,59	3162,00		
Content knowledge (CK)	Female	98	58,63	2873,00	1243,00	,182
	Male	118	51,07	3013,00		
Pedagogical knowledge (PK)	Female	98	57,63	2824,00	1292,00	,339
	Male	118	51,90	3062,00		
Pedagogical Content knowledge (PCK)	Female	98	55,30	2709,50	1406,50	,792
	Male	118	53,84	3176,50		
Technological Content knowledge (TCK)	Female	98	56,91	2788,50	1327,50	,407
	Male	118	52,50	3097,50		
Technological Pedagogical knowledge (TPK)	Female	98	57,27	2806,00	1310,00	,396
	Male	118	52,20	3080,00		
Technological Pedagogical Content knowledge (TPCK)	Female	98	59,00	2891,00	1225,00	,167
	Male	118	50,76	2995,00		

When Table 2 is analyzed, it is seen that there is no statistically significant difference among teachers of different genders regarding their awareness levels on TPCK competencies ( $p>.05$ ). As is seen in Table 2, when the averages of groups are examined, it is seen that female teachers have a relatively high level of awareness compared to male teachers.

### *Differentiation of teachers' awareness levels on TPCK competencies by branch*

In line with the third sub-problem of the study, Kruskal Wallis test results on whether teachers' awareness levels on TPCK competencies differ by branch are given in Table 3.

Table 3. Kruskal Wallis test results of teachers' awareness levels on TPCK competencies by branch

Elements	Branch	N	$\bar{X}$	Sd	$\chi^2$	P	Variables in which Statistical Significance is observed
Technology knowledge (TK)	Mathematics (A)	52	3,74				
	Science & Technology(B)	46	3,92	3	10,41	,015	A-D
	Turkish Literature (C)	44	3,91				
	Social Sciences (D)	74	4,08				
Content knowledge (CK)	Mathematics (A)	52	4,44				
	Science & Technology(B)	46	4,43				
	Turkish Literature (C)	44	4,34	3	,59	,899	
	Social Sciences (D)	74	4,48				
	Mathematics (A)	52	4,60				A-B
Pedagogical	Science & Technology(B)	46	4,09				A-C

knowledge (PK)	Turkish Literature (C)	44	4,08	3	40,58	,000	A-D
	Social Sciences (D)	74	4,30				B-D C-D
Pedagogical Content knowledge (PCK)	Mathematics (A)	52	4,69	3	30,51	,000	A-C
	Science & Technology(B)	46	4,65				A-D
	Turkish Literature (C)	44	4,18				B-C
	Social Sciences (D)	74	4,28				B-D C-D
Technological Content knowledge (TCK)	Mathematics (A)	52	4,53	3	2,79	,425	
	Science & Technology(B)	46	4,34				
	Turkish Literature (C)	44	4,40				
	Social Sciences (D)	74	4,35				
Technological Pedagogical knowledge (TPK)	Mathematics (A)	52	3,90	3	23,32	,000	A-B
	Science & Technology(B)	46	4,30				A-C
	Turkish Literature (C)	44	4,08				B-C
	Social Sciences (D)	74	3,78				B-D C-D
Technological Pedagogical Content knowledge (TPCK)	Mathematics (A)	52	4,26	3	29,49	,000	A-C
	Science & Technology(B)	46	4,32				A-D
	Turkish Literature (C)	44	3,80				B-C
	Social Sciences (D)	74	3,96				B-D C-D

When Table 3 is analyzed, it is seen that teachers' awareness levels on TPCK competencies is statistically significant in TK, PK, PCK and TPCK sub dimensions by branch ( $p < .05$ ). In order to determine among which groups this differentiation exist Mann Whitney-U test was used. Accordingly, in TK sub dimension there are statistically significant differences between "Mathematics" and "Social Sciences" branch teachers; in PK sub dimension there are statistically significant differences between "Mathematics" and "Science & Technology", "Turkish Literature", "Social Sciences"; and between "Science & Technology" and "Social Sciences"; and between "Turkish Literature" and "Social Sciences"; in PCK sub dimension there are statistically significant differences between "Mathematics" and "Turkish Literature", "Social Sciences", and between "Science & Technology", "Turkish Literature", "Social Sciences" and between "Turkish Literature" and "Social Sciences"; in TPK sub dimension there are statistically significant differences between "Mathematics" and "Science & Technology", "Turkish Literature", "Social Sciences"; and between "Turkish Literature" and "Social Sciences"; in TPCK sub dimension there are statistically significant differences between "Mathematics" and "Turkish Literature", "Social Sciences" and between "Science & Technology" and "Turkish Literature", "Social Sciences" and between "Turkish Literature" and "Social Sciences".

#### *Differentiation of Teachers' Perception Levels of TPCK Competencies, Depending on Whether In-Service Training is Received or Not*

In line with the fourth sub-problem of the research, descriptive analysis of teachers' awareness levels on *TPCK Competencies* depending on whether in-service training is received or not are given in Table 4.

Table 4. Mann Whitney U-Test results of teachers' awareness levels on TPCK competencies depending on whether in-service training is received or not

Elements	Attend in service training programs	N	Mean Rank	Mean Sum	U	P
Technology knowledge (TK)	Yes	104	75,41	3921,50	368,50	,000
	No	112	35,08	1964,50		
Content knowledge (CK)	Yes	104	64,42	3350,00	940,00	,001
	No	112	45,29	2536,00		

Pedagogical knowledge (PK)	Yes	104	51,70	2688,50	1310,50	,367
	No	112	57,10	3197,50		
Pedagogical Content knowledge (PCK)	Yes	104	60,38	3139,50	1150,50	<b>,039</b>
	No	112	49,04	2746,50		
Technological Content knowledge (TCK)	Yes	104	52,92	2752,00	1374,00	,566
	No	112	55,96	3134,00		
Technological Pedagogical knowledge (TPK)	Yes	104	63,97	3326,50	963,50	<b>,002</b>
	No	112	45,71	2559,50		
Technological Pedagogical Content knowledge (TPCK)	Yes	104	53,68	2791,50	1413,50	,791
	No	112	55,26	3094,50		

When Table 4 is analyzed, it is seen that there are differences among average score on awareness levels in TPCK competencies depending on whether in-service training is received or not. In order to determine whether this is a statistically significant difference or not, Mann Whitney U test, one of the nonparametric tests was used. Test results are shown that there is a statistically significant difference among teachers of different genders regarding their awareness levels on TPCK competencies in TK, CK, PCK and TPK subdimensions ( $p < .05$ ). As is seen in Table 4, when the averages of groups are examined, it is seen that male teachers have a relatively high level of awareness compared to female teachers.

## Conclusion

This research was carried out for the purpose of investigating teachers' (Mathematics, Science & Technology, Turkish Literature and Social Sciences) levels of TPCK competencies. In line with this aim, teachers' levels of TPCK competencies were studied in terms of gender, branch and to attend in service training programs. The findings of the study reveal that the teachers in the sample group of the study have a high level of awareness regarding their technopedagogical knowledge competencies, in general. Findings of the study have some differences compared to the findings of other studies carried out on the same issue in literature (Archambault & Crippen, 2009; Bal, 2012; Bal & Karademir, 2013; Kabakçı-Yurdakul 2011; Kaya, Özdemir, Emre & Kaya, 2011; Konokman, Yanpar-Yelken & Sancar-Tokmak, 2013; Öztürk, 2006; Şimşek, Demir, Bağçeci & Kinay, 2013; Yeşil, 2006).

According to the findings of the study, based on branch and to attend in service training programs, there are statistically significant differences among teachers' awareness levels on their TPCK competencies. That participants' awareness levels on their TPCK competencies are not differ by gender is a result that is parallel to many researches (Şimşek, Demir, Bağçeci & Kinay, 2013; Koh & Chai, 2011; Jang & Tsai, 2012; Ünal-Bozcan, 2010).

The result attained by this research study, which is a generally-expected one, inferring that receiving in-service training is effective on techno-pedagogical content knowledge, should be addressed attentively. From this standpoint, arrangement of the contents of 30-hour in-service training, organized for the purpose of supporting effective use of technology within the framework of the FATİH Project in a way to cover pedagogical approaches, will make positive contributions to the integration process. On the other hand, the connection between the beliefs of prospective teachers on integration with technology and to which extent they prefer using technology in their classrooms in the future indicates the importance of the teacher training process in the acquisition of techno-pedagogical competencies. However, the conducted studies show that prospective teachers graduate from faculties of education with insufficient knowledge and skills to use technology effectively in educational environments, thus failing to integrate technology and pedagogy concepts when they begin their duties. In this regard, prospective teachers need to be trained in using the latest technologies and contemporary teaching methods before starting their duties. Such trainings can be accomplished not only by updating the existing course contents, but also through additional courses.

## References

- Adıgüzel, A. (2010). İlköğretim okullarında öğretim teknolojilerinin durumu ve sınıf öğretmenlerinin bu teknolojileri kullanma düzeyleri. *Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi*, 15, 1-17.
- Archambault, L., & Crippen, K. (2009). Examining TPACK among K-12 online distance educators in the United States *Contemporary Issues in Technology and Teacher Education*, 9(1),1-12.
- Aşkar, P., Altun, A., Şimşek, N., & Özdemir, S. (2012). *Teknoloji kabul modeli çerçevesinde öğretmen, öğrenci ve yöneticilerin tablet ve etkileşimli tahtayı benimse süreçlerinin incelenmesi (In Press)*.
- Bal, M.S. (2012). Determining preservice history teachers' self-assessment levels with regard to their technological pedagogical content knowledge (TPCK). *Energy Education Science and Technology Part B: Social and Educational Studies (ISI)*, 4 (1), 293-308.
- Bal, M.S., & Karademir, N. (2013). Sosyal bilgiler öğretmenlerinin teknolojik pedagojik alan bilgisi (TPAB) konusunda öz-değerlendirme seviyelerinin belirlenmesi. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, 34(2), 15-32.
- Becker, H. J. (1994). How exemplary computer-using teachers differ from other teachers: Implications for realizing the potential of computers in schools. *Journal of Research on Computing in Education*, 26(3), 291-321.
- Bilgin, İ., Tatar, E., & Ay, Y. (2012). Sınıf öğretmeni adaylarının teknolojiye karşı tutumlarının teknolojik pedagojik alan bilgisine (TPAB) katkısının incelenmesi. 10th Ulusal Fen Bilimleri ve Matematik Eğitimi Kongresi, Niğde, Turkey.
- Bingimlas, K. (2009). Barriers to the successful integration of ICT in teaching and learning environments: A review of the literature. *Eurasia Journal of Mathematics, Science & Technology Education*, 5(3), 235-245.

- Butler, D., & Sellbom, M. (2002). Barriers to adopting technology for teaching and learning. *Educate Quarterly*, 25(2), 22-28.
- Büyüköztürk, Ş. (2008). Anket Geliştirme. Retrieved June 10, 2013 from [http://www.tebd.gazi.edu.tr/garsiv/2005\\_cilt3/sayi\\_2/133-151.pdf](http://www.tebd.gazi.edu.tr/garsiv/2005_cilt3/sayi_2/133-151.pdf)
- Christiansen, R. (2002). Effects of technology integration education on the attitudes of teachers and students. *Journal of Research on Technology in Education*, 34(4), 411-433.
- Chuang, H.H., & Ho, C.J. (2011). An investigation of early childhood teachers' technological pedagogical content knowledge (TPACK) in Taiwan. *Journal of Kirsehir Education Faculty*, 12(2), 99-117.
- Cox, S., & Graham, C.R. (2009). Diagramming TPACK in practice: Using an elaborated model of the TPACK framework to analyze and depict teacher knowledge. *Tech Trends*, 53(5), 60-69.
- Çağlar, E. (2012). Yeni medya dolayımı eğitim ortamında fatih projesi öğretmenlerinin pedagojik uygulamalarının uluslararası öğretmen standartları ile uyumu. 1st Uygulamalı Eğitim Kongresi, Ankara, Turkey.
- Demir, S., & Bozkurt, A. (2011). Primary mathematics teachers' views about their competencies concerning the integration of technology. *Elementary Education Online*, 10(3), 850-860.
- Demir, S., Özmentar, M.F., Bingölbalı, E., & Bozkurt, A. (2011). Sınıf öğretmenlerinin teknoloji kullanımlarının irdelenmesi, 5th International Computer & Instructional Technologies Symposium, Elazığ, Turkey.
- Dikkartin-Övez, F.T., & Akyüz, G. (2013). İlköğretim matematik öğretmeni adaylarının teknolojik pedagojik alan bilgisi yapılarının modellenmesi. *Eğitim ve Bilim*, 38(170), 321,334.
- Earle, R.S. (2002). The integration of instructional technology into public education: Promises and challenges. *Educational Technology*, 42(41), 45-53.
- Hew, K.F., & Brush, T. (2007). Integrating technology into K-12 teaching and learning: Current knowledge gaps and recommendations for future research. *Education Technology Research & Development*, 55, 223-252.
- Hosseini, Z., & Kamal, A. (2012). A Survey on pre-service and in-service teachers' perceptions of technological pedagogical content knowledge. *The Malaysian Online Journal of Educational Technology*, 1(2), 1-7.
- Kabakçı-Yurdakul, I. (2011). Öğretmen adaylarının teknopedagojik eğitim yeterliklerinin bilgi ve iletişim teknolojilerini kullanımları açısından incelenmesi. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 40, 397-408.
- Kaya, Z., Özdemir, T.Y., Emre, İ., & Kaya, O.N. (2011). Exploring preservice information technology teachers' perception of self-efficacy in web-technological pedagogical content knowledge, 6th International Advanced Technologies Symposium (IATS'11), Elazığ, Turkey.
- Konokman, G.Y., Yanpar-Yelken, T., & Sancar-Tokmak, H. (2013). Sınıf öğretmeni adaylarının tpaab'lerine ilişkin algılarının çeşitli değişkenlere göre incelenmesi: Mersin Üniversitesi örneği. *Kırşehir Eğitim Fakültesi Dergisi*, 21(2), 665-684.
- Mazman, S. G., & Usluel, Y.K. (2011). Bilgi ve iletişim teknolojilerinin öğrenme-öğretme süreçlerine entegrasyonu: Göstergeler ve modeller. *Eğitim Teknolojisi Kuram ve Uygulama*, 1(1), 62-80.
- MEB (2011). Değerlendirme raporu. Retrieved June 28, 2013 from <http://fatihprojesi.meb.gov.tr/upload/sincanilgenelmeclisi3/anketraporu.doc>
- MEB (2012). Değerlendirme raporu. Retrieved June 10, 2013 from <http://bingol.meb.gov.tr/eklenti/1563.doc>
- Mishra, P., & Koehler, M.J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017-1054.
- Oncu, S., Delialioğlu, O., & Brown, C.A. (2008). Critical components for technology integration: How do instructors make decisions? *Journal of Computers in Mathematics and Science Teaching*, 27(1), 1-19.
- Öztürk, E., & Horzum, M.B. (2011). teknolojik pedagojik content knowledge ölçeği'nin türkçeye uyarlaması. *Ahi Evran Üniversitesi Eğitim Fakültesi Dergisi*, 12(3), 255-278.
- Sezer, B. (2011). İlköğretim Okul Yöneticilerinin Teknoloji Liderliği Rollerine İlişkin Yeterlikleri. Yayınlanmamış yüksek lisans tezi, Ankara Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara, Turkey.
- Sandholtz, J., Ringstaff, C., & Dwyer, D. (1997). *Teaching with technology: creating student-centered classrooms*. New York: Teachers College Press.
- Shulman, L. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, 15(2), 4-14.
- Silverstein, G., Frechtling, J., & Miyaoka, A. (2000). *Evaluation of the use of technology in Illinois public schools: Final report* (prepared for Research Division, Illinois State Board of Education). Rockville, MD: Westat.
- Şimşek, Ö., Demir, S., Bağcı, B., & Kinay, İ. (2013). Öğretim elemanlarının teknopedagojik eğitim yeterliklerinin çeşitli değişkenler açısından incelenmesi. *Ege Eğitim Dergisi*, 14(1), 1-23.
- Usluel, Y., Mumcu, F., & Demiraslan, Y. (2007). Öğrenme-öğretme sürecinde bilgi ve iletişim teknolojileri: Öğretmenlerin entegrasyon süreci ve engelleriyle ilgili görüşleri. *Hacettepe Üniversitesi, Eğitim Fakültesi Dergisi*, 32, 164-178.
- Yazıcıoğlu, Y., & Erdoğan, S. (2004). *Spss uygulamalı bilimsel araştırma yöntemleri*. Ankara: Detay Yayıncılık.
- Yeşil, R. (2006). Sosyal bilgiler öğretmenlerinin sınıf içi öğretim yeterlikleri (Kırşehir örneği). *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi*, 7(2), 61-78.
- Yıldırım, S. (2007). Current utilization of ICT in Turkish basic education schools: a Review of teacher's ICT use and barriers to integration. *International Journal of Instructional Media*, 34(2), 171-186.

# Excel-based workbook for quality management (ewqm)

Nieto-Marquez, E <sup>a,79</sup>

<sup>a</sup>Universidad de Celaya, Carr. Panamericana km 269 CP 38080. México

---

## Abstract

Since more than a decade, our Quality Management Department has designed and implemented a simple excel-based workbook for quality management (EWQM), which collects values of indicators from the different academic and service areas; it processes them and it finally measures the quality and productivity levels of the academic and service areas of the University.

This system integrates a more complete, accurate, opportune and reliable information, which is processed by the EWQM that calculates the quality and productivity indexes for each academic area and provides feedback to directors on their opportunity areas, which must be considered in their continuous improvement plans

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* Type your keywords here, separated by semicolons ;

---

## Introduction

This excel-based workbook for quality management, EWQM, was designed and implemented following the recommendations of the accreditation process for the Federation of Mexican Private Institutions of Higher Education (FIMPES) which the University of Celaya belongs.

According the FIMPES v2, requires the institution to demonstrate that there are planning and evaluation processes that reveal the extent the institution to which meet institutional purposes, mission and vision. This required us to design and implement a system to give fast and reliable responses to these requirements. One of the strategies of Uniexcel Program, delegated us the responsibility to monitor and evaluate the performance of the University, in order to obtain sufficient and relevant information for decision-making.

This information was later integrated into an Excel workbook, called Excel-based Workbook for Quality Management (EWQM) inspired by the “One Page Management”, in the “Balanced Scorecard” and in the chapter 8 of ISO 9001-2000. (Measurement -Analysis-Improvement)

This instrument integrates performance information (KPI's) of the different areas of the University, both academic, and services.

The (QMD) operated the Quality Management System in this Excel Workbook has operated for more than 10 years

This system was audited twice by the FIMPES, and other paradigms of quality, without any recommendation or suggestion.

Recently, FIMPES v3 requires the obligation to measure institutional effectiveness and we have stated that our measurement methodology has focused from the beginning on the measurement of the effectiveness to define opportunity or strength areas.

The Director of Planning and Effectiveness, in 2012, delegated to Software Development Department to automate this system, substituting EWQM for a new automated system. But so far this has not been achieved.

## Objectives

---

\* Corresponding author. Tel.: +52 461 6087664

E-mail address: enieto@udec.edu.mx

Develop and implement an instrument to evaluate the extent to which the educational and educational support services goals are being achieved.

Collect and analyze data and allow to communicate results of relevant outcomes for the improvement of all university areas.

Calculate a quality and productivity index (QPI) to assist as an evaluation criterion of all the academic and service areas in order to support improvement programs.

Identify the main weaknesses of all institutional areas to design their improvement plans.

Demonstrate that there are planning and evaluation processes that reveal to what extent the institution fulfills its purposes, mission and vision.

Measure the effectiveness of continuous improvement plans.

## **Methodology**

This system establish components and indicators. A general overview is summarized in the following schema of components and indicators. (Scheme 1)

### *3.1 Suppliers Information*

The QMD has a group of information suppliers for different indicators in the quality management system.

These suppliers provide each semester basic information aimed at calculating the values of the different indicators.

#### *Suppliers Information*

The QMD has a group of information suppliers for different indicators in the quality management system.

These suppliers provide each semester basic information aimed at calculating the values of the different indicators.

(Scheme 2)

The indicator values from 2013 were taken directly on a virtual private server (VPS), in order for this information to be completed, well timed and accurate.

The supplier's information is taken and integrated into a Matrix concentrator, (OPM). (Table1)

On the first page of this Excel Workbook, there is a concentrator matrix in which the columns stand for the different areas of the University and as lines of different indicators to 8 components, specifically: Academics, Teachers, Alumni, Administration, Extension, Research, and Internationalization.

Note that in the blue column we have the institutional goals and column headings the different areas of the institution.

Kaleidoscope with colors, highlights areas of opportunity (in red) and strengths (in green). Table 2.

Area of Opportunity, is considered, when the indicator values that do not meet the institutional goal and green the ones which do meet them.

Thus, with just a glance, you can see globally institutional goals that are being fulfilled. It also allows a preliminary analysis of the areas (columns) and indicators (rows)

### *3.2 Processing*

Each indicator value is subject to a process of calculation, using formulas inspired by the concept of "effectiveness", as shown in the next flowchart. (Scheme 3)

### *3.3 Calculation of quality and productivity index (QPI).*



With the EWQM information, which is integrated the Key Performance Indicators (KPI) the information is automatically copied to a specific spreadsheet for each area, discarding those items which do not apply.

The calculation of QPI considers first the comparison between the institutional goal and the performance (effectiveness)

The score of each indicator is a result of multiplying the effectiveness by the weight.

For each academic and service area a sheet with the name of the area is kept.

The "personalization" of a sheet for each area, has the advantage that only the indicators that apply will be considered and no error is introduced QPI final calculation. (Table 3)

Finally the area QPI is calculated corresponding to a quotient, where the denominator is the maximum points and the numerator is the sum of the accumulated points. (Scores)

The maximum value of the QPI for each area that can be reached is 100 points, if the performance achieved in all indicator values equal to or greater than the institutional goal.

This system can easily identify the most important opportunity areas (in red, and in a descending range), which must be taken as the basis for the plans, projects and actions for the improvement process of the following semester.

#### 3.4 Semester summary of quality.

At the end of each semester a semiannual quality summary is sent to Rectorry. This summary is resultant from collected and processed information in the EWQM. (Table 5)

### Results

This workbook in Excel, EWQM, shows the following advantages:

Emphasizes on the gathering complete, accurate and well-timed indicator values related to each academic and service area for which suppliers are defined and validated and these provide the required information

Identifies strengths and weaknesses for each areas chromatically and direct. Opens an extended period of time for corrections before sending the final results to Rectorry. Its operation is economical because it does not need system engineers for operation or maintenance.

Quickly calculates quality and productivity indices and provides preliminary QPI accurate, well timed values subject to review, correction and updating.

Generates a semiannual quality report to Rectorry from the QPI, with which the different areas can be compared and institutional improvement plans can be implemented.

After the failed attempt of Software Development Department, to replace this EWQM with an automatic management system, the advantages of this practical home-made instrument are reasons for reusing this instrument in 2013 and improving its operation with a private web platform.

### Conclusions

The EWQM, demonstrated to be an effective "one page" quality and productivity administrator" of the institutional system. Its usage allowed longitudinal research and presented historical values of relevant indicators and helped in the strategic planning and continuous improvement of the different areas.

The EWQM, is a summary strategic diagnosis, both: in a quantitative and qualitative approach, area by area, allowing to "measure" with a good level of reliability, the quality and productivity of the university and its different areas, and the degree to which it is meeting institutional objectives and mission.

This instrument allows directors and authorities to easily recognize the quality and productivity index (QPI) and identify easily numerically and with colors the higher and lower performance to facilitate the improvement process each semester.

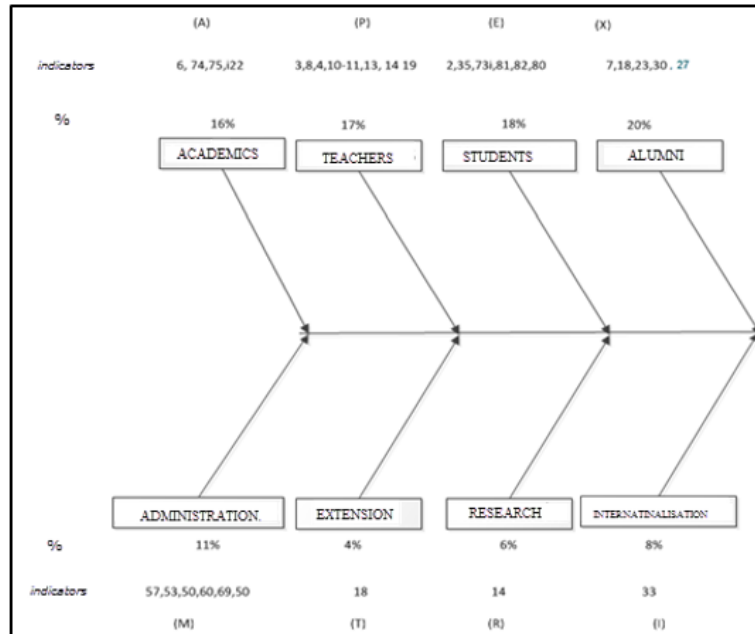
The EWQM, due to its simple design, easiness, and speed for obtaining low cost results showed that it justifies to be considered as a reliable, standardized, organized quality management system.

It is obvious that this instrument is likely to improve with the support of new technologies of information and communication technologies (ICT), but privileging the quality of information, with complete, well-timed, accurate data and calculation using standardized methods.

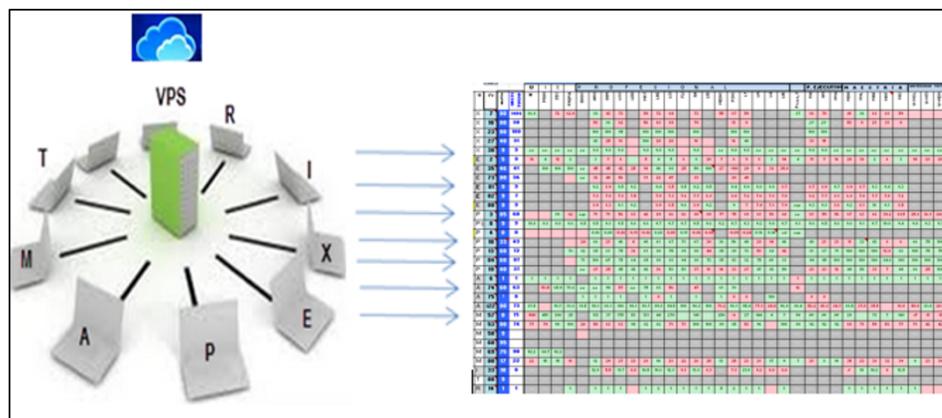
This last semester 2013, in order to improve its operability, its standardization and automation we used successfully, a Web platform and select suppliers, who uploaded directly their corresponding indicator values

## Illustrations

*Scheme 1. Components and indicators of the system*



Scheme 2. Suppliers, components and indicators



[illegible][illegible]

Scheme 3. Effectiveness Calculation

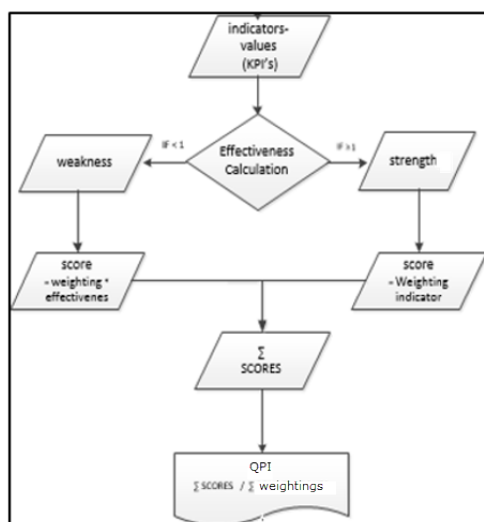


Table 3. QPI by area, representing numerical and chromatically priority weaknesses and strengths

2014										weaknesses									
POND										POND									
Puntaje										Puntaje									
D	X	22	1	0.8	0.88	0.88	0.88	ARO	f	22	3.15	0.00	3.15	(72) Entrega de un producto anual de investigación.					
C	X	11	6.0	92.5	0.21	0.21	0.75	ARO	f	11	3.35	0.70	2.65	(11) Porcentaje de profesores con grado superior al nivel del área dando impartición clara					
C	X	4	100	0.8	0.88	0.88	0.88	ARO	f	4	2.55	0.00	2.55	(43) Porcentaje de eficiencia terminal en muestra de la última generación					
C	X	24	90	77.0	0.82	0.82	0.18	ARO	f	24	9.00	7.20	1.80	(1) Porcentaje de materias con un índice de aprobación superior al 80% (excluyendo bajas)					
A	X	43	95	77.0	0.82	0.82	0.18	ARO	f	43	4.65	3.81	0.84	(2) Media del aprovechamiento académico					
A	X	1	80	77.0	0.81	0.81	0.83	ARO	f	1	4.65	4.25	0.40	(13) Porcentaje de profesores con experiencia docente universitaria de 5 años o más					
A	X	2	35	77.0	0.81	0.81	0.87	ARO	f	2	4.65	4.32	0.33	(19) Porcentaje de materias impartidas por profesores de planta					
C	X	12	60	59.0	0.33	0.33	0.81	ARO	f	12	2.25	2.23	0.02						
C	X	10	50	49.2	0.33	0.33	0.82	ARO	f	10	0.85	0.84	0.01						
C	X	3	1	6.0	0.88	0.88	0.88	f	3	2.55	2.55	0.00							
C	X	14	60	55.5	0.83	1	-0.83	f	14	2.25	2.25	0.00							
C	X	20	40	76.0	0.92	1	-0.92	f	20	1.75	1.75	0.00							
D	X	22	80	39.0	0.96	1	-0.96	f	22	1.55	1.55	0.00							
D	X	23	9	9.4	0.84	1	-0.84	f	23	4.65	4.65	0.00							
D	X	24	11	94.0	0.88	0.88	0.88	f	24	3.15	3.15	0.00							
D	X	25	2	6.4	1	1	0.88	f	25	3.15	3.15	0.00							
L	X	45	90	100.0	0.11	1	-0.11	f	45	10.05	10.05	0.00							
S	all	45	0	2032	1	1	0.88	f	45	15.05	15.05	0.00							
L	X	60	90	90.0	0.88	0.88	0.88	f	60	5.05	5.05	0.00							
A	X	61	5	6.2	1	1	0.88	f	61	1.55	1.55	0.00							
A	X	23	2	2.3	0.44	1	-0.44	f	23	1.55	1.55	0.00							
X	X	27	80																
X	X	28	80																
A	X	21	400																
A	X	64	80																
A	X	83	21																
A	X	83	10																
A	X	83	15																
A	X	74	90																

31										14.58									
57.1%																			
ARO										87.48									
SMB										75.82									

Table 5. Report of academic and service areas in the first semester. 2013 A.

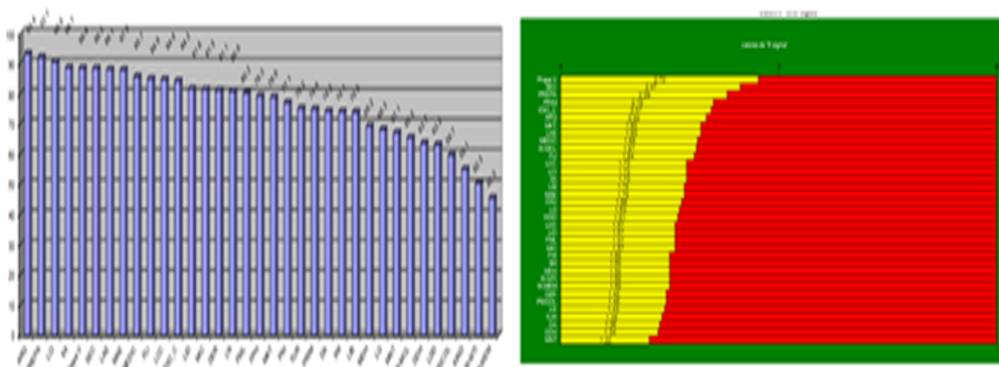
# Academic areas

academic area	ICP	No. INDOS	FORTS	AROS	INDOS	DPMO	"σ"	(6-σ)	2013 A
KIND	55.1	11	6	5	45.5	454,545	1.61	4.39	
PRIM	74.9	11	8	3	27.3	272,727	2.10	3.90	
SEC	88.5	12	10	2	16.7	166,667	2.47	3.53	
PREPA	92.1	14	11	3	21.4	214,286	2.29	3.71	
IDIO_C	84.3	7	5	2	28.6	285,714	2.07	3.93	
ARQ	93.4	26	18	8	30.8	307,692	2.00	4.00	
DER	81.1	27	13	14	51.9	518,519	1.45	4.55	
LCC	84.8	27	16	11	40.7	407,407	1.73	4.27	
LDD	83.2	19	10	9	47.4	473,684	1.57	4.43	
MKT	78.9	24	16	8	33.3	333,333	1.93	4.07	
LAE	88.1	27	18	9	33.3	333,333	1.93	4.07	
LCI	90.6	27	16	11	40.7	407,407	1.73	4.27	
FLI	84.9	19	12	7	36.8	368,421	1.84	4.16	
IIA	88.7	27	16	11	40.7	407,407	1.73	4.27	
LID	81.6	19	10	9	47.4	473,684	1.57	4.43	
MEDIC	85.7	17	11	6	35.3	352,941	1.88	4.12	
PSICOL	59.7	27	13	14	51.9	518,519	1.45	4.55	
TUR	75.2	22	10	12	54.5	545,455	1.39	4.61	
LN	80.9	19	9	10	52.6	526,316	1.43	4.57	
LG	68.3	20	11	9	45.0	450,000	1.63	4.37	
LIB	74.0	19	11	8	42.1	421,053	1.70	4.30	
Prepa V	88.6	9	8	1	11.1	111,111	2.72	3.28	
FNI	77.1	20	10	10	50.0	500,000	1.50	4.50	
IIM	74.1	20	10	10	50.0	500,000	1.50	4.50	
FPH	79.3	16	9	7	43.8	437,500	1.66	4.34	
MDH	69.2	20	10	10	50.0	500,000	1.50	4.50	
FML	80.2	19	10	9	47.4	473,684	1.57	4.43	
MAE	88.2	19	11	8	42.1	421,053	1.70	4.30	
MNT	67.1	18	7	11	61.1	611,111	1.22	4.78	
MIC	81.5	19	10	9	47.4	473,684	1.57	4.43	
W-MCL	65.5	14	9	5	35.7	357,143	1.87	4.13	
W-MTI	50.3	14	7	7	50.0	500,000	1.50	4.50	
W-MEM	45.5	14	7	7	50.0	500,000	1.50	4.50	
DA	74.2	18	8	10	55.6	555,556	1.36	4.64	
DDH	63.7	16	7	9	56.3	562,500	1.34	4.66	
PRIMS	76.5	18.8	10.7	8.1	42.1	421,212.9	1.7	4.3	

academic area	DIRECCIC	ICP	DIRECC	"σ"	(6-σ)
ARQ	93.4	Prepa V	2.72	3.28	
SEC	2.47	SEC	2.47	3.53	
PREPA	32.1	PREPA	2.29	3.71	
LCI	30.6	LCI	1.73	4.27	
IIA	88.7	PRIM	2.10	3.90	
Prepa V	88.6	IDIO_C	2.07	3.93	
SEC	88.5	ARQ	2.00	4.00	
MAE	88.2	MKT	1.93	4.07	
LAE	88.1	LAE	1.93	4.07	
MEDIC	85.7	MEDIC	1.88	4.12	
FLI	84.9	W-MCL	1.87	4.13	
LCC	84.8	FLI	1.84	4.16	
IDIO_C	84.3	LCC	1.73	4.27	
LID	81.6	LCI	1.73	4.27	
MIC	81.5	IIA	1.73	4.27	
DER	81.1	LIB	1.70	4.30	
LN	80.9	MAE	1.70	4.30	
FML	80.2	FPH	1.66	4.34	
LG	79.3	LG	1.63	4.37	
MKT	78.9	KIND	1.61	4.39	
FNI	77.1	LDD	1.57	4.43	
TUR	75.2	LID	1.57	4.43	
PRIM	74.9	FML	1.57	4.43	
DA	74.2	MIC	1.57	4.43	
IIM	74.1	FNI	1.50	4.50	
LIB	74.0	IIM	1.50	4.50	
MDH	69.2	MDH	1.50	4.50	
LG	68.3	W-MTI	1.50	4.50	
MNT	67.1	W-MEM	1.50	4.50	
W-MCL	65.5	DER	1.45	4.55	
DDH	63.7	PSICOL	1.45	4.55	
LDD	63.2	LN	1.43	4.57	
PSICOL	59.7	TUR	1.39	4.61	
KIND	55.1	DA	1.36	4.64	
W-MTI	50.3	DDH	1.34	4.66	
W-MEM	45.5	MNT	1.22	4.78	

# Service areas



# References

- FIMPES. (2011). Sistema de acreditación a través del desarrollo y fortalecimiento Institucional. Septiembre 2011. México.
- Khadem, R y R, Lobert (1991). Administración en una página. Como utilizar la información para lograr sus metas. Edit. Norma.
- Khadem, R. Recuperado el 10 de junio del 2013, de <http://www.riazkhadem.com/sitio/index.php>
- Nieto, R. (1992). Balances de operación de los terrenos agrícolas de la Universidad. Universidad de Celaya
- Nieto, M.E. (2013) Guías para el llenado "LEAD" y "CEAS". Libros Excel para la autogestión de las áreas académicas de apoyo y servicios. Universidad de Celaya
- Nieto, M.E. (2001-2012). LEGC. Libros electrónicos de Gestión de calidad. Dirección de Gestión de Calidad. Universidad de Celaya.
- Proy-NMX-CC-023-1MNC-2003. Sistemas de Gestión de calidad. Directrices para la aplicación de la Norma NMX-CC-9001-1MNC-2000 en educación. México.

# Exciting technical learning in large classes through personal response technology

Peter Knottenbelt<sup>a\*</sup>, Amuli Bukanga<sup>b</sup>

<sup>a</sup>University of Johannesburg, Faculty of Engineering and the Built Environment, Johannesburg, South Africa

<sup>b</sup>University of Johannesburg, Faculty of Engineering and the Built Environment, Johannesburg, South Africa

---

## Abstract

The use of radio frequency personal response system (PRS) to stimulate the learning activity in large class groups has been tested and found invaluable over a period of 3 years. The paper describes the benefits of using the PRS as well as some of the logistical problems and their solutions as practiced in the Mining Department of the University of Johannesburg. The applicability of PRS particularly in technical modules is confirmed.

© 2013 The Authors. Published by Elsevier Ltd.

Selection and peer-review under responsibility of The Association of Science, Education and Technology-TASET, Sakarya Universities, Turkey.

Keywords: *clickers, response system, large classes*

---

## 1. Introduction and background

Virtually all institutions of higher learning are experiencing the economic need to increase the size of class groups. Bigger and bigger lecturer halls are being introduced in the interests of viability. With this necessity comes the downside of less interaction with students: A “lecture” is a lecture and virtually no interaction can be allowed in these large classes. Compensating lecture tutorials and supporting homework are two of many alternatives to the problem of ensuring the internalization of knowledge following the formal lecture. Of course in some types of modules and under many circumstances the lecturer is the only source of query whilst in other type modules the ever increasing responsibility is placed on the learner to do self-learning through the many avenues available. The adage “it is important that the learner learns and not so much that the teacher teaches” applies.

This paper deals with an intervention used, together with many others, in attempting to blend tutorial work directly from the responsible lecturer during the lecturer/tutorial time. Particularly for large classes and in technical modules, there is a desperate need for direct interaction between lecturer and the individual student. The authors are of the opinion that this is particularly true in developing countries and probably at the early stages of undergraduate learning. It is also well established that students learn best from both the formal lecture with individualized lecturer interaction, as well as greatly from the interaction with peers. In the case being described a clear indication of a deeper internalization of knowledge is enumerated for both technical and non-technical types of modules as presented at the University of Johannesburg’s Mining Department.

Applied technology is one of the effective methods of diminishing the negative impacts of large class groups – many systems are available to assist the lecturer in assessing progress of students and carrying out formal assessments with technology facilitated grading. At the UJ Mining Department these systems are in place and being used. The PRS system is not widely used within the UJ but the Mining Department have consistently been using the process and are convinced that broad implementation of the process has resulted in better transfer of knowledge and an excitement in the learning process that enhances “deep learning”.

From literature survey and the particularly the useful paper of Jane E Caldwell “Clickers in the Large Classroom” published in Spring 2007 it appears as if there is strong general international conviction on the benefits of using PRS clickers in the class room to facilitate teaching and learning.

The context of this paper is in tertiary education at the comprehensive University of Johannesburg. This University offers the full range of qualifications from higher certificates to post doctoral studies. The setting within the UJ for this paper is the applied technology programme of Mining Engineering Diploma. The class is made up of a broad range of demographics and social backgrounds from families of disadvantaged communities

to students that have had high quality private schooling. The class size ranges from 130 in 2010 when the first trials with clickers began, to the class of 2014 with 258 students in the class. The minimum requirement of entry to the class is a Grade 12 National Senior Certificate with Mathematics and Science at 50% or more together with a 50% pass in English. Many of the students have English (the medium of instruction) as a third language. History has indicated that of the 258 students in the 2014 class about 20% although “present” in class, are virtually completely absent from class discussion, due to the fact that, despite further and further explanations, these students seem to have the feeling that they will not be successful. They seem to be completely and continuously confused. They feel that they “just can’t understand” the concepts. This group has got the tendency to be sitting at the back of the class venue and they prefer not to be close to the lecturer. Their attendance is at best is passive, and many attend just because it is “compulsory”.

The objective of introducing the clickers (PRS) was to find a technique that would encourage particularly the despondent and hapless students into active participation in the class room and to develop a confidence in particularly basic understanding, while progressively moving to more complex exercises ie by keep a high level of “engagement” from all students.

The modules subjected to test particularly in 2014 are “Science Mining “ presented by one of the authors of this paper and the module “Mineral Exploitation” presented by the other author.

The modules differ considerably in that Science Mining is basically applied physics and chemistry in a Mining Engineering context. Mineral Exploitation is a module that incorporates mining technology, geology, mineral processing and mine survey. The range is therefore from hard memory based material to understanding and application content and mathematical manipulation. The modules are both at first year (post grade 12) level.

In 2009 after a visit to an education technology expo the suppliers of Personal Response System (PRS) were approached and sponsorship for the purchase of 200 clickers was obtained. These had not been used at the university at all, prior to this activity. Literature convinced the authors of the validity of making use of these clickers for several of the standard and researched reasons as recorded below:

- Maintaining a register of attendance with little effort
- Reduced or even eliminated assessment marking and feedback
- Immediate feedback to students
- Immediate feedback to the lecturer
- Anonymousness of responses
- Committed individual response
- Improved learning
- Extending the attention span of students
- Improved grades
- Active learning using peer discussion
- Direct inter communication between lecturer and student
- Making lectures fun (Jane Caldwell)
- Exciting the learning experience – this is the subject of this paper

The research viewed was mostly from high tech institutions in the USA or UK where convincing cases were made for the use of the Radio Frequency two way clickers as the medium of the Personal Response System (PRS). More recently some universities in Africa appear to have attempted the implementation of the use of clickers in the large class. It appears as if all cases of introduction of clickers have positive outcomes or at least that the negative aspects are well outweighed by positives as listed above. Despite the efforts of the authors to convince other lecturers and academics across the Faculty the system is still being implemented very slowly. This is mainly due to the recognized difficulties as listed below

- Unfamiliarity of the software
- Technical difficulties particularly in the early stages of implementation
- Content coverage is reduced at the expense of depth of learning
- Considering the PRS as just a gimmick and not real teaching
- Difficulty of control of clickers

The subject of this paper is the “exciting” of the teaching and learning experience in large classes. In the class being considered in 2014 has 258 students - the lecturer movement in the venues has been restricted. Some classes are raked whilst others are flat, sometimes with audio-visual facilities and sometimes without. One can easily imagine that the highly motivated students arrive early and find a place in the front of the class. These are the students that would be asked questions and be conspicuous and active in the learning process. These are the

students whose work can be checked by direct observation. In short where there is personal contact as would be the case in small classes, the lecturer has a strong chance of exciting the students even without the PRS system.

The students who (by design or co incidence) do not find themselves in personal reach of the lecturer are lost in a sea of students that spread into the back of the class. The lecturer still has a duty to give quality tutoring and teaching to each individual student – there is no discount for the students at the back of the class. Generally it is recognized that overall grades and even passing of a module may be at risk just because the student is not “active”. There is no doubt that the PRS system stimulates the learner if used on a regular basis during the class. Typically up to 5 questions per 45 minute lecture were used in this trial and is typical of everyday use of the PRS. Further it is recognized that if there is the “threat” of an assessment or a random question “on the fly” during the lecture it is sure that many of the students would be more active or develop an attention span beyond the norm.

## 2. Method

**Process of reinforcing the literature in the African Large class situation:** It was decided to develop a model to add to the already convincing literature on the benefit of the clicker process.

A three pronged process was followed

- Randomly present noted classes with the clickers (C) and no clickers (N) . Carry out a clicker assessment on all the content over a period of four weeks and access the results of the components presented with and without clickers
- Consider the back 3 rows of students at an estimated 40 students and make judgment of their awareness of class activity particularly when using clickers and not using clickers for prolonged lectures after 40 minutes and 80 minutes uninterrupted lecture. It is recognized that best learning takes place in the first 5 minutes of a class. The process is recognized as a subjective process but gives a most convincing result.
- Regular end of lecture clickers assessment over a period compared to occasional and random “on the fly” questions in the class and judging the attention of the approx 40 students at the back of the class - counting those that are active and attending to the activities

The objective of the class room activities is deep learning – not just for tests but for a life time of application so assessment is made of learning offered through clickers compared to non clicker teaching with delay assessments. The following tabulations summarize the results of the tests

Test questions variable in nature:

### Clicker Research Questions (Knottenbelt)

1. What is the preferred unit of angle for engineering (radian)
2. What is the symbol for radian (rad)
3. What is the rotational idling speed of the crank of a motor car engine in rpm (800 range of 300)
4. Convert 750rev per minute to radian per second, and grad per second, and degrees per second (78,5 ; 5000 ; 4500)
5. In what unit is pressure measured (pascal)
6. What pressure would a mine fan be exerting on the turbulent air stream if the resistance is  $0.06 \text{ NS}^2/\text{m}^8$  and the flow rate is  $40\text{m}^3/\text{s}$  give answer in pascal (96)
7. What is the mass of Quartzite rock in an ore body that is 150m x 40m x 20m expressed in Mg (320000 - 340000)
8. What is the approx. density of air at normal temperature and pressure express in  $\text{kg}/\text{m}^3$  (1.2 – 1.3)
9. What pressure will be exerted on a 4m x 4m mine pillar that supports an area of 8m x 8m of rock at a depth of 250m. Use a relative density of 2,3 for the rock being supported and give answer in MPa (22 – 23)
10. What is the minimum air quantity required to be delivered at the working face of a tunnel if it is 3,3m X 3,4m in dimension Give answer in  $\text{m}^3/\text{s}$  (1.6 – 1.7)
11. What is the legal mass of a person for the purpose of working out the size of a rope holding a cage in a mine shaft – answer in kg (75)
12. In the acronym SASOL what does the S stand for (Synthetic SA Synthetic Oil Limited)

## 3. Results



Table 1: Calculation and recall using clickers and non clickers in for teaching

Question	Clicker presented C / non clicker N	Early test average for class	Late test after 2 weeks	Question type
7	C	74	68	Calc and recall
8	C	78	68	Calc and recall
10	C	67	58	Calc and recall
4	N	60	28	Calc and recall
6	N	35	27	Calc and recall
9	N	52	28	Calc and recall
2	C	84	82	RECALL
3	C	76	68	RECALL
11	C	85	82	RECALL
1	N	64	52	RECALL
5	N	68	54	RECALL
12	N	62	34	RECALL

It is clear from Table 1 that both in the calculation and recall as well as the recall areas there is a strong conviction that the use of clickers has a positive impact on the learning experience both in the short term and the longer term. This was reinforced by a random show of hands in the class where no student indicated that the clicker system did not contribute positively to the learning experience.

Table 2: Clicker and non clicker presented back rows attention comparison (Knottenbelt and Bukanga)

Lecture	Clicker presented C / non clicker N	Est number /40 not attending after 40 minutes back 3 rows	Est number /40 not attending after 80 minutes back 3 rows
1	C	0	2
2	C	5	6
3	C	0	3
6	C	4	6
4	N	26	30
5	N	12	24
7	N	25	35
8	N	30	35

It is clear from Table 2 that the use of clickers in the class as a teaching and learning tool excites the learners into extended attention span. This was reinforced by a show of hands from the student group late on a Friday afternoon where minimal absenteeism was noted. The group indicated that despite a 4 hour session all students were positively engaged right at the end of the lesson period.

Table 3: Clicker presentations End of class only and randomly used in lecture back row attention comparison

Lecture	Clicker only end class E /random clicker on Fly	Est number /40 not attending after 40 minutes back 3 rows	Est number /40 not attending after 80 minutes back 3 rows
3	E	6	3
4	E	8	5
5	E	5	3
8	E	13	4
1	F	12	14
2	F	6	12
6	F	4	3
7	F	6	3

It is clear from Table 3 that where the random “threat” of the use of clickers during a lecture (on the fly) the attention span of the student is strongly extended despite any length of lecture. Where the students know that a clicker evaluation will be used at the end of a class the attention during the class attention span is also positively affected – this is reinforced by comparing Table 2 non clicker attention span with any of the results of Table 3.

### CONCLUSIONS:

Whilst this investigation may be considered somewhat unscientific the authors are convinced that the use of clickers in any form improves the attention span in the class, promotes the deep learning activity mainly through allowing peer discussion and focused attention, and maintains excitement in the class through, if nothing else, the use of technology to stimulate two way communications. These conclusions may be achieved by simply looking at current literature however the application in an African context where the range of entry to first year engineering abilities is extremely variable is equally if not more applicable to developed countries

### References :

- Caldwell, J. E. Clickers in the Large Classroom: Current Research and Best-Practice Tips. *CBE Life Sciences Education*. 2005, 6, S. Simelane1, D.M. Dimpe2 Clicker technology: The tool to promote active learning in the classroom
- Duncan, D. Clickers: A new teaching aid with exceptional promise. *The Astronomy Education Review*. 2007, 5: page 70-88. Available at <http://aer.noao.edu/figures/v05i01/05-01-02-03.pdf>. Accessed November 02, 2009.
- Beatty, I. Transforming student learning with classroom communication system. *Educause Center for applied research: Research bulletin*. 2004, 13, page 25-33. Available at <http://www4.uwm.edu/lrc/srs/faculty/docs/TransformingStudentLearning.pdf>. Accessed May 05, 2009.
- Carnevale, D. (2005) Run a Class Like a Game Show: 'Clickers' Keep Students Involved. *The Chronicle of Higher Education:Informatino Technology*. 2005, 51, B3.
- Educause Learning Initiative. 7 Things you should know about clickers. 2005, Available at: [www.educause.edu/eli/](http://www.educause.edu/eli/). Accessed February 07, 2009.
- Robson, J. Active teaching and Learning. n.d., Available at <http://w3.gre.ac.uk/~bj61/talessi/at1.html>. Accessed July16, 2009. Bruff, D. Clickers and classroom dynamics: Classroom response systems create opportunities for managing student discussion and assessing student learning. 2007, Available at <http://www2.nea.org/he/advo07/advo1007/index.html>. Accessed June 29 ,2009. page 9-20.
- Crossgrove, K. & Curran, K. L. Using clickers in nonmajors- and majors-level Biology courses: student opinion, learning, and long-term retention of course material. *CBE—Life Sciences Education*. 2008, 7, page146-156.
- O'Donoghue, M. & O'Steen, B. Clicking on or off ? Lecturers'rationale for using student response systems. 2007, *Ascilite Singapore*. Singapore. Duncan, D. Clickers in the classroom: How to enhance Science teaching using classroom response systems 2005.
- Lantz, M. E. The use of clickers in the classroom: Teaching innovation or merely an amusing novelty? *Computers in Human Behavior*. 2010, 26, page 556-561. Available at [www.elsevier.com/locate/comphumbeh](http://www.elsevier.com/locate/comphumbeh). Accessed June 07, 2010.
- Crouch, C. H. & Mazur, E. (2001). Peer instruction: Ten years of experience and results [Electronic Version]. *American Journal of Physics*. 2001, 69, page 970-977. Available at <http://blogs.bath.ac.uk/ars/2010/02/22/what-is-the-mazur-peer-instructioncourse/>.
- Zhiming, C. Promoting active and deep learning in my class. *The China Paper*. 2004, pages 94-99. Available at [http://science.uniserve.edu.au/pubs/china/vol3/CP3\\_M1.pdf](http://science.uniserve.edu.au/pubs/china/vol3/CP3_M1.pdf). Accessed July 16, 2009.

# Expectation of educators and students towards a distance learning model in southernmost provinces of Thailand

Charuwan Kritpracha<sup>a</sup>, Ophat Kaosaiyaporn<sup>b</sup>, Wasant Atisabda<sup>c</sup>

<sup>a</sup>Department of Medical Nursing, Faculty of Nursing, Prince of Songkla University, Thailand

<sup>b,c</sup>Department of Educational Technology, Faculty of Education, Prince of Songkla University, Thailand

---

## Abstract

This study aimed to examine the expectation of administrators, teachers, education officers, and students towards a distance learning model in southernmost provinces of Thailand. The samples of this study included 112 school administrators, teachers, and educational officers in five southernmost provinces of Thailand and 237 students who study in five southernmost provinces of Thailand. The process of this study was divided into two phases: the first phase was to analyze and synthesize literature and documents related to the expectation of distance learning management and the second phase was to collect data by questionnaires. Results revealed that the management of distance learning should be organized based on students' needs and the lessons should be able to be accessed from anywhere, anytime. With varieties of instructional approaches and the opportunity for students to communicate, the learning system that allows teachers, assistant teachers, and peers to communicate without limitations of place and time will strengthen the capabilities of students in the southernmost provinces of Thailand to be more successful in higher educations.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* Expectation; Distance Learning

---

## Introduction

People in Thailand's southernmost provinces possess unique cultures, lifestyle and traditions, which are different from other regions, mainly, due to different society, religion and culture. Majority of local people are Muslim and conserve Malay culture lifestyle, language in daily use and particularly in religion schools. The practice reflects the importance of culture heritage in local people's value and beliefs. The Muslim youth education in these southernmost provinces, therefore, is influenced by local culture, traditions, and religion. Local education reflects the race and culture. Educational system in southernmost provinces was completely separated Traditional Islamic System from Secular System long time ago. Social modification has made a change in traditional knowledge, this process called "Islamization" which is a part of Islamic knowledge developing among cultural diversity, for example; adopting and opening more academic program, improving potential ability of human resources in a region. The ministry of education policy encourages educational system to serve community. (Khemkunasai, P., 1993, Fahrungsang, B., Uttayawalee, Kh., Sunghong, E., 2006 & Kaosaiyaporn, O, 2013)

Unfortunately, the unrest in southernmost provinces erupted more virulent in the past several years affects the quality of knowledge and learning achievement of students in this area. Distance learning technology through internet interactive has been proposed to be one of the main concept for solving these problems. Internet is an anytime anywhere communication media for teacher with learners, learners with learners, and learners with experts. It is learners' equity and provides opportunity to learn and share knowledge transforming the educational disadvantaged society to be the learning society.

---

\* Corresponding author.

E-mail address: charuwan.kr@psu.ac.th

The main purpose of this study is to determine the expectation of educators and students towards a distance learning model in southernmost provinces of Thailand in order to provide learners opportunity for higher education and lifelong learning process, particularly, among high school students.

### **Purposes of the study**

1. To study the expectation of administrators, teachers, education officers, and students towards a Distance Learning Model in Thailand's Southernmost Provinces.
2. To be a guideline for distance learning model development in Thailand's Southernmost Provinces.

### **Scope of the research**

Scope of this research is identified as follows;

1. To study the expectation of Educators and Students towards a Distance Learning Model in Thailand's Southernmost Provinces. The results of this study will be used as guidelines for strategic development and distance learning model.
2. Population and sample: There were 112 educators (administrators, teachers, educational officers) and 237 students working or studying in Thailand's five Southernmost Provinces; Songkhla, Satun, Pattani, Yala, and Narathiwat. Educators participants were working in Education science, Information Technology, Education Management for cultural diversity, and Distance Learning. Students participants were high school students in these five Southernmost Provinces.

## **4. Research Methodology and Finding Conclusion**

The fundamental information was studied. It included:

1. Review related literatures.
2. In-depth interviews with experts in education, cultural diversity, multicultural education, and psychology in the expectation of Educators and Students towards a Distance Learning Model in Southernmost Provinces, Thailand.
3. Distribution of questionnaires to administrators, teachers, education officers and students in five southernmost provinces, Thailand.

The finding a quality of the questionnaire for reliability by content validity and pilot study with using the Cronbach's alpha was 0.82.

This research is based on the distance learning model in southernmost provinces aiming to improve distance learning system of high school students in six subjects; Chemistry, Physics, Biology, Mathematics, English, and Thai. Distance learning consisted of an origin classroom and distance learning classrooms in several locations. The origin classroom is in Prince of Songkla University, Hat Yai campus due to well preparation including administrators, teachers, education officers, students, teaching tools, and broadcasting system to other provinces.

### **4.1 Expectation of Educators towards a Distance Learning Model in Thailand's Southernmost Provinces**

The administrators, teachers and education officers who are familiar with the diversity of race, religion, society, norm, and culture of students in these five southernmost provinces agreed that main hindrance is the unrest situation that withdrawn education development in this region. This caused deficiency of educators and absentees which become main dilemma that led to the implementation of Distance Learning in this region by;

4.1.1 The preparation of teachers in each class for Distance Learning in Southernmost Provinces; this considered to be very important part because teacher is the major factor of education achievement. Teachers should be savant in his/her own subject or course, he/she should always be well prepared, not only in content, but also in strategy, teaching technique, and methods. Learning materials should be distributed before each class, so the learners shall prepare themselves. Regular attending the training course and seminar is required among teachers especially teaching technique and Distance Learning System to improve teachers' competency.

4.1.2 Teachers in each class for Distance Learning in Southernmost Provinces should possess years of experience of 6-10 years, because of the needs of experience in teaching skills that could adapt to apply into Information Technology and be proficient in his/her own content.

4.1.3 Teachers in each class for Distance Learning in southernmost provinces should graduate at least bachelor degree, Master and Doctorate degree may be more beneficial. Even the level of education is not guaranteed teaching achievement, but it improves the creditability of educator toward students and their parents.

4.1.4 Teachers in each class for Distance Learning in Southernmost Provinces should be always available to provide advice to learners, understand learners' education background, and comprehend learners' cultural diversity. Prince of Songkla University would be the mentor of teachers in academic collaboration and improvement.

4.1.5 Advisors are very important in giving suggestions to learners if necessary towards the operation process or other related questions. Furthermore, technician is also required for maintenance and service during teaching sessions. This is consistent to the research of Greenfield (1989) referred in Sumalee Chaijaroen (2008) stating that if the learner is below the Zone of Proximal Development, learners need help in learning process called Scaffolding. The characteristics of Scaffolding are; (1) to support learning, (2) to be templates of learning, (3) to promote a deeper level of learning, (4) to complete the compelling task, and (5) to help the student achieve his/her learning goal.

4.1.6 The distance classroom should be arranged in accordance with geography, demographics, and should be at least 3 satellite classrooms in each district to be more accessible.

4.1.7 There should be activity sessions in 3-7 months, the activities shall allow students to actively participate in the learning process by talking with each other and work as a team as stated by Hoffman (1977) regarding the motivation directed by friends' influence especially among closed friend or friends in the same group of interest. The learner who has interactive activities with friends or classmates would be able to improve his/her learning ability more than the lone learner.

In addition, the researchers pursued the management of distance learning in southernmost provinces related to the appropriateness of distance learning in southernmost provinces by the means, standards deviation (SD) as indicated in Table 1.

Table 1. Means, Standard Deviation (SD) of appropriateness of distance learning in southernmost provinces responded by administrators, educational supervisors, teachers, education officers.

	Topic	Means	Standard Deviation	Interpretation
1.	Clear and continuous policy in distance learning for high school students in southernmost provinces	4.29	0.89	Good
2.	Subjects/ contents on distance learning should be congruent with learners' interest in entrance examination of higher education.	4.43	0.68	Good
3.	Pre and post assessment of students' knowledge should be conducted.	4.37	0.71	Good
4.	Course or Video-on-Demands for students who cannot attend the live instruction are provided for them to study at home or school.	4.31	0.80	Good
5.	Schools should be supported by computer	4.57	0.69	Excellence
6.	Teachers in each subject are significant variables of students' success.	4.16	0.74	Good
7.	Necessity of mentor teachers at terminal schools.	4.05	0.84	Good
8.	Mentor teachers' computer literacy.	4.22	0.83	Good
9.	Tutoring classes are provided on weekend.	3.50	1.07	Good
10.	Tutoring classes are provided on weekday.	4.03	0.97	Good
11.	Instructional activities are design to support interactive instruction among students and instructors.	4.31	0.82	Good
12.	Varieties of instructional activities based on online learning are provided.	4.29	0.76	Good
13.	Additional learning resources are provided at terminal schools.	4.33	0.71	Good
14.	Anywhere Anytime instructional supports.	4.17	0.91	Good
15.	Application of external classroom experiences for for enrichment of classroom learning.	4.31	0.67	Good

	Topic	Means	Standard Deviation	Interpretation
16.	Design of instructional activities support mindful learning and self-responsibility in learning process.	4.31	0.73	Good
17.	Authentic assessment of learning outcomes.	4.25	0.73	Good
18.	Students' needs in learning is priority; therefore, self-directed learning is significant in learning process.	4.85	4.84	Excellence
19.	Accommodate diverse learning styles in distance learning for risk areas in southernmost provinces.	4.37	0.75	Good
20.	Emphasis of Instructional design on social cooperation among students in instructional, social, and cultural aspects.	4.58	2.82	Excellence
21.	Design of tools for supporting the creative conversation on distance learning classroom for planning and information supports and exchanges.	4.32	0.64	Good
22.	Provide channels for students to contact instructors all the time.	4.41	0.73	Good
23.	Self-disciplines in self-control and time management are required for distance learning.	4.44	0.68	Good
24.	Learning Management System/ Content Management System should be developed or make use of open source software, e.g. MOODLE	4.37	0.68	Good
25.	The system is easy to use with clear objectives.	4.47	0.65	Good
26.	Login and security system are provided.	4.50	0.64	Excellence
27.	Varieties of learning resources are provided.	4.37	0.73	Good
28.	New learning environment and virtual activities on distance learning are provided.	4.32	0.73	Good
29.	Users' statistical records are provided.	4.23	0.88	Good
30.	Users' records of access to the system are provided.	4.26	0.72	Good
31.	Users' records of learning progress and statistical illustration are provided.	4.29	0.83	Good
32.	Test Bank is provided for students to review/ practice.	4.29	0.90	Good
33.	Evaluation system is provided.	4.37	0.80	Good
34.	Varieties of Instructional media, e.g., still pictures, moving pictures, illustration are provided.	4.45	0.69	Good
35.	Supporting systems are provided for technical issues, academic contents, and social network.	4.42	0.75	Good
36.	Chatroom	4.19	0.86	Good
37.	Webboard	4.15	0.87	Good
38.	Reflection room	4.29	0.83	Good
39.	Webblog	4.25	0.84	Good
40.	Short message (SMS) can facilitate communications among instructor and learners, and learners and learners).	4.17	0.90	Good
41.	Technology of Video Conference supporting distance learning.	4.24	0.93	Good

#### 4.2 Expectation of Students towards a Distance Learning Model in Southernmost Provinces of Thailand

Expectation of students towards a distance learning model in southernmost provinces can be classified as followings:

4.2.1 Students expected that before the tutoring class started, they should have prepared themselves by reviewing texts and students' manual.

4.2.2 Students preferred face-to-face orientation rather than online orientation (55.3%/44.7%).

4.2.3 Most students (56.5%) preferred a period of 1-3 months for distance learning of tutoring classes, then 28.7% for 3-7 months and 10.5% for 8-12 months.

In addition, the respondents' opinion on distance learning for southernmost provinces were identified in Table 2.

Table 2. Means, Standard Deviation (SD) of appropriateness of distance learning in southernmost provinces responded by students.

	Topic	Means	Standard Deviation	Interpretation
--	-------	-------	--------------------	----------------

1.	Subject/ content used in virtual classroom lesson should be congruent and beneficial to students for applying obtained knowledge for further studies in higher education.	4.11	1.07	Good
2.	Tutoring system should be based on Online Course-on-Demand for students who cannot attend the regular class.	4.02	0.83	Good
3.	Schools should support the computer and internet infrastructure.	4.16	0.86	Good
4.	Tutoring teachers should have opportunities to meet students at schools.	4.35	0.69	Good
5.	Mentor teachers for advising students at terminal classrooms should be teachers in local schools.	4.07	0.86	Good
6.	Tutoring class on weekday (Monday-Friday).	3.91	0.88	Good
7.	Tutoring class on weekend (Saturday-Sunday).	3.45	1.14	Fair
8.	Design of instructional activities should facilitate learning interface, questioning, and consulting teachers.	3.70	1.14	Good
9.	Varieties of learning activity design with support of peer conversation via online communication are provided.	3.95	1.11	Good
10.	Additional library and learning resources are provided.	3.78	1.27	Good
11.	More channels for students to communicate with teachers are provided anywhere anytime.	4.10	1.01	Good
12.	Self-disciplines in learning and time management are important for students in tutoring program via distance learning.	3.80	1.27	Good
13.	Books and printed materials are major resources for tutoring.	3.93	1.07	Good
14.	Old test materials are major resources for tutoring.	3.99	1.05	Good
15.	Games are major resources for tutoring.	3.85	0.90	Good

Additional opinions are provided by respondents as following:

1. Content for tutoring should be clear, precise, and simple for learning and understanding.
2. Students had high expectations on teachers' characters and teaching skills and methods, such as lively, funny, friendly, easy to follow, not too fast and understand the concepts.
3. Teachers should provide opportunities for students to ask questions and access anytime.
4. The unrest situation in southernmost areas affected the instructional process and often caused school shutdown.
5. Many schools were still lack of instructional resources.

## 5. Recommendations

1. Recommendations on a research implementation

This research could be adjustable and modified according to the situation, circumstance, and subject to achieve the learner's objective.

2. Recommendation for further studies:

- 2.1 The new technology tendency should be applied in teaching techniques.
- 2.2 To study on how to design teaching tools to be allied with Distance Learning System.

## 6. References

Fahrungsang, B., Uttayawalee, Kh., Sungthong, E. (2006). *Research report on Collection of multicultural studies of southernmost provinces of Thailand*. Pattani: Prince of Songkla University.



- Kaosaiyaporn, O., Khlaisang, J. & Na-Songkhla, J. (2012) Factors of Virtual Networks for Multicultural Classrooms to Enhance Knowledge Construction and Cultural Awareness for Graduate Students. *Technical Education Journal King Mongkut's University of Technology North Bangkok*, 3: 1.
- Kaosaiyaporn, O., Khlaisang, J. & Na-Songkhla, J. (2013) Development of a Virtual Networks for Multicultural Classrooms to Enhance Knowledge Construction and Cultural Awareness for Graduate Students. *Journal of Education, Prince of Songkla University*, 24: Special Issue.
- Khemkunasai, P. (1993). Views of Muslim Thais in southernmost areas on cultural harmony policy in southernmost provinces: Strategies to solve problems. *Journal of Thaksinkadee*. 3: 2.
- Chaicharoen, S. (2008). *Educational Technology: from principles, theories to practices*. Khonkean: Krangnanawittaya.
- Hoffman, L.W. (1977). Fear of success in 1965 and 1974: A follow-up study. *Journal of Consulting and Clinical Psychology*. pp. 310-321.
- Yongyuan, B. (2008). The encouragement a children development in the context of cultural diversity. [Online]. Available: <http://www.cf.mahidol.ac.th/autopage/file/WedJuly2008-22-18-5-4artice1-004.pdf> [November, 4, 2012].

INTE 2014

# Expectation of students from their thesis supervisor

Nuri Doğan Özge Bıkmaz81

*Hacettepe University, Ankara, Turkey  
Adnan Menderes University, Aydın, Turkey*

---

## Abstract

In this study, it is aimed “required characteristics of supervisors of graduate students” by scaling study with pairwise comparison to determined. The scale which is developed for this aim was conducted to 270 graduate students. The dependent variable of this research is the score obtained from the scale. The independent variables are graduate student’ sex, graduate level, being an academican or not. According to the findings of this study, “required characteristics of supervisors of graduate student” is sorted from the most desired characteristic to the least desired characteristic, it is determined that the most desired is “Following the plan made with his/her student ” and the least desired characteristic is determined as “being mastery on her/is field”

© 2014 The Authors. Published by Elsevier Ltd.

Selection and peer-review under responsibility of the Organizing Committee of WCES 2014.

*Keywords:* **words:** graduate student, supervisor, academic advisor

---

## 1. Introduction

Progresses and alterations in knowledge in nowadays constitute a basis for information societies. It is expected from the individuals in information societies to think all rounds, to examine events in critical way, to be productive and to have high problem solving abilities. Growing up to grade individuals is provided by education. The need for the individuals who adopt themselves, open to change and development in information societies increases gradually to be accepted and to move the society forward. In this sense, individuals tend to increase their levels of education to gain the featured that the society expect from them. Individuals that complete at the level of bachelor’s degree tend to post graduate education. The reason for that is the fact that post graduate education becomes more and more significant.

Post graduate education is an activity the purpose of which is to train scientist and instructors that will meet the needs of the developing society and that will contribute to information via researches and that carry towards post graduate degrees (Varış,1972). This process of education that consists of master and doctorate educations is efficient for the raise in individuals that will provide development and alterations in all fields of society. Besides this, it’s being the process of raising scientists that play a part in the improvement of the society increases the significance of post graduate education. Researches show that thesis supervisors largely affect the success of post graduate education process (Golde, 2000; Kam, 1997; Marsh et. al., 2002, Heart, 2002).

Thesis supervisor is the person who provide time, expertise and support for graduate student to develop research skills during thesis preparation process; and who is a guide for him/her to prepare a thesis in acceptable standards (Heath, 2002). It has been observed throughout the history of post graduate education that the relationship between thesis supervisor and student has an important role in effecting professional, cognitive and emotional developments and simplification of completion the academic degree of the student (Berelson, 1960; Healy, 1997). Consultancy affects students’ completion of their thesis and their career choices in the future (Ellison & Dedrick, 2008). Denicolo ( 2004) ranked positive supervisor attitudes from the point of students as encouraging, informative, well informed, reliable and sharing. Seagram et. al (1998) stated that supervisors’ having positive point of view and expertise also influence the process. Mainhard et. al (2009) emphasised that the qualities such as having good listening skills, supporting discussions on the researched issue when appropriate and providing feedback and support, being caring, intimate and understanding are expected from supervisors. Rose (2003) stated in the research in which the factors affecting the relationship between graduate students and thesis supervisors are studied that the thesis supervisors have a significant effect on graduate

---

\* Nuri Doğan Tel.: +15055882459.

E-mail address: nurid@hacettepe.edu.tr

students to *providing integrity* extend related to supervisor' virtuous and principled acts, and being role model; *guiding* related to supervisor's belief in students, value greatly as human, seeing the student as its colleague and study academically in regular basis and *communicating* extent including private and intimate aspects as personal problems, social events and world view that remain beyond the faculty relationship. Cohen (1995) expressed that the features that students desire from their supervisors are supporting students, having enabling role and guiding.

Although thesis supervisors have important effects on students from several aspects, Tosun (1997) pointed out that some instructors who conduct thesis supervisor role do not fulfil the qualifications necessary for being thesis supervisor. Within this framework, in the event that the supervisors, who have important positive effect during the process, do not fulfil the qualifications expected from themselves, it is possible that these effects will be in negative way. Hence, it can be said that most of post graduate program students have problem with their supervisors as those do not possess desirable qualifications sufficiently. Some students' discontinuing their education or completion education process in unsatisfied way can be given as examples of this case. Aside from these, students' having anxieties about their capability of the field because of the reasons such as not communicating with supervisors, being alone in case of problem facing during thesis process and not getting feedbacks regarding their studies can also be stated as examples (Acker, Hill, Black, 1994). In this content, it is thought that it is a need to analyse the opinions on the expectations of graduate students and results that are obtained will give significant ideas to supervisors.

The main purpose of this research is to scale the order of precedence of the features that are expected to be in thesis supervisors by asking opinions of post graduate students with the help of paired comparison method. As these can give a chance for supervisors to review the method that they follow up during student follow up process, the determination of what the students expect from the academic supervisors is thought to be important. When the literature is studied, it is remarkable that the studies carried out via paired comparison in the field of scaling in domestic and foreign is limited in numbers. It is considered that this study will contribute to the scaling studies limited in number and give an idea on the expectations of students to the supervisors. The following questions are tried to be answered in this research:

- 1)What is the order of precedence of the features that post graduate students expect from their thesis supervisors?
- 2)Does the order of precedence of academic features change depending on the students' being in master or doctorate degree?
- 3)Does the order of precedence of academic features vary depending on gender?
- 4)Does the order of precedence of academic features vary depending on students' working in university as academican (research assistant or instructor)?

## 2. Method

The order of features that the post graduate students want that their thesis supervisors have tried to be described in this research with scaling by making paired comparison. In this sense, it is a descriptive research in survey model (Karasar, 2010, s.29).

### 2.2 The Group For Which The Research Was Done

The study group of the research consist of 270 post graduate students. 53% of the students in study group having post graduate education in faculties of education of universities are in master's degree, 47% doctorate, 61% female and 39% male. 46% of the students is dependent to the university just for post graduate education, and remaining 54% work as academican (research assistant or instructor) in the universities. Some features of the teachers included in study group are given in Table 1.

Table 1. State of education of the students in study group, whether their being research assistant or not and numbers by genders

State of education	Gender				General total
	Profession	Female	Male	Total	
Master	Research assistant	37	27	64	144
	Other	49	31	80	
Doctorate	Research assistant	52	29	81	126
	Other	29	16	45	
Total		167	103	270	

### 2.3. Development And Application Of Data Collection Tool

"Features of Thesis supervisor" scale developed by researchers is used in data collection. In the phase of preparation of measurement tool, it is requested from five master and five doctorate degree students in different

departments selected from volunteer students primarily to list the features that they would like to see in their academic supervisors in open-ended way. Besides this, it is also requested from the students to determine 3 features that they prefer most among the features that they have determined and listed and sort as the most important one shall be the first. The answers given to open-ended questions by 10 students are reviewed and it is tried to determine the common and not common supervisor features. The answers of the students are dealt with content analysis approach and summarized. As a result of this analysis, 7 features that included in the list of all students and are among the top three are transformed to scaling item expressions. Opinions of five assessment and evaluations experts are received in association with the 7 scaling items obtained by transforming the answers of the students and corrections are made on two item expressions within the direction of the suggestions of the experts and then 8-items scale is obtained by adding one more items. Opinions of the 12 post graduate students reached by researcher on the 8 items in the scale are received before the application and it is controlled whether the items render service to targeted purpose, that is; the feature that is to be questioned in the item is understood by the respondents clearly or not. "Features of Thesis supervisor" scale is structured in a way that it is comprised of two sections. The items that are used to collect data on the demographic features of the students such as university, department, gender, state of education (master or doctorate), and profession (working as academician /other) are included in the first section. 8 items regarding the features thought to be expected from thesis supervisors are included in the second section. It is requested from the respondent to compare items dyadically during application and a directive on how to do it is given. The features are given both in columns and lines to prevent respondent's making mistakes and presented as 2-dimensional table. As the table is symmetrical as per main diagonal, it is arranged in a way that the respondents only use lower part of the diagonal to prevent respondents' falling into error.

#### 2.4. Analysis Of Data

Scaling method with V. state of scaling method together with paired comparisons is used in the analysis of the data in this study. First of all, frequency matrix constitutes of frequency values of each feature is established. Then, matrix of proportions is obtained by dividing frequency (F) matrix to total number of people in each cell. After that, (Z) standard values that are equalled to cell value in matrix of proportions (P) are determined and thus unit normal deviations matrix is obtained. In the end of this matrix, a line that shows the total of values of each column is established and each Z cell value in this line throughout the columns are averaged and thus scale value is calculated. Scale values (S) are sorted by scrolling the beginning of the axis (O point) to the least of average Z values in these lines. In this scrolling; if the least value is negative, the absolute value of this value is added to all values. If the least value is positive, this value is deducted from all values. As a result of this, scale value of each feature is determined on numerical axis. It is necessary to know the contradictory triple number in paired comparisons; otherwise, the scaling will give false result. In this case, contradictory triples constitute basis for the error and this also affects the reliability of the proceeding done. 0-1 grade matrix is established from the answers of each student and it is checked whether the students run into triple contradiction or not. As triple contradictory number may decrease the reliability, the scales of the ones who run into contradictions more than 3 are not taken into analysis. For this reason, despite the fact that 307 people is reached in data collection phase, 37 students with high numbers of triple contradiction are excluded from the study group.

### 3. Findings And Comments

In this part of the research, findings that are obtained from the analysis of the data are given by being supported with tables. The order in the questions of research is used in findings and comments. Firstly,

#### 3.1 What is the order of precedence of the features that post graduate students expect from their thesis supervisors?

Paired comparison results of scale items of students are analysed. As a result of the analysis, scale values of these 8 items are given in Table 2.

Table 2. Scale values and stimulant orders of supervisor features

Features of supervisor	Scale values	Stimulant orders
(1)Being problem solving in academic studies	0,78	7
(2)Having comprehensive knowledge of its field	1,043	8
(3)Having comprehensive knowledge of research methods and techniques	0,608	6
(4)Easy to be communicated with	0,598	5

(5)Abiding by plan made with student	0,000	1
(6)Giving feedback to the studies of the student on time	0,230	4
(7)Not limiting student in his/her comments and opinions	0,126	2
(8)Encouraging academic studies of the student	0,174	3

When Table 2 is analysed, if we are to make an order from the most desired feature to the least desired feature among the features of supervisor; it can be seen that “Abiding by plan made with student” is in the first rank among the features of supervisor. This feature is followed by not limiting student in his/her comments and opinions, encouraging academic studies of the student, giving feedback to the studies of the student on time, easy to be communicated with, having comprehensive knowledge of research methods and techniques, being problem solving in academic studies respectively. Having comprehensive knowledge on its field is the last one among these features. The remarkable finding is that the feature of “having comprehensive knowledge on its field” is in the last row. Similarly, having comprehensive knowledge on research methods and techniques is also preferred less. It can be said that the most preferred feature of the supervisor is related to using time effectively.

### 3.2 Does the order of precedence of academic features change depending on the students’ being in master or doctorate degree?

Paired comparison results of scale items of students are separately analysed for doctorate and master students. As a result of the analysis, scale values of these 8 items are given in Table 3.

Table 3. Scale values and Stimulant orders of features of supervisor by state of education

Features of supervisor	Master		Doctorate	
	Scale values	Stimulant orders	Scale values	Stimulant orders
(1)Being problem solving in academic studies	0,604	<b>6</b>	1,303	<b>8</b>
(2)Having comprehensive knowledge of its field	0,851	<b>8</b>	0,001	<b>2</b>
(3)Having comprehensive knowledge of research methods and techniques	0,539	<b>5</b>	1,015	<b>7</b>
(4)Easy to be communicated with	0,651	<b>7</b>	0,115	<b>3</b>
(5)Abiding by plan made with student	0,000	<b>1</b>	0,325	<b>4</b>
(6) Giving feedback to the studies of the student on time	0,153	<b>3</b>	0,549	<b>5</b>
(7) Not limiting student in his/her comments and opinions	0,137	<b>2</b>	0,700	<b>6</b>
(8)Encouraging academic studies of the student	0,313	<b>4</b>	0,000	<b>1</b>

When Table 3 is analysed, it can be observed that when order from the most desired feature to the least desired feature by master students among the features of supervisor is made, academic supervisors’ abiding by plan made with student is placed on the top. The features such as not limiting student in his/her comments and opinions, giving feedback to the studies of the student on time, encouraging academic studies of the student, Having comprehensive knowledge of research methods and techniques, being problem solving in academic studies, easy to be communicated with, follow this first rank and the last one is having comprehensive knowledge of its field. As it is observed from the Table 3 that the feature desired most by doctorate students is encouraging academic studies of the student. The other features are ranked as having comprehensive knowledge of its field, easy to be communicated with, abiding by plan made with student, giving feedback to the studies of the student on time, not limiting student in his/her comments and opinions, being problem solving in academic studies. Rank differences correlation among scale values regarding expectations of master and doctorate students from supervisor is calculated as -0,16. This case can be interpreted as there are differences between the expectations of master and doctorate students or there is not a certain relationship. Thus, being in master and doctorate phase affects the order of preference of the features expected from the thesis supervisor. Hence, master students choose abiding by plan made with student to place on the top, while doctorate students expect from their supervisors to support their academic studies. Another spectacular finding is that the feature of “having comprehensive knowledge on its field” is placed among front rows by doctorate students, while it is placed in last row by master students. When the findings are compared with the results summarized in Table 1 that is analyzed without separating students as master and doctorate students within the scope of state of education, it can be said that the expectations of master students are more compatible with the expectations of the whole group. Hence, the order of preference of 2, 5 and 7<sup>th</sup> items is the same; whereas the order of preference of doctorate students is not the same as the order of whole group.

### 3.3 Does the order of precedence of academic features vary depending on gender?

Paired comparison results of scale items of students are separately analysed for female and male students. As a result of the analysis, scale values of these 8 items are given in Table 4.

Table 4. Scale values and Stimulant orders of features of supervisor by genders

Features of supervisor	Male		Female	
	Scale values	Stimulant orders	Scale values	Stimulant orders
(1)Being problem solving in academic studies	0,592	7	0,911	7
(2)Having comprehensive knowledge of its field	0,881	8	1,154	8
(3)Having comprehensive knowledge of research methods and techniques	0,357	5	0,776	6
(4)Easy to be communicated with	0,451	6	0,697	5
(5)Abiding by plan made with student	-0,004	1	-0,001	1
(6)Giving feedback to the studies of the student on time	0,104	4	0,313	4
(7)Not limiting student in his/her comments and opinions	0,084	2	0,155	2
(8)Encouraging academic studies of the student	0,091	3	0,230	3

When Table 4 is analysed, it can be observed that when order from the most desired feature to the least desired feature by male students is made, "Academic Supervisors' abiding by plan made with student" is placed in the first rank. Not limiting student in his/her comments and opinions, encouraging academic studies of the student, giving feedback to the studies of the student on time, Having comprehensive knowledge of research methods and techniques, easy to be communicated with, being problem solving in academic studies follow this first rank and the last one is having comprehensive knowledge of its field. When order from the most desired feature to the least desired feature by female students is made "Academic Supervisors' abiding by plan made with student" is placed in the first rank. Not limiting student in his/her comments and opinions, encouraging academic studies of the student, giving feedback to the studies of the student on time, easy to be communicated with, having comprehensive knowledge of research methods and techniques, being problem solving in academic studies follow this first rank and the last one is having comprehensive knowledge of its field. Rank differences correlation among scale values regarding expectations of female and male students from supervisor is calculated as 0,976. This case can be interpreted as there is positive and strong relationship between the expectations of female and male students from their supervisor. Thus it is observed that there is a slight difference between the orderings of expectations from academic supervisors by genders. The only difference in the ordering is in the order of 5<sup>th</sup> and 6<sup>th</sup> items. Male students prefer having comprehensive knowledge on research techniques to easy communication and female students vice versa. When the findings are compared with the results summarized in Table 1 that is analysed without separating students by genders within the scope of state of education, it is observed that the expectations of female students are the same as the whole group. It can be said on the basis of findings that gender does not have a distinctive function for the study group.

#### 3.4. Does the order of precedence of academic features vary depending on students' working in university as academican (research assistant or instructor)?

Paired comparison results of scale items of students are separately analysed for female and male students. As a result of the analysis, scale values of these 8 items are given in Table 5.

Table 5. Scale values and Stimulant orders of features of supervisor by professions

Features of supervisor	Research asst./instructor		other	
	Scale values	Stimulant orders	Scale values	Stimulant orders
(1)Being problem solving in academic studies	0,732	7	0,856	6
(2)Having comprehensive knowledge of its field	1,008	8	1,099	8
(3)Having comprehensive knowledge of research methods and techniques	0,540	6	0,627	5
(4)Easy to be communicated with	0,382	5	0,944	7
(5)Abiding by plan made with student	0,109	3	0,000	1
(6)Giving feedback to the studies of the student on time	0,180	4	0,343	3
(7)Not limiting student in his/her comments and opinions	0,000	1	0,411	4
(8)Encouraging academic studies of the student	0,105	2	0,203	2

When Table 5 is analysed, it can be observed that when order from the most desired feature to the least desired feature by academican students is made, Not limiting student in his/her comments and opinions is placed in the first rank. The second one is encouraging academic studies of the student; third one is abiding by the plan, fourth

is giving feedback on time. These features are followed by easy to be communicated with, having comprehensive knowledge of methods, being problem solving, having comprehensive knowledge of its field. In consideration of the findings in Table 5, abiding by plan made with student is placed in the first rank by students not working as academician or not working among the features expected from supervisors. The other features as ranked as encouraging academic studies of the student, giving feedback to the studies of the student on time, not limiting student in his/her comments and opinions, being problem solving, easy to be communicated with, having comprehensive knowledge of research methods and techniques, and the last one is having comprehensive knowledge of its field. Rank differences correlation among scale values regarding expectations of academician students and others from supervisor is calculated as 0,762. This case can be interpreted as there is positive and above medium level relationship between the expectations of female and male students from their supervisor. Thus it is observed that there is a partial difference between the orderings of expectations from academic supervisors by professions. The first expectation of the ones working as academician is to think freely and others place abiding by the plan in the first rank. This case can be based on the fact that the ones working in other professions have less time for their education. The ordering judgement of both groups is the same on having comprehensive knowledge on the field and encouraging academic studies. The reason for the ones that are not academicians' preferring being problem solving in the upper rows may be that they face more problematic cases. When the findings are compared with the results summarized in Table 2 that is analyzed without separating students by their professions (academician or not) within the scope of state of education, it is observed that the expectations of academician students are more coincide with the total ordering in the group.

#### 4. Conclusion And Suggestions

Determination of the preference order by using scaling method with paired comparison of the features to be desired by students from thesis supervisors is aimed in this research. As per findings of the research, the features of supervisor that the post graduate students most desire from their academic supervisors is supervisors' abiding by plan made with student. This feature is followed respectively by not limiting student in his/her comments and opinions, encouraging academic studies of the student, giving feedback to the studies of the student on time, easy to be communicated with, having comprehensive knowledge of research methods and techniques, being problem solving in academic studies. The least desired feature is having comprehensive knowledge of its field. When the result of this research is taken into consideration, it can be deducted that a qualified supervisor shall be organized primarily. A plan that is well-prepared before the study is commenced is supposed as being a guide for staff what to do, when, how much and how to carry out things (Gelbal & Keecioğlu, 2007).

Besides this, features such as making it possible for students to think freely, encouraging their studies are also essential. Giving feedback concerning the studies of the students on time follows aforementioned features. It can be said that students' paying most attention to supervisors' being organized, giving feedbacks to students on time and easy to be communicated with show that students expect from their supervisors to make use of time efficiently. The underlying reason for this case can be students' taking responsibilities apart from education during post graduate education process and thus their need for using time efficiently. The preference of the items on the necessity of having knowledge of research methods and techniques and having comprehensive knowledge of its field in the last rows is unexpected case; however, this can point out that post graduate students consider supervisors' being a guide rather than getting literal from supervisors. It can be considered that students in this phase of education can reach knowledge themselves and posses research techniques and thus only want from supervisors to assume the guide role. In the open-ended questions directed to the students during the determination of scale items, students emphasised the importance of supervisors' enabling them to think freely and studying in compliance with the plans and include having comprehensive knowledge on the field; however, it was observed that when they sorted the three items, they did not write the feature of having comprehensive knowledge.

Students' being in master or doctorate phase has changed the order of preferences of the features expected from the supervisors. It is acquired in the analysis that supervisors' having comprehensive knowledge on their fields and research methods and techniques are placed at the front rows by doctorate students. This finding can be based on the fact that the students in this phase try to be specialized on certain fields, need to make fewer mistakes and need supervisors having comprehensive knowledge and being qualified on their fields. Hence, the mistakes made in doctorate thesis phase create more reactions than the mistakes made during the preparation of master thesis. It is observed that there are not any essential differences in the order of preferences of the students on features of supervisor by genders. And this is the expected result actually; it is thought that the individuals are assessed with their academic features independent from their genders in academic area. Another factor that

creates difference in the order is based on students' working in university or working outside. The first expectation of the ones working as academician is on freethinking, whereas the expectation of ones in other group is supervisors' abiding by the plan. This case can be based on the fact that the ones in other professions have lesser time for their education. Both groups have the same order regarding the features of having comprehensive knowledge on field and supporting academic studies. The reason for the ones that are not academicians' preferring being problem solving in the upper rows may be that they face more problematic cases.

## References

- Berelson, B. (1960). *Graduate education in the United States*. New York: McGraw-Hill
- Cohen, N. H. (1995). The principles of adult mentoring scale. In M. W. Galbraith & H. C. Norman (Eds.), *Mentoring: New strategies and challenges* (pp. 15–32). New Directions for Adult and Continuing Education, no. 66. San Francisco: Jossey-Bass.
- Denicolo, P. (2004). Doctoral supervision of colleagues: Peeling off the veneer of satisfaction and competence. *Studies in Higher Education*, 29(6), 693–707.
- Ellison B.A. B. & Dedrick R. F. (2008). What do Doctoral Students Value in their Ideal Mentor?. *Research in Higher Education*, 39, 455-467.
- Gelbal, S. Ve Kelecioğlu (2007). Öğretmenlerin ölçme ve değerlendirme yöntemleri hakkındaki yeterlik algıları ve karşılaştıkları sorunlar. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 33:135-145
- Golde, C. M. (2000). Should I stay or should I go? Student descriptions of the doctoral attrition process. *The Review of Higher Education*, 23(2), 199–227.
- Healy, C. C. (1997). An operational definition of mentoring, In H. T. Frierson (Ed.) *Diversity in higher education* (Vol. 1). Greenwich, Connecticut: JAI Press.
- Heath, T. (2002). A quantitative analysis of PhD students' views of supervision. *Higher Education Research & Development*, 21(1), 41– 53.
- Ives, G., & Rowley, G. (2005). Supervisor selection or allocation and continuity of supervision: PhD students' progress and outcomes. *Studies in Higher Education*, 30(5), 535–555.
- Kam, B. H. (1997). Style and quality in research supervision: The supervisor dependency factor. *Higher Education*, 34(1), 81–103.
- Karasar, N. (2010). *Bilimsel araştırma yöntemi* (19.Baskı). Ankara: Nobel Yayınları
- Luna, G., & Cullen, D. (1998). Do graduate students need mentoring? *College Student Journal*, 32(3), 322– 330.
- Mainhard, T., Rijst, R., Tartwijk J. & Wubbels, T. (2009). A model for the supervisor–doctoral student relationship. *Higher Education*. 58:359-373
- Marsh, H. W., Rowe, K. J., & Martin, A. (2002). PhD students' evaluations of research supervision. *The Journal of Higher Education*, 73(3), 313–348.
- Rose, G. L. (2003). Enhancement of mentor selection using the Ideal Mentor Scale. *Research in Higher Education*, 44, 473–494
- Seagram, B. C., Gould, J., & Pyke, W. (1998). An investigation of gender and other variables on time to completion of doctoral degrees. *Research in Higher Education*, 39(3), 319–335
- Wilde, J. B., & Schau, C. G. (1991). Mentoring in graduate schools of education: Mentees' perceptions. *Journal of Experimental Education*, 59, 165-179.



# Explanation of instruments and procedures used by the recipients of education in order to build their own learning network, based on the generic model cognitive process

Milan Klement<sup>a</sup>, Miroslav Chráska<sup>b</sup>, Sylvie Klementová<sup>c</sup>

<sup>a,b,c</sup>Faculty of Education, Palacký University Olomouc, Žižkovo nám. č. 5, Olomouc 771 40, Czech Republic

---

## Abstract

The natural use of ICT, including modern social networks and open information sources by today's generation of pupils and students is a generally recognized fact, which stimulated the development of a new concept of learning theory based on the potential of modern information and communication technologies. It was designated as connectivism.

The key aspect of teaching thus conceived is the creation and the maintenance of interconnection on the network, expanding the knowledge base of the individual beyond his or her own capacity. That is why constructivist methods, involving the process of active social learning have been gradually applied recently in order to build a proper learning network and to internalize basic knowledge structures, including further deepening of the knowledge gained, by the educatee.

Within this context, a wide scale of questions arise as to how and to what extent the pupil's and student's cognitive process is influenced by modern information and communication technologies and tools, conversely, how these technologies are used by pupils and students to build their own learning networks and to internalize their knowledge structure. To be able to, at least partially, answer some of those questions, we carried out a survey research aimed at the explanation of the procedures and tools which pupils and students use in order to build their own learning networks and to internalize their knowledge structures based on a generic model of knowledge construction. Subsequently, a classification of pupils and students shall be carried out based on the said explanation. The submitted paper presents some of the partial results of the aforementioned survey.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** constructivism; social learning; information technology; connectivism; learning networks; tools for building learning networks; social networks; cognitive process; generic model

---

## Introduction

The idea of a completely natural use of ICT, including e-learning tools and LMS, by today's generation of students, is more or less taken as a fact, based on two major arguments. The first one stems from the fact that today's adolescents and even infants deal with and manage the computer technology with a rather striking spontaneity. The second argument is based on the statistics demonstrating the level of dependence of the use of ICT on age, showing that unlike older generations; nearly all adolescents use the Internet and mobile phones (Lupac, 2011). It is around these arguments that Don Tapscott American (1998) built his essays claiming that the power model of the family was disturbed, because, unlike the past, children were taking over the teaching role and educated their parents with respect to the orientation in the digital environment. His concepts of N-GEN and that of the digital generation were soon followed by other concepts, i.e. digital natives (Prensky, 2001a), homo-zappiens (Veen, Vrakking, 2006), digitally birth (Palfrey, Glasser, 2008) and others. *"Digital natives are used to receiving information very quickly. They like doing more activities at a time (i.e. multitasking). They prefer the image processing over the processing of the text. They prefer a random access to information (i.e. hypertext) and they like best working in a networked environment (online). They expect immediate praise and frequent evaluation of their work"*. (Prensky, 2001a). The ideas of Prensky and Tapscott were quite influential at the time

and have later become subject to several attempts, more or less successful, by various researchers, to refute them (Bennett, Maton & Kervin, 2008).

Despite the fact that the above stated categorization of pupils and students has not yet been definitely determined (Brown, 2008) and the author of this categorization himself revised the concept in his later works and began to use rather the term of "*digital wisdom*" (Prensky, 2009), these considerations encouraged the development of a new concept of learning theory built on the use of the potential of modern information and communication technologies, which has been designated as connectivism (Downes, 2012).

### **Theory of learning in the digital age - connectivism**

The concept of connectivism "*as a theory of learning in the digital age*" was first introduced by G. Siemens and S. Downes, based on their analysis of the shortcomings of the current theories of learning based on behaviorism, cognitivism, and constructivism (Siemens, 2005). It is thus built on the social cognitive learning theory and takes into account the fact that the student constructs a system of knowledge (for example cognitive maps of knowledge) in terms of his or her social environment (for example Vygotsky, 1962).

Connectivism therefore regards education as a process that takes place within a computer network environment, surpassing the individual. Connectivism, as an applied theory of constructivism, stems from the conviction that "*every learning process is deeply individual, and that knowledge is formed (constructed) by one's own experiences and interpretations of the world*" (Piaget, 1955). The role of the pupils is thus progressively changing - from them being passive containers, which must be filled with knowledge, to active participants of the educational process, who create their own knowledge and surrounding reality (Zounek, Sudický, 2012). Consequently, connectivism considers understanding by the pupil as dependent on the properties of the network and on the way information is presented there. Furthermore, every member of this network manages only a certain part of knowledge (Montcon, 2007). Likewise, the teaching based on the principles of constructivism situates the student in the middle of the process and is perceived as active (as opposed to passive instructivism). At the same time, the role of the teacher is obviously changing, too, from that of an authoritative source of knowledge to this of an assistant (facilitator), who rather supports pupils in their own learning (Tracey, 2009).

A key aspect of teaching thus conceived is the creation and the maintenance of interconnection on the network, expanding the knowledge base of the individual beyond his or her own capacity. Another aspect is the fact that the volume of information which the educatee is exposed to (within the framework of both intentional and non-intentional education) is too big for him or her to be internalized by learning or by experience, and at the same time, is subject to quick changes and becomes obsolete (Downes, 2012). Siemens claims that the network connections facilitating further learning and development are of more importance than the current state of knowledge (Siemens, 2005). Nevertheless, it is also essential that contemporary pupils and students are able to organize their own learning networks, which in future will result in continuing self-education of the latter.

### **Connectivism - research tools and areas**

That is why constructivist methods, involving the process of active social learning (Oblinger, Oblinger, 2005) have been gradually applied recently in order to build a proper learning network and to internalize basic knowledge structures, including further deepening of the knowledge gained, by the educatee. In a virtual environment, specific procedures and instruments closely connected with modern information and communication technologies are applied within the framework of the knowledge construction process (Tracey, 2009):

- discussion forums - asking questions, clarifying context, knowledge sharing,
- wiki modules and nonlinear knowledge banks - social construction of knowledge,
- search function –independently organized further research.

Higher level, in terms of knowledge and skills, is represented by tools and activities based on the theory of connectivism, which introduce the necessity of the connection to relevant sources of information in terms of the current exponential growth of information volume. Connectivist activities thus include above all (Tracey, 2009):

- external news feeds (RSS), blogs, wiki modules and discussion forums,
- social and professional networks - Facebook, Twitter, etc.
- information Portals, databases of external links.

In the context of publishing and research activities related to the issue of the use and application of information and communication technologies in education, based on the implementation of the concept of connectivist learning theory; it is possible to observe three major schools of thought. The first and the oldest one focuses on the use of learning networks in education. It primarily deals with the topics related to e-learning in the narrow sense of the word, that is to say in connection with distance education with a minimum attendance of learners in classes. There exist many studies dealing with the problem, for example by: J. Zounek (2009a, 2009b), R. C. Clark and R. E. Mayer (2008), M. F. Paulsen, (2003), A. Barešová (2003), L. Eger (2002), K. Kopecky (2006), J. Prucha and J. Mika (2000) and other.

The second school of thought focuses on issues related to e-learning in a broad sense comprising new topics such as dealing with the possible uses of MOOC (Massive Open Online Course) and social networks (Web 2.0) in education. Compared to the first stream of thought, more general issues and principles connected with possible distribution of educational content and communication through computer networks, and also with the appropriate structuring of learning materials and the impact of communication on the process are dealt with. This area has also been described by a number of authors, for example by: S. Matt and L. Fernandez (2013), Ch. Parr (2012), R. Kop (2011), T. Iiyoshi and M. S. Vijay (2008), Y. Li and S. Powell (2013), J. Zounek and P. Sudický (2012), and others.

The third thought and research stream focuses on the competencies of pupils and students with respect to the use of advanced information and communication technologies. This area focuses on the definition and the exploration of the skills that pupils and students have or which they need to develop to be able to make of use all the possibilities offered by modern information and communication technologies. Research plans and projects in this area have been numerous; however, one of them dominates. It is the currently implemented international research project ICILS (International Computer and Information Literacy Study), involving the total of 18 countries from all around the world. This international project aims at gaining insight into pupils' skills regarding computer and information literacy, which a wide range of other, similarly targeted researches and information resources, both of domestic and foreign provenience, have focused on, too.

However, there is an area hitherto neglected and that is the one which is focused on the examination of the relationships between the instruments and the procedures used by the educatee while building his or her learning networks, which are based on the principle of connectivism (Siemens, 2005, Downes, 2012) on the one hand, and the internalization of basic knowledge structure based on the involvement of the cognitive process of the pupil or the student and supported by modern information and communication technologies on the other hand. These cognitive processes can be defined using the words of R.L. Atkinson as *"mental processes of perception, information encoding, storage, and processing, through which an individual acquires information, plans and solves problems"* (Atkinson, 2003, p 693). According to this interpretation, cognitive processes express the processuality of human cognition, with the related cognitive functions determining that the process should consist of individual components or processes. These functions and their components can be defined as: *"all thought processes which allow us to recognize, remember, learn and adapt to constantly changing environmental conditions. Furthermore, higher cognitive or executive functions are included, such as the ability to solve problems, plan, organize, view and judge..."* (Sternberk, 1990). Here technology is represented mainly by social networks and tools for collaborative learning in the sense of "interactive cooperation within the group of learners" (Beckman, 1990).

#### 4. Context and objectives of the realized survey research

Within this context, a wide scale of questions arise as to how and to what extend the pupil's and student's cognitive process is influenced by modern information and communication technologies and tools, conversely, how these technologies are used by pupils and students to build their own learning networks and to internalize their knowledge structure. Taken into account the abovementioned, it is no longer necessary to ask questions concerning *"what"* they use or *"how many times"* they use, or even *"how well"* they can handle the learning networks (see the above-mentioned project ICILS). On the contrary, we need to start asking *"to what purpose"* the learning networks, supported by information technologies and social networks are used by the educatees, *"how they use them for the purpose of intentional or non-intentional learning"*, *"how they build these networks"*, *"which strategies they select"* while building them and especially *"how these networks affect the process of knowledge construction"*.

While seeking answers to these questions, the concept of the theory of connectivism described hereinabove shall be helpful as well as the model of cognitive process mechanism based on the generic model of knowledge

construction (Hejny, 2004). According to this model, it is possible to divide the process of the origination and construction of a new piece of knowledge into five levels and two level crossings (ascents), which represent the core of the cognitive process (Hejny, Kurina, 2004).

They are as follows:

1. level of motivation,
2. level of isolated models,
3. first abstraction ascent - generalization,
4. level of generic models,
5. second abstraction ascent - abstraction,
6. level of crystallization (structuring).

A synthesis of the two approaches makes for deeper understanding of the functioning of the cognitive process, supported by modern information technologies, and, conversely, for better understanding of the mechanisms of the influence of these technologies on the process of learning, where learning is seen as a process of active construction of knowledge by the student in an interactive learning environment (eg. Steinbring, 2005).

The main objective of the submitted project is to produce an explanation of the procedures and tools which students use in order to build their own learning networks and to internalize their knowledge structures based on a generic model of knowledge construction. Subsequently, a classification of students shall be carried out based on the said explanation. To achieve this main objective, it was necessary to implement some sub-goals which can be defined as follows:

- to analyze the reason why students use certain tools and procedures when building their own learning networks for both intentional and non-intentional learning,
- based on the qualitative research, to find out how students use certain tools and processes of constructing their own learning networks.

## **5. Research methodology and the research sample description**

Based on the aforementioned objectives, a research survey was carried out, focused on the connection between the first two levels of the generic model of the knowledge construction and the tools and procedures that university students use when learning with the support of information and communication technologies, with a special emphasis on social networks and open information sources.

The aim of this investigation was to determine what actually motivates the students to use particular tools and procedures within building their own learning networks for the purpose of both intentional or non-intentional learning (level of motivation), and to find out how students acquire information and knowledge using social networks and other tools and procedures aimed at the building their own learning networks for the purpose of learning (level of isolated models).

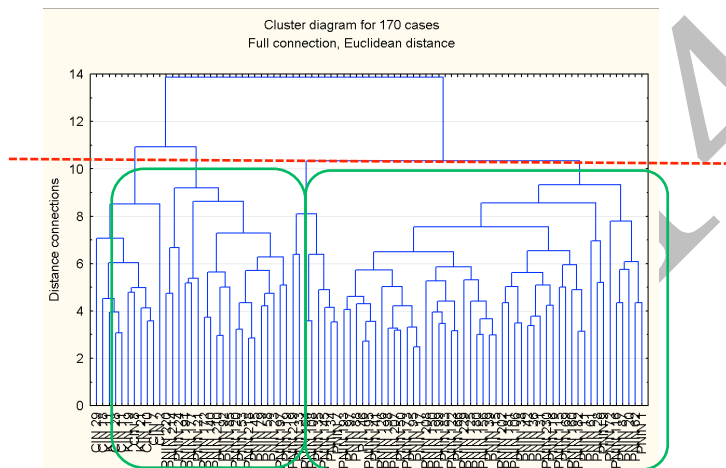
The research sample consisted of 170 students of Palacky University Olomouc Faculty of Education, who have been provided with training in both full-time and distance study programs. The selected research sample corresponded with the overall structure of the Faculty of Education students, both in terms of gender distribution (research sample: 29% of men and 71% of women, faculty: 25% of men and 75% women), and age distribution (the average age of the research sample members: 21,5 , faculty: 22,1). As an initial means to obtain the data required for the implementation of the survey, a questionnaire was used, consisting of 19 questions and an evaluation scale with number 1 determining the lowest level of preference and number 6 the highest preference, which enabled the students to express the degree of their identification with the given statements (for example that they compose the required information of pieces from different information sources, they communicate with their friends especially on the Internet, they like consulting problems with friends on the Internet, when solving a learning problem, they can concentrate on several information sources simultaneously, and so on).

Individual statements were formulated in such a way that they would examine the connection between the level of knowledge construction generic model on the one hand (due to limited capacities, only two out of five levels were examined), and the tools or the procedures which students used to construct their cognitive structures with the support of social networks and open information sources, enabling the construction of their own learning networks, on the other hand. The research method used for the purpose of processing the acquired research data was the one of cluster analysis (Pecáková, 2008). Being one of the methods dealing with the study of the similarity of multidimensional objects, that is to say objects disposing of more variables measured, and

with their classification into groups (clusters), cluster analysis is applied in particular where objects have a natural tendency to cluster. Having originated as a taxonomic method, it is nevertheless usable in other areas as well (Meloun, Militky, 2006).

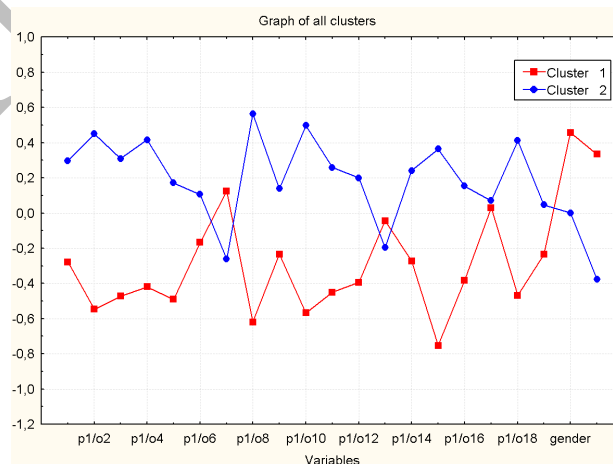
## 6. Selected research results

The first step in data processing was to determine whether there exists any distribution of the respondents depending on the extent of their identification with the given statements into clusters, which would represent the evaluation of characteristic groups of respondents. In this way, the total group of respondents was subdivided into groups which showed a similar dispersion of values. Simply put, should there appear several respondents showing a similar extent of identification with the given statements, such respondents would form a cluster. The whole situation is illustrated by the graph number 1 below.



Graph 1 – Results of the primary cluster analysis

In view of the above, it can be stated that the research sample of respondents shows a strong tendency to split into two separate clusters, according to the degree of preference to selected tools and procedures used to construct cognitive structures with the support of social networks and open information sources. It is possible to observe the fact at the level of the distances between the connections around 12. To better explain this fact and to determine possible factors which may influence the outcome, further analyses using K-means were performed. Further descriptive characteristics of the respondents, such as age and gender were used in these analyses. For the outcomes see the graph number 2 below.



As the graph above shows, the presumption was confirmed that the group of respondents can be divided into two separate clusters according to the degree of preference to selected tools and methods of building cognitive structures, supported by social networks and open information sources. With respect to the perception of the tools and procedures used, these groups are completely different not only as regards the degree of identification, but also regarding their age and gender. The first group (marked in blue) consists of students of lower age, who in most cases much more prefer the use of tools and procedures for building learning networks. The second group (marked in red) includes older students, whose preference to such tools is significantly smaller. Both the graphs also show the clear influence of gender and age on these preferences and the degree of identification. Moreover, it is possible to say that as far as gender is concerned, women prevail in groups of older age and lower preferences.

It is possible to confirm these facts also by means of the results of the implemented analysis of variance (see the table number 1 below), which show that taken the total of 19 statements, 15 showed a substantial degree of difference between the two groups and only 4 (marked in bold type) did not show any significant statistical differences.

Table 1 – Results of analysis of variance

Analysis of variance; Include condition: age and gender					
	group MN	internal MN	df	F	signif. p
p1/o1	9,890	93,988	120	12,627	0,001
p1/o2	29,719	88,893	120	40,119	0,000
p1/o3	18,305	101,513	120	21,639	0,000
p1/o4	20,886	90,450	120	27,709	0,000
p1/o5	13,118	92,207	120	17,072	0,000
p1/o6	2,234	124,022	120	2,162	<b>0,144</b>
p1/o7	4,495	131,590	120	4,099	0,045
p1/o8	41,990	79,034	120	63,754	0,000
p1/o9	4,151	106,446	120	4,680	0,033
p1/o10	33,972	81,088	120	50,274	0,000
p1/o11	15,080	96,439	120	18,764	0,000
p1/o12	10,568	89,814	120	14,120	0,000
p1/o13	0,700	116,863	120	0,718	<b>0,398</b>
p1/o14	7,934	96,495	120	9,867	0,002
p1/o15	37,322	93,369	120	47,968	0,000
p1/o16	8,544	108,181	120	9,477	0,003
p1/o17	0,049	133,350	120	0,044	<b>0,834</b>
p1/o18	23,167	97,442	120	28,531	0,000
p1/o19	2,377	128,286	120	2,223	<b>0,139</b>
gender	6,218	90,010	120	8,290	0,005
age	15,144	152,239	120	11,937	0,001

Based on these results, it is possible to categorize students according to the tools and procedures they use while building cognitive structures, supported by social networks and open information sources. The first category, for the time being called "non-networking" students, comprises respondents who, while building their cognitive structures, use information and communication technologies and social networks only marginally. This group is characterized in particular by their reluctance to use social networks for communication or education purposes, the unwillingness to share their knowledge and the preference to assembling information on their own. A typical

representative of this group is a middle-aged woman. The second group, for the purpose of the research called "networking" students, are those respondents who fully utilize the potential of social networks and open sources not only for communication but also for education and learning purposes. They are characterized by a significantly high level of collaboration, willingness to share their knowledge and impressions, the speed with which they seek and process information. A typical representative of this group is a young man.

## 7. Conclusions

Despite the fact that the above stated results cannot be considered significant (specific research sample, two out of five levels, number of respondents, and so on), they show some facts that might help explain some of the differences in the approach to the purposeful use of the tools and procedures while building their own learning networks by pupils and students.

One of these facts is that the age and the gender of the respondents do have a clear impact on the construction of knowledge supported by information and communication technologies in at least two of the five levels of the generic model. Taken that into account, when all the connections with all five levels and two abstraction ascents have been analyzed in the future, it will be possible to carry out a comprehensive classification of pupils and students according to the tools and procedures that the former use to build their own learning networks.

Based on these results, it is possible to perform at least partial categorization of college students into two groups. Both groups are distinguished primarily by the ability to perform so-called "multitasking" (ability to focus on several information sources simultaneously). While a group of "non-networking" students do not dispose of this ability and even reject it on principle, the group of "networking" of students applies the latter in full. Being able to quickly and efficiently find and process information is therefore obviously a vital skill within the framework of building the knowledge structure, supported by social networks and open information sources.

## References

- Atkinson, R. L. (2003) *Psychologie*. Praha: Portál. 752 p.
- Barešová, A. (2003) *E-learning ve vzdělávání dospělých*. Praha: VOX. 110 p.
- Beckman, M. Collaborative Learning: Preparation for the Workplace and Democracy? *College*
- Bennett, S., Maton, K. & Kervin, L. (2008) The 'digital natives' debate: A critical review of the evidence. *British Journal of Educational Technology* 39(5). pp. 12-31.
- Clark, R. C. & Mayer, R. E. (2008) *E-learning and the science of instruction: proven guidelines for consumers and designers of multimedia learning*. San Francisco: Pfeiffer. 510 p.
- Downes, S. (2012) *Connectivism and Connective Knowledge: Essays on meaning and learning networks* [online]. Toronto: National Research Council Canada. 616 p.
- Eger, L. (2002) *Příprava tutorů pro distanční výuku s využitím on-line formy studia*. Plzeň: ZČU. 59 p.
- Hejtný, M. (2004) *Mechanismus poznávacího procesu*. Praha: PedF UK. pp. 23–42.
- Hejtný, M., Kuřina, F. (2009) *Dítě, škola a matematika, Konstruktivistické přístupy k matematice*. Praha: Portál. 232 p.
- Iiyoshi, T. & Vijay, M. S. (2008). *Opening Up Education: The Collective Advancement of Education through Open Technology, Open Content, and Open Knowledge*. Chicago, M.I.T. Press. 265 p.
- Janíková, M. & Vlčková, K. (2009) *Výzkum výuky: tematické oblasti, výzkumné přístupy a metody*. Brno: Paido, 2009. 179 p.
- Kop, R. (2011) The challenges to connectivist learning on open online networks: Learning experiences during a massive open online course. *International Review of Research in Open and Distance Learning*, 12(3). Athabasca, AU Press.
- Kopecký, K. (2006) *E-learning (nejen) pro pedagogy*. Olomouc: Hanex. 121 p.
- Li, Y. & Powell, S. (2013) *MOOCs and Open Education: Implications for Higher Education White Paper*. University of Bolton: CETIS, 2013. 117 p.
- Lupač, P. (2011) *Mýty (a realita) digitální generace* [online]. *Lupa* [cit. 2012-01-10]. Gained from: <http://www.lupa.cz/clanky/myty-a-realita-digitalni-generace/>
- Matt, S. & Fernandez, L. (2013) Before MOOCs, Colleges of the Air. *Chronicle of Higher Education*, 40(2). Washington D.C.
- Meloun, M. & Militký, J. (2006) *Kompedium statistického zpracování dat: metody a řešení úlohy*. Praha: Academia, 2006. 982 p.
- Moncton, S. D. (2007) What Connectivism Is. *Half an Hour* [online]. February 3, 2007 [cit. 2014-02-03]. Gained from: <http://halfanhour.blogspot.com/2007/02/what-connectivism-is.html>
- Oblinger, D. & Oblinger, J. (2005) Is It Age or IT: First Steps Toward Understanding the Net Generation. Educating the Net Generation [online]. *Educause*, c2005 [cit. 2013-03-01]. Gained from: <http://www.educause.edu/Resources/EducatingtheNetGeneration/IsItAgeorITFirstSt>
- Palfrey, J., & Glasser, U. (2008) *Born Digital: Understanding the First Generation of Digital Natives*. Oxford, Oxford Press. 143 p.
- Parr, Ch. (2012). "Mooc creators criticise courses' lack of creativity". *Times Higher Education*, 10(4). London, TSL Education.
- Paulsen, M. F. (2003) *Online Education and Learning Management Systems - Global Elearning in a Scandinavian Perspective*. Oslo: NKI Forlaget. 337 p.
- Pecáková, I. (2008) *Statistika v terénních průzkumech*. Praha: Professional Publishing. 231 p.
- Piaget, J. (1955). *The Child's Construction of Reality*. London: Routledge and Kegan Paul.
- Prensky, M. (2001a) Digital Natives, Digital Immigrants [online]. *On the Horizon* 9(5), pp. 1-6. Gained

- from: <http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf>
- Prensky, M. (2001b) Digital Natives, Digital Immigrants: Do They Really Think Differently? [online]. *On the Horizon* 9(5), pp. 7-11. Gained from: <http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part2.pdf>
- Prensky, M. (2009) Homo Sapiens Digital: From Digital Immigrants and Digital Natives to Digital Wisdom. *Innovate* [online]. February/March 2009, Vol. 5, Iss. 3 [cit. 2014-01-03]. Gained from [http://www.innovateonline.info/pdf/vol5\\_issue3/H.\\_Sapiens\\_Digital\\_From\\_Digital\\_Immigrants\\_and\\_Digital\\_Natives\\_to\\_Digital\\_Wisdom.pdf](http://www.innovateonline.info/pdf/vol5_issue3/H._Sapiens_Digital_From_Digital_Immigrants_and_Digital_Natives_to_Digital_Wisdom.pdf)
- Průcha, J. & Mika, J. (2000) *Distanční studium v otázkách*. Praha: NCDV. 39 p.
- Siemens, G. (2005) Connectivism: A Learning Theory for the Digital Age. *International Journal of Instructional Technology and Distance Learning* [on-line]. January 2005, Vol. 2, No. 1 [cit. 2014-01-01]. Gained from: [http://www.itdl.org/Journal/Jan\\_05/article01.htm](http://www.itdl.org/Journal/Jan_05/article01.htm).
- Steinbring, H. (2005) *The construction of new mathematical knowledge in classroom interaction: An epistemological perspective*. USA: Springer.
- Sternberg, R. J. (1990) *Wisdom: Its nature, origins, and development*. Cambridge: Cambridge University Press. 339 p.
- Tapscott, D. (1998) *Growing Up Digital: The Rise of the Net Generation*. New York: McGraw-Hill. 271 p.
- Teaching*, 1990, 38(4). pp. 128–133.
- Tracey, R. (2009) Instructivism, Constructivism or Connectivism? *Learning in the Corporate Sector* [online]. Posted on 17 March 2009 [cit. 2014-03-05]. Gained from: <http://ryan2point0.wordpress.com/2009/03/17/instructivismconstructivism-or-connectivism/>
- Veen, W. & Vrakking, B. (2006) *Homo Zappiens. Growing Up In A Digital Age*. London, Network Continuum Education. 47 p.
- Vygotskij, L. S. (1962) *Thought and Language*. Cambridge, Mass.: The M.I.T. Press.
- Zounek, J. & Sudický, P. (2012) *E-learning učení se s online technologiemi*. Praha, Wolters Kluwer. 248 p.
- Zounek, J. (2009a) *E-learning – jedna z podob učení v moderní společnosti*. Brno: Masarykova univerzita. 161 p.
- Zounek, J. (2009b) E-learning ve školním vzdělávání. In Průcha, J. a kol. *Pedagogická encyklopedie*. Praha: Portál, pp. 277 – 281.



# Exploring technological innovation towards inclusive education: building digital games - an interdisciplinary challenge

Adriana G. Alves<sup>a,82</sup>, Ana Elisa F. Schmidt<sup>b</sup>, Karla D. P. Carthcat<sup>c</sup>, Regina C. L. Hostins<sup>d</sup>

<sup>a,c,d</sup>UNIVALI-Universidade do Vale do Itajaí, Rua Uruguai, 458, Itajaí-SC 88302-901, Brazil

<sup>b</sup>IFC-Instituto Federal Catarinense, Rua Joaquim Garcia, S/N, Camboriú-SC 88340-055, Brazil

---

## Abstract

Policy on inclusion in education lacks methodological frameworks and technological resources to assist students with disabilities during their teaching-learning process. This paper proposes a strategy to join interdisciplinary areas, such as education, game design and computer science, to enable affordable educational digital games development with natural and universal interface design. We also present the intended results we expected to achieve by using this interdisciplinary approach such as an educational game development based on natural user interface using Microsoft Kinect as an interaction device.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* Inclusive Education; Natural Interfaces; Universal Design

---

## Introduction

It's mandatory to propose new pedagogic workflows and tools in order to fulfill the demands suggested by the policy on inclusion in education to successfully enable and support the learning process for impaired people as well as to improve their life quality, independency and development as a whole person.

Having in mind the range of pedagogic tools for learning support, the Information and Communication Technologies – ICTs – generate new values, interaction ways and social behavior (Madariaga & Rubio, 2012). Among many ICTs the digital accessible games are at a spotlight because they not only provide entertainment but they also encourage a new learning approach, peer interaction and social engagement.

To achieve effectiveness in inclusive pedagogic instruments it's necessary that all kinds of people can successfully benefit from these instruments. Universal Design is the concept that describes products and instruments developed to aim the larger number of people possible, regardless their physical characteristics, age and social condition. Universal Design also refers to tools and products that do not target a specific public, which means any person could use them in the same way (The Center of Universal Design, 2014).

Natural user interfaces (Buxton, 2007) and non-conventional interaction devices can be viewed as pillars to allow universal design projects when talking about digital games development. However, to develop accessible educational digital games, taking in account the universal design concept, it takes more than just technology. It's necessary to work in an interdisciplinary way in order to address important questions related to inclusive education, game design and gameplay, human-computer interaction, targeted public, teach-learning strategies, among others.

To be able to articulate demands, proposals and solutions that come from such different areas is by itself a challenge during planning, development and execution phases of a collaborative interdisciplinary project. It's necessary to adapt and propose new project management tools and strategies in order to take the best out of each

---

\* Corresponding author. Adriana G. Alves Tel.: +55-47-9983-0830; fax: +55-47-3341-7544.

E-mail address: [adriana.alves@univali.br](mailto:adriana.alves@univali.br)

collaborator without losing important contributions or overloading the members with a high learning curve for new processes and tools.

Narrowing our work spectrum to digital accessible games solutions development, this article presents our strategy to join interdisciplinary areas, such as education, game design and computer science, to enable affordable educational digital games development with natural and universal interface design. It also presents the intended results we expected to achieve by using this interdisciplinary approach such as an educational game development based on natural user interface using Microsoft Kinect as an interaction device.

### **The *MUST HAVE* interdisciplinary**

Working with interdisciplinarity concepts is the way our group found to be suitable for the proposal and development of an accessible digital game which will make use of non-conventional interface devices to allow all kinds of people to properly interact with it, independent of their physics and cognitive characteristics.

In this project, our intent is to combine knowledge from multiple areas like Game Design, Computer Science and Education to create an education instrument which will contemplate ideas and demands from all these areas.

Interdisciplinary work contributes to establish connections and interlocutions between different knowledge, it establishes complementary links and leads to convergence of ideas coming from different perspectives, clearly punctuating that interdisciplinarity is much more than just a simple integration between diverse contents.

The interdisciplinarity does not dilute disciplines, by contrary, it maintains its individuality. It's a way to integrate disciplines through the comprehension of multiple causes and factors that impacts the reality. It works all necessary languages to build knowledge, to enable communication and to negotiate meanings and achieved results systematic acknowledge and registration. (Brasil, 1999, p. 89)

The three disciplines that are working in a collaborative way in this project are education, game design and computer science.

The main actors and actions taken during the project development are:

The pedagogue indicates to the game designers and computer science scientists which are the best learning tools in order to improve the learning process;

The game designer creates the game scenario, actors, interactions, rules and entertainment components based on the pedagogue feedback;

Computer science scientists identify the appropriate technological tools and devices in order to support the requisites pointed by the game designer and pedagogue in terms of natural interface and game programmability.

During the game evaluation phase we can also take advantages of these 3 different points of view:

The pedagogue will carefully review the game effectiveness as and teaching-learning instrument;

The game designer will worry about the gameplay experience, player interaction and enjoyment level;

The computer science scientist will take account for the software quality assurance, usability, maintenance, performance and security.

We propose that without this interdisciplinary approach, which has to start at the game conception up to the evaluation phase with the targeted public, it's not possible to develop an accessible educational digital game that truly takes in account the universal design concept.

Having in mind that this project is being developed in a university environment, our research groups include collaborators from different ages, gender and academic level and background. This heterogeneity according Soto, Graf & Brava (2013) constitute a factor that can add difficulties to the group work, with tough negotiations between its members.

An interdisciplinary research requires, as per Lyall & Meagher (2007), role negotiation in order to establish research workflows among research partners which will allow and enhance similarities and differences between involved areas. The research group needs to establish its particular working pattern looking for a balance between all member's collaborations. In this sense, an interdisciplinary project will fatally spend more time during execution, especially during its initial phases.

Thus, regardless of the socio academic profile of the group, symmetric relations can be achieved between its members in building a collaborative research (Soto, Bravo & Graf, 2013, p 447). In order to eliminate most of the communication barriers that exist when you are working in an interdisciplinary team, we've adopted strategies like face meetings, collaborative writing, multiple working teams grouped by task affinity as suggested

by Lyall and Meagher (2007). The following collaborative digital tools are being used in our project: Google Groups as a mailing tool for the entire group; Dropbox and Google Drive for file sharing; Trello as a project management tool and Skype for video conference. Fig.1 shows one of the moments where the team had a meeting using Skype, so everybody could participate.



Fig 1 Team meeting

## Methodology

The methodology framework currently being used during the digital game development works in an incremental way. As requisites and target public needs are being identified, the game design evolves in order to accommodate new needs; each new research action brings new information which is taken in account to evolve to the next level.

To achieve our objective in developing a game in a collaborative way, three main phases of development are identified:

### *Phase 1: studies and basic concepts*

Phase 1 is where studies on basic concepts from related areas and project requirements analysis are undertaken.

Our first step was to exchange and leverage knowledge between all different areas involved in our project. We achieved this objective by realizing conceptual seminars where each researcher exposed his knowledge and ideas which could contribute to the project. Our discussions and seminars turned around universal design, accessibility in games, natural user interfaces, non-conventional devices and impairment causes and definitions.

After these initial conceptual seminars, we have started a series of brainstorming meetings in order to recognize and comprehend specific requisites to allow learning-teaching process for special needs children, and more specifically using digital games as teaching-learning tool.

Once we have defined the main key points to move forward with game design and development, it's our intend to realize technical visits to regular schools which include children with special needs in order to evaluate and validate our initial proposal with them and their teachers. These visits will make use of techniques and methods of context of use analysis, from HCI - Human Computer Interaction, as well as strategies from Cognitive Psychology area (Cybis, Betiol & Faust, 2007).

We could summarize the main actions during this phase as:

- Conceptual seminars
- Defining targeted audience
- Identifying educational needs

Analyzing existing educational games  
Analyzing children interactions with natural interfaces

### *Phase 2: Game design and execution*

During the second phase the design, planning, development and execution of accessible educational digital games and natural interfaces enabled by the Microsoft Kinect (Microsoft Kinect, 2014) will take place.

Game development: based on the ideas, requisites and discussions elaborated during phase 1, a game prototype is going to be developed and presented to students and teachers. We will adopt participatory design techniques (Rocha and Baranauskas, 2000) to stimulate children's participation and proposal of new ideas for the game, gameplay and new types of natural interaction. Only after this participatory design intervention is concluded, we'll move to the final game design and development stage, including its sound, final art, final interaction elements and game engine coding.

Natural user interface design and development: studies on existing natural interfaces using Microsoft Kinect will take place under this second phase as well (Microsoft Kinect 2014). This non-conventional device captures movements, voice commands and video image from a user which is interacting with it. Through this technology we intend to create a natural interface which follows the universal design, allowing different kinds of people, with and without special needs, to be able to interact in same ways with our game.

A few prototype games and interaction environments will be developed in order to be presented to children and teachers during experimental workshops, allowing them to contribute via participatory design (Rocha & Baranauskas, 2000) to the game's natural interface and its interaction elements like poses, voice commands and gestures.

In summary, the main actions undertaken during this phase are:

- Participatory design
- Game design project
- Game prototyping
- Natural interfaces design
- Game development
- Natural interfaces development

### *Phase 3: verification and validation*

Phase 3 consists in products verification and validation through experiments with project audience, i.e., children from public schools involved in the earliest research (Phase 1). We will validate and verify the integration of all products developed, games and library for Kinect. Also, and more important, we will verify children's interaction, usability and accessibility, their fun and learning with the game.

For this purpose, we will collect data through specific forms and analyze them. Interaction tests will have the evaluation focus in interactions quality, which is established between users and systems (Cybis, Betiol & Faust, 2007).

We could summarize the main actions during this phase as:

- Users experience tests
- Usability and gameplay evaluation
- Learning evaluation

In order to present some results expected from the project, Fig. 2 shows a set of images that include digital games, library for Kinect, target audience, and equipment; some of them developed by our team.

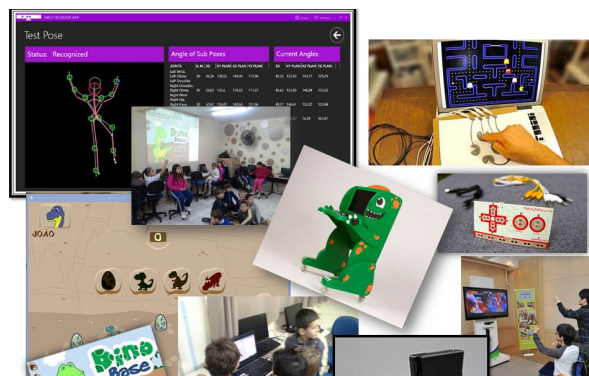


Fig 2 Concepts involved in the project

## Aimed Results

Through this project we expect to establish multiple accessibility criteria which will guide accessible games development and evaluation.

It's our goal to develop a game that aims to become a pedagogic instrument to impaired children without being restricted to this public. We expect it will be used in regular classes where both impaired and non-impaired students can interact and learn with the game in similar ways, truly promoting the inclusive education via universal design.

We will develop a game and use it as a "laboratory" for the technology created for natural interface; however, we intend that this technology will be applied to other games. The library created will allow integrate games with Kinect's functionalities and, with gestures recognition and voice commands, turn games accessible. This library should provide customizable and personalized recognition commands.

We also expect our research will collaborate with the Brazilian public policies on inclusive education, which demand for the development of didactic and pedagogic resources as a way to break down the barriers found during the teaching-learning process of impaired individuals (Brasil, 2011).

## Acknowledgements

This project is supported by National Council for Scientific and Technological Development (CNPq) and Scientific and Technological Research and Innovation Support Foundation of Santa Catarina State (FAPESC), Brazil.

## References

- Brasil. *Constituição (1988)*. Decreto 7611 de 17 de novembro de 2011. Brasília 17 de novembro de 2011. Available from: [http://www.planalto.gov.br/ccivil\\_03/\\_Ato2011-2014/2011/Decreto/D7611.htm](http://www.planalto.gov.br/ccivil_03/_Ato2011-2014/2011/Decreto/D7611.htm). [Accessed 18 June 2014]. Dispõe sobre a educação especial, o atendimento educacional especializado e dá outras providências.
- Brasil. Parâmetros Curriculares Nacionais: Ensino Médio. *Ministério da Educação*. Brasília, 1999.
- Buxton, B. *Sketching User Experiences: Getting the Design Right and the Right Design*, San Francisco: Morgan Kaufmann Publishers Inc., 2007.
- Cybis, W.; Betiol, A. H. & Faust, Richard. *Ergonomia e Usabilidade : conhecimentos, métodos e aplicações*. São Paulo, SP: Novatec, 2007.
- Lyall, C. & Meagher, L.. Short Guide to Building and Managing Interdisciplinary Research Teams. ISSTI Briefing Note (Number 3) September 2007. Available from: [http://www.issti.ed.ac.uk/\\_\\_data/assets/file/0007/77605/ISSTI\\_Briefing\\_Note\\_3\\_ID\\_teams.pdf](http://www.issti.ed.ac.uk/__data/assets/file/0007/77605/ISSTI_Briefing_Note_3_ID_teams.pdf). [Accessed: 18 June 2014].
- Liotard, J. F.. *O pós-moderno*. 3. ed. Rio de Janeiro: José Olympio Editora, 1988.
- Madariaga, A.; & Rubio, I. Videojuegos y discapacidad. El reto de la inclusión. In: *MADRID. Ministerio de Sanidad, Servicios Sociales e Igualdad. Secretaría de Estado de Servicios Sociales e Igualdad. Instituto de Mayores y Servicios Sociales. Buenas prácticas de accesibilidad en videojuegos*. Madrid: IMSERSO, 2012.
- Microsoft Kinect. *Microsoft Corporation*. Available from: <http://www.microsoft.com/en-us/kinectforwindows/>. [Accessed 15 July 2014].
- Soto, J. C. V., Graf, N. B. & Bravo, H. G. . Profile of multidisciplinary groups and collaborative styles in interdisciplinary research. INTE 2013 Proceedings Book Volume 2. Rome / ITALY. Available from: <http://www.int-e.net/publications/inte2013v2>. [Accessed 18 June 2014].
- Rocha, H. V. R.; Baranauskas, M. C. C. *Design e avaliação de interfaces humano-computador*. Escola da Computação 2000. São Paulo; IME-USP, 2000.
- The Center of Universal Design. About the Center: Ronald L. Mace. Available from: [http://www.ncsu.edu/ncsu/design/cud/about\\_us/ronmace.htm](http://www.ncsu.edu/ncsu/design/cud/about_us/ronmace.htm). [Accessed 05 May 2014].

# Exploring the effect of backwash in first year medical students and comparison with their academic performances

Afshan Sumera<sup>a</sup>, Ankur Barua<sup>a</sup>, Amutha Navamoney<sup>a</sup>

Faculty of Medicine, International Medical University, Jalan Jalil Perkasa-19, Bukit Jalil, Kuala Lumpur 57000, Malaysia

---

## Abstract

Assessment is an important aspect of learning and teaching which enables students to progress to either higher grades of studies or seek for employment, it also helps the teachers to assess the effectiveness of their teaching methodology. Several academicians have emphasized that assessment has strong impact on all aspects of learning. According to Buck, Backwash is influence of examination on learning.

We explored presence of backwash effect by questionnaire, rated on 6 point Likert scale with 10 items, in first year medical students and compared with their academic performances.

The first year medical students were surveyed by newly developed and validated backwash questionnaire (BAQ) in this study. The questionnaire was based on qualitative studies on backwash effect. All students were categorised into three groups based on their previous exam scores. High achievers were defined as having cGPA of > 3.5, medium achievers with cGPA ranges between 3.5 to 3.0 and low low achievers of cGPA < 3.0. All three groups were evaluated for the presence of backwash.

The first year MBBS students (n=81) from a designated private medical university in Malaysia participated in this study. The male: female ratio was 1:1. High achievers were 39.5% (32/81), medium achievers 48.1% (39/81) and low achievers were 12.3% (10/81). Backwash was present in 46% (38/81), highest in medium achievers 50% (19/38), followed by high achievers 39% (15/38), low achievers 10.5% (4/38).

These results suggest that medium achievers are more prone to adopt learning strategies with the aim to pass assessments only. However, it is also interesting observation that high achievers also tend to have backwash. As far as low achievers are concerned, they have less backwash effect as observed in this study. The presence of negative effect of Backwash in high & medium achievers, suggests that assessment exert great impact on learning of medical students. To take the maximum benefits out of assessment, there is need to improve learning by adopting new strategies and improvements in teaching learning activities.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* Backwash; medical education; medical students; washback

---

## 1. Background

Assessment is commonly referred as a measuring yard of learning and teaching activities. Assessment or academic performance enables students either to achieve higher grades of studies or seek employment. The teachers often asses the effectiveness of their teaching methodology by the pass grades of students. According to Alderson and Wall (1993) assessment is indeed a powerful determiner of what had transpired within a classroom. The term “backwash” denotes either negative or positive effects of assessment on learning and teaching activities (Buck, G. 1988). There is dearth of studies on backwash among medical and health care students, as backwash was used largely in language studies. Dina, T. (2011) had reported that high-stakes examinations (even though they are powerful) might not be the only key factor influencing profound changes in an education context. The study also found that factors such as faculty members, study materials, parents and educational environment equally had important roles to play in promoting backwash. Several studies reiterates the complexity of investigating backwash effects that can be found both inside and outside the classroom context

and that assessment has strong impact on all aspects of learning (Alderson C, 1993, Andrews S, 2004). Other researches defines (i) backwash as the effects of testing on learning and teaching (Hughes, 1989), (ii) an unexpected side-effects of assessment and not to the planned effects when the primary focus of the examination is to regulate the curricula (Spolsky B, 1994) and (iii) Backwash alludes to the way that testing controls not just the educational program of a course, this impact is seen working in a retrograde bearing, subsequently the expression, "washback" is also used as synonym for backwash (Biggs, 1995). Djuric, M (2008) found that washback is presented as a change agent that used as bridge for efficient communication between educator and assessor. Backwash acts differently in different educational contexts as it can infer positively and negatively on the stakeholders (Shohamy E, 1996, Ching Y, 2009). The summarised positive backwash effects are it (i) induces teachers to complete the syllabus within the stipulated time, (ii) motivates learners to work harder to accomplish goals and thus augment learning (iii) helps in the complete utilisation of designed learning-teaching activities within designated span of time. The negative backwash are (i) encourages teachers to focus only on completing the curriculum and preparing students for examination, (ii) instils anxiety among teachers and students and pose a hindrance to their performance, (iii) instead learning for knowledge that can be applied in situations, students often learn discrete points for the purpose of examination, (iv) cramming often leading learners to have a undesirable backwash toward examination and changing their motivation for learning accordingly (Ching Y, 2009).

As there were not many or no research done on backwash effects among medical and health sciences student, this study aimed to explore the presence of backwash effect in medical students and compared the results with their previous academic performances. The research would like to determine the magnitude of backwash effects (both positive and negative) and study the relationship between backwash and academic performances.

## 2. Methodology

A cross sectional pilot study was conducted among the first year medical students at renowned private medical University in Malaysia. Both semester 1 and semester 2 students were invited to participate in this study. Both cohort from semester 1 and 2 consisted approximately 427 students. There were 81 out of 427 students who had voluntarily participated in this study.

The study adopted quantitative data collection method. A structured questionnaire named as **Backwash Assessment Questionnaire** (BAQ) was developed based on extensive literature reviews. This was used as an assessment tool to measure the presence and absence of backwash effects. An initial 15-item based questionnaire was designed, rated on 6-point Likert scale which was then reduced to 10 items based on pilot study results. This questionnaire had gone expert validation under a group of senior faculty members from medical education and community medicine disciplines. The data collected through the BAQ was compared with students' previous academic performances. All students were categorised into three groups based on their previous examination scores. High achievers were defined as having cGPA of > 3.5, medium achievers with cGPA ranges between 3.5 to 3.0 and low achievers of cGPA < 3.0. All three groups were evaluated for presence of backwash.

The data collected were analysed by using the statistical package for social sciences (SPSS) version 17.0 for windows. The categorical variables were expressed in terms of proportions in descriptive analysis. Chi-square test and odds ratio were used for comparison purposes. In this study, a p-value <0.05 was considered as statistically significant.

## 3. Results

The first year MBBS students (n=81) from private medical university in Malaysia participated in this study. The male: female ratio was 1:1. High achievers were 39.5% (32/81), medium achievers 48.1% (39/81) and low achievers were 12.3% (10/81). Backwash was present in 46% (38/81), highest in medium achievers 50% (19/38), followed by high achievers 39% (15/38), low achievers 10.5% (4/38). (Table 1) We also clubbed groups for analysis. Visibly there was prominent difference in values but statistically it was not found to be significant might be because of low sample size. (Table 2)

Table 1. Socio-demographic Profile of Respondents.

Socio-demographic Factors	Backwash Present (N=38) n <sub>1</sub> (%)	Backwash Absent (N=43) n <sub>2</sub> (%)	Total Surveyed (N= 81) n(%)
---------------------------	--	---	-----------------------------------

Gender			
Male	22(53.6)	19(46.3)	41(50.6)
Female	16(40.0)	24(60.0)	40(50.4)
Ethnicity			
Malay	4(30.7)	9(69.2)	13(16.0)
Chinese	24(48.0)	26(52.0)	50(61.7)
Indian	8(61.5)	5(38.4)	13(16.0)
Others	2(40.0)	3(60.0)	5(6.1)
Semester			
One	09(39.1)	15(65.2)	23(28.3)
Two	29(50.8)	28(49.1)	57(70.3)
Type of Learner			
Surface	6(35.3)	11(64.7)	17(21.0)
Strategic / Deep	32(50.0)	32(50.0)	64(79.0)
Academic Performance			
High achiever	15(46.8)	17(53.1)	32(39.5)
Medium achiever	19(48.7)	20(51.2)	39(48.1)
Low achiever	04(40.0)	06(60.0)	10(12.3)

Table 2. Correlates of Backwash.

Socio-demographic Factors	Backwash Present (N=38) n <sub>1</sub> (%)	Backwash Absent (N=43) n <sub>2</sub> (%)	Chi-square	OR	95% CI	p-value
Gender						
Male	22(53.7)	19(46.3)	1.517	1.737	0.719-4.193	0.218
Female	16(40.0)	24(60.0)				
Ethnicity						
Chinese	24(48.0)	26(52.0)	0.062	1.121	0.456-2.754	0.803
Non-Chinese (Malay / Indian / Others)	14(45.2)	17(54.8)				
Semester						



One	9(39.1)	14(60.9)	0.907	0.621	0.232-1.663	0.341
Two	29(50.9)	28(49.1)				
Type of Learner						
Surface	6(35.3)	11(64.7)	1.166	0.545	0.180-1.653	0.280
Strategic / Deep	32(50.0)	32(50.0)				
Academic Performance						
Low / Middle Achiever	12(41.4)	17(58.6)	0.556	0.706	0.282-1.767	0.456
High achiever	26(50.0)	26(50.0)				

\* Here, p-value <0.05 was considered as statistically significant

#### 4. Discussion and conclusions

McEwen (1995) had observed that students tend to read and learn only for passing or obtaining good grades in summative examinations. There are several factors that can exert negative effects of backwash. The teachers often intentionally or unintentionally play a significant role in nurturing different types of backwash. The fear of failure promotes backwash in students at risk to avoid repetition of modules or semesters. The students are at risk when they adopt learning tactics to cover only those important parts of syllabus which will be covered in examination. Thus, the backwash effects do not help the students to improve their knowledge. It forces them to adopt surface learning approaches (Biggs, 2007, Marton P, 1976). Quality education everywhere in world has become very expensive. The high cost of course can also influence students to find out some shortcut to pass evaluations. When a large syllabus needs to be covered during a particular module, it can result in less time available to cover the course efficiently and meaningfully (Francois J, 2010).

The results from this study show that medium achievers usually involve more in superficial and strategic learning, which may include covering important topics in a view to pass the assessments. However, high achievers also had some degree of backwash in order to obtain high grades with detailed coverage of course.

Though backwash discourages deep learning but good assessment strategies can motivate teachers as well as learners to accomplish their teaching and learning targets (Alderson C, 1993). Good assessment tests can be employed and planned as beneficial activities so as to reassure a positive teaching-learning process (Pearson L. 1988). Davies (1985) stated that a creative and innovative testing instrument is helpful in learning and teaching outcomes and experiences.

New concepts or new curricula can be introduced by authorities using high-stakes testing to accomplish the goals of teaching and learning (Alderson C, 1993, Shohamy E, 1996, Cheng L, 2005). Assessment is important to promote the lifelong learning and encourage learners to engage more in deep learning. Backwash positively can exert increased learning to motivate students and teachers achieve syllabi contents thoroughly within designated time.

#### 5. Recommendations

To take the maximum advantages of backwash effect, there is need to improve teaching learning activities by adopting new strategies or design better tools to assess skills and knowledge in undergraduate medical curriculum.

#### References

- Alderson C, D. Wall, Does washback exist? *Applied Linguistics*, 14 (1993) 115.  
 Buck, G. (1988) Testing listening comprehension in Japanese university entrance examinations. *JALT Journal* 10, 15-42.  
 Dina, T. (2011). Washback of a high-stakes English exam on teachers' perceptions and practices. *Selected Papers from the*

- 19th International Symposium on Theoretical & Applied Linguistics. Extracted on 02/02/2014 from [http://www.enl.auth.gr/symposium19/19thpapers/042\\_tsagari.pdf](http://www.enl.auth.gr/symposium19/19thpapers/042_tsagari.pdf)
- Andrews, S. (2004). Washback and Curriculum Innovation. *Washback in Language Testing: Research Context and Methods*. L. Cheng, Y. Watanabe and A. Curtis. Mahwah, New Jersey, Lawrence Erlbaum Associates, Inc.: 37-52
- Hughes, A. (1989). *Testing for language teachers*. New York: Cambridge University Press.
- Spolsky B, The examination of classroom backwash cycle: Some historical cases, in Nunan, D, Berry, V and Berry, R. (Eds) *Bringing about change in language education*, University of Hong Kong, Dept. of Curriculum Studies, Hong Kong, 1994.
- Biggs J.B, Assumptions underlying new approaches to assessment, *Curriculum Forum*, 4 (1995)
- Djuric, M. (2008) Dealing with situation of positive and negative washback. *Scripta Monent* 4 (1) 14-27
- Shohamy, E., Dontisa-Schmidt, S., and Ferman, I. (1996) Test impact revisited: Washback effect over time. *Language Testing* 13(3), 298-317
- Ching Yi Pan (2009) A review of washback and its pedagogical implications, *VNU Journal of Science, Foreign Languages* 25, p 257-263
- McEwen Nelly. (1995) Educational Accountability in Alberta *Canadian Journal of Education* 20(1) 27-44.
- Biggs, J., & Tang, C. (2007). *Teaching for quality learning at university: What the student does* (3rd ed.). Maidenhead, Berkshire: Open University Press.
- Marton, P. and Säljö, R. (1976) *Student Approaches to Learning and Studying*. Melbourne: Australian Council for educational Research On qualitative differences in learning, I: Outcome and process. *British Journal of Educational Psychology*, 46, 4-11.)
- Francois J. Cilliers, Lambert W. Schuwirth, Hanelie J. Adendorff, Nicoline Herman, Cees P. van der Vleuten (2010) The mechanism of impact of summative assessment on medical students' learning *Adv in Health Sci Educ* 15:695-715.
- Pearson L, Tests as levers of change (or "putting first things first"). In D. Chamberlain & R. Baumgartner (Eds.), *ESP in the classroom: Practice and evaluation* ELT Documents #128, (pp. 98-107), Modern English Publication in association with the British Council, London, 1988.
- L. Cheng, *Changing Language Teaching Through Language Testing: A Washback Study*, Cambridge University Press, Cambridge, 2005

# Fabrication of the kinect remote-controlled cars and planning of the motion interaction courses

Ke-Yu Lee<sup>a</sup> , Jhih-Sian Jheng<sup>a</sup> , Shiang-Chih Chen<sup>a</sup> , Shi-Jer Lou<sup>b</sup>83

<sup>a</sup>Associate Professor, Department of Computer Science and Information Engineering, Cheng Shiu University, Taiwan

<sup>b</sup>Professor, Graduate Institute of Technological and Vocational Education, National Pingtung University of Science and Technology, Taiwan

---

## Abstract

This paper describes the fabrication of Kinect remote-controlled cars, using PC, Kinect sensor, interface control circuit, embedded controller, and brake device, as well as the planning of motion interaction courses. The Kinect sensor first detects the body movement of the user, and converts it into control commands. Then, the PC sends the commands to Arduino control panel via XBee wireless communication modules. The interface circuit is used to control movement and direction of motors, including forward and backward, left and right. In order to develop the content of Kinect motion interaction courses, this study conducted literature review to understand the curriculum contents, and invited experts for interviews to collect data on learning background, teaching contents and unit contents. Based on the data, the teaching units and outlines are developed for reference of curriculums.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* Kinect, motion, interaction, embedded control, remote controlled cars

---

## Introduction

After Microsoft launched Kinect gesture sensors and the SDK, the Kinect motion technology has been combined with PC to apply new man-machine interface to daily life field, such as education, medical care, entertainment, sports, demonstrations and many other innovated applications. In most past applications, virtual objects in software are operated by Kinect gesture controllers via gesture action, such as roles of body controlled video games. In recent years, applications of control hardware in Kinect gesture technology have increased. The Kinect remote controlled car discussed in this paper is an application example.

Kinect remote controlled cars are derived from commercial remote toy cars. In the car body, Arduino control panel and interface control circuits are installed to control rotating direction of front and back motors of the car (Chang, Chen, & Hung, 2011). XBee wireless communication modules are installed to receive control signals from PC terminal. In combination with PC, Kinect gesture controller, XBee wireless communication modules, Arduino control panel and interface circuits, Kinect gesture sensors can extract skeleton information to fulfill movement and direction of the toy car, forward, backward, left and right.

In the future, many industries will need many tech talents who are familiar with the gesture control technology. We also plan teaching contents of the motion interaction, and provide reference for the relevant curriculums.

## Implementation of Kinect remote control car system

Action of Kinect remote controlled cars is to use Kinect sensors to detect motion information, and convert it into control commands. Next, the computers send commands to Arduino control panel via XBee wireless communication modules. Next, the interface circuit drives motors for direction control. The hardware

---

\* Corresponding author. Tel.: +886-8-770-3202

E-mail address: lou@mail.npust.edu.tw

architecture of the Kinect remote controlled car is shown in Figure 1: comprising PC, Kinect sensor, XBee Explorer, XBee wireless communication module, Arduino control panel, interface circuit and actuating device (motor), and the description is as follows:

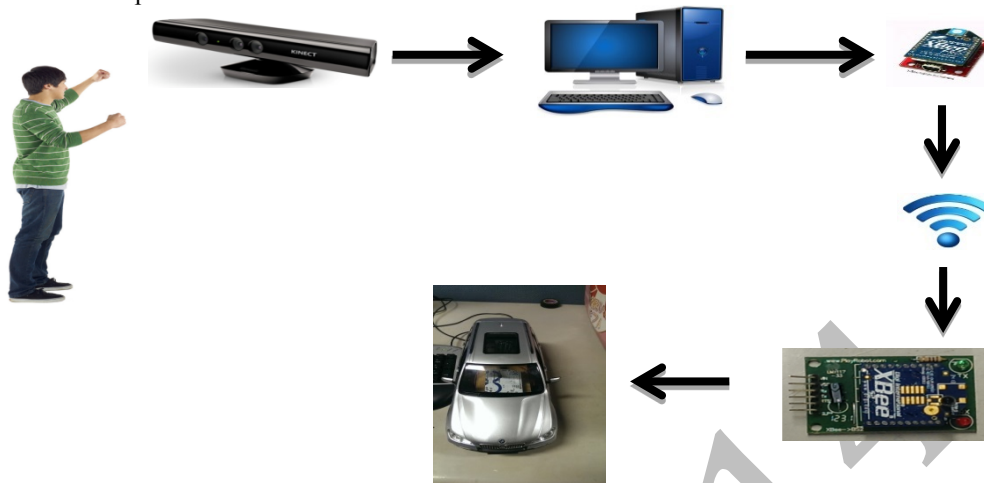


Fig. 1. System architecture of Kinect remote controlled cars

### *Kinect sensors*

As shown in Figure 2, the Kinect sensor consists of three camera lenses, and in the middle there are common RGC color camera lens which can be used to identify identification or facial expression features of users. It can be also applied to augmented reality game and video calls; the left and right camera lenses are 3D depth sensor consisting of infrared transmitter and infrared CMOS camera (Filipe, Fernandes, Fernandes, Sousa, & Paredes, 2012). Kinect mainly uses 3D depth sensor to detect user motion. Kinect has the tracking function where the motor base can rotate with movement of focusing (Dutta, 2012). In addition, Kinect also has built-in array microphone system consisting of four microphones, provides noise function, and eliminates noise after radio comparison.

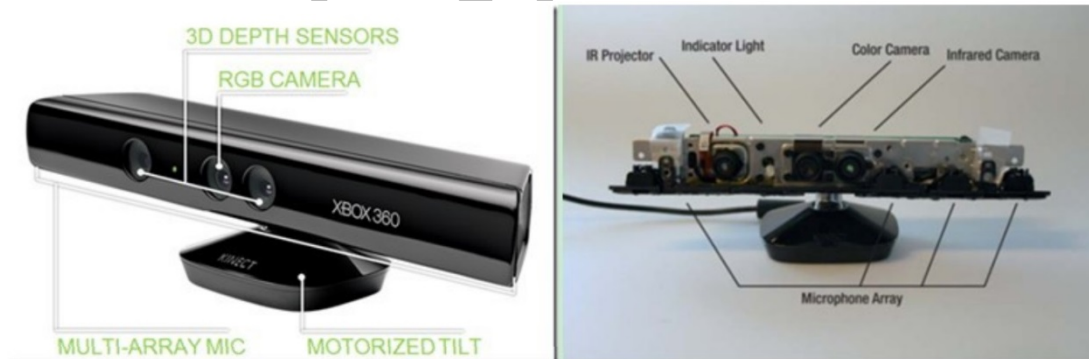


Fig. 2. Kinect Sensor

### *Arduino control panel*

Arduino is an open microcomputer control panel. Due to low price, easy-to-use software development tool and rich network resources attract many engineers and interactive designers to design various novel and interesting interactive devices. Arduino UNO control panel is installed in Kinect remote controlled car (Nghiem, Auvinet, & Meunier, 2012). Eight-digit ATMEGA328 micro-controller is used as core, which provides 14-digit I/O terminal and 6 comparison I/O terminals, and supports USB data transmission. The users can connect different electronic devices on digit I/O terminal.

## XBee wireless communication module

XBee is wireless communication module of Digi firm based on IEEE 802.15.4, with working voltage of 3V. During use, X-CTU software must be performed to set XBee module parameters (Raheja, Chaudhary, & Singal, 2011). The point-to-point data transmission is used between PC and the Kinect remote controlled car. The parameter setting is shown in the Figure 3. The set Id of Xbee module of transfer terminal and receiving terminal is the same, and the baud rate is set to 9600bps. DOUT pin of XBee module on the Kinect remote controlled car is connected to RX pin of Arduino, and DIN connects TX pin. After detection of control gesture of users, Kinect sensor converts it into control command through programs. XBee wireless communication module of PC terminal sends the control command to XBee wireless receiver module connected to the Arduino control panel. At last, Arduino control panel drives the motor of the toy car according to the received control command to fulfill the action.

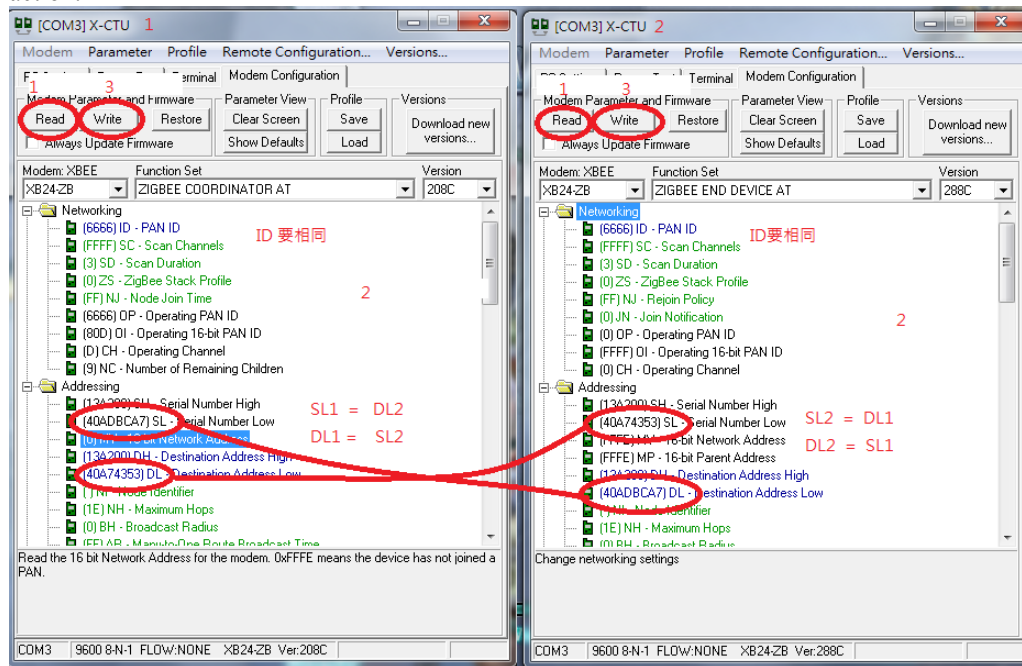


Fig. 3. Setting of Xbee parameters using X-CTU

## Interface circuit

The interface circuit core is L293D control core in which two H-Bridge circuits are arranged for control of rotation direction of front and rear DC motors (Xia, Chen, & Aggarwal, 2011). The power supply shall separate MCU from motor to prevent instability of circuit work.

## Kinect motion control process

Kinect application program can set Kinect sensor parameters through NUI Library, and extract sensor information, including: colored image information, depth image information and audio information (Fratì & Prattichizzo, 2011), as shown in Figure 4.

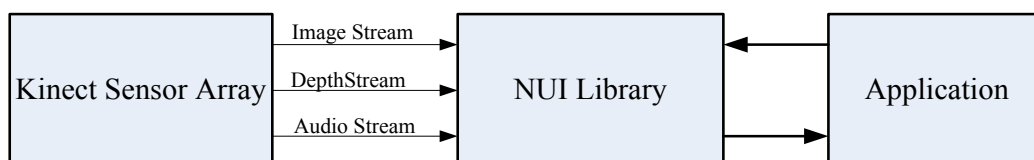


Fig. 4. Interaction of application program with Kinect device via NUI library

The control programs of remote controlled car are based on C# language. C# is an Object Oriented High-Level Computer Language launched by Microsoft based on (Yen, Suma, Newman, Rizzo, & Bolas, 2011). NET frame. The control programs define human skeleton nodes by the Kinect sensor as control command of remote controlled cars through Kinect sensors for direction control of remote controlled cars (Norman, Dale, & Bret, 2011). The control actions of the remote controlled cars are summarized in the following table:

Table 1. The control actions of the remote controlled cars.

Gesture	Action of remote controlled cars
Lift left hand	Forward
Lift right hand	Backward
Extend right hand horizontally	Turn right
Extend left hand horizontally	Turn left
Put down your hands	Stop

## Course planning

As interactive motion technologies are applied and needs of talents increase, most of universities and technical colleges lack the curriculum planning based on Kinect interactive motion technology. Thus, we conducted expert interview survey to collect learning background, textbook contents and units of the curriculums, and formulated the course units and syllabus based on the collected data. The course is experiment teaching. The course contents can be divided into theory and experiment, which can be described as follows:

*Theory: introduce Kinect sensor, embedded microprocessors, and basic architecture and principle of C# language.*

*Experiment: The experiment includes:*

Control the tilt angle of Kinect base: use a simple method to connect application programs with Kinect sensor, and change Kinect sensor tilt angle through Kinect SDK standard library.

Audio signal processing: identify and record the audio locations, voice recognition and voice synthesis.

Colored image signal processing: learn color image stream processing and application.

Depth stream processing: understand format and application of depth stream.

Apply skeleton tracking function: obtain human skeleton coordinate information, and send the skeleton information to the application programs for advanced application.

Serial communications for PC and embedded controllers: PC connects embedded controller through USB port.

After conversion, it is connected with the two I/O PINs which is used as signal transfer pin (Tx) and receiver pin (Rx) to achieve serial communications.

Switch ON/OFF light: Kinect voice recognition function is combined with embedded controller to control light switch.

LED light display control via gesture: It is divided into different gestures. Kinect sensor detects movement positions of users' arms, calculates spatial coordinates and controls several LED light display.

Hand gesture controls rotation and rotating speed of motors: Different gestures are used to sense Kinect sensor to send human skeleton information to control rotation direction and speed of motors.

Gesture remotely controlled toy cars: Kinect sensor uses different gestures for direction of remote controlled toy cars.

#### 4. Conclusion

Application and development of Kinect motion technology have been gradually penetrated into daily life, and have better perspective. The interactive course design and Kinect remote controlled cars can make students learn structure and working principle of Kinect sensors, PC control program design, signal transmission, interface circuit design, and embedded controller design technology to train students' abilities of integrating systems, and train professional talents who are familiar with Kinect motion control.

#### References

- Chang, Y. J., Chen, S. F., & Huang, J. D. (2011). A Kinect-based system for physical rehabilitation: A pilot study for young adults with motor disabilities. *Research in Developmental Disabilities*, 2566 – 2570.
- Filipe, V., Fernandes, F., Fernandes, H., Sousa, A., & Paredes, H. (2012). Blind navigation support system based on Microsoft Kinect. *Procedia Computer Science*, 14, 94 – 101.
- Dutta, T. (2012). Evaluation of the Kinect sensor for 3-D kinematic measurement in the workplace. *Applied Ergonomics*, 43, 645 – 649.
- Nghiem, A. T., Auvinet, E., & Meunier, J. (2012). Head detection using Kinect camera and its application to fall detection. The 11th International Conference on Information Science. 164 – 169.
- Raheja, J. L., Chaudhary, A., & Singal, K. (2011). Tracking of fingertips and centres of Palm using Kinect. Third International Conference on Computational Intelligence, Modelling & Simulation. 248 – 252.
- Xia, L., Chen, C. C., & Aggarwal, J. K. (2011). Human detection using depth information by Kinect. IEEE Computer Society Conference on Computer Vision and Pattern Recognition Workshops (CVPRW). 15 – 22.
- Fрати, V., & Prattichizzo, D. (2011). Using Kinect for hand tracking and rendering in wearable haptics. IEEE World Haptics Conference (WHC). 317 – 321.
- Yen, C., Suma, E., Newman, B., Rizzo, a. s., & Bolas, M. (2011). Development and evaluation of low cost game-based balance rehabilitation tool using the microsoft kinect sensor. Annual International Conference of the IEEE Engineering in Medicine and Biology Society. 1831 – 1834.
- Norman, V., Dale, R., & Bret, S. (2011). Teaching natural user interaction using OpenNI and the Microsoft Kinect sensor. Proceedings of the 2011 conference on Information technology education. 227 – 232.

# Factors affecting creative problem solving in the blended learning environment: a review of the literature

Samoe kan Sophonhiranraka\*, Praweenya Suwannatthachoteb,  
Sungworn Ngudgratokec

<sup>a</sup>Ph.D. Candidate<sup>b</sup> Assistant Professor<sup>c</sup> Lecturer

<sup>a,b</sup>Faculty of Education, Chulalongkorn University, 254 Payathai, Wangmai, Patumwan, Bangkok 10330 THAILAND,

<sup>c</sup>Faculty of Education, Sukhothai Thammathirat Open University, Muang Thong Thani, Chaengwattana Rd., Bangpood, Pakkret, Nonthaburi 11120 THAILAND

---

## Abstract

The aim of this study was to investigate factors affecting creative problem solving in a blended learning environment from the selected papers. The content analysis was used for analysing 20 research studies. The study revealed that 1) understanding the challenges, 2) generating ideas, 3) preparing for action, 4) planning own approach were main factors in creative problem solving process; and 1) learning activities, 2) learning resources, 3) feedback, 4) learning interaction, and 5) evaluation were five main factors in blended learning environment. Nine factors were proposed as a framework to design blended learning to enhance creative problem solving performance.

[Click here and insert your abstract text.](#)

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords: creative problem solving; blended learning; creative problem solving performance*

---

## Introduction

At present, an ability to solve problems creatively is one key performance (Trilling & Fadel, 2009) because new problems happen everyday. A problem solving skill consists of convergent and divergent thinking for creating the solutions (Newman, 1995). Besides, the skill involves causal reasoning, structure, and system knowledge (Jonassen, 2004). It is promoted by creative problem solving (CPS) process that has been refined for more than 60 years by many researchers. Alex Osborn (1957) first presented seven steps in CPS process, namely orientation, preparation, analysis, hypothesis, incubation, synthesis, and verification. Isaksen, Treffinger, and Firestien (1982) turned Osborn's CPS process into a linear form. The process went through several changes and as for the current model, Isaksen, Treffinger, and Firestien (1982) proposed CPS V6.1 which includes 4 main components and 8 detailed steps. This version has been applied and tested in education contexts and has been demonstrated in traditional classroom, blended, and online learning contexts.

As a result of technology revolution, technology has brought about changes in education. A great number of universities have transformed traditional undergraduate classroom into online and blended learning environment (Allen, Seaman, & Garrett, 2007). With the application of CPS and technology in education, the instructors have used diverse tools (e.g. e-mail, discussion board, chat room, social network, and others) and several techniques (e.g. brainstorming, reflection, wh-question, synectics, and others) to develop learners' ability to solve problems creatively (Treffinger et al., 2003; Proctor, 2010). Although CPS process has been studied, their results did not show the specific CPS factors that affect creative problem solving performance in blended learning context. Consequently, the aim of this study is to examine the factors affecting CPS in blended learning environment for finding the important factors to design and monitor learning context.



Creative problem solving (CPS) is the association between problem solving process and creative thinking (Kirton, 2003). CPS was developed in 1952 by Osborn (1957) who presented 7 processes of CPS which were 1) orientation 2) preparation 3) analysis 4) hypothesis 5) incubation 6) synthesis and 7) verification. Many researchers used CPS Osborn version for developing creative thinking or other abilities (Kuo, Chen, & Hwang, 2014; Buisine, Besacier, Aoussat, & Vernier, 2012; Chant, Moes, & Ross, 2009). As a result, CPS process has been improved many times and adapted to various educational contexts. CPS process that was modified by Isaksen, Dorval, and Treffinger is the latest version (CPS V6.1) of the CPS process (Treffinger et al., 2003). This version was tested in many research studies which focused on developing creative thinking, improving problem solving abilities, or enhancing divergent thinking in various student levels (Tseng et al., 2013; Vidal, 2010; Chen & Cheng, 2009). The latest CPS process consisted of 4 main steps and 8 minor steps which were 1) understanding the challenge: constructing opportunities, exploring data, and framing problems 2) generating ideas: generating ideas 3) preparing for action: developing solutions and building acceptance and 4) planning your approach: appraising tasks and designing process (Treffinger et al., 2003).

#### *Blended learning environment*

Within the last decade, the most interesting instruction was blended learning (BL), a combination between face to face (F2F) and online teaching (Allan, 2007; Horton, 2006; Roger, 2007; Voos, 2003). In a blended learning context, instructors determine learning objectives, assign learning tasks, interact with students, give feedback, and evaluate students' achievement (Alshwiah, 2009). However, instructors or instructional designers should understand the learning context and use designing steps which were 1) analyzing learner characteristics, learning objectives, and learning environments, 2) designing activities and resources, and 3) assessing instruction (Huang, Ma, & Zhang, 2008). In addition to being a facilitator, instructors should enhance their learners by considering learners' styles and providing course guidance, learning activities, interaction, and feedback (Liang and Creasy, 2004). Previous studies have demonstrated factors in blended learning as follows. First, learning activities consist of giving assignments, identifying learning objectives, and determining learners to participate in courses (Allan, 2007; Alshwiah, 2009; Chen & Cheng, 2009; Huang et al., 2008; Kashefi et al., 2011; Kirk & Pitches, 2013; Lee, 2010; Orhan, 2008; Zhao & Yuan, 2010). Second, learning resources are the documents or media that are presented in hard copy or electronic types (Allan, 2007; Alshwiah, 2009; Chen & Cheng, 2009; Huang et al., 2008; Kashefi et al., 2011; Lee, 2010; Orhan, 2008; Zhao & Yuan, 2010). Third, feedback is the comment from instructors for improving learners' products through online context (Bach, Haynes, & Smith, 2007; Huang et al., 2008; Lee, 2010; Orhan, 2008; Zhao & Yuan, 2010). Fourth, interactions include a learner-instructor interaction and learner-learner interaction which were the discussion session for brainstorming, sharing knowledge through online tools such as e-mail, chat room, or discussion board (Allan, 2007; Alshwiah, 2009; Bache et al., 2007; Huang et al., 2008; Kashefi et al., 2011; Kirk & Pitches, 2013; Lee, 2010; Orhan, 2008; Zhao & Yuan, 2010). Fifth, evaluation is the process that instructors measure and assess their learners' achievement by examining learners' works, projects, portfolio, or participation (Alshwiah, 2009; Bach et al., 2007; Chen & Cheng, 2009; Huang et al., 2008; Kirk & Pitches, 2013; Lee, 2010; Orhan, 2008; Stacey & Gerbic, 2007; Zhao & Yuan, 2010).

#### **Research methodology**

The literature search was conducted through the following databases: Elsevier, Wiley, ERIC, Taylor and Francis, and Springer. The key search terms were *creative problem solving*, *blended learning*, and *online learning*. We focused on the studies published between 2004 and February 2014. The search yielded over 110 research studies on CPS. Thus, we applied the following criteria to narrow down the search:

1. Studies were conducted with undergraduate studies in a university or employees in an organization.
2. Studies applied CPS process.
3. Studies involved online or traditional classroom and blended learning.

In total, there were 20 research studies that matched our selection criteria. These studies were then analyzed for the CPS and blended learning environment factors that affected the creative problem solving performance.

We coded the research studies for the following categories: researchers and year of publication, objective, samples, methodologies, treatment, and finding. In addition to these categories, the findings from research results and treatment in our pool of research studies were analyzed and compared (see Table 1) for considering and structuring the effective factors (see Figure 1).

## 4. Results

### 4.1 Characteristics

Most studies in our body of literatures were experimental (n=16) while the rest was a combination of qualitative research (n=2), factor analysis (n=1), and survey (n=1). In addition, most studies (n=6) were published in 2013; the rest was published between 2014 (n=2), 2012 (n=2), 2011 (n=4), 2010 (n=4), and 2009 (n=2). Slightly more than half of the papers (n=11) focused on improving learners' performance while seven studies tested factors that promoted specific thinking skills (i.e., ideas generating, ideas evaluation, and creative thinking).

### 4.2 Factors promoting CPS

The data from research studies showed that students' performance could be improved by applying CPS process (Chen & Cheng, 2009; Kuo et al., 2014; Tseng et al., 2013; Vidal, 2010) by brainstorming, reflecting thinking, and constructing concept maps (Tseng et al., 2013). We uncovered nine factors that could effectively promote CPS in online/blended classroom. These factors were expected that they affected creative problem solving abilities, which were important performances of finding the appropriate solution in works or daily life problem. Consequently, we summarized nine factors and presented them in the cross checking table (see Table 1).

As can be seen in Table 1, the CPS process that affected creative problem solving performance in blended learning context consisted of 1) understanding the challenge, 2) generating ideas, 3) preparing for action, 4) planning your approach, 5) learning activities, 6) learning resources, 7) feedback, 8) interaction, and 9) evaluation. Of the nine factors, the first four are CPS process whereas the rest belongs to blended learning. To prove whether these indicators could increase creative problem solving performance, instructors should utilize an assessment tool for evaluating creative problem solving performance in blended learning context. According to creative problem solving performance evaluation, we chose the creative solution diagnosis scale (CSDS) purposively due to the assessment criteria attributes that identified the solution in indicators (Cropley & Kaufman, 2012). Consequently, these factors could be structured as the CPS in blended learning context model (see figure 1).

Table 1 Indicator of CPS in blended learning environment

Indicators	Hentenryck & coffrin (2014)	Kuo, et al. (2014)	Barrett et al. (2013)	Jaskari (2013)	Morral, et al. (2013)	Peterson et al. (2013)	Ray & Romano (2013)	Tseng et al. (2013)	Buisine et al. (2012)	Deminger et al. (2012)	Griffin (2011)	Kashefi et al. (2011)	Nakagawa (2011)	Williamson (2011)	Eubanks et al. (2010)	Larach & Cabra (2010)	Byrne et al. (2010)	Vidal (2010)	Chen & Cheng (2009)	Chant et al. (2009)
1. Understanding the challenge	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
2. Generating ideas	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Indicators	Hentenryck & coffrin (2014)	Kuo, et al. (2014)	Barrett et al. (2013)	Jaskari (2013)	Morral, et al. (2013)	Peterson et al. (2013)	Ray & Romano (2013)	Tseng et al. (2013)	Buisine et al. (2012)	Deiningger et al. (2012)	Griffin (2011)	Kashefi et al. (2011)	Nakagawa (2011)	Williamson (2011)	Eubanks et al. (2010)	Larach & Cabra (2010)	Byrne et al. (2010)	Vidal (2010)	Chen & Cheng (2009)	Chant et al. (2009)
3. Preparing for action	•		•	•		•	•					•	•	•	•	•	•	•	•	•
4. Planning your approach	•		•	•		•	•					•	•	•	•	•	•	•	•	•
5. Learning activities	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
6. Learning resources	•	•	•	•		•	•	•	•			•	•	•	•	•	•	•	•	•
7. Feedback	•	•	•	•		•	•	•	•	•		•	•	•	•	•	•	•	•	•
8. Interaction	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•
9.Evaluation	•	•	•	•		•	•	•					•	•	•	•	•	•	•	•

## 5. Conclusion and Discussion

The aim of this study was to examine the CPS factors affecting creative problem solving abilities in blended learning environment. Creative problem solving (CPS) is one of the interesting problem solving types that should be integrated in teaching (Chen & Cheng, 2009). Furthermore, CPS which was developed over 50 years ago could still be applied in the present education because of modification into the situation. Treffinger et al. (2003) proposed the CPS version 6.1—the current iteration of the CPS process—which included 4 main steps and 8 minor steps as follow 1) understanding the challenge: constructing opportunities, exploring data, and framing problems 2) generating ideas: generating ideas 3) preparing for action: developing solutions and building acceptance and 4) planning your approach: appraising tasks and designing process.

While CPS process is one important approach to create various solutions for solving different problems, the online tools play another critical role in instruction because of technology revolution. Many instructors have applied online tools in their classroom. For instance, a discussion board was used to enhance the interaction between learners and instructors anywhere anytime (Kashefi et al., 2011). Although online tools might increase learning performance in classroom, instructors should manage and organize these tools appropriately for improving learners' skills.

It is worth noting that the body of literature in this study has given us useful recommendations for applying CPS in classroom. In the *Understanding the Challenge* step, instructors might organize activities by making their students believe in their creative abilities (Morral et al., 2013) and motivate students to construct the creative ideas (Treffinger et al., 2003). Moreover, instructors should give additional resources (Kashefi et al., 2011) for understanding problems, finding out the goals of solving problem, searching out the relevant information (Treffinger et al., 2003). Meanwhile, generating ideas could be improved by group discussion, brainstorming, reflective thinking, and concept map construction for the novel ideas (Carmeli et al., 2013; Tseng et al., 2013; Ray & Romano, 2013; Kashefi et al., 2011; Chen & Cheng, 2009). Group discussion and brainstorming can be achieved through online tools such as a chat room, discussion board, e-mail, forum, or Second Life (Ray & Romano, 2013; Kashefi et al., 2011; Chen & Cheng, 2009). Given these various and unusual ideas for generating ideas, instructors should give their learners more time to create different ideas (Morral et al., 2013). In the *preparing for action* step, the instructors could give their learners a chance to examine, improve, and validate ideas into the good solution. Afterwards, the instructors should encourage the learners to examine means to make the selected creative ideas effectively (Treffinger et al., 2003). In the *planning your approach* step, the instructors might assign the learners to review and make an overall assessment of the creative solutions, and apply the creative solution practically (Treffinger et al., 2003). According to an assessment of the creative solutions in the *planning you approach* stage, the instructors could apply the online tools such as a discussion board, or polling program for showing ideas, writing the comments, and selecting the quality solution (Ray & Romano, 2013) by examining the benefit of ideas or a wide range of implication of the ideas (Byrne, Shipman,

and Mumford, 2010). In addition, the self-assessment and comparing with the experts might increase the creative solution ideas through giving feedback to learners after they had released their ideas (Tseng et al., 2013).

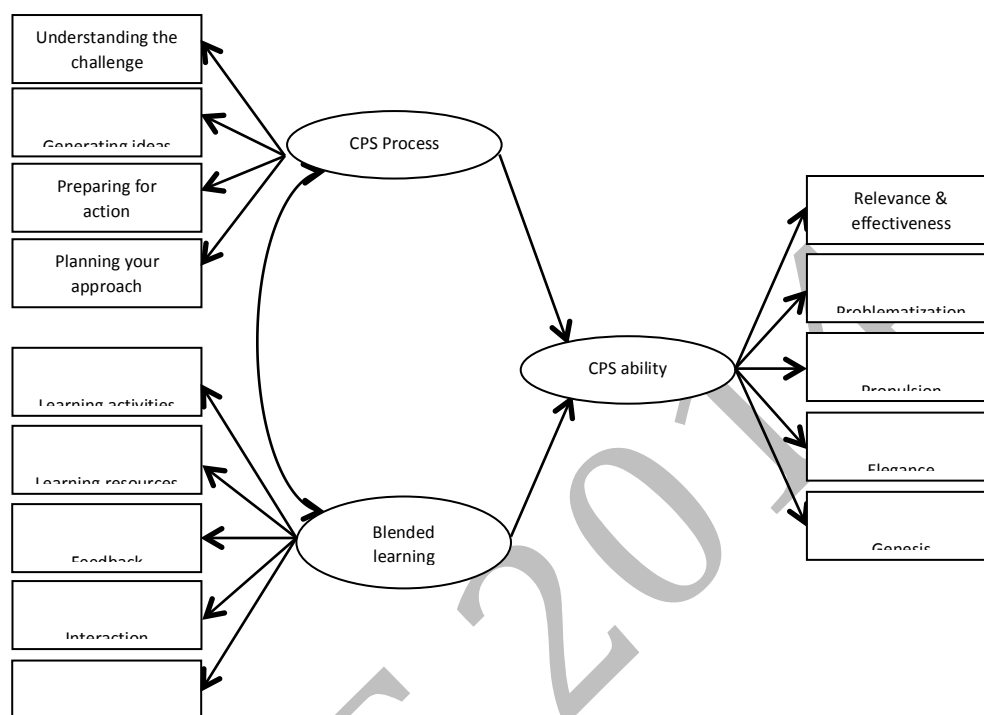


Figure 1 The creative problem solving in blended learning context model

The creative problem solving performance might be improved by examining and generating ideas (Kuo et al., 2014; Jaskari, 2013) through knowledge sharing (Carmeli et al., 2013) which could be organized by online tools such as a discussion board, chat room, voting, or electronic mail (Chen & Cheng, 2009; Nakagawa, 2011; Ray & Romano, 2013; Tseng et al., 2013; Williamson, 2011). In addition, encouragement and providing time for thinking were two factors that could enhance creative problem solving performance (Morral et al., 2013). Although creative problem solving performance could be increased by CPS process, context organization in learning was an important element because both online environment and classroom affected probably creative problem solving performance through tutorials, exercises, assignments, and different examples (Kashefi et al., 2011; Vidal, 2010) which should be the actual problem that learners experience in daily life (Jaskari, 2013; Larach & Cabra, 2010). It might be difficult to present the actual problems or cases a classroom; thus, instructors may opt for virtual world presentation (Larach & Cabra, 2010).

It is worth noting that this study does not demonstrate a causal link between the factors obtained and the creative problem solving performance. Future lines of research should study the effect of CPS in blended learning context on creative problem solving abilities, utilizing structure equation model to verify the specific factors, which might be advantageous to instruction in higher education. Moreover, the qualitative research should be integrated in future research to investigate the empirical learning context that would enhance creative problem solving performance.

## Acknowledgements

The authors wish to gratefully acknowledge the financial support from the Graduate School, Chulalongkorn University, Bangkok, Thailand.

## References

- Allan, B. (2007). *Blended learning: tools for teaching and training*. Great Britain: Cromwell Press.
- Allen, I.E., Seaman, J., and Garrett, R. (2007). *Blending in: the extent and promise of blended education in the United States*. US: The Sloan Consortium (Sloan-C). Retrieved from [http://sloanconsortium.org/publications/survey/pdf/Blending\\_In.pdf](http://sloanconsortium.org/publications/survey/pdf/Blending_In.pdf).
- Alshwiah, A.A.S. (2009). The effects of a blended learning strategy in teaching vocabulary on premedical students' achievement, satisfaction and attitude toward English language. Master's Thesis, Distance Teaching and Training, College of Graduate Studies, Arabian Gulf University.
- Bach, S., Haynes, P., and Lewis-Smith, J. (2007). *Online learning and teaching in higher education*. Berkshire: Open University Press/McGraw-Hill Education.
- Barrett, J.D. and others. (2013). Thinking about applications: effects on mental models and creative problem-solving. *CREATIVITY RESEARCH JOURNAL*, 25, 2, pp. 199-212.
- Buisine, S., Besacier, G., Aoussat, A., and Vernier, F. (2012). How do interactive tabletop systems influence collaboration? *Computers in Human Behavior*, 28, pp. 49-59.
- Byrne, C.L., Shipman, A.S., and Mumford, M.D. (2010). The effects of forecasting on creative problem-solving: an experimental study. *Creativity Research Journal*, 22, 2, pp. 119-138.
- Carmeli, A., Gelbard, R., and Palmon, R.R. (2013). Leadership, creative problem-solving capacity, and importance of knowledge sharing. *Human Resource Management*, 52, 1, pp. 95-122.
- Chant, R.H., Moes, R., and Ross, M. (2009). Curriculum construction and teacher empowerment: supporting invitational education with a creative problem solving model. *Journal of Invitational Theory and Practice*, 15, pp. 55-67.
- Chen, Y.F. and Cheng, K.W. (2009). Integrating computer-supported cooperative learning and creative problem solving into a single teaching strategy. *SOCIAL BEHAVIOR AND PERSONALITY*, 37, 9, pp. 1283 - 1296.
- Cropley, D.H. and Kaufman, J.C. (2012). Measuring functional creativity: non-expert raters and the creative solution diagnosis scale. *The Journal of Creative Behavior*, 46, 2, pp. 119-137.
- Deininger, G., Loudon, G., Norman, S. (2012). Modal preferences in creative problem solving. *Cognitive Processing*, 13, pp. S147 - S150. DOI 10.1007/s10339-012-0479-3.
- Eubanks, D.L., Murphy, S.T., and Mumford, M.D. (2010). Intuition as an influence on creative problem-solving: the effects of intuition, positive affect, and training. *Creativity Research Journal*, 22, 2, pp. 170-184.
- Griffin, D. (2011). Nudging students' creative problem-solving skills. *Political Science & Politics*, 44, 2, pp. 425-427.
- Hentenryck, V. and Coffrin, C. (2014). Teaching creative problem solving in a MOOC. Proceeding SIGCSE'14 of the 45<sup>th</sup> ACM technical symposium on Computer science education. Retrieve from [http://www.nicta.com.au/pub?doc=7482&filename=nicta\\_publication\\_7482.pdf](http://www.nicta.com.au/pub?doc=7482&filename=nicta_publication_7482.pdf).
- Horton, W.K. (2006). *E-learning by design*. San Francisco: Pfeiffer.
- Huang, R., Ma, D., and Zhang, H. (2008). Towards a Design Theory of Blended Learning Curriculum. *Hybrid Learning and Education, Lecture Notes in Computer Science*, 5169, 66-78.
- Jaskari, M.M. (2013). The challenge of assessing creative problem solving in client-based marketing development projects: a SOLO taxonomy approach. *Journal of Marketing Education*, DOI: 10.1177/0273475313485586.
- Jonassen, D.H. (2004). *Learning to solve problems: an instructional design guide*. US: Pfeiffer.
- Kashefi, H., Ismail, Z., Mohammad, Y. and Rahman, R.A. (2011). Promoting Creative Problem Solving in Engineering Mathematics through Blended Learning. *International Congress on Engineering Education (ICEED)*. DOI: 10.1109/ICEED.2011.6235350.
- Kirk, C. and Pitches, J. (2013). Digital reflection: using digital technologies to enhance and embed creative processes. *Technology, Pedagogy and Education*. DOI: 10.1080/1475939X.2013.768390.
- Kirton, M.J. (2003). *Adaption-innovation: in the context of diversity and change*. Great Britain: Routledge.
- Kuo, F.R., Chen, N.S., and Hwang, G.J. (2014). A creative thinking approach to enhancing the web-based problem solving performance of university students. *Computers & Education*, 72, pp. 220-230.
- Larach, D.U. and Cabra, J.F. (2010). Creative problem solving in second life: an action research study. *Creativity and Innovation Management*, 19, 2, pp. 167-179.
- Lee, J. (2010). Design of blended training for transfer into the workplace. *British Journal of Educational Technology*, 41, 2, pp. 181 - 198.
- Liang, X. and Creasy, K. (2004). Classroom assessment in web - based instructional environment: instructors' experience. Online Submission, Practical Assessment, *Research & Evaluation*, 9, 7.
- Morral, E.J.R., Palmon, R.R., and Kaufman, J.C. (2013). The interactive effects of self-perceptions and requirements on creative problem solving. *The Journal of Creative Behavior*, 47, 3, pp. 200-214.
- Nakagawa, T. (2011). Education and training of creative problem thinking with TRIZ/USIT. *Procedia Engineering*, 9, pp. 582 - 595.
- Newman, V. (1995). *Problem solving for results*. Great Britain: Biddles Ltd, Guildford.
- Orhan, F. (2008). Redesigning a course for blended learning environment. *Turkey Online Journal of Distance Education*, 9, 1, pp. 54 - 66.
- Osborn, A.F. (1957). *Applied imagination: principles and procedures of creative problem-solving*. US: Charles Scribner's Sons.
- Peterson, D.R. and others. (2013). Teaching people to manage constraints: effects on creative problem-solving. *Creativity Research Journal*, 25, 3, pp. 335-347.
- Proctor, T. (2010). *Creative problem solving for managers: developing skills for decision making and innovation*. Third edition. New York: Routledge.
- Ray, D.K. and Romano, N.C. Jr. (2013). Creative problem solving in GSS Groups: do creative styles matter? *Group Decision and Negotiation*, 22, 6, pp. 1129-1157.

- Roger, J. (2007). *Adult learning*. Berkshire: Open University Press.
- Stacey, E. and Gerbic, P. (2007). Teaching for blended learning – Research perspectives from on – campus and distance students. *Educational Information Technology*, 12, 3, pp. 165 – 174.
- Treffinger, D.J., Isaksen, S.G., and Dorval, K.B. (2003). *Creative problem solving (CPS version 6.1 TM) a contemporary framework for managing change*. Retrieved from <http://www.cpsb/resources/downloads/public/CPSVersion61B.pdf>.
- Trilling, B. and Fadel, C. (2009). *21st century skills: learning for life in our times*. US: Wiley.
- Tseng, K.H., Chang, C.C., Lou, S.J., and Hsu, P.S. (2013). Using creative problem solving to promote students' performance of concept mapping. *International Journal of Technology and Design Education*, 23, 4, pp. 1093-1109.
- Thorne, K. (2003). *Blended learning: how to integrate online and traditional learning*. Great Britain: Kogan Page Limited.
- Vidal, R.V.V. (2010). Creative problem solving: an applied university course. *Pesquisa Operacional*, 30, 2, pp. 405-426.
- Voos, R. (2003). *Blended learning: What is it and where might it take us?*. US: The Sloan Consortium (Sloan-C).
- Williamson, P.K. (2011). The creative problem solving skills of arts and science students-the two cultures debate revisited. *Thinking Skills and Creativity*, 6, pp. 31-43.
- Zhao, G. and Yuan, S. (2010). Key factors of effecting blended learning satisfaction: a study on Peking university students. *Hybrid Learning Lecture Notes in Computer Science*, 6248, 282 – 295.

# Factors impacting academic achievement in Colombian working children: A gender profile

Marla Maestre-Meyer<sup>a</sup>, Óscar Oviedo-Trespalacios<sup>a</sup>, Jorge Palacio<sup>b</sup>

<sup>a</sup>Department of Industrial Engineering, Universidad del Norte, Km. 5 vía Pto. Colombia, Barranquilla, Colombia

<sup>b</sup>Department of Psychology, Universidad del Norte, Km. 5 vía Pto. Colombia, Barranquilla, Colombia

---

## Abstract

The current study aims to determine the similarities and differences of the incidence of child labour conditions in academic achievement between male and female children. Specialized surveys were applied to a sample of 3302 families with a son or daughter participating in the “Educame Primero Colombia” program conducted in the Colombian Caribbean Coast for the eradication of child labour. The results showed that there were differences between the variables that affected the academic performance between boys and girls. These results represent a contribution to the literature since very few studies have considered the gender differences on educational conditions.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* child labour; gender; work conditions., academic achievement.

---

## Introduction

The phenomenon of child labour has been considered as an epidemic of the global economy that must be eventually eliminated since it has been recognized as detrimental to the child [1,2]. However, while some people state that every child should have a workfree childhood, others consider child labour acceptable whilst it does not impede children’s development [3]. According to a recent report from the United Nations Children's Fund (UNICEF) [4] around 150 million children between the ages of 5-14 are currently involved in child labour. “Child labour” has been defined by the International Labor Organization (ILO) as “a work that deprives children of their childhood, their potential and their dignity, and that is harmful to physical and mental development”[5].

Despite many efforts for eradicating child labour have been made at national and international levels, it remains persistent in many countries [6]. The determinants of child labour include economic growth, large family size, unemployment, lack of educational facilities, parental illiteracy and ignorance about the importance of education [7]. For low resource families, for example, child labour is a necessary financial support. The consequences of child labour are alarming. According to Amar et al [8] it implicates negative consequences on the quality of life, mental health and emotional development of the minor; cognitive and social development are affected as well in child labourers.

As previously shown, child work has a high number of harmful effects, but special attention must be paid to its educational repercussions due to its importance in the quality of life of the child [9]. As stated by Holgado et al [10] the aspects that should be taken into account to consider the global educational experience include assistance, desertion, absenteeism, performance and acquisition of basic educational abilities. It has been estimated that children who work tend to leave school at an earlier age rather than on enrollment as a child. Also child labourers have their school attainment reduced [11]. A study conducted in Paraguay shows that factors that have an influence on the increase of child labour practices also influence on reduced school attendance and on an increased chance of grade repetition [12].

There exists indirect evidence that child labour limits the child’s human capital development [13]. The intensity of work has repercussions on the schooling outcomes [14]. Singh [15] reported that children attending school and working for long hours had their test scores and grades hurt. In Senegal, children are often enrolled in school or economically active, but not both activities at the same time [16]. However, it has also been argued that a small increase in child labour does not always result in a negative effect on children’s education [17]. The effect of being employed and attending school simultaneously on academic performance is theoretically

ambiguous [18]. This happens because of the complexity of measuring the relationship between child labour, academic achievement and school attendance. The difficulty lies in the fact that students who work might do poorly in school and low school achievement might also make parents or families decide that their children should invest more time working rather than attending school [19]. Orazem and Gunnarsson [13] affirmed that the more the child works, the lower the school attainment.

The gender perspective helps understanding the phenomenon of child labour [20]. A comparative analysis conducted in Peru and Pakistan showed that in both countries boys registered higher work participation than girls [21] while other empirical evidence has suggested that child labour incidence is higher for female children [22]. Authors have shown using data from the UNICEF MICS (Multiple Indicator Cluster Survey) that girls working have an incidence of 72.1% compared to boys with 64.8% [23]. As the nature of early employment is different between males and females, it is likely that the returns to education could also differ by gender [24].

This paper intends to determine if there exists an influence of child labour on education and learning processes between children from the Colombian Caribbean Region. Interrogations like is education important in the framework of child labour and if positive, how are they associated? will be discussed. Also the relationship between child labour and school attendance will be examined by determining if child labour has an impact on children's school attendance. The hypothesis of the incidence of gender on education and academic performance will also be considered since it has not been done in the Colombian review. As this is a study of just one country, the estimations cannot be generalized but compared among other countries. Further analysis must be made to validate the results in the country.

## Methods and Procedure

A sample of 3302 families with a son or daughter participating in the “Educame Primero Colombia” program for the eradication of child labour were interviewed with a diagnostic instrument designed by the International Center for Education and Human Development (CINDE) to determine the minor's involvement in labour activities. The presence of the minor during the interview was requested. The sample participants were families from the state of Atlántico, municipalities of Barranquilla (37.3 percent) and Soledad (5.3 percent); the state of Bolívar, in Cartagena (32.9 percent) and the state of Magdalena in Santa Marta (23.5 percent) and Sitio Nuevo (1.0 percent). The mean age of the children participating in the study was 9.66 years (SD=2.17) having a 72.8 percent of children between 8 and 12 years.

The educational performance factor was determined using the method proposed by Holgado et al [10] based on the Analytic Hierarchy Process (AHP). This process helped minimizing subjectivity in the moment of choosing the weight of each response alternative related to the academic achievement of the minor. The instrument consisted on a semi-structured interview that intended to diagnose the minor's association and risk of association with child labour by evaluating the socio-demographic, economic and educational variables of the family and the child. The package SPSS 19 was used to analyze the collected data.

Classification trees were built to construct the gender profiles of the variables of child labour concerning the school performance. Russell and Norvig [27] defined the trees as a method that “takes as input an object or situation described by a set of properties, and outputs a yes/no decision”. The negative effect of low academic achievement will be classified for male and female children. The decision trees are an effective and agile method to classify data, and can supply good support for the decision making [28].

## Results

A total number of 1537 children participating in the survey were registered with work experience. More than half (58.29%) of the participants were male children. The mean average of hours worked per week for boys is 14.43 (SD = 1.39) and girls 14.16 (SD = 1.4). Table I illustrates the educational conditions among children who work.

Table I: Educational conditions for male and female children involved in child labour

Gender	Educational Condition				
	Very high	High	Medium	Low	Very Low



Male Children	27.0%	15.2%	20.2%	17.0%	20.6%
Female Children	23.9%	15.3%	25.1%	14.0%	21.7%

According to the aims of this study, the hypothesis of the incidence of gender on education between child labourers was set, having as result that there were no significant differences between boys and girls in terms of education ( $t = -.973$ ,  $p < .131$ ) and work conditions ( $t = .297$ ,  $p < .591$ ). However, it is worth noticing that a 37.6% of male children have low and very low levels of schooling (35.7% for female children) which is a high proportion out of the sample.

The methodology of classification trees was implemented in order to identify what variables have incidence in academic performance of male and female children. A classification tree is a rule for predicting the class of an object from the values of its predictor variables. The tree is constructed by partitioning the sample variables into nodes and the test is based on a statistical Chi-Squared test [25]. Following this, two trees were set with the total population as the main node,  $N = 896$  for boys and  $N = 641$  for girls. The independent variables taken into consideration for the model were schedule (weekdays, weekends, morning, afternoon and night), occupations of the parents, length of the job (permanent or temporal), reasons of working, hours dedicated to work and home location.

### 3.1 Classification tree for male children

The final variables included in the model are summited in Table II. If the children work in the morning and live in rural or urban areas are the aspects that have a negative impact in their school achievement.

Table II: Variables included in the final model	
First level	Educational Condition
Second level	Morning work
Third level	Home location

As shown in Table III, the tree makes an accurate prediction of the 57.8% of all cases included in the model, with an error of 0,016. A 36.7% of the children affirmed working in the mornings and had their job schedule affecting their academic performance (Chi-Square = 12.464,  $p = 0.0004$ ). The predictor of educational conditions in the subsequent level is the home location, in which a 51.7% of the boys were found to live in urban areas (Chi-Square = 7.955,  $p = 0.048$ ).

Table III: Accuracy of the predictive model			
Observed	Predicted		Correct Percentage
	Yes	No	
Yes	466	52	90.0%
No	326	52	13.8%
Global Percentage	88.4%	11.6%	57.8%

### 3.2 Classification tree for female children

The final variables included in the model are shown in Table IV. If the children work during weekdays and the classification of the job as permanent or temporal are the aspects that harm their academic performance.

Table IV: Variables included in the final model	
First level	Educational Condition
Second level	Work during weekdays
Third level	Permanent job

Table V illustrates that the tree makes an accurate prediction of the 60.8% of all cases included in the model, with an error of 0,019. A 53% of the children were found to be affected in school by working during weekdays (Chi-Square = 9.404,  $p = 0.002$ ). The predictor of educational conditions in the subsequent level is the length of the job, in which a 44.6% of the girls were found to live have permanent jobs (Chi-Square = 7.734,  $p = 0.022$ ).

Table V: Accuracy of the predictive model

Observed	Predicted		
	Yes	No	Correct Percentage
Yes	390	0	100.0%
No	251	0	0.0%
Global Percentage	100.0%	0.0%	60.8%

## Discussion and conclusions

In the literature, little discussion has been made about gender differences in child labour. As revealed by surveys of the ILO, in terms of the gender distribution of child labour, since 1981 there has been an increase in child labour for girls and a decrease for boys [29]. It is estimated that approximately 90% of children involved in domestic labour are girls [30]. It was rated that from the children participating in the program, a 72.6 percent had a permanent job, while in the rest of the cases, it was temporal or with a specified duration [31].

The results of the study show how the academic performance is not directly related with the phenomenon of child labour among children participating in the “Educame Primero Colombia” program. However the findings about the variables that influence the academic performance between child labourers represent a contribution to the child labour literature in Colombia, since the gender profiles had not been analyzed before. A study conducted in Philippines about mining work showed that the majority of children were participating only after classes in the afternoon, during weekends and holiday. Still, an amount of children had dropped their schooling and were working permanently [26]. In Latin America few studies have aimed to establish the relationship between academic achievement and child labour. In Paraguay it was argued that school performance was affected by child labour practices [12]. In Colombia, research showed that three aspects affect negatively the educational experience of the minor. These aspects are the deteriorated work conditions, the time dedicated to the work and the presence of work in the morning [10]. Nevertheless, little prior research has been done about gender differences of children educational conditions regarding their labour activities.

The methodology of classification tree helped to hierarchically classify the variables affecting the minors’ academic achievement. It was found that the variables were different for male and female children. For boys, the model included the educational condition, the morning work and the home location. On the other hand, for girls, the model had as variables the educational condition, the work during weekdays and the permanence of the job. As the objective of the “Educame Primero Colombia” program is to eradicate child labour through public and development policies, the variables affecting the children’s performance on education must be carefully studied, since education is fundamental to the minor’s quality of life. As the causes of the low school performance were distinct for boys and girls, different treatment must be given taking into account the gender at the time of applying the strategies and policies to reduce and eradicate child labour. Future research should seek to include other variables that may affect the learning process of the male and female children.

## Acknowledgements

This article was written within the framework of the “Educame Primero Colombia” project, developed by Partners of the Americas, Cinde, Devtech and Mercy Corps, financed by the United States Department of Labor (DOL-IL-16574-07-75K), executed in the Caribbean by the Universidad del Norte (Barranquilla), the Mamonal Foundation (Cartagena), and the Foundation for Child, Family and Community Development (Santa Marta). In addition, scholarships for collaboration and exchange were provided by the Development Cooperation Office of the University of Sevilla, the Spanish Agency for International Cooperation for Development (AECID), Office of Faculty Development at Universidad del Norte, and by the childhood and youth strategic line of the Universidad del Norte.

## References

- [1] Dinopoulos, E., & Zhao, L. Child labor and globalization. *Journal of Labor Economics*, 25(3), 553-579. (2007).
- [2] Miwa, K., Han, P., & Fukui, S. Does Child Labor Have a Negative Impact on Child Education and Health? A Case Study in Rural Cambodia. 日本経済学会年度秋季大会報告論文. (2008)
- [3] Dumas, C. Does work impede child's learning? The case of Senegal (No. 2008-01). (2008).
- [4] Anthony, D. The state of the world's children 2011-adolescence: an age of opportunity. United Nations Children's Fund (UNICEF). (2011).
- [5] ILO, Accelerating Action Against Child Labour : Global Report Under the Follow-up to the ILO Declaration on Fundamental Principles and Rights at Work: ILO, (2010).
- [6] Doepke, M., & Zilibotti, F. INTERNATIONAL LABOR STANDARDS AND THE POLITICAL ECONOMY OF CHILD-LABOR REGULATION. *Journal of the European Economic Association*, 7(2-3), 508-518. (2009).
- [7] Pal, M., Pal, J. K., Tiwari, H. R., & Bharati, P. What makes child workers go to school? A case study from West Bengal. *International Labour Review*, 150(3-4), 375-386. (2011).
- [8] Amar, J., Palacio, J., Llinás, H., Puerta, L., Sierra, E., Pérez, A. M., & Velásquez, B. (2008). CALIDAD DE VIDA Y SALUD MENTAL POSITIVA EN MENORES TRABAJADORES DE TOLUVIEJO. *Suma Psicológica*, 15(2).
- [9] Heady, C. (2003). The effect of child labor on learning achievement. *World Development*, 31(2), 385-398.
- [10] Holgado, D., Maya-Jariego, I., Ramos, I., Palacio, J., Oviedo-Trespalacios, Ó., Romero-Mendoza, V., & Amar, J. (2014). Impact of child labor on academic performance: Evidence from the program “Educame Primero Colombia”. *International Journal of Educational Development*, 34, 58-66.
- [11] Beegle, K., Dehejia, R., & Gatti, R. (2004). Why should we care about child labor. The education, labor market and health.
- [12] Patrinos, H. A., & Psacharopoulos, G. (1995). Educational performance and child labor in Paraguay. *International Journal of Educational Development*, 15(1), 47-60.
- [13] Orazem, P. F., & Gunnarsson, V. (2004). Child labour, school attendance and performance: A review. Iowa State University, Department of Economics.
- [14] Buonomo Zabaleta, M. (2011). The impact of child labor on schooling outcomes in Nicaragua. *Economics of Education Review*, 30(6), 1527-1539.
- [15] Singh, Kusum. 1998. “Part-time employment in high school and its effect on academic achievement”, in *The Journal of Educational Research* 91 (Jan./Feb.): 131-139.
- [16] Dumas, C. (2012). Does Work Impede Child Learning? The Case of Senegal. *Economic Development and Cultural Change*, 60(4), 773-793.
- [17] Fan, C. S. (2004) Relative wage, child labour, and human capital, *Oxford Economic Papers*, 56(4), pp. 687–700.
- [18] Sabia, J. J. (2009). School-year employment and academic performance of young adolescents. *Economics of Education Review*, 28(2), 268-276.
- [19] Bezerra, M. E. G., Kassouf, A. L., & Arends-Kuenning, M. (2009). The impact of child labor and school quality on academic achievement in Brazil (No. 4062). IZA discussion papers.
- [20] Bhat, B. A. (2010). Gender, Education and Child Labour: A Sociological Perspective. *Educational Research and Reviews*, 5(6), 323-328.
- [21] Ray, R. (2000). Analysis of child labour in Peru and Pakistan: A comparative study. *Journal of Population Economics*, 13(1), 3-19.
- [22] Kumar, A. (2013). Preference based vs. market based discrimination: Implications for gender differentials in child labor and schooling. *Journal of Development Economics*, 105, 64-68.
- [23] Edmonds, E.V., Pavenik, N., 2005. Child labor in the global economy. *Journal of Economic Perspectives* 19, 199–220.
- [24] Katz, E. G., & Correia, M. C. (Eds.). (2001). *The economics of gender in Mexico: Work, family, state, and market*. World Bank Publications.
- [25] Loh, W. Y., & Shih, Y. S. (1997). Split selection methods for classification trees. *Statistica sinica*, 7(4), 815-840.
- [26] Huesca Jr, E. F. (2013). Gender and Child Labor Issues in Mining: A Preliminary Study on the Artisanal and Small-scale Mining (ASM) Industry in Davao Oriental, Philippines. *Procedia-Social and Behavioral Sciences*, 91, 150-157.
- [27] Russell, S. J., Norvig, P., Canny, J. F., Malik, J. M., & Edwards, D. D. (1995). *Artificial intelligence: a modern approach* (Vol. 2). Englewood Cliffs: Prentice hall.

- [28] Aitkenhead, M. J. (2008). A co-evolving decision tree classification method. *Expert Systems with Applications*, 34(1), 18-25.
- [29] International Labour Organization (2006) *World of Work. Targeting the Intolerable* (Geneva: ILO).
- [30] International Labour Organization, *Good Practices and Lessons Learned on Child and Adolescent Domestic Labour in Central America and the Dominican Republic: A gender perspective*, ILO, San Jose, 2005, p. 10.
- [31] Oviedo-Trespacios, O., Manjarrés, R., Maestre-Meyer, M., Peñabaena-Niebles, R., Holgado, D. (2013). *Study of Hazardous Work Conditions Prevalence in Child Labour: A survey of the Colombian Caribbean Region*. *Social Science and Education* (Vol. 47). Information Engineering Research Institute.

INTE 2014

# Factors influencing function and form decisions of interior architectural design studio students

Umut Tuğlu Karslı<sup>a84</sup>

<sup>a</sup>*Doğuş University, Faculty of Fine Arts and Design, Department of Interior Architecture, Istanbul, 34722, Turkey*

---

## Abstract

The design studio constitutes the core of interior architecture education. The purpose of this research is to discuss the factors influencing function and form decisions of students in design studio where the students encounter various obstacles in solution-seeking process for the design problem. The study primarily defines the educational approach of design studio and examines deductive and inductive design methods which guide students in their function and form decisions. The function and form decisions of students within two design studio case studies and a survey administered to these students are analyzed in order to discuss the factors influencing their decisions.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** Design studio; Interior architecture education; Decision making; Design process; Design methodology

---

## Introduction

Interior architecture education is a studio-oriented type of training in which students become acquainted to and become skillful at solving technical, social, cultural and technological aspects of the problems of interior architectural design. Yet, the act of design is the problem of suggesting ideas on analysis, synthesis, evaluation and solution. Afacan (2012) points that each studio project consists of stages such as studying of previous examples, spatial analysis, form research, material selection and construction techniques decision, and preparation of presentation drawings and three-dimensional models. Interaction between the project coordinator and other project students in the studio provides a practice for real-life situations. As Uluoğlu (2000) suggests, the conscious facilitation of an experiment in design education prevents professional practices from being coincidentally taken place in the future. In this sense, the design studio is a substantially complex and formidable experience. In this demanding experience, students are expected to perform two tasks simultaneously: to design and learning to design. Sachs (1999) points that certain students meet expectations without facing any problems but a majority of the rest encounter a “stuckness” that may even result in cessation of the project in the decision stage. This “stuckness” occurs in the design stage, the most difficult stage of the project, where main decisions of the project are taken. Upon examination of the process of project development experienced in the interior architectural design studio, it has been observed that this process consists of three phases; namely, research-programming, design and presentation. Students choose their design methods in the “design” stage where they have got the most difficulty in reaching a solution, and have to make the main decisions about the project. These design methods offer a road map to the students and main decisions taken on the project are brought to maturity through dialogue with the project coordinator (Kvan & Yunyan, 2005). These decisions are about the principles of “utilitas, venustas, firmitas”, which are referred today as function, form and construction, suggested by the architectural theoretician Vitruvius (2005). The function and form decisions within these resolutions constitute the first and most important steps of the design stage. In this context, while the first part of the research defines the design studio training in the general sense, the second part studies the “deductive” and “inductive” design methods which can be practiced in the interior architectural design studio and can guide students in making decisions on function and form. The third part analyzes function and form decisions of students through a case

---

\* Correspondent Author Tel.: +090-216-444-7997-1942.

E-mail address: utuglu@dogus.edu.tr

study in two interior architectural design studios where the said design methods are practiced upon and it discusses the outcomes of a survey administered to these students in order to determine the factors which influence their decisions.

### **Interior architectural design studio**

In most disciplines, classes in universities are the common environment for learning and teaching. Instructors teach by lecturing and assigning homework, and evaluate performance by exams. In design studio, contrary to these theoretical classes, students are expected to offer fitting solutions to hypothetical design problems assigned by the instructor and they learn by working on projects (Oh et al., 2012). Students develop their projects in design studio in parallel to criteria provided by the instructor and jury (Schön, 1985). As some theoreticians suggest, education in design studio is provided by jury's critiques offered by multiple instructors while desk critique is offered by a single instructor and group critique (Dutton, 1987; Schön, 1984; Attie & Mugerauer, 1991). While desk critique is considered as the main component of studio education and while it is the individual critique session executed by the student on their desk, group critique is that a small group of 5-10 students, gatherings together, comment on each others' project. Roles of instructor and student can differentiate in these critiques. As Ciravoğlu (2003) indicates, instructor is the "master" and student is the "apprentice" in some studios. The instructor (master) passes their professional knowledge and experience to the student (apprentice) through critiques in the master-apprentice training. Another role undertaken by the instructor and student in the design studio is the "user-designer" role as claimed by Dutton (1991). In this design studio, the instructor (user) comments on the student's (designer) project according to user perspective and orients project by user demands. Regardless of the aforementioned critique methods, instructors in design studio provide students with a design method that will guide them through developing solutions particularly for their initial projects. In that context, the latter part of the research examines the "deductive" and "inductive" methods which are among the methods that can act as a guide for interior architecture students in the freshman year.

### **A guiding method in design studio: deductive and inductive methods**

The design problem consists of factors based on data consisting of various numbers and qualities based on an informational background. This problem is based on the same background with epistemology which is commonly analyzed in the discipline of philosophy. In this sense, Özer (1975) examines the design problem within philosophy and has developed a design methodology within this framework. According to this methodology; the deductio (deductive) and inductio (inductive) methods which have emerged as two different schools of thought in the philosophy discipline can be applied as reaching a singular solution through universal data (architectural shell) and a universal solution through singular data (functions). Özer (1975) divides the inductive method in architectural design process into three subcategories which are the methods of "induction through grouped primal functions", "induction through primal functions" and "induction through partially primal functions".

#### *.1. Deductive method in architectural design*

Deduction is a method in philosophy which offers a way of theoretical thinking that begins in the general and ends in the particular and it narrows down from universal to singular (Manktelow, 2000). Similarly, in architectural design it is defined as the method of reaching singular forms of primal functions from a general form which constitutes the universal solution of the design problem. The main principle in this method is that universal form does not get affected from changes in primal function or partially primal function. One, several or all of the economic, technological, functional and aesthetic reasons may lead the designer to decide on the rational or irrational forms of the deductive method for the purpose of finding a solution to a specific architectural matter. Rational deduction stands to be a commonly adopted method with respect to factors such as constructional application and economic efficiency. The most vital inconvenience that deduction method poses is that it does not give primal functions (the liberty of finding their own original forms) and therefore the method of deduction creates an external form of hegemony within itself.

## *.2. Inductive method in architectural design*

Similar to philosophy, purpose of the inductive method is to take the singular as a starting point and widen up to arrive at the whole. It is defined as the method of reaching a general form which constitutes the universal solution from singular forms of primal functions. There are inductive methods for grouped primal, primal, and partially primal functions. In other words, it aims to a universal form through ways of adding, assembling and articulating by taking the singular forms of singular functions as a starting point.

### *.2.1. Induction through grouped primal functions in architectural design*

Primal functions in architecture are seen to be combined in certain groups (Living+kitchen can be seen as one group form and sleeping+bathroom as one group form in the house example). The design problem is solved by reaching a universal form through group forms which incorporate group functions. One, several or all of the economic, technological, functional and aesthetic factors may encourage this grouping attempt. By this way, there emerges an induction movement gaining momentum out of the groups. Forms that incorporate functions of groups are separated into components of primal functions within the framework of the deduction method. In this context, the induction through grouped primal functions constitutes a medium method between pure deduction in reality and pure induction. The beneficial features of both absolute methods usually face an attempt to be made to fit into an interim solution. Forms of the grouped primal functions may be rational or they may be irrational as well.

### *.2.2. Induction through primal functions in architectural design*

This method is the definition of pure induction. The universal solution for design problem is achieved by using singular forms of separate functions (A solution can be developed by form groups in the house example which incorporate primal functions such as living environment, kitchen environment, sleeping environment and bathroom environment). Each function in the method of induction through primal functions is developed as needed either in surface or in formation. The primal function is occasionally fit into a sole form (rational or irrational); or sometimes it is interpreted by being separated into its various components.

### *.2.3. Induction through partially primal functions in architectural design*

This is an advanced version of the inductive method through primal functions in which a universal form solution is acquired by use of singular forms of partially primal functions which are created by dividing primal functions into subcomponents. The singular volume which contains the primal functions here is obtained via inducing rational or irrational portions which reflect the partial functions (Dividing the living environment primal function into subcomponents of living, eating, working, storing and reaching a universal form through singular forms which incorporate all these partially primal functions by also dividing other primal functions into subcomponents). The distinctive feature of this design method in the designing sense is that each component of a function acquires a new formal identity with itself and none of the partially primal functions recess under the domination of one another. At the same time, the most important disadvantage of the induction through partially primal functions method is extremely complex, dynamic and intricate singular forms which can set various obstacles to designers in terms of application (Özer, 1975). Each functional data which defines the design process influences the creation of architectural form. The forms obtained through design and the creation of the architectural environment are originated by the designer's experience and decisions which have been developed in parallel to bunches of data defining the design problem. Hence, the designer must consider function as well as form in order to create the final product. The designer initially imagines the design data in the beginning stage; then visualizes the images by using two or three-dimensional basic geometrical forms and therefore retrieves the final product in the last stage by altering these images (Özen Yavuz & Akçay, 2012). The design methods mentioned above are also influential in making form decisions by offering a road map to students in their function decisions in interior architectural design process. As Özer (2009) suggests, there is a "reaching a formal order" concept in the essence of architecture design, it affects the aforementioned methods with variations of

rationality-irrationality, and it also influences the determination of solution in the schematic sense with options like right orthogonality, non-orthogonality and curvilinearity.

### Case study: interior architectural design studio

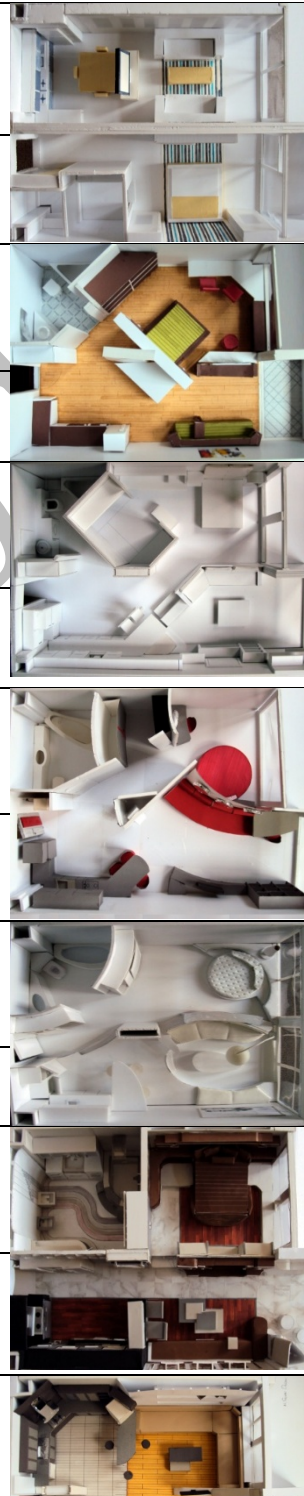
The case study includes design studios of Interior Architecture Department of two different universities, where the said design methods are practiced upon. These second semester design studios include the interior organization and design of a 60m<sup>2</sup> studio flat according to user identities and requirements separately specified for each student. The design studio usually includes desk critiques, additionally there are also 2 group critiques during the term. The studio adopts a “user-designer” studio concept; the instructor (user) passes their project critiques to the student (designer) through user needs and demands. During the first stage in the design studio (the research-program phase), the user identity and needs are determined; individual-measure-behavior research and sample interior solutions are examined and a program is established. The second stage is design phase. Function schemes are created in the planimetric order, conceptual researches are conducted and studies are carried out regarding graphic impact on vertical surfaces in accordance with the concept. In this phase, interior architecture students are expected to solve the studio flat functions with one of the grouped primal, primal or partially primal functions of induction method without modifying the building envelope and execute the design with one of the rational, irrational non-orthogonal or irrational curvilinear forms. Function, color, form, material and construction decisions are made with help of the sketch drawings and models at the end of the design stage. The last one is the stage of project presentation. It includes presentation of the project by traditional methods or by digital media and by creating a model. The research analyzes function and form decisions of 24 students (12 students for each studio) who have submitted their projects and discusses the influencing factors of these decisions. Table 1 examines under the title of “function” each students’ project’s user identity, program, design method and factors influencing the function decision-making process and examines under the title of “form” each students’ project’s form decisions in planimetric order and factors influencing the form decision-making process.

Table 1. Function and form decisions taken by students in design studio and factors that influence these decisions

Function	Form	Project Model
<b>User identity:</b> Advertiser <b>Program:</b> Sleeping, living, eating, kitchen and bathroom environment <b>Design method:</b> Induction through primal functions <b>Factors influencing the decision-making process:</b> Ease of use	<b>Form decisions on the planimetric order:</b> Irrational curvilinear <b>Factors influencing the decision-making process:</b> Unique form creation	
<b>User identity:</b> Architect <b>Program:</b> Sleeping, living, working, eating, kitchen and bathroom environment <b>Design method:</b> Induction through partially primal functions <b>Factors influencing the decision-making process:</b> Spatial personalization	<b>Form decisions on the planimetric order:</b> Irrational non-orthogonal <b>Factors influencing the decision-making process:</b> Designer identity	
<b>User identity:</b> Engineer <b>Program:</b> Sleeping, clothing, living, eating, kitchen and bathroom environment <b>Design method:</b> Induction through grouped primal functions <b>Factors influencing the decision-making process:</b> Traditionality	<b>Form decisions on the planimetric order:</b> Rational <b>Factors influencing the decision-making process:</b> Applicability	
<b>User identity:</b> Photographer	<b>Form decisions on the planimetric order:</b>	



<b>Program:</b> Sleeping, living, eating, dark room, kitchen and bathroom environment	<b>order:</b> Irrational non-orthogonal	
<b>Design method:</b> Induction through partially primal functions		
<b>Factors influencing the decision-making process:</b> User identity	<b>Factors influencing the decision-making process:</b> Unique form creation	
<b>User identity:</b> Jewellery designer	<b>Form decisions on the planimetric order:</b> Rational	
<b>Program:</b> Sleeping, living, eating, kitchen and bathroom environment		
<b>Design method:</b> Induction through primal functions		
<b>Factors influencing the decision-making process:</b> Ease of solution	<b>Factors influencing the decision-making process:</b> Applicability	
<b>User identity:</b> Student	<b>Form decisions on the planimetric order:</b> Irrational non-orthogonal	
<b>Program:</b> Sleeping, living, working, eating, kitchen and bathroom environment		
<b>Design method:</b> Induction through primal functions		
<b>Factors influencing the decision-making process:</b> Ease of use	<b>Factors influencing the decision-making process:</b> User identity	
<b>User identity:</b> Model	<b>Form decisions on the planimetric order:</b> Irrational non-orthogonal	
<b>Program:</b> Sleeping, clothing, living, eating, kitchen and bathroom environment		
<b>Design method:</b> Induction through partially primal functions		
<b>Factors influencing the decision-making process:</b> Spatial personalization	<b>Factors influencing the decision-making process:</b> Unique form creation	
<b>User identity:</b> Designer	<b>Form decisions on the planimetric order:</b> Irrational curvilinear	
<b>Program:</b> Sleeping, clothing, living, eating, kitchen and bathroom environment		
<b>Design method:</b> Induction through partially primal functions		
<b>Factors influencing the decision-making process:</b> User identity	<b>Factors influencing the decision-making process:</b> Designer identity	
<b>User identity:</b> Sea captain	<b>Form decisions on the planimetric order:</b> Irrational curvilinear	
<b>Program:</b> Sleeping, living, eating, kitchen and bathroom environment		
<b>Design method:</b> Induction through partially primal functions		
<b>Factors influencing the decision-making process:</b> Spatial personalization	<b>Factors influencing the decision-making process:</b> User identity	
<b>User identity:</b> Ceramicist	<b>Form decisions on the planimetric order:</b> Rational	
<b>Program:</b> Sleeping, living, eating, kitchen and bathroom environment		
<b>Design method:</b> Induction through grouped primal functions		
<b>Factors influencing the decision-making process:</b> Ease of use	<b>Factors influencing the decision-making process:</b> Ease of solution	
<b>User identity:</b> Cook	<b>Form decisions on the planimetric order:</b> Rational	
<b>Program:</b> Sleeping, living, eating, kitchen and bathroom environment		
<b>Design method:</b> Induction through grouped primal functions		



<b>Factors influencing the decision-making process:</b> Applicability <b>User identity:</b> Author <b>Program:</b> Sleeping, living, library, eating, kitchen and bathroom environment <b>Design method:</b> Induction through primal functions <b>Factors influencing the decision-making process:</b> Ease of solution	<b>Factors influencing the decision-making process:</b> Applicability <b>Form decisions on the planimetric order:</b> Irrational curvilinear <b>Factors influencing the decision-making process:</b> Unique form creation	
<b>User identity:</b> Banker <b>Program:</b> Sleeping, clothing, living, working, eating, kitchen and bathroom environment <b>Design method:</b> Induction through primal functions <b>Factors influencing the decision-making process:</b> Traditionality	<b>Form decisions on the planimetric order:</b> Rational <b>Factors influencing the decision-making process:</b> Applicability	
<b>User identity:</b> Graphic artist <b>Program:</b> Sleeping, living, eating, working, kitchen and bathroom environment <b>Design method:</b> Induction through grouped primal functions <b>Factors influencing the decision-making process:</b> Ease of solution	<b>Form decisions on the planimetric order:</b> Rational <b>Factors influencing the decision-making process:</b> Applicability	
<b>User identity:</b> Singer <b>Program:</b> Sleeping, living, eating, kitchen and bathroom environment <b>Design method:</b> Induction through grouped primal functions <b>Factors influencing the decision-making process:</b> Ease of solution	<b>Form decisions on the planimetric order:</b> Rational <b>Factors influencing the decision-making process:</b> Applicability	
<b>User identity:</b> Lawyer <b>Program:</b> Sleeping, living, working, eating, kitchen and bathroom environment <b>Design method:</b> Induction through grouped primal functions <b>Factors influencing the decision-making process:</b> Ease of solution	<b>Form decisions on the planimetric order:</b> Rational <b>Factors influencing the decision-making process:</b> Applicability	
<b>User identity:</b> Landscape architect <b>Program:</b> Sleeping, clothing, living, working, greenhouse, eating, kitchen and bathroom environment <b>Design method:</b> Induction through partially primal functions <b>Factors influencing the decision-making process:</b> Spatial personalization	<b>Form decisions on the planimetric order:</b> Rational <b>Factors influencing the decision-making process:</b> Applicability	
<b>User identity:</b> Student <b>Program:</b> Sleeping, living, working, eating, kitchen and bathroom environment <b>Design method:</b> Induction through partially primal functions <b>Factors influencing the decision-making process:</b> Spatial personalization	<b>Form decisions on the planimetric order:</b> Irrational curvilinear <b>Factors influencing the decision-making process:</b> Unique form creation	
<b>User identity:</b> Director	<b>Form decisions on the planimetric order:</b>	

<b>Program:</b> Sleeping, living, eating, kitchen and bathroom environment	<b>order:</b> Rational	
<b>Design method:</b> Induction through grouped primal functions		
<b>Factors influencing the decision-making process:</b> Ease of solution	<b>Factors influencing the decision-making process:</b> Ease of solution	
<b>User identity:</b> Model	<b>Form decisions on the planimetric order:</b> Rational	
<b>Program:</b> Sleeping, living, working, eating, kitchen and bathroom environment		
<b>Design method:</b> Induction through primal functions		
<b>Factors influencing the decision-making process:</b> Applicability	<b>Factors influencing the decision-making process:</b> Traditionality	
<b>User identity:</b> Photographer	<b>Form decisions on the planimetric order:</b> Irrational non-orthogonal	
<b>Program:</b> Sleeping, living, eating, dark room, kitchen and bathroom environment		
<b>Design method:</b> Induction through partially primal functions		
<b>Factors influencing the decision-making process:</b> Spatial personalization	<b>Factors influencing the decision-making process:</b> Unique form creation	
<b>User identity:</b> Sea captain	<b>Form decisions on the planimetric order:</b> Irrational curvilinear	
<b>Program:</b> Sleeping, living, working, eating, kitchen and bathroom environment		
<b>Design method:</b> Induction through partially primal functions		
<b>Factors influencing the decision-making process:</b> Spatial personalization	<b>Factors influencing the decision-making process:</b> User identity	
<b>User identity:</b> Model	<b>Form decisions on the planimetric order:</b> Irrational non-orthogonal	
<b>Program:</b> Sleeping, living, clothing, runway, eating, kitchen and bathroom environment		
<b>Design method:</b> Induction through partially primal functions		
<b>Factors influencing the decision-making process:</b> Designer identity	<b>Factors influencing the decision-making process:</b> Designer identity	
<b>User identity:</b> Painter	<b>Form decisions on the planimetric order:</b> Rational	
<b>Program:</b> Sleeping, living, art studio, eating, kitchen and bathroom environment		
<b>Design method:</b> Induction through grouped primal functions		
<b>Factors influencing the decision-making process:</b> Traditionality	<b>Factors influencing the decision-making process:</b> Applicability	

### .1. Function and form decisions of students in interior architectural design studio

Upon examination of studio flat projects (table 1) of 24 students of two design studios, it has been found out that 8 students have chosen induction through grouped primal functions, 6 students have chosen induction through primal functions, and 10 students have chosen induction through partially primal functions method under the function title. Percentages of the decisions have been examined in fig. 1(a). Under the form title, it has been seen that 12 students have chosen rational, 6 students have chosen irrational non-orthogonal, and 6 students have chosen irrational curvilinear forms. Percentages regarding the form decisions have been examined in fig. 1(b).

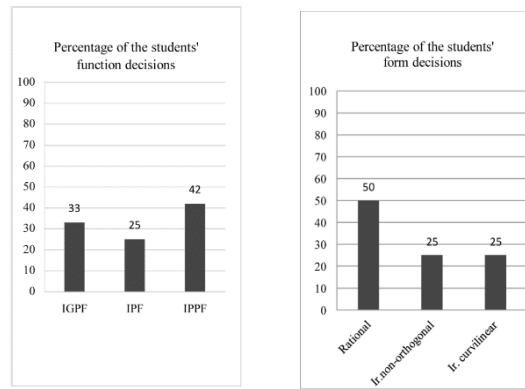


Figure 1. (a) Function decisions of the students; (b) Form decisions of the students.

### 1. Factors influencing form and function decisions of students in interior architectural design studio

Kumkale (2008) suggests that the design process can be compared to a “black box” executed with intuition and personal accumulation of knowledge developed by the individual’s own experience. The most compelling stage in the interior design studio is the one in which students develop function and form decisions. There are certain influencing factors in the design stage that lead the students in their function and form decisions during their time of stuckness-uncertainty. A survey has been administered on students in order to determine these factors after the submission of projects. The survey has asked students to define what influences them mostly in the process of making function and form decisions and asked to choose one of the answers among the options of “ease of solution”, “traditionality”, “ease of use”, “spatial personalization”, “user identity”, “applicability”, “designer identity” and “unique form creation”. As a result; percentage of factors that influenced students who made designs with induction through grouped primal functions, induction through primal functions and induction through partially primal functions are shown on fig. 2(a) , 2(b), and 2(c); and percentage of factors that influenced students who applied rational, irrational non-orthogonal or irrational curvilinear form decisions on their projects are shown on fig. 2(d), 2(e) and 2(f).

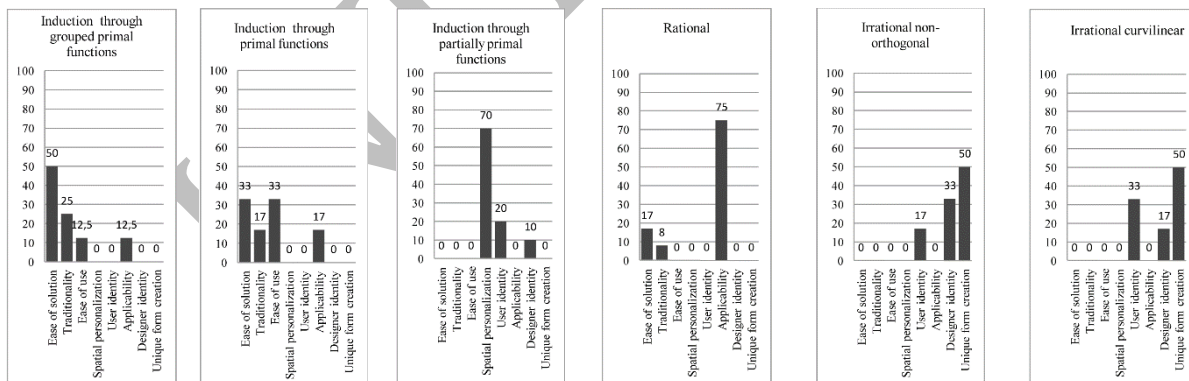


Figure 2. Factors influencing students who used (a) induction through grouped primal functions method; (b) induction through primal functions method; (c) induction through partially primal functions method; (d) rational form; (e) irrational non-orthogonal form; (f) irrational curvilinear form

## 5. Conclusion

This research has aimed to discuss factors which influence function and form decisions of students in design stage of the interior architectural project phase. In this context, upon examination of projects created in design



studio it can be seen that the method choices of induction through grouped primal and primal functions and induction through partially primal functions are significantly close to each other. Similarly, rational and irrational form choices are also equal. The survey shows that students who have designed their projects in methods of induction through grouped primal functions and induction through primal functions describe the influential factors as ease of solution, traditionality, ease of use and applicability. Students who have designed their projects in the method of induction through partially primal functions describe the influential factors as spatial personalization, user identity and designer identity. Under the title of form, students who have applied the rational form decision in their projects describe the influential factors in their decision-making process to be ease of solution, traditionality and applicability. Students who have applied irrational non-orthogonal and irrational curvilinear form decisions in their projects are influenced by factors like user identity, designer identity and unique form creation.

The experienced project phase in interior architectural design studio and the design problems faced in the professional life bear great resemblance to each other. Induction methods through grouped primal and primal functions or the use of rational form are similarly preferred in professional life for reasons like ease of solution, traditionality and applicability. Likewise, the method of induction through partially primal functions, which requires a more original solution or the use of irrational non-orthogonal and curvilinear form, is likely to be preferred in line with the designer's aspiration in professional life to create a unique and original design, by avoiding monotony and creating a personal environment suitable for the needs of a specific user.

When experiencing the interior architectural design process, the perspectives, methods and influential factors of interior architecture students, in function and form problems are seen as parallel to those in professional life. One of the most important reasons is that the design studio runs like a miniaturized model of the professional life. The occupational problems of students in the future will diminish as the education in design studios grow more similar to the practice of professional life.

## References

- Afacan, Y. (2012). Investigating the effects of group working in studying interior architecture. *Procedia-Social and Behavioral Sciences*, 51, 506-511.
- Attoe, W., & Mugerauer, R. (1991). Excellent studio teaching in architecture. *Studies in Higher Education*, 16/1, 41-50.
- Ciravoğlu, A. (2003). Mimari tasarım eğitiminde formel ve enformel çalışmalar üzerine [Formal and informal studies in architectural design education]. *Yapı*, 257, 43-47.
- Dutton, T.A. (1987). Design and studio pedagogy. *Journal of Architectural Education*, 41/1, 16-25.
- Dutton, T.A. (1991). The hidden curriculum and the design studio. *Voices in architectural education: Cultural politics and pedagogy*. New York: Bergin and Gravey.
- Kvan, T. & Yunyan, J. (2005). Students' learning styles and their correlation with performance in architectural design study. *Design Studies*, 26, 19-34.
- Kumkale, E. (2008). Discovering personal reason for architecture education. Designing Design Education: Modern Education in Architectural Design Basics, 5-7 June, Amsterdam, Available on 12.03.2012 at <http://www.designtrain-ldv.com/activitie7/19-ekumkale.pdf>.
- Manktelow, K. (2000). *Reasoning and thinking*. UK: Psychology Press Ltd.
- Oh, Y. et al. (2012). A theoretical framework of design critiquing in architecture studios. *Design Studies*, <http://dx.doi.org/10.1016/j.destud.2012.08.004>
- Özer, B. (1975). Tümdengelim, tümevarım ve mimaride dizaynlama yöntemleri üzerine bir deneme [An essay on methods of deduction, induction and designing in architecture]. *Yapı*, 10, 25-42.
- Özer, B. (2009). *Kültür, sanat & mimarlık [Culture, art & architecture]*. Istanbul: YEM.
- Özen Yavuz A.İ. & Akçay F. Ç. (2012). Development of an approach for producing architectural form in design education. *Procedia-Social and Behavioral Sciences*, 51, 222-227.
- Sachs, A. (1999). Stuckness in the studio. *Design Studies*, 20, 195-209.
- Schön, D. (1984). The architectural studio as an exemplar of education for reflection-in action. *Journal of Architectural Education*, 1, 2-9.
- Schön, D. (1985). *The design studio*. London: RIBA.
- Uluoğlu, B. (2000). Design knowledge communicated in studio critiques. *Design Studies*, 21, 33-58.
- Vitruvius. (2005). *Mimarlıkta on kitap [The ten books on architecture]*. Istanbul: Şevki Vanlı Mimarlık Vakfı.

# Factors motivating teachers working at elementary and secondary schools

Süleyman CAN<sup>a85</sup>

*<sup>a</sup>Muğla Sıtkı Koçman University, Faculty of Education 48000, “Muğla”, Turkey*

---

## Abstract

The purpose of the present study is to determine the factors motivating teachers working at elementary and secondary schools and the relationships between gender, age, marital status, educational status and income level and their motivation. The study was conducted on 448 elementary and secondary school teachers working in Menteşe district of Muğla in the spring term of 2013-2014 school year. Within the context of the study, a scale was developed based on the scale developed by İncir (1990). At the end of the study, it was found that factor level is high and age and educational status have significant effects on motivational factors, yet, gender, marital status and income are not influential on motivational factors. Moreover, younger teachers and those holding a master degree were found to be more affected motivational factors than the others.

Click here and insert your abstract text.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* Teacher, motivation, factor, primary education, secondary education

---

## Main text

Works done in the field of motivation are of great interest to all parts of societies. Organizations making up the society aim to develop their psychological sides. Hence, great emphasis is put on the concept of motivation. Therefore, it is indispensable for educational organizations and accordingly for educational system to be affected from motivation. The people working in the basic components of education, elementary schools and secondary schools, are affected from the concept of motivation for their organizational goals. In recent years, the amount of research carried out to determine the factors affecting the motivation of teachers working at educational organizations has increased (Mansfield ve Beltman, 2014; Güçlü, Receptoğlu and Kılınç, 2014; Lourmpas and Dakopoulou, 2014; Receptoğlu, 2014; Satman, 2013; Yalçın and Korkmaz, 2013; Ada et al., 2013; Sharabyan, 2011; Güzel, 2011; Alam and Farid, 2011; Lam, Cheng and Ma, 2009; Kulpçu, 2008; Sinclair, 2008; Cemaloğlu, 2002; Günbayı, 2001; Atkinson, 2000).

The root of the term of motivation is “Moti”, it comes from Latin word “Movere” (move). Motivation affects the types of action performed to satisfy a need or for an individual to achieve his/her aim. Conscious or unconscious factors triggering a certain type of action, making it understandable, sustaining it and directing it are called motives in psychology. The formation process of behaviour under the influence of motives is called motivation (Köknal, 1983). A similar definition is given by Turkish Language Dictionary (2000) “Make someone willing and eager to get into action” (Açıksöz, 2008).

Motivation is a state of empowerment having physiologic, cognitive and affective dimensions and energizing an individual for a certain goal, making him/her willing to perform an action, increasing eagerness to work, directing efforts and directly affecting the performance of workers (Bursalıoğlu, 2011; Özdemir and Muradova, 2008; Başaran, 1991). Motivation is the sum of opinions, hopes, beliefs, desires, needs and fears of people activating them and directing their actions (Örücü and Kambur, 2008). Motivation is internal and external motives, desires and wishes directing, empowering and controlling people’s actions by affecting them (Güzel, 2011).

---

\* Süleyman CAN. Tel.: +90 505 223 81 67; fax: +90 252 211 17 93

E-mail address: scan0767@gmail.com.tr

As it is not possible to explain human behaviours on the basis of a single factor, there are many theories formulated related to motivation. The most popular theory of motivation is Maslow's Hierarchy of Needs. Maslow's theory of Hierarchy of Needs assumes that there are five basic needs sequenced according to their importance for living as physiological, security, belongingness, respect and self-actualization (Hoy and Miskel, 2012).

In educational organizations, there are two concepts mentioned as the source of motivation. These concepts are intrinsic and extrinsic motivation. Intrinsic motivation is shaped according to the teacher's own interest in, curiosity about and satisfaction from the assigned task. Desire, enthusiasm and willingness to do something are important sources of intrinsic motivation. When the satisfaction taken while doing a task is given the highest priority, it means that the teacher is intrinsically motivated to do the task (Güçlü, Reçepoğlu and Kılınç, 2014; Joo and Lim, 2009; Littlejohn, 2008; Millette and Gagne, 2008; Lin, 2007). The source of extrinsic motivation is on the other hand is external such as reward and punishment (Littlejohn, 2008). Educational organizations need teachers to achieve their organizational objectives and they use material incentives to motivate their teachers. The success of organizations depends on motivation of their workers (Yiğenoğlu, 2007). Therefore, at schools that are the smallest unit of educational organizations, teacher motivation is an important subject of research. Increasing teacher motivation results in improving efficiency both on the part of teachers and students. Thus, educational organizations can achieve their objectives more easily. Enhancing intrinsic and extrinsic motivation of teachers is of great importance for students to be motivated in the class and for educational reforms to take place. When the teachers are motivated, educational reforms can be realized more easily, changes are easily adapted to and achievement and satisfaction can be increased (Cenkseven-Önder and Sarı, 2009; Yazıcı, 2009; Günbayı, 2001).

There are many factors leading to display of low or high motivation by teachers working in school organizations in the educational system. Teachers working at schools may exhibit low motivation due to reasons such as physical conditions, job satisfaction, type of control exerted and wage and they may exhibit high motivation due to reasons such as job satisfaction, positive inter-personal relations and pleasure taken from the work (Ada et al., 2013; Yalçın and Korkmaz, 2013; Güzel, 2011; Dereli and Acat, 2010; Kulpçu, 2008; Günbayı, 2001).

Hence, the purpose of the present study was set to be to determine the factors motivating teachers working at elementary and secondary schools and the relationships between gender, age, marital status, educational status and income level and their motivation. In this respect, answers to the following questions were sought.

- 1) What are the attitudes of teachers working at elementary and secondary schools towards motivational factors?
- 2) Are the motivational factors motivating elementary and secondary school teachers significantly affected by gender, age, marital status, educational status and wage?

## **Method**

In the present study, survey method is used. Survey method is a type of research used to determine the existing state. In such research, sampling is kept quite large. The easiest way of reaching large sampling is questionnaire. Therefore, a questionnaire is used in the present study. As there are comparisons made based on variable such as gender, age, marital status, educational status and wage, cross sectional approach is adopted and moreover, as the study aims to determine the relationship between the continuous variables of the study, relational survey approach is adopted (Çepni, 2010).

### *Universe and sample*

The universe of the study consists of 1270 teachers working at 76 elementary and secondary schools in Menteşe district of Muğla in the spring term of 2013-2014 school year. Out of the universe, 448 teachers were randomly selected and make up the sampling. Demographic features of the sampling are: 47.1% (211) are males, 52.9% (237) females; 5.1% (23) are 21-30 years old, 36.6% (164) 31-40 years old, 41.7% (187) 41-50 years old, 16.5% (74) 51 years old or over; 89.5% (401) are married, 10.5% (47) are single; 11.2% (50) are graduates of two-year degree programs, 79.5% (356) are university graduates, 9.3% (42) have graduate education.

### Data collection instrument

In the present study, as a data collection instrument, “The Questionnaire of Factors Motivating Teachers” is used. The questionnaire consists of two parts as personal information and teacher motivation scale. In the first part of the questionnaire, demographics of the teachers (gender, age, marital status, educational status and wage) are elicited.

The second part of the questionnaire includes “Teacher Motivation Scale” to determine the factors motivating teachers. This scale was developed on the basis of “Job Satisfaction Evaluation Scale” developed by İncir (1990), literature review and expert opinions. The Cronbach Alpha reliability coefficient was found to be .774.

### Data analysis

In the analysis of the data, IBM SPSS 21 program package was used. In order to determine the factors motivating the participating teachers, percentages were descriptively analyzed. Scores of factors motivating teachers were determined to be 35-69 “Low”, 70-104 “Medium”, 105-139 “High”, 140-175 “Very high” (the minimum score to be taken is 35 and the maximum score to be taken is 175). T-test was run to determine whether gender and marital status have significant affects on the teachers’ attitudes towards motivational factors and One Way Anova was employed to test whether age, educational status and wage have significant affects on the teachers’ attitudes towards motivational factors.

### Findings

#### *Distribution of the attitudes towards factors motivating teachers*

Level of factors motivating teachers	N	Minimum score	Maximum score	Mean	S
	448	55	149	124.08	11.42

The mean of the scores of the teachers’ attitudes towards motivational factors is 124.08, standard deviation is 11.42. These values show that the teachers’ attitudes towards motivational factors are high. This indicates that in general the teachers are affected by motivational factors.

#### *Teachers’ motivation scores in relation to gender*

Gender	N	$\bar{X}$	S	sd	t	p
Male	211	124.72	11.12	446	1.136	.257
Female	237	123.50	11.67			

As can be seen in Table 2, the sampling of the study consists of 211 male teachers and 237 female teachers. The teachers scores of attitudes towards motivational factors do not significantly vary based on gender [ $p>.05$ ]. This shows that there is no significant correlation between the teachers’ attitudes towards motivational factors and gender. Yet, male teachers’ attitudes towards motivational factors ( $\bar{X}=124.72$ ) are more positive than the female teachers’ attitudes towards motivational factors ( $\bar{X}=123.50$ ).

#### *Age-dependent motivation scores of the teachers*

Source of the variance	Sum of squares	sd	Mean of squares	F	p
Between-groups	1024.245	3	341.415	2.645	.049 (1-3; 1-4)
Within-groups	57300.862	444	129.056		
<b>Total</b>	58325.107	447			



1: 21-30 years old, 2: 31-40 years old, 3: 41-50 years old, 4: 51 years old or over

The data given in Table 3 reveal that there is an age-based significant difference among the attitudes towards motivational factors [ $F_{(3,444)} = 2.645$ ,  $p < .05$ ]. That is, age is a significant variable affecting the factors motivating teachers. There is a significant difference between the attitudes of teachers aged 21-30 and 41-50 and between the attitudes of teachers aged 21-30 and 51 and over. This significant difference favours the teachers aged 21-30. So, younger teachers are more affected by factors motivating teachers.

#### *Teachers' motivation scores in relation to marital status*

Marital status	N	$\bar{X}$	S	sd	t	p
Married	401	123.90	11.47	446	-.961	.337
Single	47	125.59	10.94			

As can be seen in Table 4, 401 of the participants are married and 47 are single. The teachers' attitude scores do not significantly vary depending on their marital status [ $p > .05$ ]. This indicates that there is no significant correlation between factors motivating teachers and their marital status. It is also seen that the attitudes of married teachers towards motivational factors ( $\bar{X} = 123.90$ ) are more negative than the attitudes of single teachers ( $\bar{X} = 125.59$ ).

#### *Teachers' motivation scores in relation to their educational status*

Source of variance	Sum of squares	sd	Mean of squares	F	p
Between-groups	884.855	2	442.428	3.428	.033 (1-3)
Within-groups	57440.252	445	129.079		
<b>Total</b>	58325.107	447			

1: Two-year degree program, 2: undergraduate, 3: graduate

The results of the variance analysis presented in Table 5 show that there is a significant difference among the teachers' attitude scores based on educational status [ $F_{(2,445)} = 3.428$ ,  $p < .05$ ]. That is, educational status has a significant influence on the teachers' attitudes towards motivational factors. It is seen that there is a significant difference between the attitudes of teachers completing two-year degree program and those of the teachers having graduate education. This difference favours the teachers having graduate education. It can be argued that the teachers having graduate education are affected more by factors motivating teachers.

#### *Teachers' motivational scores in relation to their wage*

Source of variance	Sum of squares	sd	Mean of squares	F	p
Between-groups	31.339	2	15.699	.120	.887
Within-groups	58293.709	445	130.997		
<b>Total</b>	58325.107	447			

The results of variance analysis presented in Table 6 show that wage does not have a significant effect on the teachers' motivational scores [ $F_{(2,445)} = .120$ ,  $p > .05$ ]. That is, wage is not a variable determining the teachers' attitudes towards the factors motivating teachers.

## **Discussion**

The mean score of the teachers' attitudes towards factors motivating teachers was found to be 124.08. In the current study, this mean score is considered to be high. This indicates that while the teachers are working for the goals of the school, they are affected by factors motivating them to a great extent. In this regard, it is clear that

enhancing the motivation of teachers is important. In order to increase teachers' motivation, among factors motivating them, the positive ones should be supported and the negative ones should be eliminated from the environment. In this regard, the most important determiners of whether teachers are positively or negatively affected by motivational factors are school directors and educational authorities because the most important person leading the school towards its objectives is the director. Hence, school directors should be sensitive to the needs of teachers, care about their desires, determine the motivational factors that will help to minimize the negative atmosphere in the organization, and support teachers. Directors should especially be careful about intrinsic motivational factors affecting teachers and support these intrinsic motivational factors because teachers having high intrinsic motivation participate in the process more willingly, successfully and actively. The findings of the study concur with the findings of Erdem and Gözel (2014) and Ada et al., (2013).

It was found that the teachers' attitude scores for the motivational factors are not significantly affected by gender [ $p > .05$ ]. Hence, it can be argued that gender does not have a significant influence on teachers' attitudes towards motivational factors. This finding is similar to the findings reported by Erdem and Gözel (2014), Kulpcu (2008), Receptoğlu (2014), Eroğlu (2007), Tanrıverdi (2007) and Güven (2007).

It was found that there is a significant correlation between the teachers' attitude scores for motivational factors and age [ $F_{(3,444)} = 2.645$ ,  $p < .05$ ]. The source of this difference stems from the differences between the scores of younger teachers and older teachers; hence, it can be claimed that younger teachers are more affected by motivational factors. In this respect, it is seen that the older the teacher is, the less he/she is affected by motivational factors, the less sensitive they become towards their job and the more reluctant they become. Efforts should be made to find ways of making older teachers more motivated. This finding is supported by Güven (2007), Tanrıverdi (2007) and Receptoğlu (2014).

No significant difference based-on the teachers' marital status was found among the attitude scores of the teachers [ $p > .05$ ]. Marital status does not have a significant effect on teachers' attitudes towards motivational factors. This finding is supported by Kulpcu (2008).

It was found that educational status of the teachers has a significant effect on the teachers' attitudes towards motivational factors [ $F_{(2,445)} = 3.428$ ,  $p < .05$ ]. The teachers' attitudes are significantly affected by their educational status. There is a significant difference between the attitudes of the teachers completing two-year degree program and having graduate education. This difference favors the teachers having graduate education. This may be because the teachers having higher education will naturally increase their expectations; hence, they need more motivational factors. This finding is supported by Receptoğlu (2014), Yılmaz (2009), Tiryaki (2008) and Tanrıverdi (2007).

It was found that there is no significant difference among the teachers' attitude scores based on wage [ $F_{(2,445)} = .120$ ,  $p > .05$ ]. Hence, it can be argued that wage does not have a significant effect on teachers' attitudes towards motivational factors. In this regard, it seems that the teachers are not affected by external motivational sources. This finding concurs with Çoşkun (2009).

## Conclusions and Recommendations

In light of the findings of the present study, it can be argued that the teachers' attitudes towards factors motivating them are high. Age and educational status have significant affects on the teachers' attitudes towards factors motivating them; however, gender, marital status and wage do not significantly affect the teachers' attitudes. It is seen that younger teachers with higher education are the ones most affected by motivational factors. In this regard, following suggestions can be made to researchers and directors:

- Factors motivating teachers should be selected among intrinsic motivational factors,
- In order to increase the motivation of older teachers, motivating factors should be organized more carefully,
- In order to increase the motivation of teachers, they can be encouraged to do master degree by their directors.

## References

- Açıksöz, A., (2008), Fen ve teknoloji öğretmen adaylarının fen eğitimine yönelik motivasyonları belirlemek için örnek bir ölçek geliştirilmesi, *VII. Ulusal Sınıf Öğretmenliği Sempozyumu*, Çanakkale Onsekiz Mart Üniversitesi, 2-3-4 Mayıs.
- Ada, Ş., Akan, D., Ayık, A., Yıldırım, İ. & Yalçın, S. (2013). Öğretmenlerin motivasyon etkenleri. *Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 17(3), 151-166.
- Alam, M. T., & Farid, S. (2011). Factors affecting teachers motivation. *International Journal of Business and Social Science*, 2(1), 298-304.
- Atkinson, E. S. (2000). An investigation into the relationship between teacher motivation and pupil motivation. *Educational Psychology: An International Journal of Experimental Educational Psychology*, 20(1), 45-57.
- Basaran, ;E. (1991). *Örgütsel davranış*. Ankara: Gül Yayınları.
- Bursalioğlu, Z. (2011). *Okul yönetiminde yeni yapı ve davranış*. Ankara: Pegem Akademi.
- Cemaloğlu, N. (2002). *Eğitimde örgütsel yenileşme ve öğretmenlerin güdülenmesi*. Ankara: Aktif Eğitim.
- Cenkseven-Önder, F. & Sarı, M. (2009). Öğretmenlerde öznel iyi olmanın yordayıcıları olarak okul yaşam kalitesi ve tükenmişlik. *Kuram ve Uygulamada Eğitim Bilimleri*, 9, 1205- 1236.
- Çepni, S. (2010). *Araştırma ve proje çalışmalarına giriş*. Trabzon: Üç Yol Kültür Merkezi.
- Çoşkun, M. (2009). İlköğretim okullarında motivasyon araçları hakkında öğretmen görüşleri ve doyum düzeyleri üzerine bir alan araştırması (Silivri örneği). Yayımlanmamış Yüksek Lisans Tezi, Beykent Üniversitesi Sosyal Bilimler Enstitüsü, İstanbul.
- Dereci, E. & Acat M.B. (2010). Okul öncesi eğitim öğretmenliği bölümü öğrencilerinin motivasyon kaynakları ve sorunları. *Selçuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 24, 173-187.
- Erdem, A.R. & Gözel, E. (2014). Motivational levels of prospective primary school teachers concerning teaching profession. *The Journal of Academic Social Science*, 2(1), 49-60.
- Eroğlu, S. (2007). *Toplam kalite yönetimi uygulanan orta öğretim kurumlarında öğretmenlerin örgütsel adanmışlık ve motivasyon düzeyleri*. Yayımlanmamış Yüksek Lisans Tezi, Yeditepe Üniversitesi Sosyal Bilimler Enstitüsü, İstanbul.
- Güçlü, N., Receptoğlu, E. & Kılınç, A.Ç. (2014). The relationship between organizational health of the primary schools and teachers' motivation [in Turkish]. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi [Hacettepe University Journal of Education ]*, 29(1), 140-156.
- Günbayı, İ. (2001). İlköğretim okulu öğretmenlerinin iş doyumunu. *Kuram ve Uygulamada Eğitim Bilimleri*, 1, 93-112.
- Güven, A. (2007). *Kamu yöneticilerinin davranış tarzlarının personelin motivasyonu üzerine etkileri: Tokat il milli eğitim müdürlüğünde çalışan öğretmenler üzerinde bir uygulama..* Yayımlanmamış Yüksek Lisans Tezi, Gazi Osman Paşa Üniversitesi Sosyal Bilimler Enstitüsü, Tokat.
- Güzel, H. (2011). Fizik öğretmenlerinin demografik özellikleri ve motivasyon faktörlerinin araştırılması. *Kuram ve Uygulamada Eğitim Bilimleri Dergisi*, 11(2), 1031-1054.
- Hoy, W. K., & Miskel, C. G. (2012). *Eğitim yönetimi, teori, araştırma ve uygulama* (Çeviri editörü: S. Turan, 7. Baskıdan çeviri). Ankara: Nobel.
- İncir, G., (1990), *“Çalışanların iş doyumunu üzerine bir inceleme*, Ankara: Milli Prodüktivite Merkezi Yayınları.
- Joo, B. K., & Lim, T. (2009). The effects of organizational learning culture, perceived job complexity, and proactive personality on organizational commitment and intrinsic motivation. *Journal of Leadership & Organizational Studies*, 16(1), 48-60.
- Köknel, Ö., (1983), *“Kişilik”*, 4. Baskı, İstanbul: Altın kitap.
- Kulpcu, O. (2008). *İlköğretim okullarında görev yapan öğretmen ve yöneticileri motive etmede kullanılabilecek motivasyon araçları üzerine bir araştırma*. Yayımlanmamış yüksek lisans tezi, Gaziantep Üniversitesi Sosyal Bilimler Enstitüsü.
- Lam, S.-F., Cheng, R. W., & Ma, W. Y. (2009). Teacher and student motivation in project-based learning. *Instructional Science*, 37, 565–657.
- Lin, H. F. (2007). Effects of extrinsic and intrinsic motivation on employee knowledge sharing intentions. *Journal of Information Science*, 33(2), 135-149.
- Littlejohn, A. (2008). The tip of the iceberg: Factors affecting learner motivation. *Regional Language Centre Journal*, 39(2), 214-225.
- Lourmpas, S. & Dakopoulou, A. (2014). Educational leaders and teachers' motivation for engagement in innovative programmes. The case of Greece. *Procedia-Social and Behavioral Sciences*, 116, 3359-3364.
- Mansfield, C.F. & Beltman, S. (2014). Teacher motivation from a goal content perspective: Beginning teacher' goals for teaching. *International Journal of Education Research*, 65, 54-64.
- Millette, V., & Gagne, M. (2008). Designing volunteers' tasks to maximize motivation, satisfaction and performance: the impact of job characteristics on volunteer engagement. *Motivation and Emotion*, 32(1), 11-22.
- Örücü, E. & Kambur, A. (2008). Örgütsel-yönetimsel motivasyon faktörlerinin çalışanların performans ve verimliliğine etkilerini incelemeye yönelik ampirik bir çalışma: hizmet ve endüstri işletmesi örneği. *Yönetim ve Ekonomi*, 15(1), 85-97.
- Özdemir, S. & Muradova, T. (2008). Örgütlerde motivasyon ve verimlilik ilişkisi. *Journal of Qafqaz University*, 24, 146-153.

- Recepoglu, E. (2014). Analyzing job motivation level of high school teachers in Turkey. *Procedia-Social and Behavioral Sciences*, 116, 2220-2225.
- Satman, C. (2013). *Devlet okullarında görev yapan öğretmenlerin ekip çalışması konusundaki yaklaşımları, ekip çalışmasına ilişkin motivasyon ve doyum düzeylerinin incelenmesi*. Yayınlanmamış Doktora Tezi, Ankara Üniversitesi Eğitim Bilimleri Enstitüsü.
- Sharabyan, S. K. (2011). An investigation into Iranian language teachers' motivation with respect to their job satisfaction and second language pedagogy. *Procedia-Social and Behavioral Sciences*, 30, 1071-1075.
- Sinclair, C. (2008). Initial and changing student teacher motivation and commitment to teaching. *Asia-Pacific Journal of Teacher Education*, 36, 79-104.
- Tanrıverdi, S. (2007). *Katılımcı okul kültürünün yabancı dil öğretmenlerinin iş motivasyonu ile ilişkisine yönelik örnek bir çalışma*. Yayınlanmamış Yüksek Lisans Tezi, Yeditepe Üniversitesi Sosyal Bilimler Enstitüsü, İstanbul.
- Tiryaki, A. (2008). *İşletmelerde modern liderlik yaklaşımları ve çalışan motivasyonu ilişkisine yönelik bir uygulama*. Yayınlanmamış Yüksek Lisans Tezi, Yıldız Teknik Üniversitesi Sosyal Bilimler Enstitüsü, İstanbul.
- Yalçın, H. & Korkmaz, M.E. (2013). Preschool teachers' conditions of motivation. *The Journal of International Social Research*, 6(26), 602-609.
- Yazıcı, H. (2009). Öğretmenlik mesleği, motivasyon kaynakları ve temel tutumlar, kuramsal bir bakış. *Kastamonu Eğitim Dergisi*, 17 (1), 33-46.
- Yılmaz, F. (2009). *Eğitim örgütlerinde örgüt kültürünün öğretmenlerin iş motivasyonu üzerindeki etkisi*. Yayınlanmamış Yüksek Lisans Tezi, Selçuk Üniversitesi, Sosyal Bilimler Enstitüsü, Konya.
- Yiğenoğlu, E. (2007). *Ortaöğretim okulu öğretmenlerinin algılarına göre, mesleki etkinliklerindeki güdülenmişliklerini sağlayan etmenler*. Yayınlanmamış yüksek lisans tezi, Gazi Üniversitesi, Eğitim Bilimleri Enstitüsü, Ankara.

# Fen Bilgisi Öğretmen Adaylarının Hazırlamış Oldukları Ders Materyalleri Hakkındaki Görüşleri Nasıldır?

Abdullah Koray<sup>a</sup>, Gürkay Birinci<sup>a</sup>, Özlem Koray<sup>a</sup>\*86

<sup>a</sup>Bülent Ecevit Üniversitesi, Ereğli Eğitim Fakültesi, Zonguldak, Türkiye

## Özet

Sürekli değişen ve gelişen dünya düzenine uygun, çağdaş öğretme-öğrenme ortamlarında, öğretmenlerin güncel ve yaratıcı öğretim materyalleri tasarlaması ve etkili bir şekilde kullanması çok önemli bir noktaya sahiptir. Öğrenmeyi en kısa ve verimli yoldan sağlayabilmek adına, ders içerik ve hedefleriyle de uygun materyallerin öğretmenler tarafından bizzat hazırlanması, materyal tasarlama ve hazırlama sürecinde edinilen kazanımlarla ilgilidir. Bu çalışmanın amacı, Fen Bilgisi öğretmen adaylarının hazırlamış oldukları öğretim materyallerini, tasarlama ve geliştirme sürecinde yaratıcılıklarını ne düzeyde kullandıklarına yönelik görüşlerini tespit etmektir. Bu amacı gerçekleştirmek üzere, 2012-2013 eğitim-öğretim yılı güz döneminde “Öğretim Teknolojileri ve Materyal Tasarımı” dersini alan 35 üçüncü sınıf Fen Bilgisi öğretmen adayının görüşleri ele alınmıştır. Çalışmanın verileri, katılımcıların hazırlamış oldukları üç boyutlu ve bilgisayar temelli materyallerin tasarımı ve geliştirilmesi süreci ile ilgili standartlaştırılmış açık uçlu görüşme formu toplanmıştır. Elde edilen veriler, nitel veri analizi tekniklerinden içerik analizi ve betimsel analiz tekniği kullanılarak analiz edilmiştir. Araştırmanın bulgularına göre, öğretmen adayları yaratıcı fikirlerini her iki materyali tasarlarken ve geliştirirken kullandıklarını, üç boyutlu materyali tasarlama ve geliştirme sürecinde, bilgisayar temelli materyale göre daha yaratıcı olduklarını ifade etmişlerdir. Materyal hazırlama sürecine göre, materyal konusu seçme ve tasarlama aşamalarında daha fazla zorlandıklarını belirtmişlerdir. Ayrıca tüm süreç için, öğretmen adaylarının yaratıcılıklarının yanı sıra bakış açılarının geniş ve alan bilgilerinin çok iyi olması gerektiğini fark ettikleri belirlenmiştir.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

**Keywords:** Materyal tasarımı, Fen Eğitimi, Yaratıcılık

## Abstract

It is very significant for teachers to design up-to-date and creative instruction materials appropriate for constantly-changing and developing world and to use them effectively in up-to-date instruction settings. The development of class materials appropriate for class contents and targets by teachers is closely related to the gains obtained through the material design and preparation process for the purpose of providing with learning through the easiest ways. The purpose of this study is to determine to what extent pre-service science teachers use their creativity in the design and development of instruction materials. To serve that purpose, 35 third year pre-service science teachers taking the course of “Instructional Technologies and Material Development” in the fall term of 2012-2013 academic year were requested to submit their opinions related to the issue. The data of the study was collected through a standard open ended interview form related to the 3 dimensional and computer based material design and development prepared by the participants. The obtained data was submitted for analysis through content analysis and descriptive analysis techniques which are qualitative data analysis techniques. According to the findings of the study, pre-service teachers suggest that they use their creative ideas in the design of both materials, but they suggested that they were much more creative in the design and development of 3 dimensional material compared to that of computer based material design. They also suggest that they had more difficulty in the process of choosing the topic and designing the material compared to that of developing the material. They also suggested that it is better for pre-service teachers to have broader perspectives as well as being creative.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

\* Corresponding author. Tel.: +90-542-520-0608

E-mail address: korayabdullah@gmail.com

## GİRİŞ

Günümüzde yeni ve değerli bir şeyler üretme olgusuna önem verilmesi, çocukların ve onları yetiştirecek öğretmenlerin eğitiminde hayal gücü ve yaratıcılığa ne denli önem vermemiz gerektiğini göstermektedir. Bilinenin, alışılmış ve kalıplaşmış olanın tam karşısı olan bir davranış biçimi, düşünme süreci ya da yeni bir ürün ortaya koyma becerisi olarak tanımlanan yaratıcılığın eğitimde kullanılması ile bireylerin ve dolayısıyla tüm toplumun kalite standartları yükseltilebilir. Yaratıcılık eğitiminin amacı; merak eden, deneyen, araştıran, keşfeden, üreten, sorgulayan, sorunları değişik açılardan değerlendirebilen, mantığını ve sezgilerini bir arada kullanabilen, bağımsız ve kendi kendine karar vermeyi bilen, kısaca düşünen insan yetiştirmektedir (Koray, 2003). Bu tür özelliklere sahip bireyler yetiştirmek için eğitim programlarının, düşünme eylemini özellikle de yaratıcı düşünmeyi merkeze alarak düzenlenmesine ihtiyaç vardır. Yaratıcılık, problem çözme becerisi olarak görülmekle beraber; gerçekte yaratıcı performans, problemi fark etmeyi, farklı düşünmeyi ve çözüm geliştirmeyi gerektirmektedir. Yaratıcılık potansiyelini geliştirmeye yönelik olarak hazırlanan ve bilim, eğitim, sanat, mühendislik ve iş sektörü gibi hemen hemen her alanda uygulanan programlarla, bireylerin yaratıcı gelişimlerinde özellikle problem çözme ve ürün ortaya koyma becerilerinde mükemmel sonuçlar ortaya çıktığı görülmüştür (Conner, 1998; Ihsen ve Brandt, 1998; Atkıncı, 2001; Dinç, 2000).

Bireylerin ve dolayısıyla bütün toplumun yaşam kalitesini artıran bir diğer unsur da; teknolojinin gelişmesidir. Günümüzde teknolojinin toplum hayatında daha etkin bir yere sahip olması, teknolojinin eğitimdeki etkisinin büyümesine ve böylece teknolojinin bir öğretim aracı olarak kullanılabilmesi için öğretmenlerin yeni bilgi ve yeteneklere sahip olmaları gereğini ortaya çıkarmaktadır. Teknolojinin öğretmenler tarafından yeterince etkili kullanılamaması ve eğitim teknolojilerindeki değişimlerin takip edilememesi, eğitim sisteminin ana ögesi olan öğretmenin etkinliğini azaltmakta, buna bağlı olarak eğitim kalitesinin niteliğinde düşüşler gözlemlenebilmektedir (Haddad ve Jurich, 2002). Dolayısıyla öğretmenleri, teknolojideki yeni gelişmelerle buluşturabilmek için, gerek eğitim ortamlarındaki altyapının sürekli iyileştirilmesi, gerekse öğretmenlere verilecek eğitimlerin içeriklerinin sürekli güncellenmesi gerekmektedir. Böylece öğretmenler, teknolojiyle donatılmış bir ortamda teknolojinin eğitime entegre edilmesini sağlayabilir ve ders içeriğini kendi yöntemleriyle sunabileceği öğretim materyalleri hazırlayabilirler. Bu çalışmada ürün geliştirmede odak noktası olan öğretim materyali kavramı; genel olarak hedefleri gerçekleştirmek amacıyla araçlardan faydalanılarak yapılan ders sunum içerikleri olarak tanımlanabilir (Yanpar Yelken, 2009). Materyal tasarımı geçerli ve önceden kestirilebilen bir öğretim için, hem materyallerin hem de görsel ve işitsel diğer unsurların öğretim hedefine yönelik olarak seçimi, üretimi, kullanımı ve bunlardan etkili şekilde yararlanılması sürecini kapsar. Son yıllarda öğretim materyali tasarımı ve kullanımı üzerinde önemle durulmakta ve özellikle Milli Eğitim Bakanlığının 2004 yılında uygulamaya koyduğu eğitim programında en çok vurgulanan konular arasında yer almaktadır (MEB, 2004).

Bu bağlamda; sürekli değişen ve gelişen dünyaya uygun, çağdaş öğretme-öğrenme ortamlarında, öğretmenlerin güncel ve yaratıcı öğretim materyalleri tasarlaması ve etkili bir şekilde kullanması çok önemli bir noktaya sahiptir. Öğrenmeyi en kısa ve verimli yoldan sağlayabilmek adına, ders içerik ve hedefleriyle de uygun materyallerin öğretmenler tarafından bizzat hazırlanması, materyal tasarlama ve hazırlama sürecinde edinilen kazanımlarla ilgilidir. Günümüz eğitim sisteminde, öğretmenlerin yaratıcı düşünme süreçlerini kullanarak, güncel, kullanışlı ve hedeflerle uyumlu öğretim materyalleri tasarlaması ve etkili bir şekilde kullanması çok önemli bir noktaya sahiptir. Ayrıca pedagojik yönden ve alan hakimiyeti yönünden yetiştirilmelerine önem verilen öğretmen adaylarının, öğretim materyallerinin tasarımı ve hazırlanması sürecinde yaratıcılıklarının da geliştirilmesi gerekmektedir. Bu nedenle bu çalışmada elde edilecek veriler, öğretmenlerin materyal geliştirme sürecinde yaratıcı düşünme becerilerini kullanma düzeylerinin belirlenmesi açısından alanyazına önemli katkılar sağlayacağı düşünülmektedir.

Bu çalışmanın amacı, Fen Bilgisi öğretmen adaylarının hazırlamış oldukları öğretim materyallerini, tasarlama ve geliştirme sürecinde yaratıcılıklarını ne düzeyde kullandıklarına yönelik görüşlerini tespit etmektir. Bu genel amaç doğrultusunda aşağıdaki sorulara yanıt aranmıştır:

- Öğretmen adayları üç boyutlu ve bilgisayar temelli materyallerini tasarlar ve hazırlarken;
1. Yaratıcı olup olmamalarının bağlı olduğu faktörler konusundaki görüşleri nelerdir?
2. Yaratıcı düşünme becerilerinin gelişip gelişmediği konusundaki görüşleri nelerdir?

### 3. Hangi tür öğretim materyali hazırlarken daha yaratıcı olduklarına yönelik görüşleri nelerdir?

## YÖNTEM

Araştırmada nitel araştırma yöntemlerinden görüşme türü ve görüşme türlerinden görüşme formu yaklaşımı kullanılmıştır. “Görüşme formu yöntemi benzer konulara yönelmek yoluyla değişik insanlardan aynı tür bilgilerin alınması amacıyla hazırlanır (Yıldırım ve Şimşek, 2008). Bu çalışmada yapılandırılmış görüşme formu kullanılarak öğretmen adaylarının araştırma problemleri doğrultusundaki görüşleri tespit edilmiştir.

### *Çalışma Grubu*

Araştırmada kolay ulaşılabilir durum örnekleme kullanılmış olup, 2012-2013 eğitim-öğretim yılı güz döneminde “Öğretim Teknolojileri ve Materyal Tasarımı (ÖTMT)” dersini alan 35 üçüncü sınıf Fen Bilgisi öğretmen adayı ile gerçekleştirilmiştir.

### *Yapılan Uygulamalar*

Araştırma kapsamında ÖTMT dersinde öğrencilerin üç boyutlu ve bilgisayar temelli materyaller geliştirmeleri istenmiştir. Uygulama gerçekleştirilmeden önce öğrencilere yapılandırılmış görüşme formu(ön görüşme formu) uygulanmıştır. Uygulama esnasında ise; öğretmen adayları materyallerini geliştirirken grup çalışması (4 ya da 5 kişilik gruplar) yapmışlar ve 6 haftalık süreçte materyallerini geliştirmişlerdir. Materyallerin geliştirilmesi süreci, 3 oturumluk çalışma kâğıtları ile takip edilmiştir. Genel hatlarıyla çalışma kâğıtlarının ilk oturumunda (1 hafta süreli), alternatif konular ve materyaller ortaya konmuş, grup etkileşimleriyle ve beyin fırtınası tekniğiyle konu ve materyaller etrafında tartışılmış ve oturumun sonunda özellikle materyallerin yapılacağı konu belirlenmiştir. İkinci oturumda (2 hafta süreli), belirlenen konu çerçevesinde, öncelikle kâğıt üzerinde ayrıntılı olarak 3'er adet üç boyutlu ve bilgisayar temelli materyal tasarımları oluşturulmuştur. Bu tasarımlar için gerekli malzemeler, bilgi kaynakları, maliyet ve zaman hesaplamaları, kullanılacak programlar vb. konular yine grup tartışmaları ile ortaya konmaya çalışılmıştır. Oturumun sonunda hangi materyal tasarımlarının yapılacağına - üç boyutlu ile bilgisayar temelli materyallerin birbirleriyle paralellik taşıması noktasının da üzerinde durularak-karar verilmiştir. Seçilen materyaller için gerekli malzeme, zaman çizelgesi, grup görev dağılımı ve harcamalar gibi konular da bu oturumda beyin fırtınası kullanılarak, grupça tartışılmıştır. Son oturum (3 hafta süreli), materyallerin yapım aşaması ile ilgilidir. Materyallerin yapımında, ilgili kaynaklar taranarak ve grup fikirleri de alınarak gerekli malzemelerin temini, bunların bir araya getirilmesi, çeşitli denemelerin yapılması, uzmanlardan dönütler alınarak gerekli düzenlemelerin yapılması işleri tamamlanmıştır. Her üç oturumda da grupların oturum formlarını doldurarak yazılı olarak süreci ifade etmeleri sağlanmıştır. Son hafta da ise; gruplar materyallerini tamamlanmış bir şekilde sınıf ortamına getirmişlerdir. Sınıfın genel değerlendirmesi çerçevesinde, yapılan materyaller içerisinde en iyi üç örnek gerekçeleriyle birlikte seçilerek süreç tamamlanmıştır.

Uygulama sonucunda (1 hafta sonra), öğretmen adaylarının, süreç ve ürün (materyaller) ile ilgili görüşlerini tespit etmek için açık uçlu görüşme formu(son görüşme formu) uygulanmıştır.

### *Veri Toplama araçları*

Bu çalışmada öğretmen adaylarının materyal tasarlama ve hazırlama sürecinin değerlendirilmesine yönelik görüşlerini belirlemek amacıyla açık uçlu sorulardan oluşan dört maddelik (birbirine paralel sorular) yapılandırılmış ön ve son görüşme formu kullanılmıştır. Formun kapsam geçerliliği öğretim teknolojileri, alan eğitimi ve ölçme değerlendirme uzmanlarının görüşleri alınarak sağlanmıştır.

### *Verilerin Analizi*

Araştırmada yapılandırılmış görüşme formu ile toplanan verileri analiz etmek için, nitel veri analizi tekniklerinden içerik analizi ve betimsel analiz kullanılmıştır.

## BULGU VE YORUMLAR

### *Materyal Tasarımında Yaratıcı Olup Olmama İle İlgili Görüşler*

Öğretmen adaylarına materyal tasarlama sürecinden önce “Materyal tasarlama sürecinde yaratıcı olacağınızı düşünüyor musunuz? Bunu neye bağlıyorsunuz?” sorusuna; materyal tasarlama sürecinden sonra ise “Materyal tasarlama sürecinde yaratıcı olduğunuzu düşünüyor musunuz? Bunu neye bağlıyorsunuz?” sorusuna yanıt vermeleri istenmiştir. Alınan yanıtlar doğrultusunda dikkat çeken veriler ile oluşan tablolar aşağıda verilmiştir.

Tablo1. Materyal tasarımında yaratıcı olup olmama ile ilgili görüşler

ÖNCE		
Yaratıcı olup olmayacakları	Bağlı olduğu faktörler	Frekans
Evet, yaratıcı olacağım	Özgün bir materyal tasarlayacağım	10
	Grup çalışması yapacağız	5
	Konuya hakimim	3
Hayır, yaratıcı olmayacağım	İlk defa yapacağım	3
SONRA		
Yaratıcı olup olmadıkları	Bağlı olduğu faktörler	Frekans
Evet, yaratıcıydım	Özgün bir materyal tasarladım	12
	Atık malzeme kullandık	12
	Kullanışlı bir materyal tasarladık	7
	Konuyu somutlaştırdık	6
	Grup çalışması yaptık	4
Hayır, yaratıcı değildim	-----	0

Verilen yanıtlardan, özgün ve yeni bir fikre odaklanarak materyal tasarlamanın, öğretmen adaylarını yaratıcı düşünme becerilerini kullanmaya daha fazla yönelttiği anlaşılmaktadır. Geçmişte yapılmış materyallere bağlı kalmadan ve fikrini kendilerinin oluşturdukları materyaller, öğretmen adaylarını yaratıcı düşünmeye sevk etmektedir. Bunun yanında öğretmen adaylarının grup çalışmasının önemine vurgu yaptıkları görülmektedir. Grupça birlikte çalışılan projelerde, ortaya atılan küçük fikirlerin karşılıklı tartışmaların sonucunda büyüyerek olgun bir fikre dönüşmesinin, yaratıcı bir ürünün ortaya çıkmasında önemli bir rol oynadığının altı çizilmektedir.

Materyal tasarımında atık malzemelerin kullanılmasının, öğretmen adaylarını yaratıcı düşünmeye sevk eden önemli etmenlerden biri olduğu anlaşılmaktadır. Öğretmen adaylarının bu konuda verdiği yanıtların sadece materyal tasarımından sonra olmasının nedeni, öncesinde materyal tasarımı için atık malzeme kullanacaklarını bilmemelerinden kaynaklanmıştır. Demek oluyor ki, materyal tasarımında kullanılacak malzemeler konusunda bir sınırlılığın getirilmesi, öğretmen adaylarını daha fazla yaratıcı fikirler ortaya koymaya yönlendirmektedir.

### *Materyal Tasarımının Yaratıcılığı Geliştirip Geliştirmemesi İle İlgili Görüşler*

Öğretmen adaylarına materyal tasarlama sürecinden önce “Materyal tasarlama sürecinin yaratıcılığınızı geliştireceğini düşünüyor musunuz? Bunu neye bağlıyorsunuz?” sorusuna; materyal tasarlama sürecinden sonra ise “Materyal tasarlama sürecinin yaratıcılığınızı geliştirdiğini düşünüyor musunuz? Bunu neye bağlıyorsunuz?”



sorusuna yanıt vermeleri istenmiştir. Alınan yanıtlar doğrultusunda dikkat çeken veriler ile oluşturulan tablolar aşağıda verilmiştir.

Tablo 2. Materyal tasarımının yaratıcılığı geliştirip geliştirmemesi ile ilgili görüşler

ÖNCE		
Yaratıcılığı geliştirecek mi	Bağlı olduğu faktörler	Frekans
Evet, geliştirecek	Özgün bir fikir için kendimizi düşünmeye zorlayacağız	18
	Araştırma yapacağız	8
	Grup çalışması yapacağız	4
	Soyut bir konuyu somutlaştıracamız	4
Hayır, geliştirmeyecek	İlk defa yapıyoruz	2
SONRA		
Yaratıcılığı geliştirdi mi	Bağlı olduğu faktörler	Frekans
Evet, geliştirdi	Farklı düşünerek özgün fikirler geliştirdik	21
	Atık malzemeler kullandık	12
	Grupça tartışmalar yaptık	3
	Soyut bir konuyu somutlaştırdık	2
Hayır, geliştirmede	-----	0

Öğretmen adayları, özgün bir fikir bulabilmek için kendilerini düşünmeye zorlamanın yaratıcılıklarını geliştirmeye katkıda bulunduğunu ifade etmektedirler. Amacın sadece sıradan bir materyal geliştirmek olmamasının, özgün bir fikrin peşine düşme çabasının yaratıcı fikirlerin ortaya çıkmasına zemin hazırladığı anlaşılmaktadır. Bunun yanında öğretmen adaylarının grup çalışmasının önemine burada da vurgu yaptıkları görülmektedir. Grupça birlikte çalışılan projelerde, ortaya atılan küçük fikirlerin karşılıklı tartışmaların sonucunda büyüyen bir fikre dönüşmesinin, yaratıcı bir ürünün ortaya çıkmasında önemli bir rol oynadığının altı çizilmektedir. Ayrıca öğretmen adaylarının, soyut konuları somutlaştırma çabasının da yaratıcılığı geliştirdiğini ifade ettikleri görülmektedir.

Atık malzemelerin materyal tasarımında kullanılmasının, yaratıcılığı geliştiren önemli etmenlerden biri olduğu belirtilmektedir. Öğretmen adaylarının bu konuda verdiği yanıtların sadece materyal tasarımdan sonra olmasının nedeni, öncesinde materyal tasarımı için atık malzeme kullanacaklarını bilmemelerinden kaynaklanmaktadır. Demek oluyor ki, materyal tasarımında kullanılacak malzemeler konusunda bir sınırlılığın getirilmesi, öğretmen adaylarını daha fazla yaratıcı fikirler ortaya koymaya yönlendirmektedir.

#### *Materyal Türüne Göre Yaratıcı Olma Durumu İle İlgili Görüşler*

Öğretmen adaylarına materyal tasarlama sürecinden önce “Üç boyutlu materyali tasarlarken mi yoksa bilgisayar temelli materyali tasarlarken mi daha yaratıcı olabilirsiniz?” sorusuna; materyal tasarlama sürecinden sonra ise “Üç boyutlu materyali tasarlarken mi yoksa bilgisayar temelli materyali tasarlarken mi daha yaratıcıydınız” sorusuna yanıt vermeleri istenmiştir. Alınan yanıtlar doğrultusunda dikkat çeken veriler ile oluşturulan tablolar aşağıda verilmiştir.

Tablo 3. Materyal türüne göre yaratıcı olma durumu ile ilgili görüşler

ÖNCE		
Materyal Türü	Gerekçe	Frekans
Üç boyutlu materyal	Elle tutulan nesneleri kullanmak daha kolay	7
	Bilgisayar bilgim sınırlı	6
Bilgisayar temelli materyal	Zengin ortamlar var	6

SONRA		
Materyal Türü	Gerekçe	Frekans
Üç boyutlu materyal	Bilgisayar bilgin sınırlı	12
	Özgün bir fikir bulmak daha kolay	5
	Elle tutulan nesneleri kullanmak daha kolay	3
	Kullanılabilecek birçok malzeme var	3
Bilgisayar temelli materyal	Zengin ortamlar var	3
	Bilgisayarı iyi kullanabilirim	2
	Bilgisayarda yapılabilecek materyaller düşünebilirim	2

Tablodaki verilerden, öğretmen adaylarının verdikleri yanıtların materyal geliştirme sürecinin öncesinde ve sonrasında çok fazla değişikliğe uğramadığı dikkati çekmektedir. Öğretmen adaylarının büyük çoğunluğunun materyal tasarımında üç boyutlu (elle tutulabilen) nesneleri kullanarak materyal tasarlamayı tercih ettikleri anlaşılmaktadır. Bunun en temel gerekçesi olarak da, elle tutulan nesnelerin kullanılmasının kolay olmasını ve bilgisayar kullanma bilgilerinin yetersiz olmasını göstermektedirler. Bilgisayar bilgisinin yeterli olduğunu düşünen öğretmen adayları ise, bu ortamlarda kullanılabilecek daha fazla zengin ortamların (ses, animasyon, simülasyon, video vb.) bulunmasından dolayı bilgisayarı tercih ettiklerini ifade etmişlerdir.

## SONUÇLAR

Materyal tasarım sürecinin, öğretmen adaylarının yaratıcılıklarının gelişimine katkısının olup olmadığının incelendiği bu çalışmada, öğretmen adaylarının kendi söylemleri doğrultusunda bulgular elde edilmiş ve bu bulgulardan hareketle yaratıcılıklarının gelişimine katkıda bulunduğu sonucuna ulaşılmıştır. Bu olumlu duruma etki eden etmenler, öğretmen adaylarının verdikleri her yanıtta benzerlik göstermektedir. Bu etmenler arasında en fazla dile getirilenler, özgün bir materyal tasarlama gereksinimi, atık malzemelerin kullanılmasının istenmesi, grup çalışması ile fikirlerin olgunlaştırılması konularıdır. Öğretmen adayları, özgün ve yeni bir fikre odaklanarak materyal tasarlamının, kendilerini yaratıcı düşünme becerilerini kullanmaya daha fazla yönettığını belirtmişlerdir. Ayrıca fikir alışverişlerinin yapıldığı ve küçük bir fikrin, üzerinde yapılan tartışmalarla olgunlaştırıldığı grup çalışması ortamlarının yaratıcı fikirlerin gelişmesinde önemli katkılarının olduğunu altını çizilmiştir. Bunun yanında, öğretmen adaylarını kullanacak malzeme türü olarak sınırlandırıldıklarında, sadece atık malzemeler kullanmaları istendiğinde, yaratıcı düşünme süreçlerini daha etkili kullandıklarını da belirtmişlerdir.

Öğretmen adaylarının çoğunun, kendilerini üç boyutlu materyal geliştirirken daha yaratıcı buldukları belirlenmiş, bunun en önemli nedeninin, bilgisayar kullanım becerilerinin yeterli düzeyde olmamasından kaynaklandığı tespit edilmiştir. Bilgisayar temelli materyal geliştirmede kendilerini yaratıcı bulan öğretmen adaylarının, bilgisayarı iyi düzeyde kullanabildiklerine yönelik yanıtları, bu bulguyu desteklemektedir. Dolayısıyla, bilgisayar temelli ortamların sıkça kullanıldığı bu çağda öğretmen adaylarının bilgisayar becerilerinin yükseltilmesi, bilgisayar temelli materyal geliştirme sürecinde daha yaratıcı fikirler geliştirebilecekleri yönünde olumlu bir durumu da ortaya koymaktadır.

## Kaynaklar

- Atkinci, H. (2001). İlköğretim birinci kademe eğitim programlarının yaratıcı düşünmenin gelişimine etkisi, Yayınlanmamış Yüksek Lisans Tezi, Onsekiz Mart Üniversitesi Eğitim Bilimleri Anabilim Dalı, Çanakkale.
- Conner, C. (1998). Can you teach creativity?, British Educational Research Journal, 24,(4), 482-490.
- Dinç, A. (2000). Örgütlerde karar verme ve problem çözme süreçlerinde yaratıcı düşüncenin yeri ve önemi, Yayınlanmamış Yüksek Lisans Tezi, İstanbul Üniversitesi Sosyal Bilimler Enstitüsü, İstanbul.
- Ihsen, S. ve Brandt, D. (1998). Editorial: Creativity: How to educate and train innovative engineers, European Journal of Engineering Education, 23, (1), 3.
- Ertürk, S. (1972). Eğitimde "Program" Geliştirme, Hacettepe Üniversitesi Yayını, Ankara.
- Haddad, W.D., and Jurich, S. (2002). ICT for education: prerequisites and constraints. In W.D. Haddad and A. Draxler (Eds.).
- Koray, Ö. (2003). Fen eğitiminde yaratıcı düşünmeye dayalı öğrenmenin öğrenme ürünlerine etkisi, Yayınlanmamış Doktora Tezi, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.
- MEB (2004). İlköğretim fen ve teknoloji dersi öğretim programı, Ankara.

Yanpar Yelken, T.(2009). Öğretim teknolojileri ve materyal tasarımı, Anı Yayıncılık, Ankara.  
Yıldırım, A. ve Şimşek, H. (2008). Sosyal bilimlerde nitel araştırma yöntemleri, Seçkin Yayıncılık, Ankara.

INTE 2014

# Financial strategies, the professional development of employers and performance of sme's ( AGUASCALIENTES case )

Jesús Salvador Vivanco Florido<sup>87</sup>, Martha Gonzalez Adame, Miguel Angel Oropeza Tagle

*Universidad Autónoma de Aguascalientes*

*Universidad Autónoma de Aguascalientes*

*Universidad Autónoma de Aguascalientes*

---

## Abstract

The present investigation aim to identify strategies to increase the performance and development of SMEs and is considered the professional development of entrepreneurs in financial aspects such as liquidity management and corporate leverage, that can help in improving these and allow their permanence in the market since it is known that a high percentage of SMEs fail to overcome the barrier of the two years; in this research has demonstrated through the application of statistical models in 125 SMEs in the State of Aguascalientes Mexico, such as linear regression and ANOVA, that there is a strong positive relationship between financial management aspects such as liquidity and leverage and increased performance of SMEs,

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* Financial Strategies, Professional Development, SME

---

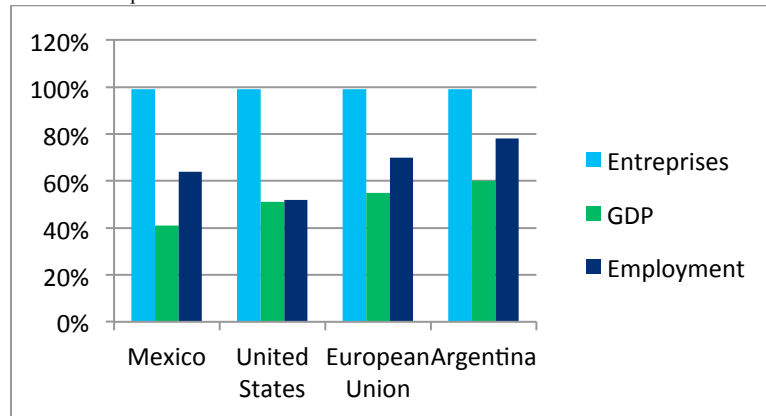
---

\* Corresponding author. Tel.: 014499107400; fax: 014499107400.

E-mail address: svivanco@correo.uaa.mx

SMEs account the economic platform of our country under currently employing 62% of the economically active population and contributing 41% of national GDP and account for 99% of the number of operating companies, is why our concern for searching tools for development and retention, the finance function involves a critical factor for effective operation and this research will address the issue of finance as means or knowledge that the entrepreneur must master to ensure the development of SMEs, starting to present some Outlook data information representing SMEs in Mexico.

Table 1  
Economic Impact of SMEs



Source: Small and medium size enterprises OECD June 2002

As shown in the graph SMEs represent a significant contribution to the economies of countries, since their contribution is very high in terms of GDP, employment and number of firms, as this involves the livelihoods of millions of families who depend on permanence of SMEs to ensure their survival and that of their families

## 2 LITERARY REVIEW.

### 2.1 Professional Development.

As an important part of professional development of entrepreneurs in SMEs, then presented from research articles commenting on a need for professional development in the accounting and financial field allowing the growth and permanence of SMEs.

Tunkele. et.al (2011), discussed in his study of forestry SMEs in the European Union, the role of small and medium enterprises (SMEs) in the development of the economy becomes more important since it can bereorient rapidly changing economic situation, and are the main guarantee of being in the regional scale. Although these companies are different SME's in the European Union. meet several similar difficulties. One of the main problems is the lack of SME management skills causing difficulties to ensure efficient management of enterprises. The aim of his research was to study the skills needed for employers to carry out their functions in small and medium forest enterprises European Union (SMFE Forestry SMEs). The task of the research was to identify the problems facing management SMFE in daily activity. To get results, used the method of qualitative interview and survey data and methodology are evaluated and well-established criteria

Dorasamy, et.al (2010 ) mention in their study of SMEs in Malaysia, the challenges faced by companies in maintaining the competitive edge in the business world have become a major concern. Companies are adopting technologies and best practices to address the frequent global changes. Several functions of the company are being redesigned for this purpose. Accounting functions play an important role in helping companies maintain a competitive edge paper. However, some small and medium enterprises (SMEs ) face fundamental problems of management accounting functions. This is predominantly due to his inexperience ; accounting functions not only require knowledge of generally accepted accounting standards or tax laws , but also the need to apply the rules in a given business environment ( Everaert , Sarens and Rommel , 2006) experience. They discussed the possibility of outsourcing accounting functions , as there is limited data in this area in the context of Malaysia. In essence , they found empirical evidence on the practices of accounting outsourcing by SMEs in Malaysia and conducted a survey to identify the SMEs overview of outsourcing with respect to accounting and third party organizations . Factors contributing to the decision to outsource accounting functions were analyzed. The study revealed a significant relationship between the roles of outsourcing accounting and two contributing factors, risks and management of the operation.

Mengyun et Jie (2012 ) indicate in their study on SMEs in China, with the development of market economy and the rapid growth of economic globalization , the limitations in the management model of private high -tech SMEs China gradually emerge as constraints for the development of family firms is given . The funding , capital integration , especially the integration of human capital are important to highlight in family-owned businesses issues. Therefore, how to efficiently introduce professional management mechanisms of private high-tech SMEs and how to solve the vacancy of trust are two of the main problems for private high -tech SMEs and presents the characteristics of private high -tech SMEs , and the shortcomings of the professional management companies owned by the family are discussed , the problems of job confidence in management, which prevents effective integration between professional management , the mechanism of trust and high technology , which is " growth -tech" SMEs

Nagaraju. B. et.al ,(2013 ) discussed in his research in India which financial services are vital in the development of vibrant SME sector . However access to financial services in this sector remains severely restricted. Lack of access to finance is often cited by SMEs as a barrier to growth. Commercial banks are the oldest institutions that have a wide network of branches and increased public confidence and have the major share in total banking. Often commercial banks consider financing of SMEs as risky and costly to meet due to lack of adequate resources , low capitalization , vulnerability to markets and lack of accounting records. The study attempts to analyze the loans of commercial banks to priority sectors and non priority sector lending , to identify problems and prospects of SME lending . E indicates that overcoming the challenges that exist, resulting in a great opportunity for commercial banks , showing a large market to serve and make loans to SMEs profitable banking operation . Additionally the SME have multiple banking needs. This in turn can provide excellent opportunities in other banking operations. Commercial banks should be proud to serve an important sector of the economy, which is the key growth engine of the economy of India.

Torlak .et.al (2005) , in his research on SMEs in Turkey , mentioned that small businesses have a growing need for effective marketing recipes that lead to improved performance and viability during the recession , recovery, and peak periods of business cycles . The owner / manager has to find a way to understand the essential characteristics of effective marketing of goods and services from small businesses. To this end, in your research analyzed the nature of the market and pricing in small businesses , and how the invitation is built to the customer and sell their products and services as well as the appropriate factor of customer credit is established . Thus, the document resulting from their research is an attempt to shed some light on the marketing strategies used by the owner / manager of small business ; which is an important field , but very sloppy.

The references cited above , indicate that training in business management and linking teachers sector and the productive sector is essential for the development of micro, small and medium enterprises as mentioned, are the platform of the economies of developed and developing countries.

### 3 FINANCIAL ASPECTS TO BE CONSIDERED IN THE DEVELOPMENT OR PERFORMANCE OF SMEs.

#### 3.1 Liquidity.

Liquidity is a term that demonstrates the ability to pay, the companies have to meet its short-term and often measured through the working capital according Gitman (1996), is the difference between current assets and or short-term liabilities is also defined as current assets financed by long-term liabilities; All in illiquid is impossible for a firm and especially SMEs can survive given the low level of capital that for their operations. Skomp (1978), consider the amount of liquidity and capital to meet expenses in a given period of time that can be insured by the initial capital and cash generated from normal operations in a given period of time without consider the sale of fixed assets and obtaining external funding.

To the extent that SMEs can control the key elements that promote liquidity and inventory turnover and accounts receivable, as well as maintaining positive working capital and generate a significant profit margin on the cost, will be more likely to have liquidity for their operations, increasing performance and therefore the possibility of subsistence.

Back (2005) in relation to liquidity, measured the financial aspects of the companies based on indexes not such as late payments that better explain the causes of financial problems, such as high leverage and illiquidity, which have even led to the bankruptcy of enterprises and especially SMEs by low operating capital.

From this information we can conclude that payments culture is important in entrepreneurs to maintain healthy business economy, establishing priorities according to their ability to pay, in the execution of these, employees, suppliers, treasury, etc..

Liquidity, income, less debt and operating efficiency, reflect, they have higher profits, businesses and greater

liquidity, demonstrating that support the operation itself is better than debt to achieve higher profits. Dromms (1979)

the pharmaceutical industry in the United States, closed or were sold large number of businesses, due to low sales and this is associated with the use of financial ratios and decision-making and successful businesses and is also observed that the analysis financial indexes is not a systematic analysis of past performance. Thomas III (1987).

If the operation is supported with funds generated from the operation itself, this becomes a more healthy management policy than borrowing which causes the increase in the cost of the operation, making the business less profitable and decreasing their chance of survival.

### 3.2 Leverage

Debt, best known as leverage defined by Weston et al, (1987), as the proportion of funds that have provided bank or commercial creditors.

SMEs involved in a very significant way in economic output and employment, but have a high mortality rate, the main causes of premature death can be; the size of the initial enterprise, lack of income and debt, as well as external factors such as economic growth of the sector in which they operate, or the geographical location of this, the initial size, financial performance, activity sector economic, have a positive impact, but there is an inverse relationship between leverage and business survival, implying that debt is more risky for the survival of SMEs factor. Sandoval (2008).

The ratio of the number of banks operating are related with business performance, since the return on assets decreases when the number of banks which it operates increases. Castelli (2006)

Domestic financing maintains a positive relationship with business growth and growth has a positive effect with formal financial institutions not to informal sources of financing. Saeed (2009).

### 3.3 Financial Ratios Analysis

The most commonly used financial ratios to measure performance in the following companies are, ROA (return on assets), ROI (Return on Investment), NPV (Net Present Value) and UNDI (Profit after tax), these indices are high application in medium and large companies, The VPN is defined as a method of valuation of projects that compares the value of Investment with project performance to present value.

This utility UNDI is determined:  $(\text{Net income} / \text{Sales})$  and the index recommended is at least 5%. In the SME sector of 25 to 250 workers applying these indices is limited by the lack of related information, however should be done to the extent you have obtained this information because information such as ROI (Return on Investment) we can provide the time required to recover the investment and the rate of NPV (net present value) that provides information such as the value of the return on investment to appraise the appropriateness of an investment or not.

## 4.PERFORMANCE

### 4.1 SMEs performance Elements

Have identified different ways of measuring performance in SMEs and then have different factors that lead to successful performance of SMEs raised by various researchers.

The degree of innovation in products, processes and management systems have a positive influence on performance, as well as the survival and competitiveness of SMEs, based on the success factors such as innovation, value added services, technology, quality and information society. Marin and Garcia Perez de Lema et.al (2007),

The performance measures, which are the resources generated operating income, economic profitability, operating profit and financial performance, are performance measures to measure the performance of SMEs. García Pérez de Lema and Miñarro (2006)

The average number of earnings before interest and taxes, quality of products or services, introduction of innovations, productivity of labor, customer satisfaction with products or services, knowledge and experience in business, motivation / satisfaction employees and reputation and image of the company is recognized as explanatory factors of competitive success of SMEs, and considered more relevant, the financial, technological edge, innovation, marketing capabilities, management of human resources and technologies of information and communication. Antonio Aragón Sánchez and Alicia Rubio Bañón (2005)

To measure the success of SME's studied in Ville Hochimin South Vietnam, considered, among others, the elements are listed below. Trinh Minh Hien (1999).

Elements of Measurement:

1. More than two years of existence.
2. Growth of market share.
3. Workplace Safety and good atmosphere among staff
4. Market expansion abroad.
5. Marketing a new product or service.
6. Employee benefits long term.
7. Existing Utilities.
8. Contribution to the improvement of the environment social.
9. Dignity associated staff successful entrepreneur or leader

The basis of the success of micro enterprises in the country are: technological innovation, aggressive marketing strategies, the culture of the business, the quality of products or services, political stability, bank loans, financings and family business conduct, which were reflected in the success as perceived by the Vietnamese entrepreneur are: High level of profits, greater market share, export products, workplace safety, employee benefits packages, environmental improvement and social pleasant work environment

## 5. HYPOTHESIS.

The hypothesis in this research is as follows:

Hypothesis; A greater financial management of liquidity and leverage, improved performance of SMEs. As suggested Dromms. (1979), in his research, which showed that financial support in the operation itself is more profitable than to generate greater financial leverage and liquidity, to achieve higher profits.

## 6. RESEARCH OBJETIVE.

As Objective of this research have raised the following goals; Identify the influence of the financial management aspects such as liquidity and leverage the performance of these.

### 6.1Objetivos specific.

Identify, financial aspects like liquidity and leverage for to know which of them have more influence on improving the performance of SMEs.

## 7. RESEARCH METHODOLOGY

### 7.1 Type of Study

The research conducted is quantitative, using the method of Linear Regression analysis, ANOVA and frequency analysis, the research is also transactional, because surveys are at a moment in time in 2009; exploratory, descriptive and explanatory correlational, since the causal relationships between variables are sought. (Schmelkes 1998).

The research design is not experimental, so that none of the dependent and independent variables are manipulated.

This research is aimed at analyzing the influence of the administration of financial issues such as liquidity and leverage as well as the internationalization of SMEs and their effect on the performance of these, the universe of SMEs are taking the SIEM (Mexican Enterprise Information System, 2009).

Taking a representative sample of this population, which was 125 SMEs, selecting them randomly, from different business sectors of the state of Aguascalientes and its municipalities.

For the research quantitative tools were used to achieve test the hypothesis raised on the Influence of the administration of financial and internationalization of SMEs and their influence on the performance of these

## 8. INFORMATION COLLECTION

The collection of information is directly, through interviews with the owner or person responsible for SMEs, as most of the questionnaire data collection, are the only enterprise level business managers handle; surveys were implemented in the first half of 2009.

The definitive collection instrument was designed based on the related literature and indicators of both dependent and independent variables to achieve identification of the existence of the influence of the administration of financial and internationalization of SMEs based in the response of employers, at their discretion and the definition of the causes of SME's performance, industry, according to the responses of the entrepreneurs themselves; applying the Likert scale to measure the results of 1-5, with 1 being strongly disagree and 5 strongly agree, the questionnaire was applied to a sample of 125 SME's. different business sectors of Aguascalientes.

## 9. RESULTS OF THE INVESTIGATION.



As the first results of the investigation, we present the No.1 table, showing the average of the different aspects of performance measured as applied in a Likert scale, where 1 is least important and 5 is the most important, which stand out as performance factors with the greatest impact seen by employers; Customer satisfaction and quality of products and services.

Table. 2

Mean Business Performance

DEPENDENT VARIABLE	MEAN
1.- Product Quality /service	4.02
2.- Customer Satisfaction	4.02
3.- Image of the company and its products and services	3.96
4.- Truancy Reduction Work	3.94
5.- Speed of adaptation to the needs of markets	3.93
6.- Efficient internal business processes	3.89
7.- Organization staff task	3.89
8.- Reducing Staff Turnover	3.82
9.- Increased Productivity	3.74
10.-Increased market quote	3.66
11.-Grounds Worker Satisfaction	3.63
12.-Increase Profitability	3.54

Source: Own calculations based on analysis results

SPSS frequencies in a scale of 1 = not important and 5 = Very important

Table. 3

Significance of Variables

Managing finances vs. performance.

Independent Variable	R	R. square	t	Sig.
Finance Administration	.436	.190	21,741	.000***

Statistically significant differences: (\*):  $p < 0.1$ ; (\*\*):  $p < 0.05$ ; (\*\*\*) :  $p < 0.01$

Dependant Variable: Performance

The above table indicates the existence of a high positive relationship between the Department of Finance and Performance SMEs and the R square is above the .160 indicated by Cohen and Cohen (1983) for 5 independent variables and a sample of 125 surveys and the significance level is below .01 at 95% confidence level, so that may explain the increased business performance of SMEs through the adoption of the Financial management as a form of management.

Table. 4

Significance of Variables step by step.

Performance vs. Finance Management

Dependant Variables	R square	Sig.
---------------------	----------	------

1 .- (3305)	.208	.000 ***
2.- (3305,3303)	.673	.000 ***
3.- (3305,3303,3308)	.797	.000 ***
4.- (3305,3303,3308,3310)	.885	.000 ***
5.- (3305,3303,3308,3310,3306)	.926	.000 ***
6.- (3305,3303,3308,3310,3306,3312)	.946	.000 ***
8.- (3305,3303,3308,3310,3306,3312,3301)	.981	.011 **
9.- (3305,3303,3308,3310,3306,3312,3301,3309)	.985	.016 **
10.(3305,3303,3308,3310,3306,3312,3301,3309, 3311)	.990	.002 ***
11.-(3305,3303,3308,3310,3306,3312,3301,3309, 3311,3307)	.993	.004 ***
12.- (3305,3303,3308,3310,3306,3312,3301,3309 ,3311,3307,3304)	.997	.166

Statistically significant differences (\*):  $p < 0.1$ ; (\*\*):  $p < 0.05$ ; (\*\*\*)  $p < 0.01$   
Predicting Variables: Finance Administration.

#### Dependent Variables:

3305.- Customers Satisfaction  
3303.- Organization Personal Tasks.  
3308.- Profitability Increased.  
3310.- Motivation / Personal Satisfaction.  
3306.- Image of the company and its products / services  
3312.- Reducing Absenteeism.  
3301.- Quality product / service  
3309.- Increase in productivity  
3311.- Reduced staff turnover  
3307.- Increased market share  
3304.- Customers Satisfaction

In table 4 , we see that the introduction of each of the dependent variables ( performance ) , they demonstrated greater relative to the variable Independent Finance Administration , which indicates a high influence between the Finance Administration and increased performance in each of the factors identified as performance in SMEs in Aguascalientes Mexico , as it can be seen that the significance is less than .05 indicated in the introduction of each of the variables tested which is significant at a confidence level of 95% explaining the relationship of each of the dependent variables with the independent variable " Finance Administration " , except 3302 identified as the dependent variable "Efficiency in internal business processes " that is unrelated to the Managing finances to stay no longer included in the test step by step presented in the table above.

#### 10. DISCUSSION AND CONCLUSION .

As shown in the present study , through the application of UNIVARIABLES statistical models, demonstrated high positive influence between the administration of the financial aspects as leverage and liquidity, increased performance of SMEs, thus H1 hypothesis is demonstrated , raised in this research , also demonstrated through empirical evidence collected , the training of entrepreneurs in the management and administration of SMEs, is essential for the development and performance of these companies, concluding that it is recommended as a business practice , rely on the resources generated by the operation itself and avoid excessive debt , impacting on loss of liquidity for the payment of the interest on the loans acquired; and this practice represents a viable alternative to improve the performance of SMEs by promoting their development and retention , achieving the objectives stated in the research hypothesis to be proved.

## References

- Aragón Sánchez Antonio y Alicia Rubio Bañón (2005) Investigación "Factores explicativos del éxito competitivo: el caso de las Pymes de estado de Veracruz publicación "Contaduría y administración" No. 216 mayo-agosto 2005.
- Back, Peter (2005), Explaining Financial Difficulties Based on Previous Payment Behavior, Management Background Variables and Financial Ratios. *European Accounting Review*; Dec2005, Vol. 14 Issue 4, p839-868, 30p, 10 Charts
- Castelli, Annalisa Dwyer, Jr., Gerald P, Hasan, Iftekhar (2006) Bank Relationships and Small Firms' Financial Performance Working Paper Series (Federal Reserve Bank of Atlanta); May2006, Issue 5, preceding p1-26, 27p
- Cohen, J. and Cohen, P., (1983) *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences* 2a.Edition. Hillsdale, NJ: Lawrence Erlbaum.
- Dorasamy, Magiswary Marimuthu, Maran,, Jayabalan, Jayamalathi, Raman, Murali, Kaliannan, Maniam (2010), Critical factors in outsourcing of accounting functions in malaysian small medium-sized enterprises (smes). *Kajian Malaysia: Journal of Malaysian Studies*. 2010, Vol. 28 Issue 2, p39-69. 31p. 1 Diagram, 8 Charts, 1 Graph.
- Droms, William G. Miller, Charles W. Lacerte, Grant A. (1979). A Financial Profile Of Small Retailing Firms. *American Journal of Small Business*; Apr79, Vol. 3 Issue 4, p42-58, 17p
- García Pérez de Lema Domingo, Dr. Salvador Marín Hernández, Mtro. Tirso Juan Ordaz Coral (2007), Análisis estratégico para el desarrollo de la pequeña y la mediana empresa en el estado de Quintana Roo, Universidad tecnológica de Cancún, Universidad de Cantabria, Universidad Politécnica de Cartagena, Universidad de Murcia Libro Edit. Universidad de Cancún
- García Pérez de Lema y Miñarro Quiñero (2006). Publicación de Investigación. Gestión de los costes de calidad y rendimiento de las pequeñas y medianas empresas *la universidad politécnica de cartagena*
- García Pérez de Lema, D. (2005): *Estrategia e innovación de la Pyme industrial en España*. Asociación Española de Contabilidad y Administración de Empresas,
- Garza Garcia J. (1995) Análisis de la Información Mercadológica a través de la Estadística Multivariante Edit. Alhambra Mexicana, México.
- Lawrence & J.Gitman (1996) *Administración Financiera Básica*, San Diego University. Harla, México.
- McMahon, Richard G. P.Davies, Leslie G. ARTICLE ABSTRACTS (In English, French, German, and Spanish). *Journal of Small Business Management*; Jan94, Vol. 32 Issue 1, p1-8, 8p, 3 Charts
- Milesi, Dario, Moori, Virginia, Robert, Verónica, Yoguel, Gabriel (2007) Publication Desarrollo de ventajas competitivas: pymes exportadoras exitosas en Argentina, Chile y Colombia. *Revista de la CEPAL* Date: Wednesday, August 1 2007
- Minh Hien Trinh (1999). Los empresarios y los factores críticos de éxito de las Pyme's en Hochiminnville (Vietnam). Visión y realidad
- Mora Heredia Alfredo (2009) EL FOMENTO DE LAS PYMES COMO ESTRATEGIA PARA INCENTIVAR EL UNA APROXIMACIÓN EMPÍRICA OBSERVATORIO IBEROAMERICANO DEL DESARROLLO LOCAL Y LA ECONOMÍA SOCIAL Revista académica, editada y mantenida por el Grupo EUMED.NET de la Universidad de Málaga ISSN: 1988-2483 Año 3 – Nro.7 –Diciembre de 2009
- Saeed, Abubakr, (2009) FORMALITY OF FINANCIAL SOURCES AND FIRM GROWTH: EMPIRICAL EVIDENCE FROM BRAZILIAN SMES 1999-2005 *Journal of Academic Research in Economics*; Oct2009, Vol. 1 Issue 2, p129-140, 12p, 4 Charts
- Sandoval, Alberto Arias, Marín, Raúl Fernando Quiroga (2008). CESE DE ACTIVIDADES DE LAS PYMES EN EL ÁREA METROPOLITANA DE CALI (2000-2004): UN ANÁLISIS DE SUPERVIVENCIA EMPRESARIAL. (Spanish) *Cuadernos de Administración* (01203592); 2008, Vol. 21 Issue 35, p249-277, 29p, 8 Charts, 7 Graphs
- Schmelkes Corina (1998) *Manual para presentación de anteproyectos e informes De Investigación* Oxford University Press México.
- Skomp, Stephen E, Edwards, Donald E (1978). MEASURING SMALL BUSINESS LIQUIDITY: AN ALTERNATE TO CURRENT AND QUICK RATIOS. *Journal of Small Business Management*; Apr78, Vol. 16 Issue 2, p22-26, 5p, 1 Chart
- Thomas III, Joseph Evanson, Robert V. (1987) AN EMPIRICAL INVESTIGATION OF ASSOCIATION BETWEEN FINANCIAL RATIO USE AND SMALL BUSINESS SUCCESS *Journal of Business Finance & Accounting*; Winter87, Vol. 14 Issue 4, p555-571, 17p
- Weston, J.F. & Brigham, E.F (1987) *Las Finanzas en Administración* Universidad Iberoamericana SA de CV México D.F. 1984.

# First grade teachers teach reading with songs

Derya Arslan<sup>a88</sup>

*<sup>a</sup>Mehmet Akif Ersoy Education Faculty, Department of Educational Sciences, Burdur, 15100, Turkey*

---

## Abstract

In Turkey in reading instruction a kind of phonetic method is used which is called sound based sentences method. In this method, the reading instruction is initiated by sounds. Instead of letters name, letters' sound is taught. Teaching sounds are performed in compliance with the six sound groups. In teaching process for phonetic awareness during sound teaching, songs are one of the activities teachers instruct. The purpose of this study is to investigate how first class teachers teach reading with songs. The qualitative research method was used in this research. A interview form was developed which was applied ten first grade teachers in 2012-2013 education year. Descriptive analyze was used while analyzing data.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* First grade; teaching reading; songs.

---

## Introduction

Reading is one of the academic skills which is not learnt by birth contrary to speaking and listening but is taught at first class. For Akyol (2009) reading is an interpretation process when prior knowledge is used, which is based on effective communication between author and reader and carried out in an organized environment in accordance with suitable method and purpose. Reading learning process begins by birth. According to Emergent literacy, various activities which are experienced from birth have great effects on reading learning (Akyol, 2009). Phonological awareness is an important part of emergent literacy (Zygouris-Coe, 2001). Phonological awareness involves the ability to notice, think about, or manipulate the individual sounds in words (Torgesen & Mathes, 1999). Phonological awareness is defined as sensitivity to phonological structure of the words (Torgesen, Wagner, & Rashotte, 1994). To aware and interfere in phonological segments of spoken language is a significant factor of alphabetical writing system. Such a phonological awareness is an effective predictor of reading skill in English and other language and students who are sensitive to sound compounds of words have more chance to become successful in reading (Peynircioğlu, Durgunoğlu & Öney-Küsefoğlu, 2002).

One of the activities performed in order to increase phonological awareness is to sing a song (Zygouris-Coe, 2001). Songs are one of the significant tools used in education, especially in language teaching. They are frequently used in foreign language teaching (Batdi, Semerci, 2012; Şevik, 2012; Şevik, 2011). Listening skills of children are benefited not only for language teaching but also for reading instruction through songs. During first reading writing instruction, activities are made by benefiting from music, drama etc. that prepare students for reading before reading instruction and support reading instruction during reading teaching. Activities made before reading instruction can be thought within the scope of phonological awareness.

Since the starting age for primary school was determined as 66 months in 2012, preparatory studies for reading and writing have been focused rather than teaching of reading and writing instruction in the first term of the first year. Temur Doğan, Özyeğit, Divrengi, Özkara, & Ayyıldız (2012) specify that it is more important to provide education with harmonized activities rather than to begin with reading and writing studies in the first class of primary school for the purpose of ensuring a reliable beginning in such teaching fields. Harmonized activities are composed of painting, music, cut and paste activities in class. With these activities it is aimed to

---

\* Corresponding author. Tel.: +90-248-2134038; fax: +90-248-213416.  
E-mail address: deryaarslan@mehmetakif.edu.tr, aderya@hotmail.com

improve skills such as fine and gross motor skills, eye hand coordination, entertainment, recognizing sounds and rhythms, thumping out etc.

In Turkey reading and writing is taught with sound based method. Instead of letters name, letters' sound is taught. Teaching sounds are performed in compliance with the eight sound groups formed (Primary School Turkish Lesson Curriculum and Guide, 2009). Sounds are taught in three stages such as preparation for first reading-writing, beginning to reading-writing and improving it and becoming literate. The stage of beginning to first reading-writing and improving it is composed of four steps that are feeling and recognizing the sound, reading and writing sound, forming syllables from sounds, words from syllables, sentences from words and lastly writing a text (Primary School Turkish Lesson Curriculum and Guide, 2009). At the stage of feeling and recognizing sounds, mental preparation of the student is ensured by drawing attention to the sound to be taught, preparing student's mind and ear for the sound (Güneş, 2007). During reading instruction process, students are taught sounds beginning from prior knowledge, benefiting from songs and drama activities at the stage of first beginning of reading-writing – second stage of the method – and the stage of feeling sound and improving – first stage of developing (Primary School Turkish Lesson Curriculum and Guide, 2009).

According to the studies about the program and reading instruction, sounds are used before and during reading instruction. There are some studies regarding the effect of music programs (Bolduc, 2009), songs on phonological awareness of the students. The aim of this study is to determine how class teachers benefit from songs during reading instruction at the first class when reading is taught.

In accordance with the aim of the study, sub-problems stated below will be studied:

Of the first class teachers,

1. What are the preparatory studies for the song before beginning to teach with songs?
2. How is the process of teaching with songs?
3. How is the assessment of reading instruction with songs?

## **2. Method**

### *2.1. Research model*

In order to determine how the first class teachers benefit from songs during reading instruction, phenomenology, one of the patterns of qualitative research, will be used. Phenomenology pattern focuses on facts that individuals are aware but do not have deep and detail knowledge (Yıldırım, Şimşek, 2005). In Sound Based Sentence Method, songs are used during preparation period before reading instruction and during reading instruction at the stage of making sound felt. In this study teachers are asked for their opinions about benefiting from songs only at the stage of making the sounds felt.

### *2.2. Participants*

Working group of the study is composed of first class teachers. Homogeneous sampling is used in the study. These are first class teachers and are selected among those who are new at their working life and educate first class for the first time. The reason of selecting teachers who are new at their working life is that they have just completed their undergraduate education and they have received education about reading-writing instruction with sound based sentence method. 10 teachers (6 of them are women and 4 of them are men) working in Şırnak participated in the study. Four of the teachers have been working for 1 year, four of them have been working for 2 years, one of them has been working for 3 years and one of them has been working for 5 years. All of the teachers educate first class for the first time of their working life.

### *2.3. Data Collection Tool*

In the study participants' opinions were taken in writing. While the questions were being prepared, firstly field research was made and then a question pool was constituted. Questions were prepared in accordance with the opinions of an expert working in Turkish teaching and then were implemented on two class teachers. Revision was made in accordance with class teachers' opinions. Later, actual implementation was carried out. Interview form is composed of 11 open-ended questions. Form is composed of 2 questions measuring

preparation period of teaching, 3 questions measuring teaching period and 5 questions measuring assessment part. Teachers were asked to write their own opinions at the end of the form if they wished to add.

#### *2.4. Data Collection*

Interview forms were sent to class teachers working in Şırnak via internet. Participants printed questions and filled themselves. Then they sent them to the researcher by cargo.

#### *2.5. Data Analysis*

Interview forms were analyzed with descriptive analysis. Data were summarized and interpreted according to subjects specified before. In this study, data were edited according to subjects specified with the questions (Yıldırım, Şimşek, 2005). First of all answers of each questions were written on a word document separately. Then answers were classified according to subject and categories. Detail description was given at validity stage and intentional sampling was used (Yıldırım, Şimşek, 2005). Afterwards analysis results were examined for confirmation in order to compare with raw data. Frequency was also used in analysis. Quotations of the participants of research were quoted.

### **3. Results**

#### *3.1. Preparatory studies made by first class teachers regarding songs*

Teachers have explained how they select songs they use during reading instruction at the stage of sound feeling under the subjects of “what the songs are about and where they are from”. Class teachers define features of songs under the subject of “what the songs are about”. According to the sounds taught, songs (n=3), nursery rhymes (n=2), popular songs that the students know (n=1), songs about the words that are learnt on the relevant day (n=1), songs suitable for the students’ readiness level (n=1) and songs that the students sing easily (n=1), animated songs (n=1) are selected by teachers. Teachers are required to select songs according to the features specified. First class teachers have also explained “from where” they obtained the songs. It is determined that teachers obtain songs from source books prepared by Ministry of National Education (MEB) (n=2), websites (n=2), various sources (n=1) and by making researches (n=1) that they use for reading instruction. For instance while one of the first class teachers states (s)he selects “songs suitable for students’ readiness level and songs that the students sing easily. (Teacher:1)” other teacher states (s)he selects “songs from source books prepared by MEB”.

First class teachers have been asked how they prepare music activities. Teachers state that they prepare music activities by improvising (n=7), making plans (n=2). One of the teachers state “I make research about songs on sounds that I will teach and then I prepare a plan accordingly (Teacher:4).” Besides it is seen that “improvisational (Teacher:8)” music activity is used.

#### *3.2. Findings about reading instruction process with songs*

First class teachers explained activities before teaching songs. Teachers do activities such as breathing exercises (n=3), reading rhyme/text regarding sounds (n=1), rhythm (n=1), informing the target (n=1), drawing attention (n=1), giving instruction about listening (n=1), ensuring the sound to be felt (n=1). One of the teachers state that “I do activities such as ensuring the sound to be felt and breathing exercises (Teacher:4)”

First class teachers state different explanations about how they teach songs. Teachers explain the states of song teaching process as follows:

- I sing – repeat a few times.- I sing together with students.
- Part to whole.
- Whole- repetition a few times-Part by part.
- I teach some specific parts (if the song is long).
- I make the students listen to songs from Cd –I sing with CD - We sing together and repeat.
- I make the students listen to songs from Mp3 player – make them repeat constantly.

- I play with flute – I also sing.
- I make the students listen to songs from computer – I also sing.
- I sing and they repeat.
- I make the students listen to songs from computer – repeat within a group – make the students who have learnt the song sing and other students sing with them –thumping out with maraca.

One of the teachers stated that “Firstly I make the students listen from computer, then ask them to repeat with computer constantly, call the students to the blackboard who have learnt the song and all other students sing with them, make them thump out with maraca (Teacher:3)”.

First class teachers have explained what they do after they teach the song. Teachers make activities such as singing individually (n=3), singing all together (whole class) (n=3), word finding activity regarding sound (n=3), singing within a group (n=1), painting visual items on coloring books about sounds (n=1), drawing the said materials and objects on board (n=1), trying to find taught sounds in students’ names (n=1), repeating songs by relating some other lessons later (n=1), teaching song as a game, performing (n=1). While one of the teachers says that “I make activities such as word finding activity regarding sound, painting visual items on coloring books about sounds (Teacher:9)”; other teacher says “I ask the students to feel the sounds with song and then ask them to tell materials and objects about the sound they feel and then draw them on board and lastly I tell the names of the students ask them whether their names have the sound we have learnt or not (Teacher:10).”

### *3.3. Evaluation findings of first class teachers on reading instruction with song*

Teachers have explained contributions of music activities to reading instruction process. Teachers state that thanks to music activities they can ensure permanent learning (n=3), positivism (n=2), to calm, to make happy, willingly and determined learning, assimilation, to be the basis of sound teaching for first classes, to be the keystone of reading-writing instruction, to be the basis of teaching of Turkish, to be able to pronounce sounds better, to feel the sounds, to draw attention, to entertain, and to define the sound better. While one of the teachers states “I believe that music calms students and makes them happy therefore they are more willing and determined while trying to learn (Teacher:1)”, other teacher explains “I think since especially in Southeast Region students have a language problem, music is one of the keystones of teaching Turkish and reading-writing (Teacher:10).”

First class teachers have explained feelings of the students about reading after music activities. Teachers state that students are happy (n=6), enjoy so much (n=2), are enthusiastic (n=2), are not bored (n=1), are willing to learn (n=1), exited (n=1), love lessons (n=1). While one of the teachers says “during these activities they experience the most happy hours (Teacher:6)”, other teacher says “Music makes them more enthusiastic. They are more willing to learn (Teacher:2).”

First class teachers have evaluated their education about benefitting from music activities for reading instruction. Teachers have explained education about benefitting from music activities for reading instruction as insufficient (n=5), not sufficient (n=3), sufficient (n=2), insufficient instruments (n=1). While one of the teachers said that “Internship we underwent is beneficial. However I believe that reading-writing teaching should be focused more at universities (Teacher:7)”, other teacher “it cannot be said that it is sufficient. We took lessons about reading-writing teaching and music teaching; but practice is so different from theory (Teacher:9).”

First class teachers have explained materials concerning music activities on reading instruction and how they use these materials. Teachers have stated they have sources (n=6), they couldn’t find sources (n=3), they have difficulty in finding sources (n=1). Sources they benefit from are CD (n=3), internet (n=2), computer (n=1), magazine-book (n=1). While one of the teachers states that “internet enables enough possibilities (Teacher:2)”, other teacher says “No. We are trying to benefit whenever the circumstances allow (Teacher:10).”

The first class teachers were asked whether they wanted to add something else about the subject and two teachers made an explanation. Seventh teacher said “I believe that music activities for reading - writing teaching should be focused on more”. Ninth teacher added “Education we received during university is perfectionist. We have difficulty in practice now. It should be taught what can be done at underprivileged schools.”

## **4. Conclusion**

First reading & writing education starts with sounds while using the Sound Based Sentence method. Songs are used at the stage of feeling the sound and it is expected that students can distinguish sounds with songs (Güneş, 2007; Primary School Turkish Lesson Curriculum and Guide, 2009). How the first class teachers organize and guide this process is a significant research subject. Therefore the aim of this study is to determine how the first class teachers teach sounds with songs. At the stage of feeling the sound during reading instruction, teachers define the features of songs under the subject of “What the song is about” and they select the songs accordingly. According to the sounds taught, songs, nursery rhyme, popular songs that the students know, songs about the words that are learnt on the relevant day, songs suitable for the students’ readiness level and songs that the students sing easily, animated songs are selected by teachers. It is determined that teachers obtain songs from source books prepared by MEB, websites, various sources and by making researches that they use for reading instruction. First class teachers explain activities before teaching songs. Teachers do activities such as breathing exercises, reading rhyme/text regarding sounds, rhythm, informing the target, drawing attention, giving instruction about listening, ensuring the sound to be felt.

First class teachers state different explanations about how they teach songs. Teachers explain the states of song teaching process as: I sing – repeat a few times.- I sing together with students, part to whole, whole-repetition a few times -Part by part, I teach some specific parts (if the song is long), listening from Cd – I sing with CD - We sing together and repeat, make the students listen to songs from Mp3 player – make them repeat constantly, Play with flute – I also sing, make the students listen to songs from computer – I also sing, I sing and they repeat, I make the students listen to songs from computer – repeat within a group – make the students who have learnt the song sing and other students sing with them –thumping out with maraca. As it is seen, all of the teachers teach songs according to their own distinctive methods. There is not any education union that all or many of the teachers follow.

First class teachers have explained what they do after they teach the song. Teachers make activities such as singing individually, singing all together (whole class), word finding activity regarding sounds, singing within a group, painting visual items on coloring books about sounds, drawing the said materials and objects on board, trying to find sounds taught in students’ names, repeating songs by relating some other lessons later, teaching song as a game, and performing. After sound is felt by song during the first reading instruction activities, sound activities continue. Here it is seen that some teachers continue song activities.

Teachers have explained contributions of music activities to reading instruction process. Teachers state that thanks to music activities they can ensure permanent learning, to be positive, to calm, to make happy, to learn willingly and determined, assimilation, to be the basis of sound teaching for first classes, to be the keystone of reading-writing teaching, to be the basis of teaching of Turkish, to be able to pronounce sounds better, to feel the sounds, to draw attention, to entertain, to define the sound better. It is seen that teachers generally believe using songs in reading instruction is important. Besides that positive effect of songs on learning is another reason of teachers for their belief that songs are beneficial. First class teachers state that students are happy, enjoy so much, are enthusiastic, are not bored, are willing to learn, exited, love lessons.

According to first class teachers, their education about benefitting from music activities for reading instruction is not sufficient. During undergraduate cycle, Class Teachers take Music Teaching lesson besides First reading-writing instruction. There can be so many reasons why teachers think that their education is insufficient – some of the reasons can be that as one of the teachers state music activities are so limited for reading writing activities or as another teacher state they have problems in practice when they face with harder conditions. It is understood that teachers usually find sources for reading instruction with songs. Erkul & Erdoğan (2009) find out that teachers have no problem related with the instruments and materials.

When the ages of the students learning reading for the first time are considered, students can learn easier when lesson is given entertainingly. Teachers offered some proposals like singing songs for overcoming the problems encountered during the feeling and recognizing sounds (Erkul & Erdoğan, 2009). With this point of view that teachers are aware of, studies given at First Reading Writing and Music Teaching lessons can be increased for Class Teacher Undergraduate program. Although first reading program has been changed since 2005, it is seen that studies on sound teaching have still deficiencies. More enriched activities on this subject can be planned and applied. Experimental or action researches different from this study can be made.



## Acknowledgements

Thanks to the class teachers who attend this study.

## References

- Akyol, H.(2009). *Türkçe ilk okuma yazma öğretimi* (8. Baskı). Ankara:PegemA yayıncılık.
- Batdi, V., & Semerci, Ç. (2012).Students' views towards effectiveness of songs in developing foreign language skills. *Journal of Research in Education and Teaching*, 1 (4), 126-133.
- Bolduc, J. (2009). Effects of a music programme on kindergartners' phonological awareness. *International Journal of Music Education*, 27 (37), 37-47.
- Erkul, Ö., & Erdoğan, T. (2009). The problems and suggestions encountered during the implementation of sound based sentence method. *Procedia Social and Behavioral Sciences* 1, 2294-2300.
- Güneş, F. (2007). *Ses temelli cümle yöntemi ve zihinsel yapılandırma*. Ankara: Nobel Yayın Dağıtım.
- Primary School Turkish Lesson Curriculum and Guide (1-5. Sınıflar). (2009). Milli Eğitim Bakanlığı Talim ve Terbiye Kurulu Başkanlığı. Ankara:Devlet Kitapları Basım Evi.
- Peynircioğlu, Z. F, Durgunoğlu, Y. A., & Öney-Küsefoğlu, B. (2002). Phonological awareness and musical aptitude. *Journal of Research in Reading*, 25 (1), 68-80.
- Şevik, M. (2012). First step to effective listening: "Listen and show" songs. *International Journal of English and Education*, 1 (1), 9-18.
- Şevik, M. (2011). Teacher views about using songs in teaching English to young learners. *Educational Research and Reviews*, 6 (21), 1027-1035.
- Temur Doğan, Ö., Özyeğit, D., Divrengi, M., Özkara, M. & Ayyıldız, Y. (2012). *Uyum ve hazırlık çalışmaları öğretmen kitabı:İlkokul 1. Sınıf* (Ed. Turan Temur). Milli Eğitim Bakanlığı.
- Torgesen, J. K. & Mathes, P. G. (1999). *Assessment and instruction in phonological awareness*. Florida Department of Education Division of Public Schools and Community Education Bureau of Instructional Support and Community Services.
- Torgesen, J. K., Wagner, R. K., & Rashotte, C. A. (1994). Longitudinal studies of phonological processing and reading. *Journal of Learning Disabilities*, 27 (5), 276-286.
- Zygouris-Coe, V. (2001). *Emergent literacy*. University of Florida:Florida Literacy and Reading Excellence (FLaRE).

# For a city's pedagogy

Olivia Moraes de Medeiros Neta<sup>89</sup>

Doctor in Education and teacher at Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Norte, Brasil. Email: olivianeta@gmail.com

---

## Abstract

How and where do we educate ourselves? This question has made possible to link together reflections about spaces not as inert scenarios but rather as instructive materiality, the bodies and field managers of educability. Thus, it is our objective to discuss the role of the city as an educator in order to (re-)establish the pedagogy of the city. This is expressed not only through the urban life style, the learning of civility and the entitlement to the city, but also in pedagogical functions expressed in urban and school projects, in the relationship existing between the urban body/citizen body, urban hermeneutics and a sensible stance in face of the urban.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* Pedagogy; City; Education; History.

---

## Reflections on city and education

Is it possible to establish a pedagogy for the city? This line of questioning reveals our audacity in taking risks in relationship to the most varied areas of knowledge, even though that is not a recent stance, and *with some care*, it can be traced to 1929, when the magazine *Annales d'histoire économique et sociale* was founded.

The city as object of study and reflection is present in the trade of educators, historians, geographers, architects, urbanists and literates among others. Multiple ways of looking at cities and their histories can be found in that space itself, in accordance to the different uses of men, women and children.

Therefore, city's pedagogy can be perceived, if one takes as a starting point, the understanding of educability as an investigative demarcation, since "[...] the city's educative action is full of representations which are defined in the confrontation between population's everyday practises and the actions of technicians and politicians."<sup>iv</sup> (VEIGA, 1997, p. 107).

In this way, the city is invested with a pedagogical orientation which is expressed in its *modus Vivendi*, its different scenarios, its ritualizations and institutions and, the educability is a constant of that orientation, since "[...] the educational process does not take place only or even mainly in our schools' banks." (ARROYO, 1997, p. 25). According to this, what interest us is to conceive a city's pedagogy, since we understand that urban dynamic as a whole is educative.

---

\* Corresponding author: Av. Romualdo Galvão, 3676, Bloco F, Ap. 503, Lagoa Nova, Natal, RN, Brasil. CEP 59075-750. Tel.: +55 84 9948 0680

E-mail address: olivianeta@gmail.com

## 2. Conceiving a pedagogy of the city

The city is “[...] a mediation among mediations” which “[...] has always had relationships with society as a whole, with its composition and the way it functions, with its constitutive elements [...], with its history.” (LEFEBVRE, 2001, p. 46). Hence, the city is the holder of a socializing education and is invested with a pedagogical function, which moulds different values and models of conduct, since we can say that the city holds a social function resulting from the experience of urbanity, the personal experiences, the city’s projects and practises themselves, for the city has “[...] an history; it is the product of history, i.e., of well determined people and groups which accomplish that production in historical conditions.” (LEFEBVRE, 2001, P. 47).

So, city’s pedagogy starts to be defined from the power which, as stated by Michel Foucault (1981), is a set of relationships between forces that build singularities and inserts itself wherever particularity prevails, becoming then more of an exercise than a possession and, it is not a granted privilege, but only the outcome of its strategic positions thus being, then, pertinent to the analysis of the formative processes of the citizens inhabiting the *urbe*. With the implementation of socio-cultural practices, the city becomes involved in power machinations substantiated through actions or deliberations in constitutions, laws, decrees or stances which serve not only to regulate the links between the *urbe* and the life in society but also the structuration of the urban space itself presented in a textual form, in the field of the visible as well as in the invisible, thus making possible to understand the city as “[...] something which is talked and written about.”

Therefore, city’s pedagogy expresses itself not only through the urban life style, the learning of civility and the entitlement to the city, but also in pedagogical functions expressed in urban and school projects, in the relationship existing between the urban body/citizen body, urban hermeneutics and a sensible stance in face of the urban. Thus, city’s pedagogy might very well be defined in the search for answers presented in the questionnaire carried out by Roche (2000): *why and in what way can mankind live the way it does and why is that acceptable?* In fact, city’s pedagogy starts to be drafted from the relationship between the urban life style and the learning of civility, insofar as pedagogy occurring in the urban social universe is intertwined with paraphernalia, institutions and distinct spaces.

Considering that “[...] urbanity was characterized [...] by the complexity of social relationships and the manner they rearrange themselves [...] imposing on the constant disparity of the social face-to-face [...]” In these terms, we would like to emphasize that public and private constitute the citizen in a process of constant educability, or in a broader form of pedagogy whether at home with the family, or in schools, or even during civic and religious ceremonies, since as Coulanges (2007, p. 248) points out, the city is a social organization with diverse beliefs and customs and the citizen, is subjected to all of it without reservations, entirely belonging to it.

The citizen comprises the city and simultaneously it is comprised by it. Such is the relationship that allows a given pedagogy by and in the city. This pedagogy is only possible because, as Castells reminds us (apud ARROYO, 1997), cities are live systems, generated, created and transformed by human beings and, for that reason the cities roots are the citizens themselves.

Therefore we might say that the city acts as a pedagogic factor while it exerts a civilizing influence as well. Such a civilization’s project is made possible through the development of political, collective and social space cultures. Nevertheless, this has been a slow and strained process (ARROYO, 1997), since the city as a civility reference, was built in opposition to the rural world, bestowing on the law different functions such as organizing, classifying and collecting the urban territories, attributing meanings and generating notions of civility and citizenship directly proportional to the way of life and the family micro politics of the different groups which were more involved in its formulation (ROLNIK, 1999).

The building of the urban and civilized life style is done through and proportionately to the education, since the modern city has become *locus*, par excellence, of these changes arising from transformations occurring in the economy as well as in political life, not as a passive receptacle, but as the producer of new forms of sociability and social interaction. (VELHO, 1995).

Pedagogization through civility starts with understanding that individuals deal and move themselves among differentiated codes and universes concerning values, orientations and classification systems. Those codes are measurements of the cities’ projects for their inhabitants and their customs. Thus, it is in the dimension of the culture of the urban that the manifestations, the actions and customs of the inhabitants of the *urbe* (de-)limit their

social conscience. Accordingly, educative processes are present in urban dynamics which,

[...] as a whole educate or dis-educate, form new behaviour patterns, civilize or stultify, depending on the humanizing or dis-humanizing virtualities inherent to the existential forms of production that city-dwellers are submitted to. (ARROYO, 1997, p. 25).

The city as the holder as well as simultaneously being the producer of pedagogies for its inhabitants is a possible construction since there is a relationship between the city and its dwellers. Therefore, to transform “[...] the interests and social values present in the forms and functions of a historically determined city is a social tension due to the values and interests which rule the space production as well as its services and occupation.” (ARROYO, 1997, p. 25). This *pedagogization* also occurs in the urban experience once new possibilities of assembly, communication, as well as the comparison between life conditions and the (re)construction of consciences have been achieved.

Concerning the city’s pedagogy defined, to start with, from the urban life style and the learning of civility, we should render visible the production and the intensification of the *right to the city*, since that right “[...] manifests itself as a superior form of entitlement: right to freedom, to the individualization of socialization, to the habitat and to inhabiting. The right to the *task* (to the participating activity) and the right to *appropriation* [...] are implied in the right to the city.” (LEFEBVRE, 2001, p. 135).

According to this perspective, the right to the city passes through the re-appropriation of the spaces and the apprehension of the urban passes through claiming the city in its broader forms and materialities since this right “[...] affirms itself as an appeal, as an exigency” and can only be formulated as a right to *urban life*, transformed and renewed. (LEFEBVRE, 2001, p. 116).

Learning the right to the city occurs through claiming that right itself, as space, as spatial structures, living quarters, school, water, leisure, among other claims. As a consequence, city’s pedagogy is grasped through, and also by the understanding of the city itself, since they carry their own symbols, their cultural identities and values, enabling new social meanings to the urban experience.

In effect, city’s pedagogy is woven by its citizens’ movements which explore and translate the city and the fact of living there. The city is defined by its own citizens, but, along this process, the urban that comes from the outside to break off with the city’s physical limits, becomes an imaginary effect that produces an impact on its dwellers. “Urban life, urban society, in a single word “the urban” cannot dispense with a practical-sensitive basis, a morphology.” (LEFEBVRE, 2001, p. 49).

The pedagogical function expresses itself through urban and school projects which (de)limit the contours of pedagogization in and through the *urbe*. In order to have a better understanding of this pedagogical function, I shall revert to Ítalo Calvino (1997), and recall the passage related to Marco Polo’s visit to the city of Zuo, where Marco Polo highlights the idea that cities have their own motives and characteristics, have their own functions. But, what is the city’s motive? Veiga (2002) help us to reflect upon that question and highlights that the modern city’s motivation suggests delimitation and demarcation of functions. Thus, “[...] city and education keep between themselves, the tensions arising through modernity’s gestational process.” (VEIGA, 2002, p. 14).

The city is the boosting and materializing agent of the dimensions of citizenship and education, considering that the urban and school projects are responsible for building up models for the urban body as well as the citizen body, inasmuch as “[...] planning the city is simultaneously to think real’s *plurality itself* and to give *effectiveness* to this same thought of the plural: it is to know and being able to articulate.” (CERTEAU, 1994, p. 172).

The relationship between city and education is indeed a tense one, since “[...] the modern pedagogical project and the urbanists’ projects touch each other: both plan to build a type of ideal human being as a civilized social being.” (VEIGA, 2002, p. 19). This relationship is built on conflicts, but does not lose sight of the purpose of its very social function: to educate towards new models of modernity. (VEIGA, 1997).

This formation of the subject occurs by and through socialization, but “[...] the city’s educative action is full of representations which are defined through the confrontation between the population’s quotidian actions and the actions of technicians and politicians.” (VEIGA, 1997, p. 107). The subjects concerning the city are rights and duties and are immersed in the urban as educative space.

The urban as educational has been a *locus* where men exercise power and claim their rights. As Rama (1985,

p. 27) reminds us, the city has an order, it is literate and administered, modernized as well as politicized, is, therefore, an *haven of intelligence*, a dream of an order, a project with a rationalizing conscience able of setting an order to men within a repeated urban landscape, ultimately, it is the [...] the translation of a social order into a physical reality [...].”

Hence, we can then highlight that city's pedagogy is intrinsic to an order and implies a hierarchy which is not only disciplined but also disciplinarian. Thus, the city educates through different and superposed networks: “[...] a physical one, on which the common visitor roams over until getting lost in its multiplicity and fragmentation, and a symbolical one, which sets an order and interprets it.” (RAMA, 1985, p. 53). Even more, it is

Through the ordering of signs [...] [that] the literate city articulated its relationship with power, which has been serving by means of laws, regulations, proclamations, cells, propaganda as well as through idealization destined to sustain and justify it. (RAMA, 1985, p. 55).

The city is, then, a dream of an order, a project with a rationalizing conscience which organizes men within an urban landscape through a planned form and according to administrative, military, commercial, religious and scholastic guidance.

Thus, city's pedagogy expresses itself in a broad sense in the relationship between the urban body and the citizen body. To think city and citizen is to compose a vivid, pulsating and moving landscape through which the city's pedagogy arises according to the sensitivity expressed in the urban organization starting on quotidian aspects of life, such as: social customs of men and women, hygiene and speech habits, since “[...] relationships between urban bodies in spatial terms determine their mutual relationships, how they see and hear each other, how they come in contact and distance themselves.” (SENNETT, 2003, p. 17).

This pedagogization has accentuated contours, since the city is a network of signs to be read by its dwellers, it has its own hermeneutic as it has been pointed out by Lepetit (2001) that holds temporalities' rhythms as well as spatialities. Each fragment of the *urbe* holds its own spellings and orientations.

Urban hermeneutic exists, mainly, in the acts of walking, reading, sense and see the city as a text with a given grammatology. The act of walking is for the urban system as the enunciation is for a language or for the verbalized utterances. The act of walking has a triple enunciating function: it is a process of appropriation of the topographical system by the pedestrian; it is a spatial realization of a given place; it implies relationships between differentiated positions. Thus, the act of walking seems to imply a first definition as a space of enunciation.

The enunciation through the speech of steps is, then, a language related to city's pedagogy expressed by a language which is a type of practise of the space, a way to make sense of it, since “the quotidian or literary accounts are our public transports” (CERTEAU, 199, p. 200). Every account is a practise of space even though it is not simply a supplement of pedestrian statements, it is not only a question of transporting steps and senses, but a way of organizing the walks themselves; walks are, therefore, “narrative actions” as well as pedagogic ones through which the city's user extracts fragments from the account in order to update them secretly. According to the enunciation frame, the walker constitutes, in relationship to his position, a close and a distant, a here and a there.

A sensitive posture in front of the urban is also one of the possibilities in relationship to the pedagogy of the city. In fact, this one expresses itself through the political education of senses and its relationship with political-cultural as well as relational practises, in which the notions of subject, culture and education do not restrain themselves to rational dimensions, but also incorporate sensitive ones. (GAY, 1988).

As highlighted by Pesavento (2007) city is *sensitivity*, is a cultural phenomenon which presupposes the construction of an *ethos*, implying the attribution of values to whatever was agreed to call *urban*. Thus, a sensitive posture of the urban enables a pedagogy ruled by feelings, affections and emotions in *urban living*, but also by the expression of utopias, hopes, wishes and fears, individual and collective, favoured by the fact of living in proximity.

This dimension of sensitivity bestows on pedagogy the condition to attribute reasons and meanings to space and urban time and also to apprehend its visible and experienced frame of references. This pedagogy of the sensitive is also imaginary, since it is constructed by a thought process which identifies, classifies and qualifies the trace, form, volume, practices and actors of that urban space. (PESAVENTO, 2007). This sensitive posture in

face of the urban is linked to human experience which “[...] participates in the creation of objects of interest and passion, gives form to still incipient cravings and removes barriers as well as ominous anxieties. (GAY, 1988, p. 19).

In a more assertive way, city’s pedagogy expresses itself through the concept of *educative city*, diffused from the 1970’s onwards, with three possible dimensions for the relationship between city and education; learn in the city, learn from the city, learn about the city. (TRILLA, 1999, p. 24-37). In order to do that, it is required the full comprehension of the city’s pedagogical intentionality. Thus, the city is recognized as an educating agent as well as a true space for learning which organizes, systematizes and deepens the informal knowledge we acquire spontaneously through quotidian life.

An educating city presupposes that we learn how to read it and that constitutes a dynamical system in continuous evolution. Even more, it also presupposes that we learn how to cohabit, how to live together and to interact with others and that we learn also, the minimal skills on how to circulate through the city and the rights as well as the obligations whilst city dwellers. (BRARDA, RIOS, 2004). As per that perspective, city’s pedagogy would be associated to the more ample understanding of educative city and the dimensions of learning in the city, learning from the city, learning about the city.

Learning in the city or the understanding of the *city which contains education* presupposes the urban environment as a framework of multiple educative events such as: a stable pedagogical structure constituted by educative institutions in the fields of formal and informal education; a set of equipment and stable citizen institutions but not specifically educational; a set of occasional educative events; a spread out and permanent set of educative spaces and experiences, not pedagogically planned but that would nevertheless comprise quotidian’s life informal education. (TRILLA, 1999).

Learning from the city presupposes the city as an educative agent, i. e. the environment as education’s informal agent, since it is in the city that people, as well as ideas, objects and techniques get together. Finally, learn about the city is to understand the *city itself as educative topic*, since the informal knowledge generated by urban environment, is, per se, knowledge about that very environment itself. The city which teaches itself.

The educational city harbours and interrelates educative institutions and places such as schools and universities, informal educative interventions organized for teaching and training aimed at specific objectives and also a set of educating experiences such as shows, promotion and diverse social relationships such as friendship. On those terms, as highlighted by Brarda and Rios (200) the most significant contributions of urban pedagogy are as follows: broadening of pedagogy’s field of action, construction of democratic-participative values, give new signification to citizenship and also the multiplication of educational and cultural networks.

## Considerations

Pedagogy of and in the city is possible in function of citizen’s movements and urbanity, as well as by monumentalizing the city, thus becoming responsible for the transmission of acquired knowledge. And, even more, in order to enable a city’s pedagogy, we have to put aside a perspective of the educative phenomenon reduced to spaces, epochs, processes and scholastic interveners. In fact, every city opens itself as a privileged focus for the *Concentration of Powers* of the most varied kinds (from institutional and repressive to micro powers which rule the quotidian life of its inhabitants). (BARROS, 2007).

Thus, the pedagogization in and by the city it is constituted through the learning of a urban and civilized life style, the right to the city and its pedagogical function expressed through urban or educational projects, in the city and its hermeneutic, its norms, behaviours and its sensitive posture. All these expressed different forms of learning and pedagogical functions corroborate a broad dimension of pedagogy, the one belonging to the city.

## References

- ARROYO, Miguel G. (1997). O aprendizado do direito à cidade: Belo Horizonte — a construção da cultura política. *Educação em Revista*, Belo Horizonte, n. 26, p. 23-38, dez. 1997.
- BARROS, José D’ Assunção. (2007). *Cidade e história*. Petrópolis: Vozes, 2007.
- BLOCH, Marc. (1997). *Apologia da História*. Rio de Janeiro: Jorge Zahar, 1997.

- BRARDA, Analia; RIOS, Guillermo. (2004). Argumentos e estratégias para a construção da Cidade Educadora. In: GADOTTI, Moacir; PADILHA, Paulo Roberto; CABEZUDO, Alicia. (Org.). *Cidade Educadora: princípios e experiências*. São Paulo: Cortez, 2004.
- BRESCIANNI, Maria Stella M. (1998). História e Historiografia das Cidades, um Percurso. In: FREITAS, Marcos César. (Org.). *Historiografia brasileira em perspectiva*. São Paulo: Contexto, 1998. p. 237-258.
- CALVINO, Ítalo. (1997). *As cidades invisíveis*. Tradução Diogo Mainardi. São Paulo: Companhia das Letras, 1997.
- CARVALHO, Adalberto Dias de. (2008) A educabilidade como dimensão antropológica. *Revista de Letras*. Porto, 1990, p. 145-156. Disponível em: <<http://ler.letras.up.pt/uploads/ficheiros/1759.pdf>> Acesso em: 10 dez. 2008.
- CERTEAU, Michel de. (1994). Caminhadas pela cidade. In: \_\_\_\_\_. *A invenção do cotidiano: 1. Artes de fazer*. Tradução Ephraim Ferreira Alves. 9. ed. Petrópolis: Vozes, 1994. p. 169-192.
- COULANGES, Fustel de. (2007). *A cidade antiga*. 2. ed. São Paulo: Martin Claret, 2007.
- FOUCAULT, Michel. (1981). *Microfísica do poder*. Rio de Janeiro: Graal, 1981.
- GAY, Peter. (1988). *A experiência burguesa da rainha Vitória a Freud: educação dos sentidos*. Tradução Sérgio Bath. São Paulo: Companhia das Letras, 1988.
- LEFEBVRE, Henry. (2001). *O Direito à cidade*. São Paulo: Centauro, 2001.
- LEPETIT, Bernard. (2001). *Por uma nova história urbana*. São Paulo: EDUSP, 2001.
- PESAVENTO, Sandra Jatahy. (2007). Cidades visíveis, cidades sensíveis, cidades imaginárias. *Revista Brasileira de História*. São Paulo, v. 27, n. 53, p. 11-23, 2007.
- RAMA, Angel. (1985). *A cidade das letras*. São Paulo: Brasiliense, 1985.
- ROCHE, Daniel. (2000). *História das coisas banais: nascimento do consumo nas sociedades do século XVII ao XIX*. Tradução Ana Maria Scheerr. Rio de Janeiro: Rocco, 2000.
- ROLNIK, Raquel. (1999). *A cidade e a lei*. São Paulo: Studio Nobel, 1999.
- SENNETT, Richard. (2003). *Carne e pedra: o Corpo e a Cidade na Civilização Ocidental*. São Paulo: Record, 2003.
- TRILLA, Jaume. (1999) Un marc teòric: la idea de ciutat educadora. In: TRILLA, Jaume et al. *Les ciutats que s'eduquen*. Barcelona: Diputació de Barcelona, 1999. p.13-51.
- VEIGA, Cynthia Greive. (1997). Projetos urbanos e projetos escolares: aproximação na produção de representações de educação em fins do século XIX. *Educação em Revista*, Belo Horizonte, n. 26, p. 103-112, dez. 1997.
- VEIGA, Cynthia Greive. (1995). *Cidadania e educação na trama da cidade: a construção de Belo Horizonte em fins do século XIX*. Bragança Paulista: EDUSF, 2002.
- VELHO, Gilberto. (1995). Estilo de vida urbano e modernidade. *Estudos Históricos*. Rio de Janeiro. v. 8, n. 16, p. 227-234, 1995.

---

<sup>1</sup> Much of the literature used for the construction of the text is the translation into Portuguese of Brazil. To better understand the text citations were also translated into English.

# Foreign language teaching : A problem in Turkish education

Aygül Oktay

*Abant İzzet Baysal University, Faculty of Education, Educational Sciences Department, Gölköy-Bolu, 14280, Turkey*

---

## Abstract

One of the functions of Turkish Educational system is to prepare enough and qualified manpower, required by economics. In order to be able to open the ways for this qualified manpower, for economic and social improvement and change, it became more important to know even more than one foreign language. But Turkey, in this area, in spite of so much efforts given ever increased financial burden, besides some schools and universities having instructions in a foreign language, doesn't seem very successful. But, as a candidate for European Union, this problem is one of the urgent one to be solved. To identify the problems faced very often is important to be able to choose the "urgent" ones. The problem statement of this study is identified as "How often Senior students and staff at English class face with the problems related to foreign language teaching?" 6 staff and 117 senior students from Department of Teaching of English and 41 instructor from Language Teaching and Practicing Center of Abant İzzet Baysal University are included in this study. By examining the related literature and working with 14 volunteer, the problems which they are faced during their foreign language study, 20 problems which were the "same" with the ones in related "literature", identified.

In order to identify their "views", a questionnaire was prepared for the students and staff by asking them if they faced the related question 1)Never, 2)Very seldom, 3)Sometimes, 4)Very often.

After having the view an area specialist, the questionnaire of 36 staff and 72 senior students were included in evaluation and in evaluation SPSS for Windows Package Program, in addition (f) frekans and (%) percent values were used and showed in related tables.

Findings according to the total frequencies were : 1) Turkey's policy in foreign language teaching is not sufficient enough (82,4%) ; 2) Foreign language courses are generally called "teacher-centred" as is being processed (75,0%); 3) Too much emphasis is given in grammar (73,1%); 4)Students are not spending enough time for language learning (64,8%); 5)Classes are too much crowded (63,9%); 6) Language teaching is not starting early enough ( 61,1%); and environment for language teaching is not sufficient enough (61,1. %); 7)There is not enough practice (59,3%); 8)No question is asked in the university entrance exams in a foreign language (57,4%); 9) Motivating students the desire to learn the language is not enough (55,6%); 10) Homework is not helpful with the language learning (54,6%) and students active participation in foreign language courses is insufficient (54,6%). It seems necessary to work on the problem of foreign language teaching urgently by having more and detailed studies by getting specialists' views at this matter.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** Foreign language, teaching, problem

---

## Introduction

One of the functions of Turkish Educational System is to prepare manpower, needed by the economy both in numbers and qualifications. In order to make the qualified manpower to be able to open ways towards positive developments and changes knowing more than two foreign languages for them became very important, in our days. Vergili (1993;25) pointed out that to learn a foreign language has some benefits for an individual. Some of them are getting a better job, salary and social statue and having a deeper understanding. To be open towards the innovations and improvements may be gained by knowing several foreign languages. Besides, knowing a foreign language makes us able to follow the publication and news by TV, radio, newspapers, internet, books, magazines and it makes foreign travels and searches easier.

It is usually discussed in the area that students taking foreign language courses especially in state schools starting from secondary education till the end of higher education are not gaining the necessary skills at the targeted levels in reading, listening, writing .According to somewhat an "idefix" which is quite widely spread



out in Turkey that .” A foreign language cannot be learned in Turkey. One can learn a foreign language by living there. In order to learn a foreign language one should go to that country and live in which the language is spoken. “The number of people who goes to those countries to learn their language, stay, spend time and money are quite a lot.

### *.1. Problem Statement*

During the Ottoman Empire, “Before the Schools Period (1299-1773) ( Mektepler Öncesi Dönem),the official language of the state was Turkish, but education was in Arabic. Besides Arabic, education is also carried out in French. In schools Period (1773-1923) ( Mektepler Dönemi),since french is widely used in important laws and commercial agreements, French was taught widely. Armenian, Bulgarian, English, Italian, German, Greek, Persian, Russian and Albanian were the other foreign and minority languages taught (Ekmekci,2003;38).During this period education is Arabic and Persian in primary (Sıbyan) and Arabic and French in Enderun (Secondary) schools (Demirel,2010;5).

During the “Tanzimat” Period Tıphane-i Amire ve Cerrahhane-i Ma’mûre, Mekteb-i Tıbbiye-i Adliye-i Şahane were opened in 1827 and Mekteb-i Mülkiye was opened in 1863. French was continued to be the foreign language thought.Opening the Galatasaray Lycee on September1in 1868 has become somewhat a turning point for the foreign language teaching in Turkey. Foreign language teaching at secondary level was first started at this lycee. German was started to be taught during the “Mesrutiyet”and English after the Second World War (Demircan, 1988).In 1908 French became compulsory in all schools and English and German became “electives”.

Teaching Arabic and Persian were ended during the Republican Period in1927.English,French, German, Italian and Latin were replaced them (Demirel, 2003). During the first years of the Republic in foreign language teaching, understanding what one read and during the Atatürk’s Period stressing on passing the technical and cultural transfers had more importance and priorities (Ekmekçi,2003;39). Weekly foreign language hours were 5 in 1924,but lowered to 3 in 1949.

Between1924 and1960 as foreign languages, mainly German, French, English and Italian and sometimes Latin, Arabic and Persian have been taught (Demircan, 1988; 92).Starting by1938 educational institutes (Junior colleges) and their foreign Language Departments and after 1970 Four –years higher schools for foreign languages were opened by the Ministry of National Education (Ekmekçi,2003;38-39).During the Republican Period teaching a foreign language became compulsory for each class. But, teaching a foreign language at schools has not been very successful. Then, at the 1988-1989 educational year foreign language courses became “electives” at the “regular” or “normal” lycees. But ,in 1997,when “compulsory education” raised to 8 years, teaching foreign languages from 4th to 8th grades were also became compulsory.

Foreign languages at schools (Mektep) during the Ottoman Empires and first years of the Republic were thought either by the “former” teachers or someone who knew that foreign language. But, it was carried out by foreign teachers at the “foreign” or “minority” schools. Teacher training was first started on 16 March 1848 in İstanbul at Teacher Training School (Öğretmen Okulu).The needs of teachers for the secondary schools during the Republican Period for some times was faced by the Gazi Teacher Training School for Secondary Education (Gazi Orta Muallim Mektebi). This school was established in Konya in 1926 and moved to Ankara in 1927.Later,in 1946 its name was changed to the Gazi Educational Institute-A Junior College (Gazi Eğitim Enstitüsü).At these schools, in order to train foreign language teachers, French in 1941,English in 1944 and German Departments in 1947 were added (Demircan,1988).These departments to train foreign language teachers were raised from two to three years in 1962.Later on, all of the educational Institutes (Eğitim Enstitüsü) have become four-year higher teacher training schools (Yüksek Öğretmen Okulu) (Demirel, 1991).

In summary, we can show resources to get foreign language teachers before 1982 as follows:

- 1-Besides foreign language teachers departments of the universities, those who are from the other departments taking foreign language courses at A, B and C levels,
- 2- Formal and informal graduates of the foreign language departments of the Educational Institutes,
- 3-Those who completed the “Informal Higher School “ of the Educational Institutes during the summer and those who finished the “fast” programs between 1978 and1980,
- 4- Those who past the “assistant teachers” exams which were prepared by the Ministry of National Education occasionally,

5- Later on, in order to meet the needs for foreign language teachers, graduates of the “other” departments of those universities which their instruction is in a foreign language (besides foreign language departments for teacher training) were also accepted as teachers. After 2002, the graduates of the “Open teacher training programs for English” were also become foreign language teachers.

On the October 14,1983, the Law of 2923 for the Foreign Language Education and Training was put into effect. This law illustrates the foreign languages to be taught at the educational institutions and the working principles of the schools which their instructions in a foreign language were. According to this law, foreign languages to be taught are decided by the Council of the Ministries. The courses to be taught in a foreign language and schools which their instruction would be in a foreign language at the primary, secondary and informal education institutions are to be decided by the Ministry of National Education and these at the higher education are to be decided by the higher institutions and the Higher Education Council (YÖK).The principles of programs at the primary, secondary and informal education are settled by the Ministry of National Education, and for the higher institutions, they are to be decided by the Higher Education Council (YÖK). The fitness’s of the practices to the goals, basic and foundation principles of Turkish National Education and this law are supervised by the Ministry and by the Higher Education Council (YÖK) at the higher institutions. (Official Newspaper-Resmî Gazete .Date: 19/10/1983 n. 18196)

Based upon this law ‘Ministry has acted a regulation on foreign language teaching. The main goals of this regulations are ,to give the individuals skills in foreign language training; in a)Listening and understanding, b)Reading and understanding, c)Talking and d)Writing ; and make them able to communicate in that language and having positive attitude towards foreign language teaching.

Related to the foreign language programs, following principles are settled:

- a) Programs at the primary and secondary education have to follow and complete each other.
- b) Educational materials and equipment are to be improved according to innovations, scientific and technological developments and to the needs of the country and environment.
- c) Programs of the compulsory and elective foreign language courses are to be put into effect after approval of the Council.
- d) Programs followed in the foreign language courses at schools and other institutions are prepared by the branch teachers and to be approved by the provincial (or sub-provincial) directorates of education (Official Newspaper-Resmî Gazete, 31.05.2006 n.26184).

The main principles at the foreign language teaching activities at the formal informal and distance education institutions are set by the Regulations of the foreign language education and teaching of the Ministry are set as follows:

- a) Starting by the 4th grade, at the primary education some compulsory foreign language courses are put in curriculum.
- b) At the secondary institutions, as the continuation of the foreign language courses at the primary level, one, and if it is approved by the Council a second compulsory foreign language course are to be taken place. In addition, in order to back up the compulsory foreign language courses elective foreign language courses can be put in curricula. The numbers of class hours are decided by the commission, according to the school type and classes. Besides in order to back up them, according to the levels of students, some extra foreign language courses can be organized (Official Newspaper-Resmî Gazete, 31.05.2006 n.26184).

Foreign language teaching at the higher education institutions and its goals, covers, practicing. Its practicing and evaluation principles are settled by the “Regulation for foreign language teaching and teaching in a foreign language.” This is based upon the Law Numbered 2547 (Item 5 and 49), the Law Numbered 2923 (Item 3).The objectives of foreign language teaching according to this “Regulation” are teaching the basic principles of foreign language taught, improve the “vocabulary”, understanding what is read and being able to explain himself (or herself) both in reading and writing (Official Newspaper-Resmî Gazete 04.12.2008 n.27074).

Students who are enrolled for the first time in a higher education programs take a foreign language test prepared by the administration of that university to identify their “levels”. Later on, according to the “points” they received on the test, it is decided if they will go on the “prep school” or not, or if they will do which level or class they will.(Official Newspaper-Resmî Gazete 04.12.2008 n. 27074).

Those who went to school at least for three years in a country which her language is the foreign language taught and those who completed their secondary education in that country; and those who received the necessary “points” which settled by the university Senates, at the foreign language tests to identify their “levels”

(TOFEL,DALF,PNDS).In addition, the students who received the necessary points decided by the Senates at the tests given by the “ Student Selection and Placement Committee” and accepted their “equivalences” by the “higher Education Council” are “exempted” from the “foreign language level identification tests (Official Newspaper-Resmi Gazete 04.12.2008 n. 27074).

According to the Law Numbered 2547 (and item 5-1 ),the students who could not pass the “foreign language equivalency test”, or those who did not take that test have to take and pass the foreign language courses. The compulsory foreign language courses are programmed and taught at least for a minimum two semesters and cannot be less than 60 hours. For the students who were exempted or passed the compulsory foreign language courses before some elective foreign language courses can be organized later (Official Newspaper-Resmi Gazete 04.12.2008 n. 27074).

In an higher education institution, even if the main teaching language is Turkish, some elective courses can be thought in a foreign language, completely or partially. But, for this there is a need for decision of senate and approval of Higher Education Council. In addition, again by having the decision of senate and approval of the Council, some courses at the pre-license and graduate levels, can be given in a specific foreign language or in Turkish only, or in that foreign language and Turkish, both. If the programs in Turkish or in a foreign language together, a minimum thirty percent of the courses must be given in that foreign language. For the students who completed their education in this foreign language in Turkey or in another country, these foreign language courses are to be given by those elements who are competent enough in that language either completed their education in that country of foreign language in the program or in a program in Turkey (Official Newspaper-Resmi Gazete 04.12.2008 n.27074).

Different policies and practices are followed in Turkey from the beginning of the foreign language teaching process till today. Various problems were faced in development and spreading out process of the foreign language teaching. Numbers of people who have taken internationally organized tests such as TOEFL, IELTS or receive Cambridge efficiency form and pass the centralized foreign language exams for “Public Administration” (KPDS), the inter-university (ÜDS) and foreign language exams (YDS) have been very few. For instance, according to the information given by the Student Measurement and Placement Center of the 2013 Fall data, 137.060 students have taken English tests and there were 80 questions, and average was 36.758 and then the standard variation was 16.401. To pass these and similar exams for many require a lot of effort, time and financial spending. According to the Index of the “EF Education First” which gives foreign language education in 41 cities, in 7 languages, Turkey was behind Hungary, Malaysia, Singapore, Uruguay, Sri Lanka , Peru and similar countries. The first country on this list was Sweden and the last one was Irak. In spite of the time, spending and efforts given to the foreign language teaching in Turkey, with some exceptions of some schools and universities which their education is in a foreign language, the level of success in foreign language teaching has not been at the “desired” level. For this reason, identifying the problems faced often and in general, in foreign language teaching in Turkish Educational System is important in trying to solve them.

## *.2. Problem Statement*

The statement of this research is formulated as “How often the foreign language teachers and teachers’ candidates in Turkey are faced with the foreign language teaching problems?

## **Method**

The research group is consisted of 6 teachers from the department of English Teachers from the Department of Foreign languages of AIBU and 117 senior students,41 instructors from the Centre for Teaching of Language, Research and Practice (DILMER).

By reviewing the literature, the problems faced in the foreign language teaching are tried to be identified. It was tried to be understood the problems they faced in their foreign language teaching by having a group work with 14 volunteer senior students from the Department of English Teaching. 20 problems which they faced were identified and those problems were fitting with the problems identified in literature. In addition, in order to get the teachers and students views, a questionnaire was prepared. In this questionnaire, the frequencies of facing the 20 questions (As 1-I have never faced,2-Very seldom,3-Sometimes,4-Very often) were asked to be answered and “the other questions” (As open ended ones) they may identified were also asked. Because of having the large

coverage of the questionnaire, the “specialist’s view was received. 36 teachers, 72 senior students. A total 108 questionnaire, 36 teachers, 72 senior students are evaluated. At this evaluation SPSS for Windows’ Package Program; frequency (f), and percentage ( % ) were used and tables were prepared and explained the observed ones.

## Findings and Suggestions

According to the sexes of the students and “Instructors” of the study in terms of “very often” answers of the facing the twenty problems ‘in terms of total numbers of their “bigness” have been put in “orders” at tables 1,2 and 3. But because of “ordering the pages” the total values are not repeated.

As the table 1 illustrates, the instructors and students in research, according to their sexes, were accumulated at “very often” and “sometimes” choices. Total percentages of those who pointed out the “very often” accumulated between 82,4 and 61,1 percentages. The problem of “the policy of foreign language teaching is not good enough” was taken the first place. But, the point of the “foreign language teaching policies in Turkey have been changed, till today” was taken place the first place, with the highest degree. The other first six problems followed this item were the “teacher centred foreign language courses ( 75,0%), “Heavy grammar oriented (73,1%),”Students not reserving enough time (64,8%), “too crowded classes (63,9%),”Not having suitable learning conditions at schools” (61,1%),”Not starting foreign language teaching at the earlier ages (61,1%). Those who marked the answer of the “I have never faced these problems” was 2,8%. But, at the end, we can point out those problems as the “system’s problems” which are faced very often, they are quite general and illustrate the reasons for “failures” at the foreign language teaching. Because of not having a policy for foreign language teaching, its faults and insufficiency seemed as the main reason for not being able to learn a foreign language.

When the Table 2 is examined, we see that illustration of instructors and students in the study in terms of their sexes we see that their distribution is merged at “very often” and “sometimes”, “choices.” Very often” alternative is located between (59,3%) and (54,6%). Those are “not having enough practice”, besides those who take foreign language exams,” not being asked any question on foreign language and by this way its lessening the importance of the foreign language” (57,4%),”Insufficient motivations of the students in learning foreign language (55,6%), “The students not attending the foreign language courses actively (54,6%),”students homework as not being helpful with foreign language learning (54,6%). We can say that these questions somehow are the ones which make foreign language teaching difficult and they are the problems related to the learning environment and the students.

Table 1. Situations of Facing the problems of Instructors and Students ,According to their Sexes

No	Problems	Status	Sexes		Degree of Facing the Problem			
					1	2	3	4
1.	The policy to learn a foreign language is not sufficient	Instructor	F	f %	0 0,0	2 5,6	3 8,3	22 61,1
			M	f %	0 0,0	0 0,0	2 5,6	7 19,4
		Student	F	f %	2 2,8	3 4,2	5 6,9	46 63,9
			M	f %	0 0,0	0 0,0	2 2,8	14 19,4
		Total			f %	2 1,9	5 4,6	12 11,1
								<b>89</b> <b>82,4</b>
2.	Foreign language classes in Turkey in general are run as the ‘teacher-centred’	Instructor	F	f %	1 1,8	0 0,0	2 5,6	24 66,7
			M	f %	0 0,0	1 2,8	5 13,9	3 8,3
		Student	F	f %	1 1,42	2 2,8	11 15,3	42 58,3
			M	f %	0 0,0	2 2,8	2 2,8	12 16,7

Total				f	2	5	20	<b>81</b>
				%	1,9	4,6	18,5	<b>75,0</b>
3.	The classes are heavily based upon the `grammar`	Instructor	F	f	0	1	7	19
				%	0,0	2,8	19,4	52,8
		Student	F	f	0	1	3	5
				%	0,0	2,8	8,3	13,9
			F	f	1	5	7	43
				%	1,4	6,9	9,7	59,7
			M	f	0	0	4	12
				%	0,0	0,0	5,6	16,7
Total				f	1	7	21	<b>79</b>
				%	0,9	6,5	19,4	<b>73,1</b>
4.	The time reserved by the students to learn a foreign language is not good enough	Instructor	F	f	1	1	6	19
				%	2,8	2,8	16,7	52,8
		Student	M	f	0	0	4	5
				%	0,0	0,0	11,1	13,9
			F	f	2	3	14	37
				%	2,8	4,2	19,4	51,4
			M	f	0	1	6	9
				%	0,0	1,4	8,3	12,5
Total				f	3	5	30	<b>70</b>
				%	2,8	4,6	27,8	<b>64,8</b>
5.	Foreign language teaching is affected negatively by the crowded classes	Instructor	F	f	1	1	10	15
				%	2,8	2,8	27,8	41,7
		Student	M	f	1	0	3	5
				%	2,8	0,0	8,3	13,9
			F	f	1	3	11	41
				%	1,4	4,2	15,3	56,9
			M	f	0	1	7	8
				%	0,0	1,4	9,7	11,1
Total				f	3	5	31	69
				%	2,8	4,6	28,7	63,9
6.	It is not provided a sufficient environment for foreign language learning in schools	Instructor	F	f	1	3	7	16
				%	2,8	8,3	19,4	44,4
		Student	M	f	0	1	3	5
				%	0,0	2,8	8,3	13,9
			F	f	0	4	15	37
				%	0,0	5,6	20,8	51,4
			M	f	2	0	6	8
				%	2,8	0,0	8,3	11,1
Total				f	3	8	31	66
				%	2,8	7,4	28,7	61,1

Table 2. Facing With the Problems by Instructors and Students According to Sexes

No	Problems	Status	Sex		Degree of Facing			
					1	2	3	4
6.	It is not being started foreign language learning in earlier ages in Turkey	Instructor	F	f	0	4	8	15
				%	0,0	11,1	22,2	41,7
		student	M	f	0	0	3	6
				%	0,0	0,0	8,3	16,7
			F	f	2	5	14	35
				%	2,8	6,9	19,4	48,6
	M	f	3	0	3	10		
		%	4,2	0,0	4,2	13,9		
Total				f	5	9	28	66
			%	4,6	8,3	25,9	61,1	
7.	Practicing in foreign language teaching is not carried out sufficiently	Instructor	F	f	0	4	10	13
				%	0,0	11,1	27,8	36,1
		Student	M	f	0	0	0	9
				%	0,0	0,0	0,0	25,0
			F	f	2	5	17	32
				%	2,8	6,9	23,6	44,4
	M	f	0	6	0	10		
	%	0,0	8,3	0,0	13,9			
Total				f	2	15	27	64
		%	1,9	13,9	25,0	59,3		
8.	Not being asked any question in foreign language at	Instructor	F	f	0	2	9	16

	the university exams besides language students affects it negatively			%	0,0	5,6	25,0	44,4
			M	f %	0	2	3	4
		Student	F	f %	2	3	19	32
			M	f %	2,8	4,2	26,4	44,4
Total				f %	1	2	3	10
				%	1,4	2,8	4,2	13,9
				f %	3	9	34	62
				%	2,8	8,3	31,5	57,4
9.	The students do not have enough motivation to learn a foreign language	Instructor	F	f %	0	3	12	12
			M	f %	0	2	2	5
		Student	F	f %	0,0	5,6	5,6	13,9
			M	f %	1	5	20	30
				%	1,4	6,9	27,8	41,7
				f %	0	1	2	13
				%	0,0	1,4	2,8	18,1
Total				f %	1	11	36	60
				%	0,9	10,2	33,3	55,6
10.	Active attendance of the students in classes is not sufficient	Instructor	F	f %	1	2	8	16
			M	f %	2,8	5,6	22,2	44,4
		Student	F	f %	0	2	4	3
			M	f %	0,0	5,6	11,1	8,3
				f %	1	7	17	31
				%	1,4	9,7	23,6	43,1
				f %	0	2	5	9
				%	0,0	2,8	6,9	12,5
Total				f %	2	13	34	59
				%	1,9	12,0	31,5	54,6
10.	The students` home works are not sufficient enough to help with foreign language learning	Instructor	F	f %	0	3	10	14
			M	f %	0,0	8,3	27,8	38,9
		Student	F	f %	0	2	4	3
			M	f %	0,0	5,6	11,1	8,3
				f %	0	6	18	32
				%	0,0	8,3	25,0	44,4
				f %	0	2	4	10
				%	0,0	2,8	5,6	13,9
Total				f %	0	13	36	59
				%	0,0	12,0	33,3	54,6

Table 3. The Problems Faced by Instructors and Students According to Their Sexes

No	Problems	Status	Sexes		Degrees Faced			
					1	2	3	4
11.	School administrators are not emphasising on foreign language teaching	Instructor	F	f %	1 2,8	4 11,1	9 25,0	13 36,1
			M	f %	1 2,8	2 5,6	2 5,6	4 11,1
		Student	F	f %	2 2,8	2 2,8	20 27,8	32 44,4
			M	f %	1 1,4	2 2,8	4 5,6	9 12,5
Total				f %	5 4,6	10 9,3	35 32,4	58 53,7
11.	The contemporary methods, techniques and methodologies in foreign language teaching are not used as they should be	Instructor	F	f %	0 0,0	3 8,3	12 33,3	12 33,3
			M	f %	1 2,8	2 5,6	3 8,3	3 8,3
		Student	F	f %	0 0,0	3 4,2	20 27,8	33 45,8
			M	f %	2 2,8	0 0,0	4 5,6	10 13,9
Total				f %	3 2,8	8 7,4	39 36,1	58 53,7
12.	The educational technologies and equipment of schools are not good enough for foreign language	Instructor	F	f %	1 2,8	6 16,7	9 25,0	11 30,6

	teaching		M	f %	1 2,8	0 0,0	6 16,7	2 5,6
		Student	F	f %	4 5,6	8 11,1	14 19,4	30 41,7
			M	f %	2 2,8	3 4,2	2 2,8	9 12,5
Total				f %	8 7,4	17 15,7	31 28,7	<b>52</b> <b>48,1</b>
12.	The students do not have enough knowledge about the importance of learning a foreign language	Instructor	F	f %	0 0,0	2 5,6	16 44,4	9 25,0
			M	f %	0 0,0	1 2,8	4 11,1	4 11,1
		Student	F	f %	0 0,0	7 9,7	17 23,6	32 44,4
			M	f %	0 0,0	3 4,2	6 8,3	7 9,7
Total				f %	0 0,0	13 12,0	43 39,8	<b>52</b> <b>48,1</b>
12.	Foreign language programs are not prepared sufficiently to teach a foreign language	Instructor	F	f %	2 5,6	5 13,9	8 22,2	12 33,3
			M	f %	0 0,0	3 8,3	3 8,3	3 8,3
		Student	F	f %	0 0,0	4 5,6	23 31,9	29 40,3
			M	f %	1 1,4	2 2,8	5 6,9	8 11,1
Total				f %	3 2,8	14 13,0	39 36,1	<b>52</b> <b>48,1</b>

When the Table 3 is examined it is observed that distributions of the instructors and students, according to their sexes' in research were intensified at the "very often" and "sometimes" choices. Total rates of those who marked the "very often" choice were located between (53,7%) and (47,2%). These problems are "the school administrators are not giving enough importance on foreign language teaching" (53,7%), "contemporary foreign language teaching techniques and technologies are not practiced as they should be in foreign language teaching" (53,7%), "Educational technology and materials which schools own are not good enough for foreign language teaching" (48,1%), "students do not have enough knowledge about the importance of foreign language learning" (48,1%), "foreign language programs are not necessarily prepared as sufficient for learning" (48,1%). It is quite safe to say that these problems seems important affecting the foreign language learning seriously.

#### 4. Discussions

According to the "Human Development Index" (December7, 2013), the English sufficiency level of Sweden, is at the "first place", 68.69, and she is at the 9th developmental place among the "well developed" countries, Brazil which is located at the 85th place is located at the 38th place with the point of 50.70. Turkey is at the 90th developmental level and at the 41th place with the 49.52th point. ( English Proficiency Index, December 2013, pp. 6-7)

The problem of "The policy on Foreign language teaching of Turkey is not good enough" has taken the first place. The foreign language teaching policies in Turkey have been changed from time to time. For instance, some changes have been made by following some practices in China, Australia, and France. Larry in China, in 1965, Field in Australia in 1974 focuses on personal activities, using films, changing the class environments and materials were among the most effective changes in foreign language teaching. Emphasis on the "grammar" becomes less important. A graduate from a senior high school was expected to be able to communicate in his or her foreign language. In Turkey too, foreign language teaching policies and practices have been changed, such as starting earlier, in 2013-2014. In China they started at the age of 10, at the third grade, in Ukraine they started at the ages 4 or 5. In Japan it is at the age of 12, in Norway and Luxemburg it is at the age of 6.

"Teacher centred foreign language teaching" (75.0%), Işık (2008; pp.21) is takes in foreign language teaching and teacher preparation are among the points discussed and still accepted as the "mistakes" in the foreign language teaching in Turkey. The crowded classrooms, (63,9%) is still a "problem". The average number of students in a class is still 26.1. It is 24.2 in Brazil and 19.8 in Mexico. Among the more developed countries for

instance it is different. It is 18.2 in Austria and 15.7 in Luxemburg (Education at a Glance 2013: OECD Indicators; 374).

(% 53, 7) point out that “Modern methods and techniques in foreign language teaching are not being used. The methods and techniques are coming both from the Ottoman times and from the West and translation, understanding what one learned, emphasizing on the “grammar” are still “accepted points” ( Işık., 2008, pp.18-19).

#### 4.1. Conclusions and Suggestions

The problems of the foreign language teaching are stated at the tables 1,2 and 3.The policy of foreign language teaching, teaching environments teaching strategies, teacher training and classrooms situations are interrelated and they affect the teaching conditions negatively. These and similar problems may be accepted as the main reasons for the failures in the foreign language teaching.

The law of the 2923 which acted at the October 14.,1923 on the foreign language teaching has brought some positive changes. Based upon this law the regulations’ of the foreign language teaching and the foreign language teaching at the higher institutions and teaching in a foreign language were acted. We can say that these changes have not been good enough to solve the “problem”. For instance the problem of preparing the foreign language teacher, reserving more resources for the foreign language teaching still seems very vital.

#### References

- Aggeler,W.F.(1958). The teaching of english in france. PMLA, Vol. 73, No. 4, Part 2: Supplement .7-14 .Stable URL: <http://www.jstor.org/stable/2699434> .
- British Council. ( TEVAP) .( 2013) *Türkiye’deki devlet okullarında İngiliz dilinin öğretimine ilişkin ulusal ihtiyaç analizi*,[National needs analysis of teaching English at the state schools in Turkey] *Kasım 2023* . Ankara: ISBN 978-9944-927-63-5
- Demircan,Ö.( 1988).*Dünden bugüne Türkiye’de yabancı dil*. [Foreign language in Turkey from yesterday to today] İstanbul: Remzi Kitabevi.
- Demirel,Ö.(1991). Türkiye’de yabancı dil öğretmeni yetiştirmede karşılaşılan güçlükler.[The problems faced in preparing of foreign language teachers in Turkey] *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 6,25-39.
- Demirel,Ö. (2003). *Yabancı dil öğretimi*. [Foreign language teaching] Ankara: Pegem Yayıncılık.
- Demirel,Ö. (2010). *Yabancı dil öğretimi: dil biyografisi, dil dosyası* [Foreign language teaching A biography of foreign language teaching] (S.Baskı) Ankara: Pegem Yayıncılık
- Education First. Basın Bültenleri <http://www.marjinal.com.tr/detay.asp?hid=11037&mus=educationfirst>. Stable URL:31.01.2014
- Ekmekçi , Ö. (1983 ) *Yabancı Dil Öğretiminde Psiko-Sosyal Etmenler*. Orta Öğretim Kurumlarında Yabancı Dil Öğretimi ve Sorunları.[Psyco Social Factors in Foreign Language Teaching] Ankara: TED Yayınları,
- Field,B. (1974).International perspective: the teaching of english in australia *The English Journal*, 63(7) 18-19 Stable URL: <http://www.jstor.org/stable/813029> .
- Işık, A. (2008). Yabancı dil eğitimimizdeki yanlışlar nereden kaynaklanıyor? [Where the mistakes are originated in our foreign language teaching] *Journal of Language and Linguistics*,4(2), 15-26.
- Lary,D.(1965) .Teaching english in china. the china quarterly, *The School of Oriental and African Studies* 24,1-14.Stable URL: <http://www.jstor.org/stable/651837> .
- MEB.(2006).Yabancı dil eğitimi ve öğretimi yönetmeliği.[Regulation on foreign language teaching] Official Paper. 31.05.2006. n. 26184
- OECD(2013) Education at a Glance 2013:OECD Indicators, OECD publishing. <http://dx.doi.org/10.1787/eag-2013-en>
- ÖSYM ( 2013) Sonbahar dönemi sonuçlarına ilişkin sayısal bilgiler [Numeric knowledge on fall results]Stable URL: <http://www.osym.gov.tr/belge/1-12668/gecmis-yillardaki-sinavlara-ait-sayisal-bilgiler.html>
- Vergili,A. (1993).*Özel ortaöğretim kurumlarında yabancı dil öğretiminde benimsenen ilkeler ile uygulama teknik ve yöntemlerin bazı değişiklikler açısından karşılaştırılması*. [A comparison of accepted principles methods and techniques on foreign language teaching at private secondary schools on some changes ] Turkey, Elazığ: unpublished doctoral thesis ,pp.. 25.
- YÖK. (2008). Yükseköğretim kurumlarında yabancı dil öğretimi ve yabancı dille öğretim yapılmasında uyulacak saslara ilişkin yönetmelik[Regulations on foreign language teaching at the higher institutions and having education in foreign language ] Official Paper 04.12.2008 n: 27074
- .2923 Sayılı yabancı dil eğitimi ve öğretimi kanunu[Law of 2923 on foreign language teaching]14.10. 1983 Official Paper.19.10.1983.n.18196



# Free problem posing cases of prospective mathematics teachers: Difficulties and solutions

Sare ŞENGÜL<sup>a</sup>, Yasemin KATRANCI<sup>b90</sup>

<sup>a</sup>Marmara University, Education Faculty Primary Department, İstanbul, Turkey

<sup>b</sup>Kocaeli University, Education Faculty Primary Department, Kocaeli 41380, Turkey

---

## Abstract

The aim of this study is to evaluate free problem posing studies of prospective mathematics teachers about Ratio and Proportion Subject', to determine the difficulties faced by the prospective teachers during problem posing process and to elicit suggestions regarding the experienced difficulties. For this purpose a data form was created by the researchers. This data form has three parts which were; i) *The task of posing free problems*, ii) *The difficulties faced during problem posing process* and iii) *Suggestions for solutions of the difficulties*. The data form was applied to 114 prospective primary mathematics teachers. During the analysis of the data regarding the first part of the data form, the following criteria were considered; i) *Problem text (language and expression)*, ii) *The compatibility of the problem with the mathematical principles*, iii) *The type/structure of the problem* and iv) *The solvability of the problem*. In the analysis of the data obtained from the second and third parts of the form, content analysis was conducted and the program which is called as NVivo 10 was used. In conclusion, it was concluded that prospective mathematics teachers posed clear and understandable problems which were compatible with the mathematical principles in the form of exercise type and which can be solved by students. The difficulties faced during problem posing process determined as; lack of experience, lack of the content knowledge, not recognizing the cognitive levels of the students, lack of curriculum knowledge and difficulties in writing problem texts. The solutions which were suggested in the scope of this study were as the following; emphasizing problem solving and posing studies, in depth analysis of the curriculum, teaching special teaching methods in details and resorting to resources during problem posing process.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University

**Keywords:** Free problem posing, difficulties, solutions

---

## 1. Introduction

Problem posing is a process of creating meaningful mathematical problems from interpretations established through concrete cases and based on mathematical experiences (Stoyanova & Ellerton, 1996). Students in problem posing process feel the necessity of demonstrating their reasoning skills, understanding the subject in details and connecting with real life situations (Cunningham, 2004). This process has the potential to provide students an understanding about what it means to “do mathematics” (Lavy & Shriki, 2009). Besides this process not only provides students to have different and flexible thoughts but also gives them responsibility for learning (Ergün, 2010).

When the previous research about this subject was analyzed, it was seen that there are various problem posing methods (Abu-Elwan, 2007; Dickerson, 1999; Grundmeier, 2003; Stoyanova, 2003). These methods are as in the following; i) *free problem posing*, ii) *semi-structured problem posing*, iii) *structured problem posing* and iv) *what if?...what if not?..*. In this study, it was only focused on the task of free problem posing. In this sense;

In free problem posing process, students are given a situation or a subject from daily life. Students generate a problem by using them (Akay, 2006). It is the case of asking students to pose problems about any subject without providing them any data, figure or problems (Ergün, 2010). In this process, students struggle to pose

problems not only for their own understanding but also for their friends to understand and to solve (Lowrie, 2002). A task which is given with an instruction such as “*Pose a problem by using your existing mathematical knowledge about Tables and Graphics*” can be given as an example for free problem posing method. It is a process in which students are asked to blend their existing mathematic knowledge with a given situation or topic. It will be more beneficial, if the teacher asks students to pose new problems from these situations by correlating real life situations and learnt mathematical subjects in this process. By this way, the mathematical thinking of the students will also be supported (Akay, 2006).

Lin (2004) states the necessity that problem posing activities should be carried out and teachers should have a solid understanding regarding problem posing activities. It is thought that increasing students’ mathematical performances and their success in understanding the mathematics can be provided by giving an insight to teachers about problem posing (Crespo & Sinclair, 2008; Işık, 2011; Işık, Kar, Yalçın & Zehir, 2011; Stoyanova, 2003). Within this context, the studies about searching prospective primary mathematics teachers’ problem posing levels are getting importance. Işık and Kar (2012a) identified in their studies that primary mathematics teachers use problem posing activities in their lessons. In addition that, it was appeared that teachers during their lessons generally used structured or semi-structured problem posing activities and they did not carry out free problem posing activities. At this point, we have noticed a gap in literature and it was decided to focus on this gap.

In this regard, free problem posing levels of prospective mathematics teachers about Ratio and Proportion Subject’ was evaluated in this study and it was tried to determine their experiences during problem posing process and which solutions are suitable for the difficulties they faced during this process. In this sense, the answers of the following questions were searched.

1. What is the level of free problem posing skills of prospective mathematics teachers?
2. What are the difficulties that prospective mathematics teachers face during problem posing process?
3. What are the solutions related with difficulties that prospective mathematics teachers face (if any)?

## 2. Method

### 2. 1. Research Design

Qualitative research is a search for demonstrating perceptions and events in a holistic and realistic manner in natural environments and in which a qualitative process is followed (Yıldırım & Şimşek, 2008). In this sense, this study is a qualitative research which is aimed to demonstrate results of a particular situation.

### 2. 2. Working Group

The work group of this study consisted of 114 prospective third-year students who are studying in Marmara University, Teaching Primary School Mathematics department. 89 of the prospective teachers are female (78,07%) and 25 (21,93%) of them are male.

### 2.3. Data Collection Tools and Collecting Data

The data of this study was collected by using “Data Form” which was prepared by the researchers. This data form consisted of three sections. These sections are as in the following; *i) free problem posing task, ii) difficulties faced in problem posing process and iii) suggestions for solutions*. The data form used in this study showed in the following table.

Table 1: Data form

1. About ‘Ratio and Proportion’ Subject;
2.
1. Pose a problem in middle school level (5 <sup>th</sup> , 6 <sup>th</sup> , 7 <sup>th</sup> , 8 <sup>th</sup> grade level) and then solve the same problem.
3.
2. Write your experiences (e.g. what kind of difficulties you faced) you had during problem posing process.
4.
3. Which solutions do you suggest for the difficulties you faced during problem posing process?

This data form which was prepared by the researchers distributed to prospective teachers and they were asked to fill in this form. Students were given 40 minutes to fill in this form.

#### 2.4. Data Analysis

The data obtained from the first part was first evaluated by the researchers separately. As a result of this analysis it was determined that one of the prospective teachers did not pose any problems and 13 of the prospective teachers posed problems on different subjects (Sets, Algebraic expressions, Equations, etc.) other than Ratio and Proportion subject. For instance;

Problem: Buket'in 13 tane ceviz'i var. Yasemin'in cevizleri Buket'in cevizlerinin 2 katından 11 fazladır. Buket'in cevizleri toplam cevizlerin yüzde kaçını oluşturmaz?

Problem: Buket has 13 walnuts. Yasemin has 2 times and 11 more walnuts than Buket. What is the percentage of Buket's walnuts in total walnuts?

Fig. 1. Free problem posing task of prospective teacher with number 59

Problem: Ahmet Bey aylık %2 faiz veren bir bankaya parasını yatırmış ve ay sonunda parasını 1020 lira olarak çekmiştir. Ahmet Bey başlangıçta bankaya ne kadar para yatırmıştır? (5.sınıf düzeyi.)

Problem: Mr Ahmet deposit to a bank with 2% interest per month and at the end of the month withdrew his money as 1020 TL. How much money did Mr Ahmet deposit to bank in the beginning? (5th grade level)

Fig. 2. Free problem posing task of prospective teacher with number 61

The remaining 100 problems from the first part were evaluated by the researchers by using an evaluation form which was developed in another study. This evaluation form consists of four dimensions and each dimension consists of three sub-dimensions. It was decided that the agreement percentage regarding the compatibility of each dimension for evaluation changed between 0,89 and 0,92 and the agreement percentage regarding the compatibility of the sub-dimensions to dimensions changed between 0,86 and 0,90. 100 problems were evaluated by using this evaluation form by the researchers separately and results of the evaluation were then compared. The differences appeared were discussed and then an agreement was reached. In conclusion, the evaluation results as being related with each sub-dimension was presented on the basis of frequency (f) and percentage (%).

Content analysis method was used in the analysis of the data regarding the second and third part of the data form. Content analysis means combining similar data around particular concepts and themes and editing and interpreting them as readers can understand. In this sense, first of all the data was coded. At this phase the researcher try to divide the data into meaningful parts by analyzing and to find what each part means conceptually (Yıldırım & Şimşek, 2008). A code list was created by reading the data by the researchers separately more than once. The codes were compared and a discussion was made on different codes.

It is necessary to find themes which can explain the data in general by considering the codes (Yıldırım & Şimşek, 2008). Secondly, researchers created themes separately by gathering similar codes together. The level of agreement between researchers was calculated by using the formula " $Agreement Percentage = [Agreement / (Agreement + Disagreement)] \times 100$ " as determined by Miles and Huberman (1994). In this regard, it was decided that the agreement percentage regarding the themes changed between 0,86 and 0,92. Later on, themes were organized and presented to readers. For the interpretation of the findings, the themes were presented on the basis of frequency (f) and percentage (%) by digitalizing the data. NVivo 10 program was used in content analysis.

### 3. Findings and Comments

Findings and comments regarding the research problem which was specified as “*What is the level of free problem posing skills of prospective mathematics teachers?*” are as in the following;

Table 2. The evaluation of the task of posing free problems

5. Evaluation Criteria		6. f	7. %
8. Problem Text (Language and Expression)	9. The text of the problem is not clear and understandable.	10. 0	11. 0
	12. The text of the problem is relatively clear and understandable.	13. 12	14. 12
	15. The text of the problem is clear and understandable.	16. 88	17. 88
18. The Compatibility of the Problem with the Mathematical Principles	19. The problem is not suitable to Mathematical Principles.	20. 0	21. 0
	22. The problem is relatively suitable to Mathematical Principles.	23. 32	24. 32
	25. The problem is suitable to Mathematical Principles.	26. 68	27. 68
28. The Type/Structure of the Problem	29. Exercise.	30. 69	31. 69
	32. Simple normal problem.	33. 29	34. 29
	35. Normal problem.	36. 2	37. 2
38. The Solvability of the Problem	39. The problem cannot be solved.	40. 0	41. 0
	42. Problem can be solved but it is erroneous.	43. 0	44. 0
	45. It can be solved.	46. 100	47. 100

When Table 2 was analyzed, it was seen that 88 (88%) of the posed problems had clear and understandable texts. It was determined that 12 (12%) problems had relatively clear and understandable texts. It was seen that 68 (68%) problems were suitable to mathematical principles and 32 (32%) problems were relatively suitable to mathematical principles. It was appeared that 69 (69%) posed problems were exercise type problems, 29 (29%) problems were simple normal type problems. It was understood that all the posed problems were solvable. For instance;

**Problem:** 50 tane kalem 3 öğrenci arasında paylaştırılacaktır. Kalemler öğrenciler arasında 2, 3 ve 5 ile doğru orantılı bir şekilde paylaştırılacak ise, en fazla kalemi olan öğrenci toplam kaç kalem alır? → (6.sınıf olabilir ama bu konuda emin değilim çünkü müfredat hakkında yeterli bilgim yok.)

**Çözüm:**

Kalemler 2, 3 ve 5 ile orantılı verilerek ise ;

$$\left. \begin{array}{l} 1. \text{ öğrenci} = 2k \\ 2. \text{ öğrenci} = 3k \\ 3. \text{ öğrenci} = 5k \end{array} \right\} \text{ kalem alır.}$$

$$2k + 3k + 5k = 50$$

$$10k = 50$$

$$k = 5$$

en fazla kalem olan öğrenci  $\Rightarrow 5k = 5 \cdot 5 = 25$  tane kalem alır.

**Problem:** 50 pencils will be divided among 3 students. If pencils are divided among students directly proportional as 2, 3 and 5, How many pencils will the student who will get most of the pencils, take?

(This can be for the 6th grade but I am not sure about this because I do not have enough information about the curriculum)

**Solution:** If the pencils will be given directly proportional as 2, 3 and 5;

1 student	= 2 pencils = 2k	$2k + 3k + 5k = 50$	the student who will take
2 students	will take = 3 pencils = 3k	$10k = 50$	most of the pencils
3 students	= 5 pencils = 5k	$k = 50$	$5k = 5 \cdot 5$
			He/she will take 25 pencils

Fig. 3. Free problem posing task of prospective teacher with number 28

Findings and comments regarding the research problem which was specified as “What are the difficulties that prospective mathematics teachers face during problem posing process?” are as in the following;

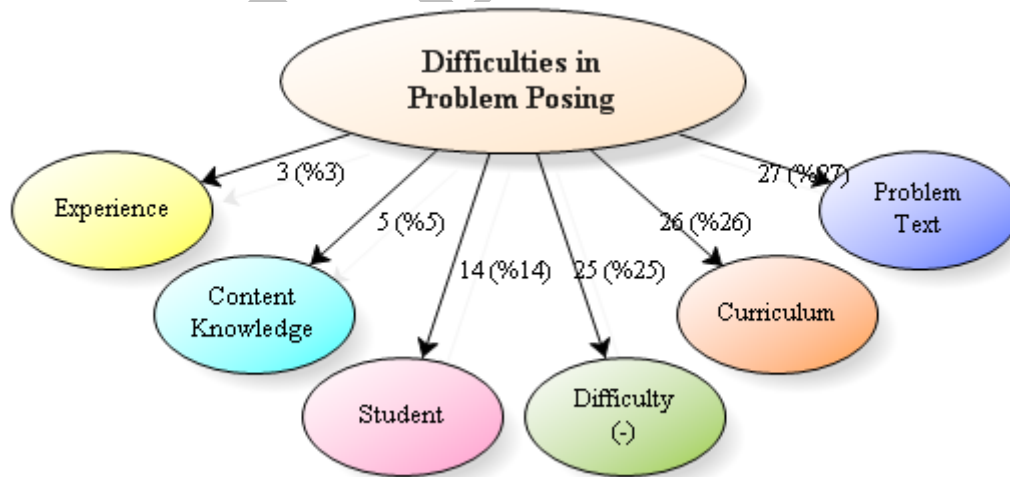


Fig. 4. Difficulties in problem posing

When Figure 4 was analyzed, it was understood that 3 (3%) prospective teachers expressed their opinions about “experience” theme. It was seen that prospective teachers stated that they had difficulties in posing problems as they had less experience about problem posing. 5 (5%) prospective teachers expressed their opinions about “content knowledge”. It was seen that prospective teachers could not completely remember the “Ratio and Proportion” subject for this reason they expressed that they had difficulties in posing problems. 14

(14%) prospective teachers expressed their opinions about “student” theme. Prospective teachers expressed that they could not completely understand the cognitive levels of students. For this reason, they stated that they did not know whether the posed problems were understood by students or not. In this sense, they had difficulties in posing problems. It was seen that 25 (25 %) prospective teachers stated that they did not face with any kind of difficulty.

Twenty six (26%) prospective teachers expressed that they did not know on which grade level “Ratio and Proportion” subject was covered at which level. They stated that since they did not have enough information about curriculum, they had difficulties in posing problems. 27 (27 %) prospective teachers expressed that they had difficulties in expressing problem texts. They indicated that they paid attention to pose problems which are suitable to everyday life, to have numbers that can be fully divided and to provide a language which is suitable to students’ level. For this reason, they had difficulties in creating problem texts. For instance;

İlk olarak cümle oluşturmada zorluk çektim. Anlatım bizzat  
 izluğu yapmamak için uğraştım. Problemin açık ve anlaşılır  
 olması için çalıştım  
 Çözme sürecinde ise öğrencilerin en rahat şekilde anlayabil-  
 mele için uğraştım ve biraz zorlandım.

First of all, I had difficulties in creating sentences. I tried hard not to have ambiguous sentences. I tried to write clear and understandable texts.

During the solution process, I made an effort for having students to understand easily and I had a little difficulty.

Fig. 5. The difficulties of prospective teacher with number 71

Problem oluştururken kurduğum cümlelerde zorluk yaşadım.  
 Problem yaparken dilimin anlaşılır olmasına dikkat etmek  
 gerekiyordu, ben problemin dikkat çekici olmasını da istediğimden  
 dolayı cümleler kurarken sorun yaşıyorum.

I had difficulties in writing sentences while posing the problem. It is necessary to pay attention to have an understandable language while posing problems, since I wanted to pose an outstanding problem; I had difficulties in writing sentences.

Fig. 6. The difficulties of prospective teacher with number 97

Findings and comments regarding the research problem which was specified as “What are the solutions related with difficulties that prospective mathematics teachers face (if any)?” are as in the following;

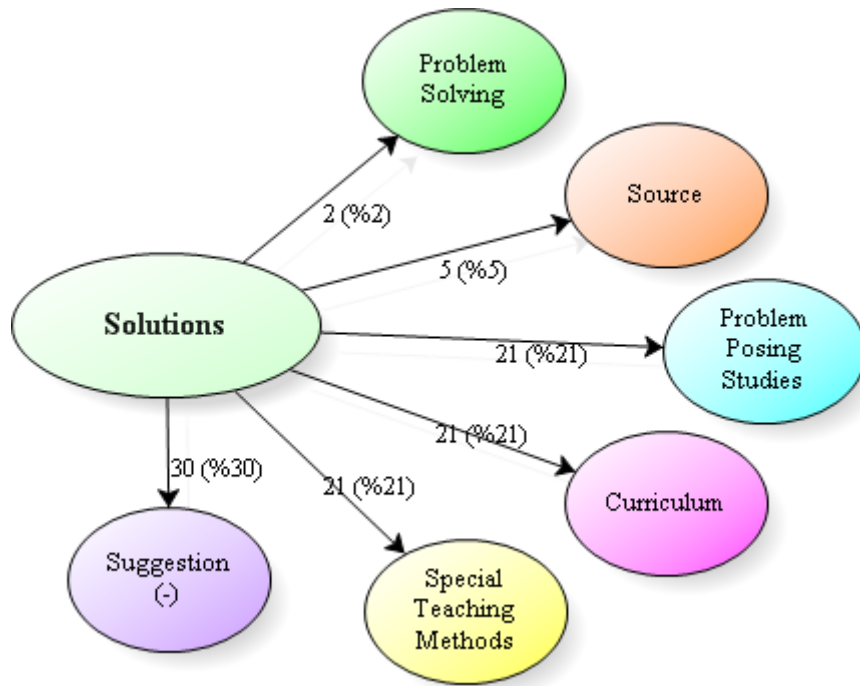


Fig. 7. Solutions

When Figure 7 was analyzed, it was occurred that 30 (30%) prospective teacher did not suggest any kind of solutions. It was determined that 2 (2%) prospective teacher indicated that in order to pose problems, it was necessary to give importance to problem solving. 5 (5%) prospective teachers expressed their opinions about “source” theme. In this sense, they mentioned that it was necessary to use additional resources while posing problems (books, colleagues etc.) 21 (21 %) prospective teachers expressed their opinions about “problem posing studies” theme. It was specified that prospective teachers thought that they could overcome the difficulties by conducting more problem posing studies.

Twenty one (21%) prospective teachers expressed their opinions about “curriculum” theme. Prospective teachers stated that it was necessary to know middle school curriculum very well. 21 (21%) prospective teachers expressed their opinions about “special teaching methods” theme. In this regard, they stated that it was necessary to focus more on how to teach middle school mathematics subjects when prospective teachers are students. They expressed that it was necessary to conduct various problem posing studies about subjects and to teach them how to teach these subjects, when they are students. For instance;

Problem kurarken oran-orantıyı görmüş bir öğrenci orada denklem kurmayı ve çözneyi biliyormudur diye düşündüm. Kendince 7. sınıf sorusu yaptım ama emin değilim?

While I was posing problems, I thought whether a student who learnt ratio and proportion subject know how to equate and to solve equations or not. I wrote 7th grade question in my own way but I am not sure.

Fig. 8. Suggestions for solutions by prospective teacher with number 53



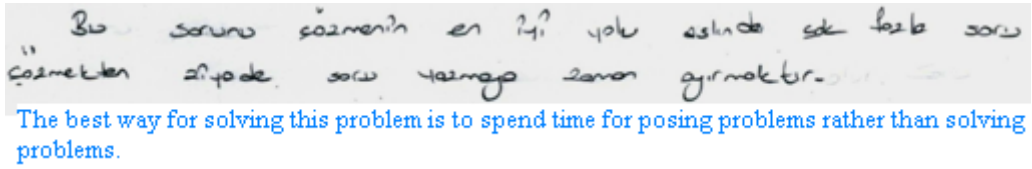


Fig. 9. Suggestions for solutions by prospective teacher with number 97

#### 4. Conclusion, Discussion and Implications

As result of the analysis of the data obtained from the first part of the data form, it was determined that prospective teachers during free problem posing tasks posed problems which had clear and understandable texts. It was concluded that posed problems were suitable to mathematical principles. It was appeared that all the problems were solvable. In addition to that all the posed problems were in exercise type. In the previous studies (Albayrak, İpek & Işık, 2006; Crespo, 2003; Crespo & Sinclair, 2008; Işık, Işık & Kar, 2011) it was specified that prospective teachers posed predictable, simple and well-structured problems. In this case, it can be said that this study echoed with the previous studies stated above.

Korkmaz and Gür (2006) indicated that prospective teachers had misconceptions about problem concept and they got confused between the concepts of problem and exercise. They also expressed that prospective classroom teachers and mathematics teachers could not manage to go beyond mathematical problems given in text books. In their studies, they concluded that prospective teachers had difficulties in organizing the problems, understanding the features of problems and had common mistakes. It was also concluded in that study that prospective teachers posed problems in exercise type. In this sense, it can be said that they got similar results with our study. It can be said for the reason of this that prospective teachers remain dependent on the course books during their education and they do not face with problem solving studies. Besides Korkmaz and Gür (2006) also determined that prospective mathematics teachers posed verbal word problems. They expressed that they could not fulfil the expectations of mathematical thinking and reasoning. In their studies, open ended and creative problems were rarely recognized. In this sense, it can be said that two studies have similarities. It can be said that the finding obtained in this study as 'prospective mathematics teachers posed problems in exercise types' is overlapping with the finding obtained from the study of Işık and Kar (2012c) as they prefer problems that can be solved by using simple mathematical calculations.

It was concluded that prospective teachers had difficulties in five different themes during problem posing process. These themes were determined as; '*experience*', '*content knowledge*', '*student*', '*curriculum*' and '*problem text*'. In this sense, the difficulties experienced during problem posing process appeared as; lack of experience, lack of content knowledge, not recognizing the cognitive experiences of the students, lack of curriculum knowledge and difficulties in writing problem texts. It was concluded that prospective teachers mostly had difficulties in creating problem texts. Işık and Kar (2012b) suggested that prospective teachers should be given opportunities to pose their own problems so that their problem posing skills could be improved. The reason of this finding can be seen as prospective teachers have rarely encountered with problem posing studies.

Secondly, it was determined that they did not know the curriculum of mathematics lesson and which subjects were taught in which grades. For this reason, it was decided that they had difficulties while posing problems. This difficulty may be related with the fact that prospective teachers are informed very little about mathematics curriculum during their training. The third difficulty was specified as prospective teachers did not know the cognitive levels of their students. This comes from the fact that they have not started their careers as teachers yet and they have not seen different student profiles. As their experiences as being teachers increased, they will be able to overcome this difficulty.

It was concluded that prospective teachers expressed their opinions about five different themes related with the difficulties mentioned above. These suggestions for solution were come up with as; '*special teaching methods*', '*curriculum*', '*problem posing studies*', '*source*' and '*problem solving*'. It was appeared that prospective teachers stated that it was necessary to focus more on how to teach mathematical subjects during



their training processes. In addition to that, it was come out that it was necessary to give information about curriculum in more details.

Besides, it was also seen that prospective teachers stated that the difficulties stated in this study could be overcome by conducting problem posing studies. In this sense, it was appeared necessary that problem posing studies should be carried out with teachers. In accordance with this necessity, it is suggested that compulsory and selective lessons about problem posing should be added to the teaching mathematics programs. It is seen important that prospective teachers should be informed about problem posing and they should be provided opportunities to get more information about problem posing. In this study only free problem posing was considered and the problems posed by prospective teachers during this process, the difficulties they faced and suggestions for solutions were brought into light. It is seen necessary to repeat this study by considering structured and semi-structured problem posing processes. Besides, it is important to detail this study which was carried out qualitatively with quantitative data in terms of generalizing this study.

## References

- Abu-Elwan, R. (2007). The use of webquest enhance the mathematical problem-posing skills of pre-service teachers. *The International Journal for Technology in Mathematics Education*, 14(1), 31-39.
- Akay, H. (2006). The examination of the effect of mathematics instruction with problem posing approach on students' academic achievement, problem solving ability and creativity. Doctoral dissertation, Gazi University Institute of Educational Sciences: Ankara.
- Albayrak, M., İpek, A. S., & Işık, C. (2006). Problem designing-solving students in teaching of basic operation skills. *Journal of Erzincan Education Faculty*, 8(2), 1-11.
- Crespo, S. (2003). Learning to pose mathematical problems: Exploring changes in preservice teachers' practise. *Educational Studies in Mathematics*, 52(1), 243-270.
- Crespo, S., & Sinclair, N. (2008). What makes a problem mathematically interesting? Inviting prospective teachers to pose better problems. *Journal Mathematics Teacher Education*, 11, 395-415. doi: 10.1007/s10857-008-9081-0
- Cunningham, R. F. (2004). Problem posing: An opportunity for increasing student responsibility. *Mathematics and Computer Education*, 38(1), 83-89.
- Dickerson, V. M. (1999). The impact of problem-posing instruction on the mathematical problem-solving achievement of seventh grades. Doctoral dissertation, Faculty of Graduate School of Emory University, Department of Educational Studies: USA.
- Ergün, H. (2010). The effect of problem posing on conceptual learning and problem solving in physics education. Published doctoral dissertation. Marmara University Institute of Educational Sciences: İstanbul.
- Grundmeier, T. A. (2003). The effects of providing mathematical problem posing experiences for K-8 pre-service teachers: Investigating teachers' beliefs and characteristics of posed problems. Doctoral dissertation, University of New Hampshire, Durham: USA.
- Işık, C. (2011). Conceptual analysis of multiplication and division problems in fractions posed by preservice elementary mathematics teachers. *H. U. Journal of Education*, 41, 231-243.
- Işık, C., Işık, A., & Kar, T. (2011). Analysis of the problems related to verbal and visual representations posed by pre-service mathematics teachers. *Pamukkale University Journal of Education*, 30(11), 39-49.
- Işık, C., & Kar, T. (2012a). A qualitative study on teacher views of problem posing in mathematics lesson. *National Education*, 41(194), 199-215.
- Işık, C., & Kar, T. (2012b). An error analysis in division problems in fractions posed by pre-service elementary mathematics teachers. *Educational Sciences: Theory & Practise*, 12(3), 2289-2309.
- Işık, C., & Kar, T. (2012c). Pre-service elementary teachers' problem posing skills. *Mehmet Akif Ersoy University Journal of Education Faculty*, 23, 190-214.
- Işık, C., Kar, T., Yalçın, T., & Zehir, K. (2011). Prospectives teachers' skills in problem posing with regard to different problem posing models. *Procedia Social and Behavioral Sciences*, 15, 485-489.
- Korkmaz, E., & Gür, H. (2006). Determining of prospective teachers' problem posing skills. *Journal of the Institute of Science and Technology of Balıkesir University*, 8(1), 64-74.
- Lavy, I., & Shriki, A. (2009). Small change - big difference. *The Montana Mathematics Enthusiast*, 6(3), 395-410.
- Lin, P. J. (2004). Supporting teachers on designing problem-posing tasks as a tool of assessment to understand students' mathematical learning. *Proceedings of the 28th Conference of the International Group for the Psychology of Mathematics Education*. Bergen: Bergen University.
- Lowrie, T. (2002). Designing a framework for problem posing: Young children generating open-ended tasks. *Contemporary Issues in Early Childhood*, 3(3), 354-364. doi: 10.2304/ciec.2002.3.3.4
- Miles, M. B., & Huberman, M. A. (1994). *An expanded sourcebook qualitative data analysis*. London: Sage Publication.
- Stoyanova, E. (2003). Extending students' understanding of mathematics via problem posing. *Australian Mathematics Teacher*, 59(2), 32-40.
- Stoyanova, E., & Ellerton, N. F. (1996). A framework for research into students' problem posing. In P. Clarkson (Ed.), *Technology in mathematics education* (pp. 518-525). Melbourne: Mathematics Education Research Group of Australasia. Retrieved from [http://www.merga.net.au/documents/RP\\_Stoyanova\\_Ellerton\\_1996.pdf](http://www.merga.net.au/documents/RP_Stoyanova_Ellerton_1996.pdf)
- Yıldırım, A., & Şimşek, H. (2008). *Sosyal bilimlerde nitel araştırma yöntemleri*. Ankara: Seçkin Publication.

# From vision to action – a strategic planning process model for open educational resources

Chen, Shu-Hsiang<sup>1</sup>, Nasongkhla, Jaitip<sup>\*b</sup>, Donaldson, J. Ana<sup>c</sup>.

<sup>1 b</sup> Faculty of Education, Chulalongkorn University, 254 Payathai, Wangmai, Patumwan, Bangkok, 10330 Thailand

<sup>c</sup> Walden University, 100 Washington Avenue South, Suite 900, Minneapolis, MN 55401 USA

---

## Abstract

Strategic visionary and planning processes are a way to systematically plan the development of open education resources and practices for the future. Strategic planning processes are considered to be a powerful tool and guideline for helping all levels of higher educational institutions (HEIs) develop their strategic plan, and to find their competitive advantage and place within their environment. From vision to action, the research objective of this study is to develop a strategic planning process (SPP) model based on the concept of open educational resources (OER), university social responsibility (USR), social entrepreneurship (SE), and strategic planning (SP). The proposed SPP model will serve as a guide for mapping out a strategic plan and activities for aligning and implementing OER, which can tie strategic planning to a university's effectiveness and success in sustainability for the long term. The SPP model can also help HEIs to guide their vision, mission, values, goals, and strategies to foster OER development and practices.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

**Keywords:** open educational resources; university social responsibility; social entrepreneurship; strategic planning process

---

\*Corresponding author Tel: +662218-2650,  
email: jaitip.n@chula.ac.th

## Introduction

The Internet revolution has facilitated the concept of openness now more than ever. A number of current technologies support the paradigm of modern education in terms of creation, communication, and collaboration. In addition, technology has created many opportunities and opened people's minds in terms of sharing their knowledge (Zhao, 2012). The concept of openness plays an important role in driving educational innovation and transformation in a number of articles. The results of openness that are relevant to the current education movements were summarized by Weller (2012) as consisting of (1) open sources, (2) open educational resources, (3) open courses, (4) open research, (5) open data, and (6) open application program interfaces (APIs). Openness has been perceived as a catalyst for educational reformation and transformation (Wiley, 2006a; 2006b), and has allowed HEIs to implement the fundamental values of university-based education, and shift the focus from traditional lecturing to a more learner-centered approach (Wiley, 2006a; 2006b; Wiley, 2010; Wiley & Hilton III, 2009). Wiley and Hilton III (2009) proposed six ways that are critical for higher education institutions (HEIs) to recognize and understand the significance of openness. The six ways are (1) from analog to digital, (2) from tethered to mobile, (3) from isolated to connected, (4) from generic to personal, (5) from consumers to creators, (6) from closed to open. The authors further argue that HEIs should focus on their supersystem in four areas: (1) connectedness, (2) personalization, (3) participation, and (4) openness. Among these four areas, openness is the most pressing priority for HEIs because the culture of openness is a prerequisite to affordable, large-scale progress in the other three areas. Openness will manifest itself differently in different

HEIs until it becomes part of the core organizational culture.

Previous studies have interpreted the meaning of openness in the relation to OER. The meanings of open and openness consists of rich and multidimensional approaches, and have been implemented in many ways that have affected every aspect of the creation of OER. For example, Foote (2005) defines four freedoms: (1) freedom to copy, (2) freedom to modify, (3) freedom to distribute, and (4) freedom to redistribute modified versions, whereas, Walker (2005) describes openness as being convenient, effective, affordable, sustainable, and available to every learner and educators worldwide. Daniel (2006) further states 4As: accessible, appropriate, accredited, and affordable as the meaning of open, while Wiley (2007; 2009; 2010a; 2010b) and Hilton III, Wiley, Stein, and Johnson (2010) propose a 4Rs openness framework: reuse, redistribute, revise, and remix as a new way to promote learning and sharing. Moreover, Yuan and Powell (2013) describe the concept of openness as offering opportunities for sharing ideas, connecting and collaborating among institutions, educators, and learners locally and internationally, and facilitating more meaningful engagement in teaching and learning. Accordingly, the impact of openness will require a new educational paradigm and new learning skills in the future.

OER is one example of an innovative approach to education because it opens up opportunities to create and share a wider array of educational resources among a greater diversity of global learners. Its trends and movements have become more prominent as not only a phenomenon but as a way of improving the quality of education. OERs have made global education into a potential reality for the first time in the 60 years since the Universal Declaration of Human Rights declared “everyone has the rights to education ... education shall be directed to the full development of the human personality and to the lengthening of respect for human rights and fundamental freedoms” (United Nations, 1948, Article 26 as cited in). Furthermore, if “free and open access to opportunity is a basic human right... if educational materials can bring people out of poverty” (Caswell, Henson, Jensen, & Wiley, 2008, p. 10), then it is the right thing and a responsibility or obligation for individuals and institutions to open their minds and policies to share educational materials and information around the world.

OERs alone will not be sustainable on their own dimension. It has to combine concepts from different interdisciplinary areas such as education for sustainable development and business perspectives. Currently, many of OERs initiatives have made the effort to push for adoption as a next step. Policy and strategy regarding the promotion and sustainability of OERs have been discussed in many of reports. For example, UNESCO (2012) declared a Paris OER Declaration to move OERs development into a global scale. However, the support from global institutions regarding OERs policy and strategy development is still limited. Many of the questions and concerns regarding OERs development for the next decade still remain to be solved. These issues require serious consideration not only for individuals, but also for HEIs with respect to all human beings, their rights, and the roles they play within their personal and professional practices. Ideally, OERs will become another public service and practice that every HEI will provide to society. The implications and recommendations can be looked at from different angles of the growing OER movement for individual, institutional, and country contributions. It is important to also look at the policy and strategic plan for promoting further growth in the use, reuse, and production of OERs in order to meet the needs of the global market and challenges of social-cultural and economic changes in the longer scope of sustainability (OECD, 2007).

To date, very little research has been conducted on the policy development and strategic planning to support and foster OER development. As such, a good starting point for HEIs is to consider developing a clear policy and strategic plan that is aligned with their current university practices in addition to creating services that can truly extend the use and development of OERs in HEIs.

### *Conceptual Framework*

Open educational resources (OERs), are a driver and motivator to fostering the social practices and educational processes that view OERs as reinforcing the idea that “world’s knowledge is a public [social] good and that technology provides an extraordinary opportunity for everyone to share, use, and re-use knowledge” (Atkins, Brown & Hammond, 2007, p.5). OERs provide a strategic opportunity for HEIs to improve the quality of education, and to connect knowledge sharing and capability building in both human capital and social capital for the global community (Arnold, 2012; Geser, 2007; OECD, 2007, UNSECO, 2012). Accordingly, this study defines OERs as any type of educational resources in either print or digital format (including course materials, websites, textbooks, audio materials, podcast, video, multimedia applications, visual materials, archived discussions, simulations or animations, maps, ancient or historical manuscripts, software, and any other tool or technique used to allow access to knowledge) that reside in the public domain and have released under an

intellectual property license or open license such as Creative Commons that permits users with 4Rs Openness framework: reuse, revise, remix, and/or redistribute to support knowledge building, sharing, and learning to the worldwide community.

University social responsibility (USR), is a philosophy or principle for social movement, which can be perceived as a philosophy of a university to use an ethical approach to develop and engage with the local and global community in order to sustain the social, ecological, environmental, technical, and economic development. USR acts as a key player for social changes, as USR implies having a policy of ethical quality, governing the performance of the university community. This is done via the responsible management of the educational cognitive, labor, and environmental impact from the university, in an interactive dialogue with society and its communities, in order to promote sustainable human development through education (transforming knowledge), provision of service, research, teaching, and scholarship. All of these underline an ethical collaboration not only with the university community but also with business community in terms of stakeholder involvement (Esfijani & Chang 2012a, 2012b; Esfijani, Hussain, Chang, 2012; Nasongkhla, 2014; Reiser, 2007; Vallaes, 2007).

Social entrepreneurship (SE), as an action and as an actor, focuses on the social dimension for HEIs to take with respect to social change purpose that intend to make a great difference and contributions to human and societal development. SE is a hybrid formed from the private, non-profit, and public sectors, and is a process through which entrepreneurs can make both a great difference and significant contributions to the next century of human and societal development (Alvord, Brown, & Letts, 2004; Roper & Cheney, 2005). SE aims to provide innovation solutions to manage complex social problems toward a further social change (Chand & Misra, 2009), and SE is based on the concept of business and intends to increase the social impact and social movement of human society.

Strategic planning (SP) is a process and a tool for HEIs to plan and follow for social practices. SP is a comprehensive process for determining what HEIs should become, what are the current gaps of HEIs, and how it can be best achieved throughout the strategic planning process. SP offers a systematic process to ask and answer the most critical questions confronting a management team and explicitly links the objectives to the actions, and to the resources required to achieve them. SP is future facing and is based on the analysis of foreseen or predicted trends and scenarios, and is flexible and oriented towards making vision a reality (Hinton, 2012; Kotler, Murphy, 1981; Lerner, 1999; Oztermel et al, 2009; Paris, 2003; Pisel, 2001, 2008).

By examining existing literature and from a social dimension perspective, this study views OERs as being a social practice driving the development of education, USR as being a philosophy for social movement, SE as being an action for a university to take as an agent of social change, and SP as being a process and tool to follow for effective social practice in HEIs. When embedding OERs within other disciplinary areas, this will foster OER's transparency to the educational process, fulfill the university's social responsibility mission, and help establish a new sustainable development model for education.

Accordingly, the purpose of this study is to propose a strategic planning process (SPP) model for Asian HEIs for incorporate OER, USR, and SE into its current strategic plan and making it sustainable. The proposed SPP Model will serve as a guide for mapping out a strategic plan along with activities for aligning and implementing OER, which together can connect strategic planning to universities' sustainable effectiveness and success in the long term. The research objective in this study is to develop a strategic planning process model based on the concept of open educational resources, university social responsibility, and social entrepreneurship

## **2. Research Methodology**

A systematic literature review (SLR) has been discussed in a number of articles (Bandara, Miskon, & Fielt, 2011; Khan, Kunz, Kleijnen, & Antes, 2003; Liyanagunawardena, Adams, & Williams, 2013). The review begins from the disciplinary stance by exploring journals listed within educational technology, business and management, and social entrepreneurship journals. Various online databases including ProQuest, JSTOR, IEEEExplorer, Scopus, Google Scholar, and Springer, were used to find related scholarly articles. A variety of keyword descriptors were used in searching within these online databases. The keyword descriptions searched include "open educational resources", "university social responsibility", "social entrepreneurship", "strategic planning for higher education", and "strategic planning process model for higher education" in the title, article keywords, and abstracts summaries. In searching for applicable articles, the search engines were limited to search peer-reviewed journals, peer-reviewed conference proceedings, and books during the time period from

1987 to 2014. In addition, the basic Boolean search operator “And” was used with a subset of keywords to narrow down some of the search results. The initial resource count from OER was 255, USR was 37, SE was 24, and SP was 50. After examining the quality of the content and the relevance to the topic, the final resources included in this study numbered 95. This systematic literature review helped linking together the areas of OER, USR, SE, and SP in order to create the SPP model proposed in this study.

### 3. Strategic Planning Process Model

A strategic planning process (SPP) model is a comprehensive strategic planning process model that fits between HEIs and their changing marketing opportunities. Based on the literature review of the previous strategic planning process models, a SPP model will be proposed in the following section. A SPP model is a useful tool for institutions that are truly serious about implementing OER and USR for teaching and learning on campus. The vision statement resulting from the SPP needs to be put on paper, disseminated to the entire institution, and readily available. Complementing this vision statement is a planning process that is strategic in nature. It acknowledges the opportunities and challenges inherent in technological change. The most effective institutions will not only have a strategic plan worthy of the name, but the actual planning process will be fully operational down to the details of how that institutions functions. This proposed SPP model not only give HEIs clarity but also conserves workload by focusing attention on the most important planning activities and processes.

In alignment with the suggested steps of social entrepreneurship from previous studies, elements include: (1) envisioning, (2) formulating, (3) taking action, (4) evaluating, and (5) sustaining (London & Morfopolos, 2010). These suggested steps are incorporated into the proposed SPP model. The proposed SPP Model (Appendix A.) consists of six stages including (1) envisioning, (2) social situational analysis, (3) strategic formulation, (4) taking action, (5) evaluating, and (6) sustaining, each of which will be explained in the following paragraphs.

1. Envisioning – A case study was conducted in the HEIs in the Netherlands that states there existed a lack of institution’s own vision for OER development. The lack of this alignment may result in the educational strategy being at risk of being too out-dated to meet the needs of the surrounding environment (Janssen, Jelgerhuis, & Schuwer, 2014). Thus, envisioning and developing the vision, mission and values for OER and USR must take both a bottom-up and a top-down approach. (Janssen, Jelgerhuis, & Schuwer, 2014). During the envisioning stage, the importance of OER and USR should be described and aligned with the core vision, mission, and values of the institution. This stage is perhaps the most challenging phase, because institutional planners or administrators may spend lots of time to considering where should go rather than the required to actually get there. Thus, in the envisioning stage, identification of the desired vision, mission, and values in relation to OER and USR is an important step to consider.

2. Social Situational Analysis – The main guiding question to consider in this stage is where an HEI is now by examining their needs and gaps, and recognizing the sustainable conditions required for the desired OER and USR vision, mission, and values that were defined in the first stage. The internal and external analysis, gaps analysis, and OER and USR readiness assessment will need to be conducted at this stage. A variety of strategic planning process tools were reviewed in Trainer (2004) including (1) SWOT (strengths, weaknesses, opportunities, and threats) analysis, (2) TOWS (Turning Opportunities and Weakness into Strengths) analysis, (3) Nominal group technique, (4) Affinity diagrams, (5) SMART (specific, measurable, achievable or attainable, results-oriented, and time-bound) language, (6) Responsibility matrix, (7) Flowcharting, (8) Cause-and-Effect diagrams, (9) Presentation of quantitative data, and (10) Goal attainment teams. These tools are useful in assisting institutional planners or administrators with the strategic planning process to identify, examine, collect, analyse, and deliver the information about the current condition, issues, gaps, strengths, weakness, opportunities, challenges, and competitiveness. By utilizing a number of tools, the planners and administrator will be able to identify what the needs are and what should be addressed to meet the desired vision and mission from the sustainable situational analysis.

3. Strategic Formulation – In order to answer the main question of how do achieve the goals from the strategy formulation stage, institutional planners or administrators have to develop measurable goals, objectives, and implementation strategies and initiatives based on the results of the sustainable situational analysis. The goals and objectives have to follow the SMART (specific, measurable, achievable or attainable, results-oriented, and time-bound) language approach.

4. Taking Action – At this stage, institutional planners or administrators have to focus on decisions and tasks.

This stage will create opportunities and actual action plans to address the social gaps and needs that have been identified in stage two – social situational analysis. They act as social entrepreneurs and require actions to promote the social awareness and foster OER and USR development and practice in Asian HEIs. Thus, tasks, timelines, resources, accountability, and communication should be addressed in this stage.

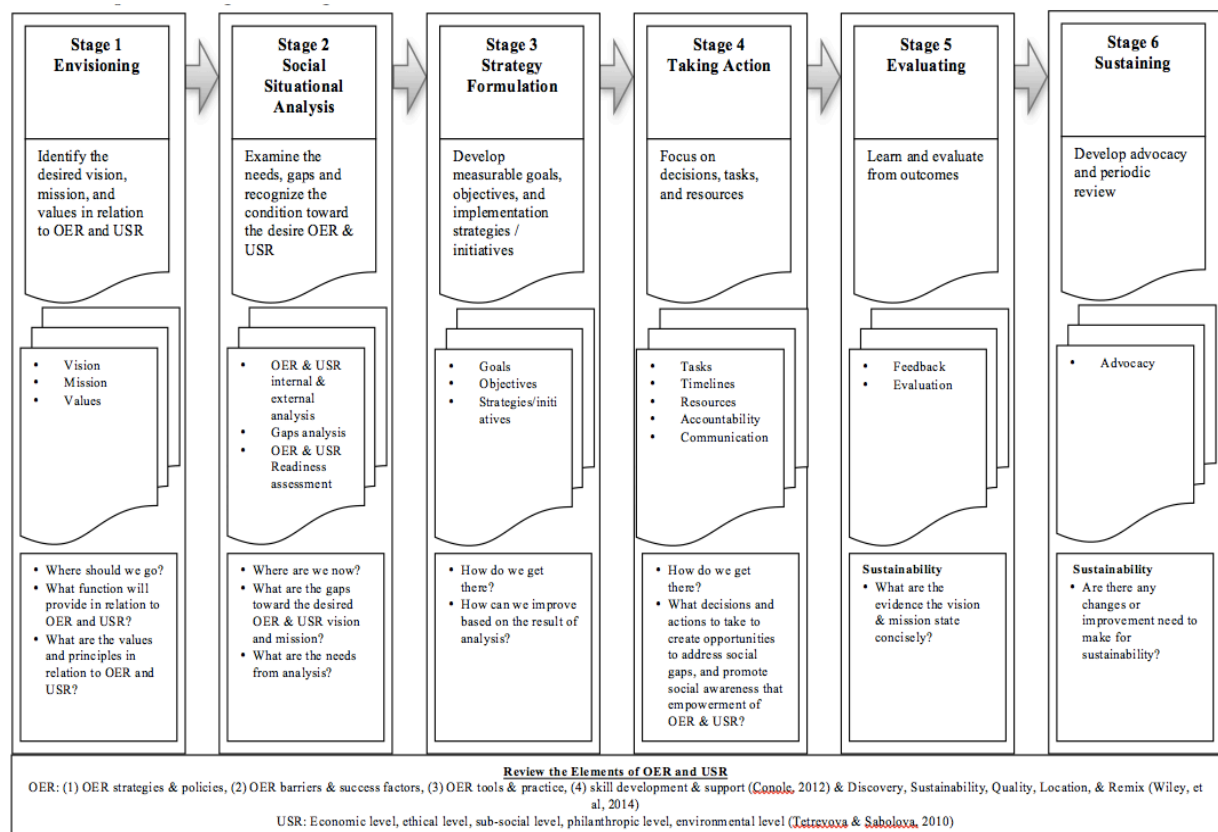
5. Evaluating – This stage includes learning from and evaluating the outcomes. A numbers of questions to help institutional planners and administrators to self-evaluate the SPP model is provided in the Paris (2003). By evaluating the results of previous steps to see if the vision and mission have been stated concisely, and receiving feedback from evaluating the outcomes of the SPP model, the institutional planners and administrators can learn much more from the results and outcomes in order to create required improvements.

6. Sustaining – To truly sustain the SPP model, developing advocacy and a periodic review will enable the institution to adapt to short-term volatility while maintaining their long-term strategic vision. Thus, periodic review and advocacy are important elements for sustaining the SPP model.

#### **4. Conclusion & Implications**

In alignment with the current status of OER and the changing landscape of higher education institutions, it should be noted that higher education institutions have an important responsibility to provide quality teaching and learning as a core mission in order to contribute to social and economic development. OECD (2007) has proposed four major common missions that higher education institutions should consider as follows: (1) developing human capital (primarily through teaching), (2) building / creating knowledge (primarily through research and knowledge development), and (3) maintaining knowledge (inter-generational storage and transmission of knowledge (Glennie, Harley, & Butcher, 2012, p. 15). Thus, to achieve these common missions, higher education institutions have to expand their vision, mission, goals, objectives, and strategies beyond the current practices in order to fulfill new functions to assure sustainable development in education. A major requirement drawn from the previous studies is to take into account and move forward in determining the most relevant paths for worldwide higher education institutions to engage and initiate their USR practices through OER because USR will soon become a global philosophy, which can be perceived as a key player for sustainability in education. In order for higher education institutions to work together toward a sustainable future and solve current challenges, HEIs should take actions as social entrepreneurs on a large scale; envision the future of HEIs through embracing social entrepreneurship as the appropriate process with ethical behaviour and a mind-set toward the philosophy of university social responsibility by creating and sharing of OER. This vision includes the idea of sustainability for future education through consideration of economic, environmental, and social-cultural dimensions. This will foster the transformative movement toward an open knowledge-based society and provide tomorrow's leaders with motivation to build a better future together. The proposed SPP model will serve as a guide for mapping out a strategic plan and activities for aligning and implementing OER, which can bind strategic planning to a university's effectiveness and success in sustainability for the long term. The SPP model can also help HEIs to guide their vision, mission, value, goals, and strategies to foster OER development and practices.

## Appendix A. Strategic Planning Process Model



## References

- Alvord, S. H., Brown, L. D., & Letts, C. W. (2004). Social entrepreneurship and societal transformation: An exploratory study. *Journal of Applied Behavioral Science*, 40, 260-282.
- Arnold, P. (2012). Open educational resources: The way to go, or mission impossible in (German) higher education? In L. Stillman, D. T. A. Sabiescu, & N. Memarovic (Ed.), *CIRN 2012 Community Informatics Conference: 'Ideals meet Reality'*. Monash.
- Atkins, D. E., Brown, J. S., & Hammond, A. L. (2007). *A review of the open educational resources (OER) movement: Achievements, challenges, and new opportunities*. Report to the William and Flora Hewlett Foundation.
- Bandara, W., Miskon, S., & Fieft, E. (2011) A systematic, tool-supported method for conducting literature reviews in information systems. In Tuunainen, V., Nandhakumar, J., Rossi, M., & Soliman, W. (Eds.) *Proceedings of the 19th European Conference on Information Systems (ECIS 2011)*, Helsinki, Finland. <http://eprints.qut.edu.au/42184/42184c.pdf>
- Chand, V. S., & Misra, S. (2009). Teachers as educational-social entrepreneurs: The innovation-social entrepreneurship spiral. *Journal of Entrepreneurship*, 18, 219-228.
- Daniel, S. J. (2006). eLearning and free open source software: The key to global mass higher education? *Commonwealth of Learning*. Malaysia. Retrieved from <http://www.col.org/resources/speeches/2006presentations/Pages/2006-01-05.aspx>
- Esfijani, A., & Chang, E. (2012a). A fuzzy logic based approach for measuring virtual university social responsibility. In *proceeding of: The 2nd World Conference on Soft Computing*, (pp. 149-154).
- Esfijani, A., & Chang, E. (2012b). Metrics development for measuring virtual university social responsibility. *2012 IEEE 12th International Conference on Advanced Learning Technologies* (pp. 724-725). IEEE.
- Esfijani, A., Hussain, F. K., & Chang, E. (2012). An approach to university social responsibility ontology development through text analyses. *Human System Interactions (HSI), 2012 5th International Conference* (pp. 1-7). Perth, WA: IEEE.
- Foot, T. (2005). Wikipedia. *Utah: Open Education Conference*.
- Geser, G. (Ed.). (2007). Open educational practices and resources: OLCOS roadmap 2012. Salzburg, Austria: Salzburg Research Edmedia Research Group. From [http://www.olcos.org/cms/upload/docs/olcos\\_roadmap.pdf](http://www.olcos.org/cms/upload/docs/olcos_roadmap.pdf)

- Glennie, J., Harley, K., & Butcher, N. (2012). Introduction: Discourses in the development of OER practice and policy. In J. Glennie, K. Harley, N. Butcher, & T. van Wyk (Eds.), *Open educational resources and change in higher education: Reflections from practice*. Vancouver: Commonwealth of Learning.
- Hilton III, J. L., Wiley, D., Stein, J., & Johnson, A. (2010). The four R's of openness and ALMS analysis: Framework for open educational resources.
- Hinton, K. E. (2012). *A practical guide to strategic planning in higher education*. Society for College and University Planning.
- Janssen, B., Jelgerhuis, H., & Schuwer, R. (2014). Supporting open education policymaking by higher education institutions in the Netherlands: Lessons learned. OCWC Global Conference 2014. From [http://conference.ocwcconsortium.org/2014/ai1ec\\_event/supporting-open-education-policy-making-by-higher-education-institutions-in-the-netherlands-lessons-learned-ben-janssen-robert-schuwer-and-hester-jelgerhuis/?instance\\_id=](http://conference.ocwcconsortium.org/2014/ai1ec_event/supporting-open-education-policy-making-by-higher-education-institutions-in-the-netherlands-lessons-learned-ben-janssen-robert-schuwer-and-hester-jelgerhuis/?instance_id=)
- Khan, K. S., Kunz, R., Kleijnen, J., & Antes, G. (2003). Five steps to conducting a systematic review. *Journal of the Royal Society of Medicine*, 96 (3): 118-121. From <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC539417/>
- Kotler, P., & Murphy, P. E. (1981). Strategic planning for higher education. *The Journal of Higher Education*, 52 (5), 470-489.
- Liyanagunawardena, T. R., Adams, A. A., Williams, S. A. (2013). MOOCs: A systematic study of the published literature 2008 - 2012. The International Review of Research in Open and Distance Learning, 14 (3). From <http://www.irrodl.org/index.php/irrodl/article/view/1455/2531>
- Lerner, A. L. (1999). *A strategic planning primer for higher education*. From <http://grapevine.laspositascollege.edu/academicservices/documents/InstitutionalEffectiveness/CSUStrategicPlanningReport.pdf>
- London, M., & Morfopoulos, R. G. (2010). *Social entrepreneurship: How to start successful corporate social responsibility and community-based initiatives for advocacy and change*. New York, NY: Routledge.
- Nasongkhla, J. MOOC (Massive Open Online Courseware) Connectivist in 21<sup>st</sup> Century: Role of university social entrepreneur (USE) and social responsibility (USR). *Journal of Education Studies*, 42 (1).
- OECD. (2007). *Giving knowledge for free: The emergence of open educational resources*. OECD Publishing.
- Oztemel, E., Kubat, C., & Taskin, H. (2009). A road map for strategic planning in higher education institutions. *6th Research/Expert Conference with International Participations "QUALITY 2009"*, (pp. 601-610). Neum.
- Paris, K. A. (2003). *Strategic planning in the university*. University of Wisconsin System Board of Regents.
- Pisel, K. P. (2001). *The validation of a detailed strategic planning process model for the implementation of distance education in higher education*. Norfolk, VA: Old Dominion University.
- Pisel, K. P. (2008). A strategic planning process model for distance education. *Online Journal of Distance Learning Administration*, 9(2). Retrieved from <http://www.westga.edu/~distance/ojdla/summer112/pisel112.html>
- Reiser, J. (2007). Managing university social responsibility. International Sustainable Campus Network: Best Practices - Future Challenges, Zurich, Switzerland. From <http://www.international-sustainable-campus-network.org/view-document/108-panel-b1-juan-reiser-pontificia-universidad-catolica-del-peru.html>
- Roper, J., & Cheney, G. (2005). Leadership, learning and human resource management: The meaning of social entrepreneurship today. *Corporate Governance*, 5 (3), 95-104.
- Trainer, J. F. (2004). *Models and tools for strategic planning*. *New Directions for Institutional Research*. John Wiley & Sons, Inc.
- UNESCO. (2012). 2012 PARIS OER DECLARATION. Paris. From [http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CI/CI/pdf/Events/Paris%20OER%20Declaration\\_01.pdf](http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CI/CI/pdf/Events/Paris%20OER%20Declaration_01.pdf)
- United Nations. (1987). *Report of the World Commission on Environment and Development*.
- Vallaes, F. (2013). *Defining social responsibility: A matter of philosophical urgency for university*. Retrieved from Global university network for innovation: <http://www.guninetwork.org/resources/he-articles/defining-social-responsibility-a-matter-of-urgency-for-philosophy-and-universities>
- Weller, M. (2012). The openness-creativity cycle in education - A perspective. *Journal of Interactive Media in Education*, 1-10.
- Wiley, D. (2009). Impediments to learning object reuse and openness as a potential solution. *Revista Brasileira de Informática na Educação*, 17 (3).
- Wiley, D. (2007). On the sustainability of open educational resource initiatives in higher education.
- Wiley, D. (2010a). Openness as catalyst for an educational reformation. *EDUCUASE Review*, 45 (4), 14-20.
- Wiley, D. (2010b). The open future: Openness as catalyst for an educational reformation. *Educase Review*, 15-20.
- Wiley, D., & Hilton III, J. L. (2009). Openness, dynamic specialization, and the disaggregated future of higher education. *The International Review of Research in Open and Distance Learning*, 10 (5).
- Yuan, L., & Powell, S. (2013). *MOOCs and open education: Implications for higher education - A white paper*. JISC Cetis Center for Educational Technology and Interoperability Standards.
- Zhao, Y. (2012). *World class learners: Educating creative and entrepreneurial students*. Thousand Oaks, CA: Corwin.



# Fundamentals and paradoxes of law which regulates the religious education in public schools of Rio de Janeiro

Catharine Vanessa Peres , Lucí Faria Pinheiro\*

\*Universidade Federal Fluminense (UFF) Brazil

---

## Abstract

The purpose of this study was to develop a conceptual model about online collaboration using system thinking process to enhance leadership by a reviewing and synthesizing of the literature concerning about online collaboration tools, system thinking, and leadership skill in agricultural undergraduate students. The framework was presented in three elements which composed of 1) communication, 2) a mechanism for sharing documents, and 3) searching and matching social network members and six steps which consisted of 1) define the problem, 2) analyze factors 3) draw the map 4) research data 5) improve by a group 6) summarize and deploy.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* religious education, secularism, public schools, Rio de Janeiro, religious pluralism.

---

## Introduction

Religious education is part of the history of formation of Brazilian society, primarily with the prospect of Portuguese colonization, conquest and domination of indigenous peoples whose commercial interests guided territorial conquests. This project therefore not interested in the preservation of nature, culture and livelihoods of forest peoples and the coastline. Instead, they used mechanisms of coercion and cooptation according to the power of resistance found forced labor. Thus, the Brazilian crop was the intervention of Portuguese Catholicism between the sixteenth and nineteenth centuries, including the popular Catholicism endures within the country and official Catholicism in the urban environment. From the first republican constitution formed a resistance in the country to the religious domain and new strategies were developed by the Catholic Church to maintain its influence, always having education as a strategic field.

From the early nineteenth century Romanization in Brazilian Catholicism, characterized by the determination of religious authority, as part of the infallible power of the hierarchy on the sacraments was introduced. Unlike the previous period domain Portuguese Catholicism, the presence of official leadership will be expanded throughout Brazil through pictures coming from Italy to instil a new culture, where the formation of a democratic state through a project of emancipating education not was on the agenda. But a new project of influence, which derive the formation of a Catholic intelligentsia, occupying a privileged space in vehicles of the then federal capital information, Rio de Janeiro. The signal strength of Catholicism gave an organized resistance in the institutionalization of the modern state, from the Republican Constitution of 1889. Circa 1930 was raised on the highest peak of the coast of Rio monument that would be the most Awesome country, Christ the Redeemer, under the rule of the Bishop of Rio de Janeiro to the present day. This period marks a conservative approach of Catholicism in Brazil.

However, the Church will evolve in its design influence after the advent of the Second Vatican Council under Pope John XXIII, who opens the Church to the modern world. In Brazil, this opening will allow more democratic

way of conceiving the existence of expression and the right of other religions and Christian religiosity, by the tendency to be legitimated as religious pluralism. I.e., the design influence of the Catholic Church does not defend the power of religion over the state, but its role in the constitution of civil society, work space where his paintings: at all levels of formal education, as well as the bases society, social classes and the bourgeoisie, the middle classes and working classes.

One point of tension in the Church project will be the gradual entry of evangelical churches in the country, even in the 1930s, evolving into membership of the faithful during the dictatorial government - 1964-1985. Currently, churches and evangelical sects occupy the second highest number of fans in the country, having already formed a veritable economic empire, which allows through television and electronic exercise the same economic and political power of the Catholic Church media. This shows that competition between the two major Christian religions leads to very surprising results of power in society, such as the defense and approval of compulsory religious education in public schools of the State of Rio de Janeiro.

In this paper we try to address the process by which it gave the debate that led to the creation of the law of compulsory religious education in Rio de Janeiro, which occupied legitimately a gap left by the 1988 Constitution. Charter This was the result of a period nearly three decades of authoritarian rule, under the command of the military in the country. It contains the defense of the values of religious freedom and the secular state, this law sustained by secular, free, quality public education, but also the free action of civil society through projects that contribute to education, while respecting the democratic principles of the present Constitution. The paradox that presents itself as the object of this study is that this process shows a strong presence of conceptions of civil society (the state bodies, political parties, religious institutions and organized movements). To defend an education project they exceed the democratic constitutional limits, introducing elements that can break with the modern perspective of state, starting with the inclusion of religious education in the curriculum of public schools.

### **The paths of religion in Brazil**

In Brazil the Catholic church that was historically maintained by the State as its official religion. With the proclamation of the Republic the secular state is declared in accordance with the Decree Law No. 119, adopted in the interim government, which we will delve into later. According to Pinheiro (2010, p 22), this change was followed by a crisis in religious and also by the increasing secularization social institution in the country, encouraging the church to establish the main objective, the recovery of regaining its prestige and power in society under new conditions, after decades of change and conflict. In 1936 the Brazilian Catholic Action (ACB), whose religious leadership Alceu Amoroso Lima aiming at the dissemination of Catholic social thought was created.

Later, in the 40 and 50, CBA undergoes significant changes with the creation of new organizations, among them the Catholic University Youth (JUC), which radicalized politically in defense of proposals to deal with social inequalities. The defense of agrarian reform among other agendas, like taking the direction of the National Union of Students (UNE) by Catholic University Youth (JUC) and the creation of a partisan entity challenges the religious conservatives leaders. On this experience, participation in the Movement Basic Education (MEB), conceived from the Peasant Leagues in the state of Pernambuco, had as goal to encourage the awakening to social change through local initiatives. But this performance was interrupted by the military coup of 64, leading to the formation of Basic Ecclesial Communities (BECs). These were aimed at rapprochement with the church of the poor, gaining the support of the mass and forming the principles of liberation theology, although they are still in this context of Catholic Action driven by religious hierarchy. Liberation theology, according to Pinheiro (2010) was synthesized by the theologian Gustavo Gutierrez as follows:

Part of a global design in which the word liberation gains a deeper and more radical sense, comprising three levels that intertwine without confusion. The release would be a process that considers the reality of the oppressed peoples of Latin America, therefore, opposed to the concept of "developmentalism" in vogue on the continent at that time, which does not assume the social, economic and political conflicts. Thus means a process of liberation of man in all dimensions, including its entire existence, and which he himself has control. (p.34)

This new model of religious expression in Brazil comes as a praxis that is different from that imposed within its alienating and prevailing practice. The new is historically constructed by intense political movements, in a

global setting, added the struggle for (re) democratization of the country, through different groups, which began to seek recognition of their identities, as a civil right in a democratic system. The dictatorial regime creates constraints that drive a decline of hegemony of civil society as an expression of a class. The Catholic Church becomes the only space manifestation of the popular will and organization, although it had been present antagonistic interests.

The process of "democratization" of the country refers to Marx's ideas about democracy, is a puzzle of power sharing and representation of the popular will in a context where market interests are dominant. The thought of the young Marx on the state and civil society is important to interpret the limits of bourgeois democracy and the place occupied by religion in general, the cultural scene. The contradiction lies in the fact that workers are dependent on the decisions of the State, and then moved by private interests. For Marx it is inconceivable that civil society is subordinate to the State, since between these two spheres there is no mediation. True democracy is possible only in a society in which men are not alienated by the State in a relationship of subordination or dependence. Marx's Capital will say that there is no democracy with participation of the masses in a system where the alienation of man is dominant economic power in favor of a minority.

Lay movements of Catholic Action will integrate the reality of the peripheries operating a process of secularization which comprises a dialectical and historical relationship with social problems, resulting in a radical, politicized and even combative conservatism interpretation of the Church and dictatorship. The 60 will be marked by the emergence of "new social movements" in Western countries - logical eco feminist, pacifist and antinuclear, urban, etc.. The question of citizenship and its set of rights also began to gain new dimensions. Duriguetto (2007, p.123) shows that Marshall interprets this change as part of a modern manifestation of citizenship, in which new rules will regulate the rights and duties so as to ensure equality to be a citizen, thus enabling the expansion of the same and thus ensuring the reduction of class conflict, in order to expand the Marxist vision of citizenship in capitalism. In the classes there is a broader social challenge that generates and feeds these differences, since identity politics ends segregating groups and losing focus of what was behind these inequalities.

Among these growing social groups who met to protest the guarantee of their rights, new religious expressions also manifested in Brazil, contributing once again to a new initiative by the Catholic Church to ensure its hegemony by developing a unique role in the debate on compulsory religious education, in which the issue of secularism revives a controversy.

### **Religious education and secularism**

The secular principle, yet that is not explicit in the Constitution, was established at the beginning of the Republic, when the state was separated from the Catholic religion rather be the official state religion.

When you do not know the meaning of a word, you can use the dictionary as a way of understanding their meaning. However it is historically constructed, gaining strength through praxis that materializes. The word secularism, for example, appears qualifying what lay and secular, as opposed to ecclesiastical, religion. Its Greek origin (Laos, laiko), refers to the whole, all the people, without exception. Subsequently in Latin, is derived from the meaning we know today associated with the idea of something universal. Although a secular state does not appear explicitly in the Constitution of 1988, this shows the parameters that consolidate their principles, for example, the legitimacy and ensuring equality and freedom, including religious, as can be seen in its TITLE II comes Rights and Fundamental Guarantees, Chapter I of the rights and individual and collective duties:

Art.5 - All are equal before the law, without distinction whatsoever, guaranteeing Brazilians and foreigners residing in the country the inviolable right to life, liberty, equality, security and property, as follows .

VI - is inviolable freedom of conscience and religion, the free exercise of religious cults and ensured the protection of places of worship and their rites being provided in the form of law;

VIII - no one will be deprived of rights on the grounds of religious belief or philosophical or political belief unless he invokes it to exempt himself from all legal liability and refuses to perform an alternative obligation established by law;

This article extends the defense in the fight waged for years by social movements linked to fighting religious intolerance, such as the Commission for Combating Religious (CCIR) of Rio de Janeiro, and MIR Intolerance,

shifting the focus from coping intolerance to the level of law, belief, religious expression, the exercise of democracy. Brandão (1993, p.122) in an interview conducted by the Institute for Studies of Religion ISER), suggests that each of us lies the right and at the same time, the awareness of feel responsible creators of meaning, the terms and practice of our faith, our beliefs and everything that derives its. However, that this right becomes in fact a praxis, it is necessary that the state and its federal entities, create mechanisms to validate these rights. For example, in its Art.19, which deals with the Political and Administrative Organization of CF/88:

Art. 19 is sealed to the Union, the States, the Federal District and Municipalities: I - establish religious cults or churches, subsidize them, embarrass them, or maintain them or their representatives dependency relationships or alliance, except , under the law, a collaboration of public interest; II - refusing faith to public documents; III - create distinctions between Brazilians or preference among themselves.

However religious education is highlighted in the constitution in order to ensure a common basic education and respect for cultural, artistic, national and regional values.

Assuming secularism, according Zylbersztajn (2012, p. 3) "as a principle with varying degrees of accomplishment...being a practice that the effective principle." The Art. 210, goes against the grain of construction a secular state, since it reinforces religious practices in a public area of responsibility of the Union and its federal entities.

This practice is still well regulated by Article 33 of the Law of Guidelines and Bases of National Education (LDB-EB 9394/96) that after clashes in resolution, championed by different ideologies, parties and expressions of civil society, won the next assignment:

Religious education, voluntary registration is an integral part of the basic training of citizens and constitutes discipline normal hours of public elementary schools, ensured respect for religious diversity in Brazil, prohibited any form of proselytizing. (Amended by Law No. 9475 of 22.7.1997)

§ 1 The school systems govern the procedures for defining the content of religious education and lay down standards for the qualification and admission of teachers.

§ 2 The school systems will hear civil entity constituted by different religious denominations, for defining the content of religious education. "

Religious education, voluntary registration is an integral part of the basic training of citizens and constitutes discipline normal hours of public elementary schools, ensured respect for religious diversity in Brazil, prohibited any form of proselytizing. (Amended by Law No. 9475 of 22.7.1997)

§ 1 The school systems govern the procedures for defining the content of religious education and lay down standards for the qualification and admission of teachers.

§ 2 The school systems will hear civil entity constituted by different religious denominations, for defining the content of religious education. "

This model of religious education in interpreting Zylbersztajn (2012, p.152) indicates that religions would take place in public education while treated using phenomenological and anthropological perspective. Is from the objective teaching of religion as a historical, cultural phenomenon of societies, since it does not appear the confessional teaching, as well as explicitly prohibits proselytizing in the classrooms of public schools.

However, in practice, is not quite what is happening, since many states are entering the confessional religious education in the school curriculum as their governments program unconstitutionally.

In Rio de Janeiro the implementation of religious education came from the 3459 law, enacted in September 2000 by the then Governor Anthony Garotinho, promoting a series of discussions involving civil society and different political forces. That's because the law, as well as adding the confessional religious education in schools, according to Novaes (2004, p 11.):

... it implies important changes in the educational landscape, particularly to provide for: the profile of teachers who can teach this discipline, the content of religious education, indicating that this is a specific allocation of the various religious authorities, and also the role the State, which shall be the duty of supporting it and afford it fully.

Furthermore the proposal that gave 3459 law authored by then Deputy Carlos Dias, forbade proselytizing, but determined the next state support to religious entities as their definitions on religious education.

In fact the confessional religious education existed in the form of a Basic Plan for Religious Education in an experimental state, guided by Catholic, evangelical and Jewish faiths through the Coordination of Religious Education, more toward Catholicism.

Opposite the movement that advocated the confessional religious education in the State of Rio de Janeiro public education sense, Mr. Carlos Minc raised the flag in defense of a secular state, referring to the Legislature of the State of Rio de Janeiro (ALERJ), the project law in 1840 that assigned to the State Education System, the power to establish standards for qualification and admission of religious education teachers, as well as define and regulate the procedures for defining the contents of each cycle.

Although the project by Mr. Carlos Dias has been victorious, reinforcing the confessional style of teaching, different sectors of civil society mobilized in favor of the bill in 1840, such as the Institute for the Study of Religions (ISER) and the Movement Inter Religious (MIR) that became part of the debate.

It was after the 3459 passage of the law that the MIR began to lean more on the subject of education, conducting demonstrations in ALERJ in schools and seeking support from different members, and to ally with the Permanent National Forum of Religious Education (FONAPER) created in 1995. descending movement of the Catholic Church, this forum brings together different religious traditions, working and advocating values that go beyond the confessional model, linked to dignity and ethics.

Although partnerships and mobilization of social movements that began to thicken the debates in favor of the bill by Mr. Carlos Minc, as well as the positioning of different religious faiths against confessional religious education, the Catholic Church remained the opposite side, Mr. Carlos Dias, along with the Union of Catholic Jurists, favoring the decision of the Court of Justice of the State of Rio de Janeiro for the bill argued that confessional religious education in public schools.

It was from there that in 2004, the Rio de Janeiro became the first Brazilian state to carry out a public tender for a professor of religious education confessional character, seriously injuring the Brazilian Constitutional Charter. In this regard, we note that there is a real tension in relation to the struggle for democratic rule, example is the opinion of the then Secretary of State for Education in the city of Rio de Janeiro, Ediléa da Silva Santos, who claims to be militant because of teaching religion in public schools. She believes that religious education should have the same weight as other disciplines of basic training, such as foreign language (SHEEP AND Giumbelli 2004, p.72).

Beyond the value given to religious education, we observed that this appears like an interview with Ram and Giumbelli (2004) is part of a hegemonic project of the predominant, Catholic and evangelical Christian religions to form thousands of students each year, committing totally critical and reflective thinking, necessary to build a true democracy. The secretary of education supports the qualification of public education by religious teaching for thinking that it is good for your family, also will be for others. But how would that measure the quality criterion of education? Of education which it refers? We believe in emancipator education, able to build critical thinking, preparing the man to become a citizen and fully exercise their democratic role.

The speech of the then education secretary, as well as in Mr. Day and his supporter's project, religious education seems to be built in Rio de Janeiro, in order to delegitimize the principle of secularism, which historically has been defended by a significant portion of society who fight for democratic rights and social equality.

## **Conclusion**

It is understood that although the debate about religious education has not in principle related to the economic issue, in fact education follows a development project, which does not prioritize the emancipation of man. Pluralism after which justifies the requirement mentioned, has not been consistent, because few popular religions have exceeded the character and have an appropriate pedagogical training to formal education. On the other hand, the lack of a reference model or teacher training for this, not only shows the weakness of law rules referred to, but also revitalizes a debate already surpassed in science where religious education is an option of the individual and the family. Therefore belongs to the private sphere, within subjectivity.

The debate around this issue is a symptom of the importance of religiosity in Brazilian society, although this law has not been willingness of the population, but of the parliamentary more conservative in their stands.

More than that, the strength and outside advocated that legislation is another characteristic of the democratic setback that the model of capitalist development has promoted the country. From this perspective, civil society has more parameters and no power to impose its will in order that the power of traditional institutions is not by way of consensus, but through a tactic that operates according to the political interests of private groups carefree on removing the barriers of conservatism in the name of a democratic and civic education.

We understand that most mainstream religions have the largest number of faithful, but are not necessarily guided by the universal knowledge of new values that need to be consolidated. They cannot therefore be prioritized in religious education at the risk of printing in education, a powerful new scheme return of religion to the sphere of the state. This is understood as representative of civil society, in a context where the bourgeoisie seeks to affirm that all means of expression of individual freedom is a condition for citizenship. The fight for the compulsory religious education by external sectors of the struggle for quality public education and has nothing to do with the defense of democracy. But with values updated again conservatism, whose advocates are not able to move efforts in defense of a project with emancipator education appropriate to the needs of quality education public resources. This fact occurs at a time in the history of Brazil that religions do not develop praxis (use) in the interests of the majority, but in the formation of groups of laypeople to affirm the Catholic and Evangelical subjectivity, therefore, in defense of their influence society.

## Reference

- ABREU, A. Para além dos direitos. Cidadania e hegemonia no mundo moderno. 1.Ed. Rio de Janeiro, Editora UFRJ, 2008.
- BRASIL, Constituição da República Federativa do Brasil. São Paulo: imprensa oficial do Estado de São Paulo, 1988
- DURIGETTO, M. L. Sociedade Civil e Democracia. Um debate necessário. 1.Ed. São Paulo: Cortez, 2007.
- FREDERICO, C. O Jovem Marx 1843 – 1844: as origens da ontologia do ser social. 2 Ed., São Paulo, Expressão Popular, 2009.
- FREIRE, P. Pedagogia do Oprimido. 17.Ed. Rio de Janeiro, Paz e Terra, 1987.
- GIUMBELLI, E. CARNEIRO, S. de S. Ensino Religioso no Estado do Rio de Janeiro. Registros e Controvérsias. Comunicações do ISER. n.60, 2004
- GRAMSCI, A. Concepção dialética da história. 7.Ed. Rio de Janeiro. Civilização Brasileira, 1987
- MARX, K. Crítica da Filosofia do direito de Hegel. 2. Ed., São Paulo, Boitempo, 2010
- MIZRAHI, V. N. Crise, praxis e autonomia: espaços de resistência e de esperanças. Espaço de Diálogos e Práticas. Porto Alegre - RS, 2010.
- NETTO, J. P. Cinco notas a propósito da “Questão Social”. TEMPORALIS. Revista da Associação Brasileira de Ensino e Pesquisa em Serviços Social – ABEPS ano 3. Janeiro a Junho, 2001.
- ZYLBERSZTAJN, J. “O Princípio da Laicidade na Constituição Federal de 1988”. 2012. 214 F. Tese (Doutorado em Direito) - Faculdade de Direito da Universidade de São Paulo, São Paulo, 2012.

# Game programming for complex system development and abet accreditation assessment

Cheer-Sun Yang<sup>91</sup>

*Computer Science Department, West Chester University, west Chester, PA 19383, U.S.A.*

---

## Abstract

“Game Programming” has been used in the past for practicing “Worked Example” principles. In this novel attempt, it is used for teaching “Complex System Development” with the goals of covering software engineering principles and satisfying partially the ABET accreditation requirement, i.e., for students to acquire the ability to apply design and development principles in the construction of software systems of varying complexity. In this paper, the course design and the assessment are presented. The assessment results and the experiences learned are discussed.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* Game Programmin; ABET accreditation assessmen; complex system development.

---

## Introduction

ABET is the organization for accrediting Computing Systems in the United States. This organization published the Program Criteria for Computing Systems on its website (ABET, 2013). According to the Program Criteria, a program must enable students to apply design and development principles in the construction of software systems of varying complexity. Hence, the assessment must demonstrate the effectiveness in the training of software development principles for systems of varying complexity.

Teaching complex system development may be challenging for several reasons. First, students tend to avoid courses that are time consuming and programming intensified. Second, the instructor cannot simply focus on software engineering principles or game theories; actual programming is definitely required for the preparation of teaching this course. Last, the assessment could add to the complexity of teaching this course. As a result, the enrolment may suffer. One of the solutions is to use game programming for introducing software engineering principles. Game Programming has been used in the past for practicing “Worked Example” principles (Sweller, 2006, Sweller and Cooper 1985, Yang, 2003, Yang and Yu, 2011). In this novel attempt of using Game Programming for covering Software Engineering principles and ABET accreditation, many experiences have been learned.

In the remaining part of this paper, the course material is explained next. Section 2 introduces the course design. Section 3 explains an ABET accreditation requirement about making a public announcement. Section 4 presents the results of the assessment. Section 5 explains the experiences learned. Section 6 discusses the conclusion and the future work.

---

\* Corresponding author. Tel.: +1-610-738-0450; fax: +1-610-436-3530.

*E-mail address:* cyang@wcupa.edu

## Nomenclature

ABET	ABET is a non-profit and non-governmental accrediting agency in the USA for academic programs in the disciplines of applied science, computing, engineering, and engineering technology.
IDLE	An integrated computer software development tool, known as an Integrated Development Environment (IDE), for python programming.
PYTHON	A programming language used for developing game programs and other software development.

## Course Design for Game Programming

### 2.1. The IDLE Integrated Development Environment (IDE)

Throughout the course of teaching python and game programming, the IDLE IDE will be used. The IDLE IDE comes with the installation of python that can be downloaded from the official python web site at <http://www.python.org/download/>. While downloading python, an instructor can briefly introduce the online tutorial and library documentation available at the web site. Since there are two non-compatible versions of python, e.g., version 2 and version 3, one needs to be sensitive about the differences on syntax rules.

### 2.2 Python Programming Language

Teaching python and game programming takes three stages: python programming, Tk interface library module for GUI, and game programming. Within each stage, incremental lab projects are presented as partial solutions; only part of the code will be available for students, and part of the code will be “carved out” and left for students to figure out initially.

In this course, focuses are on language features required later for developing 2D games. When all students did not have the experience of using python programming language, most of them had experiences of using Java programming language. Therefore, the lecture can be customized to cover python programming language features that are different from Java.

As Python is a script language supporting dynamic data typing, for students who are familiar with Java, learning python is a fun ride. If an instructor can focus on the ease of learning and use, students will be inspired.

In the following, the concept of “incremental examples” is illustrated with the list of topics to be introduced in the sequence of being introduced.

### 2.3 Simple Non-GUI-Based Games

The examples are used to illustrate how python can be used to develop games (Yang and Yu, 2011) including Tic-Tac-Toe and Reversi. The logic and the syntactic structure are explained. Some book examples (Sweigar 2013) are provided without using any GUI module. Students will be encouraged to convert these non-GUI-based games to GUI-based games later.

#### 2.3.1 Tkinter Module

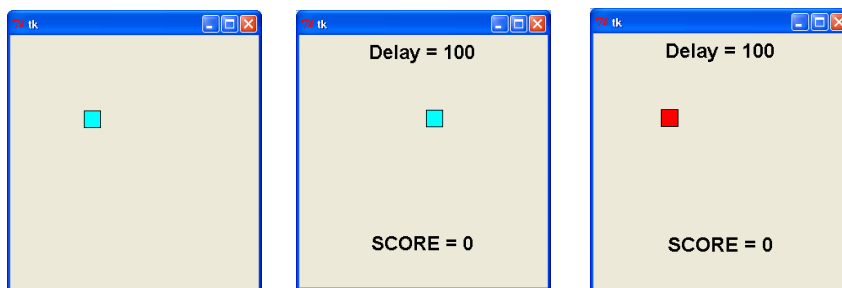
The Tkinter Module is the python interface to the Tk GUI library module. It supports functionalities for game programming. The incremental approach is used for teaching GUI programming with Tkinter/Pygame. Here is a list of introduced topics about Tkinter: (1) GUI Programming, (2) Recursion, and (3) Photo Image File Handling. The ultimate goal is to cover skills required for developing game projects. Several incremental projects used in teaching game programming, respectively, are described later in this paper.

#### 2.3.2 GUI Programming

GUI Programming is one of the major features Python Game Programming covers. The software engineering principle of stepwise refinement is illustrated using GUI Programming as the goal. In the following, examples are given in an incremental fashion:



Basic Shapes & Drawing a box inside a window – As illustrated in Fig. 1(a), the drawing of a basic shape (oval, rectangle, polygon, etc.) is used to introduce the fundamental framework for GUI programming.



**Figure 1:** (a) Basic Shape, (b) Add Text Widget, and (c) Add Event Handling

Drawing Text widgets – The next step is to add some text widgets such as “Score” or “Display” to the previous example as shown in Figure 1(b).

Timing Control: After the students become familiar with the basic GUI interfaces, the next step is to add animation to the example, e.g., moving the box without human intervention.

Event-Driven Paradigm –A variety of event handling examples is used for this stage including: adding event handling to change the speed of the moving box, the moving direction of the object, or the color of the object as shown in Figure 1(c).

#### 2.4 Python Game Programming Examples

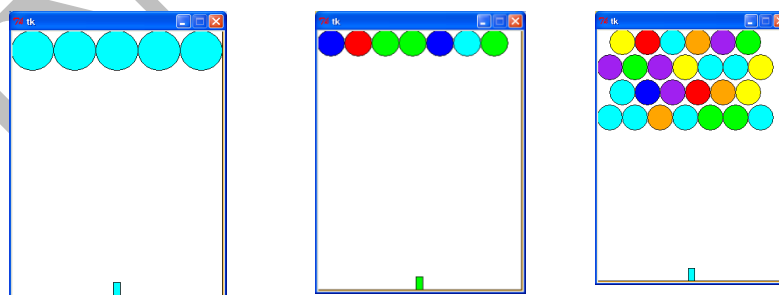
A stepwise refinement approach is used again for teaching python game programming. Students will follow the direction guide to complete a game with skeleton programs given to them at different stage. During the course of teaching python game programming, a simplified bubble shooting game is introduced. It is a simplified game similar to the one posted at the web page <http://www.bubbleshooter.net/game1.php> where the shooting is achieved with a bubble as the “bullet”. In the simplified version, a bullet is used.

Phase 1 - One row of target bubbles with the same color is used for the game as illustrated in Fig. 2(a).

Phase 2 – Students will be asked to change the colors of the target bubbles and the target will only be removed when the bullet has the same color as the target.

Phase 3 – The target bubbles will begin to drop after a while and a new row of bubbles will be added at the top of the canvas.

Phase 4 – Students can take this worked example and extend the program to support more functionality such as bouncing the bullet off the wall, removing all connected bubbles with the same color, or replace the bullet with a bubble.



**Figure 2:** Bubble Shooter (a) Phase 1, (b) Phase 2, and (c) Phase 3.

Phase 5 – An initial phase of a bubble spinner game is used to illustrate the strategies including rotating objects, bouncing the bullet off a wall. In this game, a cluster of bubbles is initially displayed to form a shape of a hexagon. More bubbles will be generated as the game proceeds. It is a simplified version of the bubble spinner game posted on the web page at <http://www.deadwhale.com/play.php?game=774>.

A worked example of a bubble spinner (Fig. 3) is used to demonstrate some of the more advanced ideas such as generating hexagon bubbles, spinning objects, and bouncing a bubble.

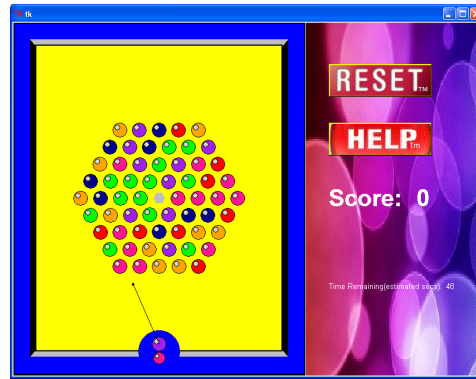


Figure 3: Bubble Spinner

### 3. An ABET Accreditation Requirement about Making a Public Announcement

According to ABET, a course must be announced in a public fashion that the course is used to satisfy the ABET accreditation criteria. As per the requirement, a course announcement is posted on the university course management system D2L (Desire-to-Learn). ABET does not delineate how the course information is publicized as long as the announcement that a course is used to satisfied the ABET accreditation is conveyed to the constituencies. Examples may include departmental web page, course management systems, or other means.

### 4. The Results

The assessment is incorporated as part of the Exam II to be held at the end of the class. Hence, there are three parts of the Exam II. Part I includes the Tkinter module and computer graphics; part II explores the Criterion I; and part III checks the Criteria K.

The first part of the assessment requires to show, “Upon graduation, Computer Science majors will attain an ability to use current techniques, skills, and tools necessary for computing practice” as stated in Criterion I. Five problems in Exam 3 are devised to provide a practical measurement for this criterion. Although this only indicates an instance of teaching this course with the goal of professionalism, the result indicates that over seventy percent of the students in a class of twenty students answered four or five problems correctly.

Table 1: Assessment about “Preparing Students for the Real World or Criterion I”

#Wrong Answers	#Students	Percentage
0	6/20	30%
1	8/20	40%
2	5/20	25%
3	1/20	5%
4	0	0%
5	0	0%

The second part of the assessment requires to show that students can attain “an ability to apply design and development principles in the construction of software systems of varying complexity” as in Criterion K. The Criterion K requires that all computer Science majors will demonstrate proficiency in the latest, cutting-edge technology. Ten questions in Exam III are used to provide the assessment of Criterion K. Out of the twenty students participating in this assessment, over 70% of the students answer nine or ten problems correctly. All can answer more than eight problems correctly.

Table 2: Assessment about “Software Engineering Principles or Criteria K”

#Wrong Answers	#Students	Percentage
0	6/20	30%
1	8/20	40%
2	6/20	30%
3-10	0	0%

## 5. Experiences Learned

This course was taught in a 5-week summer session and later in a regular semester. In the summer version, the first week is used mainly for covering python programming with some game examples. The second week and the third are used for covering graphic user interface Tkinter with more game examples. The last two weeks are used for covering advanced topics such as rotating objects using pixels for the x- and y-coordinates, respectively, drawing of hexagon bubbles, bouncing objects. In the following, some experiences learned are described briefly:

- Course preparation – It takes excessive amount of time to prepare incremental programming examples for teaching game programming. Although there are plenty python-based games available, most of them use pygame library module instead of Tkinter library module. Also, these game programs need to be “tailored” for the purpose of using them incrementally.
- Teaching material – For teaching some other courses, it may happen that only a few on-line tutorials are available. In the case of teaching python and game programming, it is just the opposite. There are many versions of on-line text material, sometimes too many; an instructor needs to customize the teaching material judgmentally with one caveat. Some require python version 2, while some others require python version 3. To be safe, an instructor needs to prepare to use both versions for demonstration and students need to be aware of the syntactic differences.
- Student evaluation criteria – Evaluation is somewhat difficult comparing with teaching without using student projects. However, assigning student projects can culminate students’ interests and conclude the course “with a high note”. A list of criteria is used including correctness, required features (a controllable component, a non-controllable component, animation, game-over, scoring, and restarting), complexity, user-interface design, and programming style, e.g., without unnecessary “hard-coded” program segments).
- Follow-up course – The teaching experience for this course demonstrates the feasibility of teaching with game building. It is strongly recommend that a Computer Science curriculum should be carefully designed to be student-centered. Moreover, an advanced course based on *python and game building* can be used to sustain the culmination of interests created by this course. For example, Computer Graphics, Smart-phone Game Programming, and Artificial Intelligence Algorithm for Game Programming are prospective examples.

## 6. Conclusions and Future Work

Using the incremental worked example approach, an instructor can teach python and game programming effectively. Students demonstrate high interests while learning python as well as Tkinter and game programming. Assigning student projects culminates students’ interests and confidence about learning programming with game building. Once overcome the initial design phase, students expose tremendous innate aesthetic capabilities in a short period of time.

Despite the seemingly successful effectiveness on promoting active learning, it requires to evaluate the effectiveness systematically about teaching with incremental worked examples. Indeed, this is only another example of applying incremental worked examples for inspiring students. For example, in the future, statistical methods will be used to study the effectiveness of the approach with incremental program samples for a quantitative study of the pedagogical approach.

The assessment for the purpose of ABET accreditation has been included as one of the major activities for teaching this course. Starting from the announcement that the CS program is applying for the accreditation, to the assessment of the Criteria I and L, students all actively participate in the process cycle due to the nature of game development. Although more statistical evaluations may further prove the effectiveness of using game

programming for teaching software engineering principles, the two instances of teaching with game programming can be considered a possible means for achieving high effectiveness.

## References

- ABET. (2013). *Program Criteria for Computer Science and Similarly Name Program..* ABET web page information accessed in December 2013 (<http://www.abet.org/DisplayTemplates/DocsHandbook.aspx?id=3142>).
- Sweller, J., and Cooper, G.A. (1985). *The use of worked examples as a substitute for problem solving in learning algebra* (pp.59-89). Cognition and Instruction, 2(1).
- Yang, C-S. (2005). *A two-tier on-line learning model for teaching Web services* (pp.40-44). 3rd International Conference on Information Technology: Research and Education (ITRE 2005).
- Yang, C-S. and Yu, J. W. (2011). *Using Incremental Worked Examples for Teaching Python and Game Programming*. International Conference on (CSEIT 2011).
- Budd, T. A. (2010) *Exploring Python*. McGraw-Hill.
- Lundh F. (1999). *An Introduction to Tkinter*. (<http://www.pythonware.com/library/tkinter/introduction/>)
- Ferg, S. (2005). *Thinking in Tkinter*. Ferg Organization.
- Wikibooks. (2013). *PythonProgramming/List*. [http://en.wikibooks.org/wiki/Python\\_Programming/Lists](http://en.wikibooks.org/wiki/Python_Programming/Lists).
- Sweigar, A. (2013). *Invent Your Own Computer Games with Python (2<sup>nd</sup> edition)*. Self-Published Online Book.

# Gamentship – an innovative project to improve entrepreneurship competences.

Pedro Tadeu<sup>\*</sup>, Teresa Paiva<sup>\*</sup>

<sup>\*</sup>UDI-Research Unit for Inland Development IPG-Polytechnic of Guarda, Av. Dr. Francisco Sá Carneiro n°50, 5300-559 Guarda, Portugal

## Abstract

Playing games it's an activity that belongs to earlier civilizations and still continues nowadays in schools and outside the environment of classroom. All studies focus on the importance of playing no matter the age, no matter the subject. In spite of the new technologies arrival and the electronic games, board games still continue to play an important role in the developing of the human being. Play it's also, from a biologic point of view, related with the complexity abilities of men to survive. The Theory of Games appears with Jon Von Neuman in 1928 and he had showed that most of the social events related with economy and business could be interpreted by strategic games. Another important aspect is this new era that humankind is living in present days. The present social and economic crisis reveal some fragility among youngsters when dealing with money and business. So, being proactive, with a truly mind set focus on always trying, never give up, should be a normal behaviour for a student. But unfortunately this is not the real world aspect. Students need to develop competences that encourage them to be entrepreneurs. We, as investigators, should integrate and teach in our classes this positive attitude. So education needs to prepare adults ready to join a diversity of offers across worldwide market. Our proposal meant to join these two important issues: play games and be an entrepreneur. In this article we focus on the necessary process to implement this project. There is a lemma that will drive us all along: better education through games, to achieve better entrepreneur students and citizens in future.

© 2014 The Authors. Published by Elsevier Ltd.

Selection and peer-review under responsibility of The Association of Science, Education and Technology-TASET, Sakarya Universitesi, Turkey.

*Keywords: Entrepreneurship Education; Theory of Games*

\* Corresponding author: Tel.: 00-000-000-0000

E-mail address: ptadeu@ipg.pt

1877-0428 © 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

## 1. Introduction

### 1.1. Technology

Currently there is a rapid growth of the mobile devices in society: phones, tablets and portable game are some examples of it. Along with this, came well know applications for these instruments, so we have another area that is increasing rapidly. But, on the other hand, all the effort done to mobilize people for the progress that arise from the use of this kind of technology is not necessary resulting in good experiences. The intense use of technology carries indispensable adaptation to the people, and of course in the case of education, the student that sits down and enjoys the technology also needs a constant follow up. We should be prepared for utilization, but also for the implications that come in the near future from working with these materials. Good and not so good opinions pops up every day, investigations are done either to approve or to deny the extended use of this tools. Some of these are in favour of the use, because tools like tablet or computer can have access to wireless technology. By allowing the connection to internet we are creating a new learning model that is the mobile learning. On the other side, investigators show that the enormous world of applications can be a prejudice to the

users, disconnected them from the real world, and sometimes from the real knowledge. So there is a new paradigm in the learning and teaching process of our society that investigators, teachers, students and all the others elements should understand and analyse.

### 1.2. Playing

Through centuries the act of playing has been seen as a very rich and intense activity that produces several positive aspects in society. Several authors had study intensively the effect of playing in youngsters. Pelligrini A. and Holmes R. (2006, page 34) refer that, *several experimental studies show that school kids pay more attention to academics after they've had a recess--an unstructured break in which kids are free to play without direction from adults*, Lancy (1996, page 122) refers also that, *young humans may learn how to take on roles, manipulate language, solve problems, and become more creative through play*. Achievements like these are very significant, but the positive aspects impact not only in young kids, but also in other ages, throughout lives. It's essential that we could realized, while playing games, the positive influence and attitude on people that will face challenges in nowadays society, especially the youngsters. We could substitute this phrase with a synonymous word that describes the general idea of being what we call now as *Entrepreneur*.

### 1.3. Entrepreneurship... what?

We are so familiar with the word entrepreneurship in our daily life that we don't realise the fresh meaning of it and how suddenly it appears in our vocabulary. But do we really know is true value, its true concept?

Most of the people connect entrepreneurship to the word business (Figure 1), but entrepreneurship it's much more than this. Being an entrepreneur is something not directly engage into business, but connected to the power of change minds by presenting solutions to old or new problems. Investigators state that we have inside characteristics that allows us move forward even if we don't suspect that we could, Ward (2004, page 175) says, *clearly, humans have the capacity to move beyond what currently exists to generate and implement new ideas*. Entrepreneurship is also linked to this, the way that we are able to generate fresh ideas, new paths along the existing way, throughout different processes.



Fig. 1: Entrepreneur connected to business

(<https://www.unyp.cz/get.php?id=6923>)

### 1.4. Creativity

Also linked to entrepreneurship is creativity. A creativity person *is the one who is able to form proper judgments through converting facts into ideas and then through sifting and elaborating the ideas* Rawat, K., Qazi, W. and Hamid, S. (2012, page 274). This is well understandable by adults, but related to education and youngsters we could say that, *a child cannot learn this art unless it is taught, unless a child is allowed to pass through this process time and again*. Rawat, K., Qazi, W. and Hamid, S. (2012, page 274). So creativity it's needed in order to access entrepreneurship while young. We are not stating that older people will not achieved

creativity, but some characteristics are more easy to acquire in earlier ages. Moreover, *the role of creativity in the economy is being seen as crucial* (Burnard, 2006, page 32) *to assist nations for attaining higher employment, economic achievement* (Davies, 2002 page 171) and to deal with competition inside society. These are two strong reasons, education and economy, that lead our mind to a way we cannot ignore or suppress creativity in the teaching and learning process nowadays.

## 2. Mixing ideas

In the Introduction we state keys strengths of our investigation focus in developing entrepreneurship education such playing and creativity. Both are directly connected, while playing we develop creativity and creativity helps on taking judgments while playing. Sinlarat P. (2000) suggests that the teaching process should impart the following items:

- *Learning how to learn*
- *Learning how to do*
- *Learning how to work together*
- *Learning how to be*

In a way to produce the following characteristics in people:

- *Learning how to learn critically*
- *Learning how to do creatively*
- *Learning how to work constructively*
- *Learning how to be wise*

All of them aim to develop future citizens more prepare to actively engage in society. Again Sinlarat P. (2000, page 345) refer, *educational process primarily needs to set a target on new thinking and creativity for it to make education have the real effect on the society*. So we propose to produce a project that emphasise this need of change in young students, but also to help older ones to realise the need of aptitude changing.

## 3. Gamentship

Taking all the ideas describe, we propose to produce the board game called GAMENTSHIP. This should be integrated on the ideas exposed, while engaging into the board game (Figure 2), students will promote creativity and enhance their entrepreneurial skills. The project gained life while discussing the ideas with other international partners also aware of this gape to be filled in our education system.

We aim to develop the concept of a board game in such a way that students could use in several range of ages: primary, secondary and older, in order to help them expose their natural way of being creative entrepreneurs.



Figure 2: Example of board game  
(<http://www.acrosstheboardgames.net/tag/booster-draft/>)

Objectives of this project are therefore to:

- Encourage creativity in young students (primary and secondary school) and older (higher education);
- Empower the entrepreneurial attitude according their ages;

- Reduce the fear of risk, by showing that we need to test and experiment failing in order to proceed stronger and have success;

#### 4. Conclusions

In this paper we explain the issues that lead us to create a board game that could improve entrepreneurship capacity on students and also to a broader audience. Since it's a concept project it's in the initial phase of developing we don't have enough data that could prove yet what we expect. But, from our experience in dealing with young people (*PRODUZ@IDEIA – An approach project to develop Entrepreneurship in primary schools*, article presented in INTE 2014 – International Conference on New Horizons in Education 2014 Paris) we believe this is the first step to a wider project. The intention is to create later, and according to the data collected while students play the board game, the same concept with other tools like mobile devices. Practicing entrepreneurial skills could be done wherever we are, whatever the hour of the day. Playing and creativity are fundamental for the integration on educational curriculum, particularly the act of playing a board game brings a social connectivity that it's very important for developing a necessary expertise in the field of entrepreneurship education. We have faith that our project combine different perspectives and we are going to show through implementing that it's a value project.

#### Acknowledgements

This work was supported by the *Fundação para a Ciência e Tecnologia (FCT)* under Grant PEst-OE/EGE/UI4056/2014.

#### References

- Burnard, P. (2006). *Reflecting on the creativity agenda in education*. Cambridge Journal of Education, 36, 313-318
- Davies, D. (2002). *Creative teachers for creative learners - a literature review*. Website available at: <http://www.steveslearning.com/Teacher%20Training%20resources/Dan%20Davies%20Bath%20Spa.pdf>
- Lancy, E. (1996). *Playing on the Mother-ground: Cultural Routines for Children's Development*, Guilford Press.
- Pelligrini A. and Holmes R. (2006). *The role of recess in primary school*. In D.Singer, R. Golinkoff, & K. Hirsh-Pasek (Eds.) York: Oxford University Press.
- Rawat, K., Qazi, W. and Hamid, S. (2012). *Creativity and Education*, Academic Research International, Vol. 2, No. 2, March.
- Sinlarat, P. (2002). *Needs to enhance creativity and productivity in teacher education throughout Asia*. Asia Pacific Education Review, 3, 139-143
- Ward, T. (2004). *Cognition, creativity, and entrepreneurship*, Journal of Business Venturing n°19 pag. 173–188.



# Gamifying French Language Learning: a case study examining a quest-based, augmented reality mobile learning-tool

Bernadette Perry\*

Department of French, University of Victoria, PO Box 1700 STN CSC, Victoria BC V8W 2Y2 CANADA

---

## Abstract

Across the globe, over 3 billion hours a *week* are devoted to gaming, and with the ubiquitous presence of mobile technologies, gaming is now also mobile. A well-developed video game will keep a player enthralled for hours on end. What if educators could engage learners the way video games engage players? In fact, many educators are turning to gamification to do just that. Gamification uses game-based mechanics, and game thinking to engage people, motivate action, and promote learning. The principal goal of this research is to assess the potential of a new mobile learning tool *Explorez*. *Explorez* was created for first-year University French students in order to bridge the gap between gaming and education through quest-based learning and augmented reality. Using GPS, *Explorez* transforms the University of Victoria, B.C. campus into a virtual francophone world, where students interact with characters, items, and media as they improve their French language skills and discover their campus. This paper explores potential benefits and limitations to this prototype learning-tool, via a case study.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

**Keywords:** Second language acquisition; gamification; augmented reality; mobile games; quest-based learning

---

## Introduction

According to statistics, 97% of teenagers play video games; however, the average age of gamers is 35, and 47% of gamers today are women (McGonigal, 2011). Globally, 3 billion hours a *week* are spent gaming (McGonigal, 2011). As the prior statistics attest, well-developed video games entail motivating and engaging elements to keep players enthralled for hours on end (Gee, 2003). How powerful would it be if we could transfer these gaming elements to learning environments? What if educators could engage learners the way video games engage players? Advances in technology offer a plethora of learning tools for instructors, yet for the most part many continue to use pedagogical methods from the industrial age (Robinson, 2006). Furthermore, engaging and motivating the digital generation continues to pose difficulties for educators everywhere (Kapp, 2012). This research takes an innovative approach to learning and teaching: gamification. Specifically, this paper explores the potential of gamifying French-language learning by means of quest-based learning and augmented realities. It addresses several benefits and limitations to the language learning-tool *Explorez*, via a case study.

## Context

Gamification is described as “using game-based mechanics, aesthetics and game thinking to engage people, motivate action, and promote learning” (Kapp, 2012, 10). In a pedagogical context, researchers have analysed gamification as a didactic method, especially regarding the validity of its integration (Natkin, 2009; Sanchez et al, 2011; O’Donovan, 2012). Other studies examine methods to integrate such a system into specific learning contexts (Bustard et al, 2011; Charles et al, 2011; Kumar, 2012; Erenli, 2013). Research is also emerging regarding the impact of gamification in learning contexts. Haskell’s (2013) implementation of quest-based learning and game mechanics at the university level demonstrates encouraging results:

- Game-based feedback tools like experience points, progress bars, badges, and achievements are motivating and meaningful to students.
- Students in a quest-based course received higher grades overall when compared to the equivalent

traditional course.

- Over 65% of students remain persistent in quest-based learning, continuing to quest beyond the minimum required to receive an “A” (3).

In regards to education, gamification has seen successful implementation in a range of subject matters, and age groups, from K-12 learners to university level courses (Kapp, 2012). However, studies specifically examining gamification and second language acquisition are not as prevalent. This research aims to partially fill this gap.

Gamification is not simply a combination of game elements (such as points, badges and leaderboards), but must also be viewed as an *experience* for the player (Werbach & Hunter, 2012); it is a means to: “re-organize the critical constructs of learning from information and knowledge units that are sequenced for learners in curriculum formats, to *learning as experiences* and apprenticeships. This allows learning to be choreographed and re-sequenced according to the personalized and specific requirements of the learner” (Freitas, & Maharg, 2011, 18).

The concept of employing games in education, and more specifically in second language learning environments, is by no means a new idea. However, given technological advances in recent years, and the ubiquitous presence of mobile technologies, gamifying language learning by means of augmented reality technologies would seem an ideal way to create an immersive environment. When logistics limit instructors from taking students to authentic language environments, augmented reality allows us to virtually bring these environments to the students. This research builds on prior research regarding the educational potential of mobile and augmented reality (AG) technologies (Gagnon, 2010; Holden & Sykes, 2011; Roy & Frandy, 2013; Dunleavy & Dede, 2014). The study adds to the emerging body of knowledge regarding mobile technologies to help produce learning that is “personally customized, socially constructed, and which extends beyond the classroom” (Holden & Sykes, 2011, 4): specifically regarding a second-language (L2) learning context, which is not yet prevalent.

## Methodology

### 3.1 Method

This research consists of the development and implementation of a prototype learning-tool, entitled *Explorez*, into a first year University French-language class. *Explorez* bridges the gap between gaming and education through quest-based learning and augmented reality: which allows us to integrate computer generated images and media in physical space. A design-based research, specifically the Analysis-Design-Development-Implementation-Evaluation (ADDIE) model was employed (Strickland, 2006; Colpaert, 2006). As Caws (2013) states: “ADDIE is an instructional system design (ISD) that is particularly well suited to guide developers in the creation and evaluation of language software or other language-related computer systems” (89). Design-based research is an iterative process, and each stage of the ADDIE model produces output that the researcher employs as input for the next stage (Colpaert, 2006, 115).

The first step of this research required a literary review and a critical analysis of gamification in education, specifically regarding its potential role in second language learning: what resources are currently available; which methods and tools might successfully transfer to language learning; how gamification can be successfully incorporated into L2 learning, and in which learning contexts and what level of learner might benefit from this type pedagogy. Although gamification is an emerging area of study, interest in the pedagogical value has resulted in resources and online tools for instructors that aid in gamifying lessons or entire courses into gamified experiences (Kapp, 2012; Sheldon, 2012; Haskell, 2013). One such resource is the Augmented Reality and Interactive Storytelling platform: ARIS. ARIS is an “open-source platform for creating and playing mobile games, tours and interactive stories. Using GPS or QR Codes, ARIS players experience a hybrid world of virtual interactive characters, items, and media placed in physical space” (ARIS, 2014).

The design phase consisted, in part, of the verification of parallels between the learning objectives of the system, and those of a portion of the curriculum of a first-year University French language course. In addition to classes, students are also required to participate in language workshops, as an additional opportunity to ameliorate oral skills. These sessions often employ a different theme each week (such as food, travel, cinema, etc.), and these themes were used to design specific quests in the gamified tool.

Specifically, this research seeks answers to the following questions: Are the expected outcomes of this gamified system reached? What are the learners’ assessments of the learning tool? What are the participants’

perceptions of their learning experience?

### 3.2 The language-learning tool: *Explorez*

Critical to the development of the language-learning tool was the open-source platform ARIS, which consists of an authoring tool to create augmented reality games or interactive stories, as well as an application for IOS devices to play the said games/tours. This platform is user-friendly, and requires no programming knowledge on behalf of the developer. However, there is a steep learning curve to mastering the platform, and to learning the intricacies of the system. As Roy & Frandy (2013) attest “[a] challenge is learning the user interface and game logic. While the ARIS game team provides instructional videos and an online manual, runs a list serve for questions and offers regular game jams, many who admire the possibilities of this platform find creating and understanding the logic of requirements for objects in a game scenario challenging” (p. 74). Storyboarding the game or interactive tour before attempting to begin to create it in ARIS is highly recommended. Each action/requirement/quest builds on one of these prior elements, and this is time consuming and meticulous work, in order to make sure the game functions as one intends.

The gamified system *Explorez* is inspired by *Mentira*, a project from the University of New Mexico. The creators of *Mentira* describe it as “the first mobile, place-based, augmented reality game explicitly oriented towards the development of language skills in Spanish” (Holden & Sykes, 2011, 2). *Explorez* is the first such place-based game directed towards the acquisition of French language skills, and the decision to create the gamified learning-tool came about after extensive research seeking a system similar to *Mentira*, but for FL2, which yielded no results.

Using GPS, *Explorez* transforms the University of Victoria, B.C. campus into a virtual francophone world, where students interact with characters, items, and media as they improve their French language skills and discover their campus. *Explorez* is a virtual narrative treasure hunt wherein the player is hired as the personal assistant to a famous French celebrity. This individual could be a politician, musician, actor, or other celebrity based on the personal preference of the player. At each location players interact with virtual characters that direct them or give them quests with clues or options to further the storyline (see Fig. 1). These interactions take place either in the form of written text or audio and video recordings to which the student must respond. This permits students to ameliorate input and output language skills both written and orally. Quests also involve challenges ranging from taking pictures of specified objects, to collecting virtual objects, to exploring locations on the map. The challenges include a variety of options from which groups or individuals can select their own learning path.



Fig. 1. (a) character in coffee quest; (b) map players see in the coffee and/or book quest (c) character in book quest

*Explorez* allows learning to take place outside of the classroom, with the goal of providing a contextual and immersive learning experience: one that is meaningful and more relevant for the learner. For example, ordering a coffee in French at the University coffee shop, finding a specific book at the library, discovering other resources, such as the French help center, and then using these real life environments to learn relevant vocabulary. The University of Victoria is not a francophone campus, but *Explorez* creates a virtual francophone environment.

To appeal to the largest demographic possible, *Explorez* includes a diverse range of elements. The extrinsic motivators of points and badges of accomplishment will appeal to certain players, while others will be drawn to intrinsic learning motivators. Research regarding the self-determination theory demonstrates that intrinsically

motivating activities must include three elements: competence, autonomy, and relatedness (Kapp, 2012). Competence is the sense of accomplishment and overcoming obstacles: challenges within *Explorez* become more complex and therefore more rewarding once achieved. To experience autonomy, individuals need to feel they are in control, and making meaningful choices. *Explorez* allows learners to decide which quests and challenges to pursue, thereby accommodating a greater spectrum of learners than traditional pedagogical methods. Relatedness is the feeling that the activity is connected to something beyond you: being a team player, or doing activities with friends. These latter two elements are incorporated in *Explorez*; there are group quests as well as individual challenges. Students are also encouraged to share links to the media they record or discover through the game via social media sites.

### 3.3 Participants

Volunteers were sought from first year University level French-language classes. The researcher gave brief presentations regarding the new language tool and asked students to email if they were interesting in participating in the study. Two classes were visited in this manner, and a total of 11 students volunteered: 4 male students and 7 female students. First year French students at the University of Victoria attend mandatory weekly language workshops in addition to their class time. Volunteering in the present study (play-testing *Explorez*) replaced 3 of 10 mandatory language workshops: interestingly 6 of the 11 volunteers chose to play-test the new tool, and also continue to go to their weekly language workshops. Participants were given the freedom to choose when to participate, and in this manner 4 test groups were created: Group A (2 students; male/male), Group B (2 students female/male) Group C (2 students female/female) Group D (3 students female/female/female).

### 3.4. Data collected

A mixed method of data collection was employed in order to permit a comprehensive evaluation of the learner experience with the tool, as well as the analysis of the said tool's pedagogical potential (Nunan, 1992). Both qualitative and quantitative data were gathered by means of questionnaires (pre and post), focus groups and audio recordings of the sessions for future analysis of the students' interactions with the system, as well as each other during play-testing. Data was also collected via the ARIS engine (badges collected, quests completed, voice recordings, photos) and the specific location of each of these actions documented.

### 3.5 Procedure

Play-testing *Explorez* took place during the winter session of 2014. This included 3 sessions of 50 minutes per week dedicated to participation in the present study. As stated previously, this is the allotted amount of time for language workshops. The week following play-testing completion, students were asked to complete a post-activity questionnaire, and two weeks following the completion of testing, participants were asked to participate in a focus group: 6 of the 11 students chose to do so.

During session 1, students met the researcher in the Digital Second-Language Learning Lab (DL2LLab). The research and tool were explained, consent forms signed, and participants then completed an online pre-questionnaire regarding their demographics and digital knowledge, use and habits. Prior to the mobile portion of the game, the first quest in *Explorez* consists of creating two avatars: one to represent the student, created individually and a second avatar created in collaboration to represent their team's chosen French celebrity. Students used laptops in the DL2LLab, and the Voki (Voki, 2014) platform for these first tasks. Voki is an online education tool that allows users to create talking avatars. Although the interface is in English, these tasks were performed in French: the Voki avatars can speak in multiple languages (when students type a text) or students can also record their own voice.

Session 2 began with students creating their ARIS login on IOS devices (iPhone or iPad), and the international language setting of the iPhone and iPads was changed to French, in order to facilitate learning new vocabulary. The mobile content is entirely in French, and at the beginning of the session the researcher indicated and then demonstrated on the devices, available online tools, such as dictionaries, that the students could employ if they encountered any difficulty with vocabulary. The researcher also briefly demonstrated to the participants how to navigate the game interface. Students then began the mobile portion of *Explorez*, and the researcher accompanied each group in order to monitor their interactions and have the participants involved in a talk-aloud protocol. This means that while students interacted with the system, they commented aloud on their decision-

making, or they answered questions posed by the researcher. In addition, during their interactions, the students recorded their accomplishments directly in the app. Session 3 was a continuation of the prior session; the participants logged into *Explorez*, and resumed play-testing the mobile portion of the system.

## Preliminary findings and discussion

The present analysis provides preliminary findings regarding the playability of *Explorez*, and a brief overview of participants' assessments of the tool and their learning experience.

### 4.1 Observation of game-play: playability of *Explorez*

Students engaged with the learning-tool and progressed through the system as intended; the students played *Explorez*. Although this may seem an obvious observation, Holden & Sykes (2011) address that the playability aspect of research-design game experiments is seldom included in relevant literature: "[l]earning to design and create better games would seem to be somewhat removed from the agenda of this writing, and so one wonders how educators might begin to improve their skills and reputations" (11). Therefore, the following examination of *Explorez* documents elements of game-play during testing.

*Explorez* consists of 3 levels with a minimum of two quests per level, and no two groups of students chose the same path through the quests. On average, the groups of 2 or 3 students completed two quests in the allotted 50 minutes. During session 1 and 2, Group B continued to play for an additional 10 and 12 minutes respectively, because they were determined to finish their current quest. The students' efforts and enthusiasm when interacting with the system and each other were encouraging. They made great efforts to speak in French, as they maneuvered the interface of ARIS, exploring the quest log, their game inventory, and the game map, collaborating to decide their next step in the game. At times this resulted in a sign language form of communication when they lacked a vocabulary word in French. Rarely did the students employ the available online tools to look up vocabulary. What did result however was a sociocultural learning effect; a more advanced student helped the lesser-advanced one navigate the system or quest, and supplied the necessary word or information. This supports prior research in L2 learning that demonstrates when second-language learners interact, they may in fact correct each other's language errors (Chapelle, 2000). However, the researcher accompanying students during play-testing possibly influenced the students language efforts; therefore a limitation in this type of mobile system is that instructors cannot gauge to what extent students employ the target language or in fact revert to their first language.

When creating this type of system for language-learning, instructors/developers must keep in mind to not only provide sufficient language-learning scaffolding, but also include adequate game-play scaffolding. Well-developed video games sufficiently guide new players at the beginning, and then appropriately increase in level of difficulty for more advanced players (Gee, 2003). The participants in the present study with little prior gaming experience found the option of multiple quests to be confusing at times; however those with gaming experience accepted these multiple options, and also maneuvered the gaming interface with greater ease than their counterparts. This type of system can quickly become quite complex, and in order to appeal to a larger demographic of learners this will be addressed in the next iteration of *Explorez*. At a first glance, three levels of 2-4 quests each, does not appear to be a very complex system. However, when each quest includes an element to also later trigger the quest that the learner did not pick as first choice, the options grow exponentially. This highlights the importance of many iterations of play-testing and the effectiveness of the ADDIE model; once the learning-tool is evaluated the data and information is then analyzed, and the researcher returns and applies this knowledge to a prior stage (such as design or development) and the cycle continues.

Sufficient and effective game-based feedback is another important element; whether or not the players have gaming experience. Game-based feedback is instantaneous, and lets the player know whether they are engaging with the system as intended (Gee, 2003). For example, the requirements of each quest in *Explorez* are visible in the quest log; once these are fulfilled the learner is aware that they have successfully completed the task when the system responds "quest complete". In this system, a badge of completion also then rewards the player for quest completion. Sykes et al. (2010) state that "[e]specially relevant to language learning is the task-based approach to quest completion. . . and the importance of failure states to provide meaningful, relevant feedback" (123). There are many types of game-based feedback, and an effective gamified system will incorporate those which best suit the design, as well as motivate their players/learners.

Other challenges encountered during testing were minor technical difficulties. The ARIS platform is under

construction, and at times the system freezes and states “cannot connect.” Sometimes this issue resolves itself in a minute or two, or a player simply needs to logout of the current game, and then log back in. Despite minor technical difficulties with the ARIS platform, the ARIS team, researchers, and instructors have been successfully creating and playing games for years; those who choose to use ARIS simply need to be aware of the issue. A second challenge was lack of the data feature on some of the devices used in the study. The DL2LLab had access to 2 devices with data, but the remaining iPads did not have this feature. When using iPads with Wi-Fi only, certain quests during testing could not be completed due to inadequate Wi-Fi connection or inadequate GPS signals within buildings. Students overcame this by sharing devices or employing their own iPhone. Therefore, BYOD (bring your own device) or working in teams overcomes this challenge. It is also possible to create ARIS games without specific GPS requirements; this should be a consideration when access to devices providing data is limited.

#### 4.2 The participants’ assessments of the tool and their learning experience

In the post-questionnaire and focus group, participants were asked to provide feedback regarding their experience with the tool and assess certain gamified elements. When asked to describe their experience with the gamified-tool *Explorez*, the top descriptors were: “fun”, “useful”, “motivating” and “relevant”. In the survey, 9 out of 11 students (88%) described the experience as “fun,” 7 out of 11 students (63.6%) responded “useful”, and 6 out of 11 participants (54.5%) described the experience as “motivating.” As mentioned previously, in order to appeal to the largest demographic possible, *Explorez* includes a diverse range of game-elements.

The students were asked to rate four such elements as learning motivators in regards to their experience with *Explorez*: creating avatars, completing quests, collecting badges and collaborating with teammates. Students were asked to choose a response on a 5-point Likert scale; 5 indicated the element was “positive-it motivated me in my learning” whereas 1 indicated, “negative-it was de-motivating”. On the 5-point Likert scale the participants mean rating of creating avatars was 3.5, the mean rating of collecting badges was 4.4, completing quests, and collaborating with teammates were both ranked with a mean of 4.5. These results illustrate that on average the test group found the intrinsic learning motivators of quest completion and collaborating with teammates, *Explorez*’s more relevant game mechanics. This correlates with the three elements comprised within the self-determination theory: competence, autonomy, and relatedness. This is of course a small test group and these results do not represent FL2 learners as a whole. However, this does support prior studies, which demonstrate game-based mechanics can be positive motivators for learners.

A potential of augmented realities in L2 is the creation of an immersive environment with the goal of creating a more relevant learning experience. The concept of cognitive apprenticeship suggests learning is naturally tied to authentic activity, context and culture (Brown, Collins & Duguid 1989). However, in the second language classroom, this may be a challenging task for the instructor. Holden & Sykes (2011) attest that “[i]n the foreign language classroom, place is an especially abstract concept where language is often isolated from communities, cultures, and places in which it is spoken” (5). In order to overcome this challenge, Sykes & Holden (2011) incorporated augmented realities into an authentic Hispanic neighborhood for their research, and the students engaged in local authentic contexts. However, the present analysis broached augmented realities as a means to create *virtual* language learning environments and attempt to gauge if learners find this a relevant experience. This study aimed to see if speaking French in real world locations (although only virtually French) could help students to see how they could apply their French or potentially aid in making their learning more meaningful. The following student excerpts support that although virtual, the use of augmented reality did in fact create a learning environment that the participants found to be relevant:

185: Uhm, I liked the book one, having to use vocab in a situation that I haven’t necessarily had to use it before. So that was good. And then also, I had more or less forgotten how to find books in the library. It’s been about a year since I’ve had to do that. So that was good because like beyond just French, it was learning other things too. So that was cool.

421: I liked getting out of the classroom; I feel I’m more engaged when I’m actually doing something. Sitting in the classroom, and repeating what we’re told to- like vocab-isn’t very engaging. You can learn, but it’s not the most engaging way to learn. Where with this we were actually going out and doing things. It makes it more exciting to learn.

994: One thing I liked about it was just the...applying the vocab and being able to be out of the classroom, which I really *really* like because it’s just so tiring sitting in a class every day. So it was nice to actually get out and apply things in a way that you wouldn’t be able to in a classroom.

These focus group excerpts attest that the students engaged in meaningful activities during their interaction with the learning-tool and that through the use of *Explorez* they ascertained real-world applications for their FL2 learning. The analysis of this data as a whole has only begun; however the preliminary findings regarding playability of *Explorez*, participants' assessment of the tool, and certain learning motivators are encouraging and demonstrate the potential of quest-based learning and augmented reality in the gamification of French as a second language.

## Conclusion

This paper explores the potential of gamifying French-language learning by means of quest-based learning and augmented realities. It addresses several benefits and limitations to the learning tool *Explorez*, via a case study. This research offers theoretical and practical implications, and aims to add to the body of knowledge regarding mobile technologies and the quest to produce learning that is customized, social and takes place outside of the classroom. Analysis of game-play data in correlation with focus group feedback will provide information for improvements; future research involves a new iteration of *Explorez*, as well as implementing the tool in first-year University French courses. As mentioned previously, the analysis of the data as a whole (triangulating the data from the surveys, focus groups, research observation and the ARIS system) has only begun. The further analysis of student interactions and their interactions with the tool will provide a comprehensive analysis of the learning-tool; this is the next step in this research, to be disseminated as a master's thesis.

## Acknowledgements

The author would like to thank the Social Sciences and Humanities Research Council (SSHRC) Government of Canada for funding this research. The participation of students at the University of Victoria in the Department of French is gratefully acknowledged.

## References

- ARIS. <http://arisgames.org/>
- Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational researcher*, 18(1), 32-42.
- Bustard, D. W., Black, M. M., Charles, T., Moore, A. A., McKinney, M. E. T., & Moffett, P. (2011). GEL: A generic tool for game-enhanced learning. In *Proceedings of International Conference on Engineering Education, Belfast, UK, iNEER*.
- Caws, C. (2013). Evaluating a web-based video corpus through an analysis of user interactions. *ReCALL*, 25(01), 85-104.
- Chapelle, C. (2000). Interaction, communication et acquisition d'une langue seconde en ELAO. L. Duquette & M. Laurier (Eds.), *Apprendre une langue dans un environnement multimédia* (19-51). Montréal, Québec : Éditions Logiques.
- Charles, D., Charles, T., McNeill, M., Bustard, D., & Black, M. (2011). Game-based feedback for educational multi-user virtual environments. *British Journal of Educational Technology*, 42(4), 638-654.
- Colpaert, J. (2006). Toward an ontological approach in goal-oriented language courseware design and its implications for technology-independent content structuring. *Computer assisted language learning*, 19(2): 109-127.
- Dunleavy, M., & Dede, C. (2014). Augmented reality teaching and learning. In *Handbook of research on educational communications and technology* (735-745). Springer New York.
- Erenli, K. (2013). The Impact of Gamification-Recommending Education Scenarios. *International Journal of Emerging Technologies in Learning (iJET)*, 8(S1), 15-21. Available at <http://www.editlib.org.ezproxy.library.uvic.ca/p/45224/>
- Freitas, S., & Maharg, P. (2011). *Digital Games and Learning*. London, NY: Continuum International Publishing Group.
- Gagnon, D. (2010). ARIS: An open source platform for developing mobile learning experiences. Unpublished Master's thesis. Available at [arisgames.org](http://arisgames.org)
- Gee, J. (2003). *What Video Games Have to Teach Us About Learning and Literacy*. New York: Palgrave Macmillan.
- Haskell, C. (2013). Understanding Quest-Based Learning: Creating effective classroom experiences through game-based mechanisms and community. Available at [http://gogolabs.net/wp-content/uploads/2013/01/QBL-Whitepaper\\_Haskell-final.pdf](http://gogolabs.net/wp-content/uploads/2013/01/QBL-Whitepaper_Haskell-final.pdf)
- Holden, C. & Sykes, J. (2011). Leveraging Mobile Games for Place-based Language Learning. *International Journal of Game-Based Learning (IJGBL)*, 1(2), 1-18. Available at [http://arisgames.org/wp-content/uploads/2011/04/Holden\\_Sykes\\_PROOF.pdf](http://arisgames.org/wp-content/uploads/2011/04/Holden_Sykes_PROOF.pdf)
- Kapp, K. (2012). *The Gamification of Learning and Instruction: Game-Based Methods and Strategies for Training and Education*. San Francisco, CA : John Wiley & Sons.
- Kumar, B. (2012). Gamification in Education-Learn Computer Programming with Fun. *International Journal of Computers & Distributed SYSTEMS*, 2(1), 46-53.
- McGonigal, J. (2011). *Reality is Broken: Why Games Make Us Better and How They Can Change the World*. New York: Penguin Books.
- Natkin, S. (2009). Du ludo-éducatif aux jeux vidéo éducatifs. *Les dossiers de l'ingénierie éducative* 65, 12-15.
- Nunan, D. (1992). *Research methods in language learning*. Cambridge University Press.

- O'Donovan, S. (2012). Gamification of the games course. *Acesso em*, 17, 1-8.
- Robinson, K. (2006) TED Talk: Do Schools Kill Creativity. [http://www.ted.com/talks/ken\\_robinson\\_says\\_schools\\_kill\\_creativity](http://www.ted.com/talks/ken_robinson_says_schools_kill_creativity)
- Roy, C., & Frandy, T. (2013). Examining Augmented Reality as a Platform for Situated Ethnography through the Lens of the ARIS Wisconsin Uprising Game. *Journal of American Folklore*, 126 (499), 70-78.
- Sanchez, E., Ney, M., & Labat, J. (2011). Jeux sérieux et pédagogie universitaire: de la conception à l'évaluation des apprentissages. *Revue internationale des technologies en pédagogie universitaire* 2(2), 48-57.
- Sheldon, L. (2012). The Multiplayer Classroom : Designing Coursework as a Game. Boston, MA: Course Technology, Cengage Learning.
- Strickland, A.W. (2006) ADDIE. Idaho State University College of Education, Science, Math & Technology Education.
- Sykes, J. M., Reinhardt, J., & Thorne, S. L. (2010). Multiuser Digital Games as Sites for Research and Practice. In *Directions and Prospects for Educational Linguistics*, Springer Netherlands, 117-135.
- Voki. <http://www.voki.com/>
- Werbach, K., & Hunter, D. (2012). *For the win: How game thinking can revolutionize your business*. Wharton Digital Press.

INTE 2014



# Gender- and giftedness-specific differences in mathematical self-concepts, attributions and interests

Ralf Benölken<sup>a92</sup>

<sup>a</sup>*Westfälische Wilhelms-Universität Münster, Institut für Didaktik der Mathematik und der Informatik, Fliegenerstraße 21, 48149 Münster*

---

## Abstract

Although there is a consensus on the fact that both sexes are equally gifted across all academic domains, in Germany just like in other western and northern European countries girls are in proportion decidedly underrepresented in support programs that aim at mathematically gifted primary school-children. Thus, from the perspective of giftedness-research, it is of interest to ascertain aspects that might make possible a more differentiated identification and support. This calls for a holistic approach which among other factors may include achievement motivation. In this article a quantitative study will be reported which can clarify the significance of self-concept, patterns of attributions and interests as determinants for the identification of giftedness. Beyond that, results of a qualitative case study will be presented that indicate the effect of the identification of giftedness on the development of individual mathematical potentials.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* giftedness; sex; self-concept; attributions; interests

---

## Introduction

In Germany just like in other western and northern European countries girls are in proportion decidedly underrepresented in programs that foster mathematical giftedness (for a survey see Benölken, 2011). This phenomenon contradicts the consensus on the fact that both sexes are equally gifted across all academic domains (e.g. Endepohls-Ulpe, 2012). When it comes to primary school-children, aspects like gender-specific typifications of mathematical occupational fields or individual biographical decisions cannot act as possible explanations, especially because there cannot be found any differences in mathematical competencies at this age (e.g. Lindberg et al., 2010), and for many years studies have indicated a decline of gender-specific differences in mathematical achievements at subsequent ages (e.g. Ma, 2010; Hyde et al., 2008). This is why it is of interest to look for aspects that improve the identification of girls' mathematical giftedness<sup>1</sup>. In principle diagnostics should be organized as a process considering both cognitive and co-cognitive parameters. This holistic approach focuses on a complex of different influences such as „motivation“ containing “self-concepts”, “attributions” and “interests” (Benölken, 2014; 2011). In this article, the significance of these factors as determinants for the identification of giftedness at primary school age will be examined by a quantitative study. Its aim is to look for boys' and girls' frequent characteristics of the mentioned factors by a comparison of four groups: boys and girls who were identified to be mathematically gifted (subsequently, they will be referred to by the acronym “img”) as well as boys and girls who were not (“n-img”). Based on a survey of theoretical findings, hypotheses on the mentioned characteristics will be deduced. Afterwards, the design and the results of the study that investigated the hypotheses will be reported. Beyond that, results of a qualitative case study will be reported that indicate the

---

\* Corresponding author. Tel.: +49 251 83 39151; fax: +49 251 83 32718.

E-mail address: rben@math.uni-muenster.de

<sup>1</sup> According to Fuchs and Käpnick (2009) “mathematical giftedness” is seen as an above-average potential regarding the criteria of Käpnick (1998). This potential is characterized by individual determinants and a dynamic development depending on inter- and intrapersonal influences in interdependence with personality traits supporting the giftedness. Therefore, diagnostics should be organized in an holistic long-term process.

effect of the identification of giftedness on the development of individual mathematical potentials. Finally, the quantitative and qualitative results will be discussed.

## **Theoretical background**

The reviewed factors of motivation need to be seen in a strong interaction guided by similar factors like attitudes and both affective and environmental factors. The concurrence of all factors influences individual behaviors as a result of a decision by an expectancy-value-appreciation (Eccles et al., 1983). Therefore, motivational factors that cause positive influences on the whole complex are characterized as “functional” (otherwise “dysfunctional”). Research on the reviewed factors of motivation is mostly based on the psychological view on giftedness, which partially differs from a special mathematical giftedness (cf. note 1). The findings show, however, the significance of these factors as determinants for the identification of giftedness (in the psychological view). Therefore, they are suited to provide a basis for the intended hypotheses.

Self-concepts develop globally and domain-specifically containing both cognitive-evaluative and affective components (e.g. Shavelson et al., 1976). They can already be found at primary school age (e.g. Marsh et al., 1991). As early as at this age, gifted and non gifted children differ in their global- and domain-specific self-concepts (e.g. Rost and Hanses, 2000). In contrast to global self-concepts (in summary Rost and Hanses, 2000), there are findings about gender-specific differences in domain specific ones (e.g. Rustemeyer and Jubel, 1996). For instance, boys often show better self-concepts in mathematics (in summary Pohlmann, 2005), girls in social or verbal skills (e.g. Valtin and Wagner, 2002). Among other things, dysfunctional mathematical self-concepts are reputed to be responsible for the fact that girls at primary school age tend to engage in mathematics on a relatively small scale (e.g. Dickhäuser and Stiensmeier-Pelster, 2003; Keller, 1998). Boys and girls who were identified to be gifted do not differ in their mathematical self-concepts (Wieczerkowski and Jansen, 1990).

The concept of attributions refers to reasons that an individual provides in order to explain his or her achievements. They are divided into the dimensions of “locus of control” and “stability” (Weiner, 1986). Findings of older studies showed that as early as at primary school age and irrespectively of certain domains, i.e. especially in mathematics, girls tend to dysfunctional external-unstable attributions of success and internal-stable ones of failure. In contrast, boys tend to functional internal-stable attributions of success and external-unstable ones of failure (e.g. Rustemeyer and Jubel, 1996; Tiedemann and Faber, 1995; Kirschmann and Röhm, 1991). Contemporary studies indicate that girls more often tend to internal-unstable attributions of success, while boys still tend to internal-stable ones (e.g. Dickhäuser and Meyer, 2006). This result is also reported for gifted children who gain mathematical success (e.g. Tirri and Nokelainen, 2011). Beyond that, gifted children generally tend to advantageous attributions more often than non-gifted children (e.g. Schütz, 2000).

According to the scientific consensus, interest is a result of an interaction that – along with adjuvant conditions – causes to focus on a long-term preoccupation with something (Prenzel et al., 1986). Even primary school-children often have a lot of interests like sports, TV, computer games or reading (in summary Pruisken, 2005). Furthermore, there can already be found gender-specific differences at this age (e.g. Hoberg and Rost, 2000): horseback riding, animals or reading seem to be “typical” interests of girls, football, technics or computer “typical” interests of boys (e.g. Fölling-Albers, 1995). Though gifted children show the same differences, they do not have any extraordinary interests compared to non-gifted children (for a survey see Pruisken, 2005). In contrast to non-gifted girls, gifted girls seem to have more interests which are supposed to be “typical” interests of boys (this is why some authors decline an interim position of gifted girls between gifted boys and non gifted girls; e.g. Stapf, 2006). In addition to that, they seem to have a larger spectrum of interests than gifted boys (e.g. Kerr, 2000).

## **Design and results of the quantitative study**

### *Questions*

In the following, the hypotheses will be presented that have been deduced from the summarized results: (1) Img girls and boys as well as n-img boys show more functional mathematical self-concepts than n-img girls. (2) Img girls and boys tend to functional, i.e. internal, attributions of mathematical success (2a.1). N-img boys more

often tend to functional, i.e. internal, attributions of mathematical success than n-img girls (2a.2). Img girls and boys tend to functional, i.e. external, attributions of mathematical failure (2b.1). N-img boys more often tend to functional, i.e. external, attributions of mathematical failure than n-img girls (2b.2). (3) Img girls have a larger spectrum of interests than img boys, n-img girls and n-img boys.

### *Design, sample and procedure*

The study adds to Benölken (2011). Operationalizations of both self-concept and attributions were extracted from a questionnaire that focuses on motivation beyond other domains and were put together with a short questionnaire that focuses on interests (the manner of operationalizing the focused factors of motivation was tested within pilot studies by Benölken, 2011). This approach is based on the infrequent identification of girls' mathematical giftedness: Existing data was used to enlarge the sample of img girls. Despite its quantitative design, the study is explorative, because established tools were not applied. The sample contains  $N=288$  children of the third and fourth grade (132 girls, 156 boys). The subsample of img children is  $n=165$  (66 girls, 99 boys). Children who are named as "mathematically gifted" take part in a project that fosters mathematical giftedness at the university of Münster called "math for small pundits". They were chosen by established long-term process-diagnostics that are a synthesis of standardized and non-standardized tools (cf. note 1; for details see Benölken, 2014).  $n=85$  from this group of probands were questioned during the school year of 2012/2013 (35 girls, 50 boys). In addition to that, all children who completed the questionnaire of interests in the previous study were included, i.e.  $n=80$  (31 girls, 49 boys), among them  $n=33$  probands (14 girls, 19 boys) whose data about self-concept and attributions could be clearly assigned. These probands were questioned during the school year of 2008/2009 using a non-anonymized questionnaire (as opposed to subsequent questioning). The sample contains  $n=123$  n-img primary school-children (66 girls, 57 boys) from common classes questioned during the school year of 2012/2013. The n-img group is obviously independent of the group of img children. All procedures of questioning were consistent: The children were told how to fill in the questionnaire. They completed it on their own without any time limit (no one took more than 15 minutes and no one refused to fill in the questionnaire).

### *Method*

Apart from declaring sex, the questionnaire was anonymized. The focused factors of motivation were operationalized corresponding to the above-mentioned research results. In order to measure self-concepts by both a cognitive-evaluative and an affective aspect, the following instruction was given (all instructions were formulated in German – subsequently, English translations will be given): "Mark with a cross a statement that is proper to you: [1] I am very good at math. [2] I particularly enjoy solving difficult math-tasks." To evaluate these items, a four-step scale was offered ("that's not correct", "that's almost not correct", "that's almost correct", "that's correct"; in addition, the children could also choose "I don't know"). Attributions for success were operationalized by the instruction: "Imagine: You solved a difficult math-problem. Why did you succeed? Because... [1] you worked really hard, [2] it was random, [3] you're very good at math, [4] the task was simple." Attributions for failure were analogically operationalized: "Imagine: You could not solve a difficult math-problem. Why didn't you succeed? Because... [1] it was random, [2] the task was really difficult, [3] you're not really good at math, [4] you didn't work hard enough." Just one answer was allowed to be chosen to get the strongest trend by a "forced choice"-decision. Instead "another reason" could be added for both success and failure in an open line. These answers were assigned to Weiner's dimensions afterwards. To collect data about the number of interests, a schedule according to the above mentioned research results was composed intending to offer a large spectrum of interests. It contained the disjunct domains intellectual, sportive, general and "typical" interests of both boys and girls (for a survey see Benölken, 2014). Beyond that, further interests could be added into open lines. The instruction was: "Mark with a cross all interests that you have. In the open lines you can also note interests that are not mentioned."

### *Evaluation*

Statements about self-concept-items were translated into numbers from 1 ("that's not correct") to 4 ("that's correct"). The coefficient of correlation as defined by Pearson between these items is .588 ( $p<.001$ ) and the

internal consistency is acceptable or even good (Cronbachs  $\alpha=.73$ ). The items have been combined to one scale with mean values and evaluated by an analysis of variance with two factors (“giftedness” and “sex”) to find significant differences between the four groups (for remarks about requirements of the used statistical procedures see Benölken, 2014). In addition to that,  $\eta^2$ -values have been calculated to see the importance of both the factors and their interaction by their effect size ( $\eta^2<.06$  means a small effect,  $\eta^2<.14$  a medium effect and  $\eta^2\geq.14$  a large effect; see Cohen, 1988). As to the evaluation of attribution-data, cross-tabs have been built containing giftedness, sex and Weiner’s dimensions. They also include standardized residua in order to point out significant differences: Values  $\leq -1.96$  or  $\geq 1.96$  indicate an ascertainable divergence from expected frequency in each cross-tabs-cell regarding to a level of significance of  $\alpha=.05$  (Eid et al., 2011). Significance of possible differences was tested using the exact Fisher-test: According to Weiner’s dimensions, attribution was operationalized by a nominal scale consisting of four values. Data of img and n-img children were evaluated independently. The chosen interest-items have been transformed into one variable containing their sum. It was evaluated by an analysis of variance with two factors (“giftedness” and “sex”).

## Results

Table 1 shows averages and standard deviations of self-concept-statements. There are significant main effects on giftedness ( $F(1,237)=63.39$ ,  $p<.001$ ,  $\eta^2=.211$ ) and sex ( $F(1,237)=21.16$ ,  $p<.001$ ,  $\eta^2=.082$ ) as well as a significant effect of interaction between these factors ( $F(1,237)=23.80$ ,  $p<.001$ ,  $\eta^2=.091$ ). Thus, there is a main effect on sex which cannot be interpreted because the averages of img boys and girls are nearly identical. As indicated by  $\eta^2$ -values, giftedness (strong effect of 21.1%) plays a bigger part to explain variance than interaction between giftedness and sex (medium effect of 9.1%). Therefore, img children have more functional self-concepts in comparison with n-img children, but n-img boys merely differ a little. This fact confirms hypothesis 1.

Table 1. Averages (standard deviations) of self-concept-statements.

group	boys	girls	overall
img	3.58 (.44) n=69	3.60 (.42) n=49	118
n-img	3.33 (.59) n=57	2.58 (.87) n=66	123
overall	126	115	241

Table 2 shows attribution-data of mathematical success. Hypothesis 2a.1 cannot be confirmed or rebutted because the result of the exact Fisher-test is not significant ( $=4.044$ ,  $p=.243$ ). In contrast, hypothesis 2a.2 was confirmed by a significant result of the exact Fisher-test ( $=30.137$ ,  $p<.001$ ). Compared to n-img boys, n-img girls more infrequently tend to internal-stable (-2.6 to 2.8), but more often to external-stable (2.2 to -2.4) attributions as shown by the standardized residua.

Table 2. Cross-tabs about descriptions of attributions for mathematical success.

group/sex		internal-unstable	internal-stable	external-unstable	external-stable	overall
img boys	number	21	42	2	4	69
	standardized residua	-.5	.6	.8	-.8	
img girls	number	19	23	0	6	48
	standardized residua	.6	-.7	-.9	.9	
overall		34.2%	55.6%	1.7%	8.5%	100%
n-img boys	number	25	31	1	0	57
	standardized residua	-.8	2.8	-1.2	-2.4	

n-img girls	number	38	10	6	12	66
	standardized residua	.7	-2.6	1.2	2.2	
overall		51.2%	33.3%	5.7%	9.8%	100%

Table 3 shows attribution-data of mathematical failure. Hypothesis 2b.1 cannot be confirmed or rebutted because the result of the exact Fisher-test is not significant ( $=3.656$ ,  $p=.282$ ). Hypothesis 2b.2 was confirmed because the result of the exact Fisher-test is significant ( $=19.882$ ,  $p<.001$ ). In comparison with n-img boys, n-img girls more often tend to internal-stable attributions as shown by the standardized residua (2.3 to -2.5).

Table 3. Cross-tabs about descriptions of attributions for mathematical failure.

group/sex		internal-unstable	internal-stable	external-unstable	external-stable	overall
img boys	number	15	1	16	37	69
	standardized residua	-1.0	-.2	.2	.6	
img girls	number	18	1	10	20	49
	standardized residua	1.2	.2	-.2	-.8	
overall		28.0%	1.7%	22.0%	48.3%	100%
n-img boys	number	15	0	9	33	57
	standardized residua	-.4	-2.5	1.0	1.0	
n-img girls	number	21	13	5	27	66
	standardized residua	.4	2.3	-.9	-.9	
overall		29.3%	10.6%	11.4%	48.8%	100%

Table 4 shows averages and standard deviations of the total sum of interests. There are significant main effects on giftedness ( $F(1,284)=10.50$ ,  $p=.001$ ,  $\eta^2=.036$ ) and sex ( $F(1,284)=86.77$ ,  $p<.001$ ,  $\eta^2=.234$ ), but there is no effect of interaction between these factors ( $F(1,284)=.01$ ,  $p=.915$ ,  $\eta^2=.000$ ). As indicated by  $\eta^2$ -values, sex (strong effect of 23.4%) plays a bigger part to explain variance than giftedness (small effect of 3.6%). Therefore, img-girls have a larger spectrum of interests compared to both img and n-img boys on average. Hypothesis 3 is confirmed for img girls. Notwithstanding hypothesis 3, n-img girls have more interests compared with the two groups of boys on average, too.

Table 4. Averages (standard deviations) of interests' sum.

group	boys	girls	overall
img	8.68 (3.43)	12.44 (3.82)	
	n=99	n=66	165
n-img	7.44 (2.47)	11.11 (3.21)	
	n=57	n=66	123
overall	156	132	288

### Retrospection

Main aspects of the deduced hypotheses have been confirmed. Within the group of n-img children, girls more often tend to have dysfunctional characteristics of self-concepts and attributions than boys. By contrast, within the group of img children, dysfunctional characteristics rarely appear, and n-img boys are very similar to this group. In addition to that, girls have independently of the identification of giftedness more often a larger spectrum of interests than boys on average.

## Results of a case study about the effect of the identification on the individual development of giftedness

Subsequently, excerpts of a case study will be presented that focused on twins, Julia and Tobias. Their unequal developments indicate possible influences of self-concepts, attributions and interests on the development of giftedness. The study is taken from Benölken (2011; 2014). Its intention was to examine effects of both boys' and girls' characteristics of particularities that had been proven by quantitative studies before within single cases. Among other things, motivational factors, which have been regarded simultaneously with the children's environment, their physical and cognitive development as well as personal traits that might support their giftedness, were examined. The twins took part in the project "math for small pundits" (cf. chapter 3.2). Methods applied within the case studies were non-standardized tools (see Benölken, 2011 for details) including guided interviews that provide the basis of the following interpretations (the probands were interviewed in German – subsequently, English translations will be given).

### *Self-concepts*

Julia did not show a strong preoccupation with mathematics and her giftedness did not attract any attention. From the parents' point of view, she assimilates her mathematics-achievements to other girls of the class (an often-reported phenomenon, e.g. Rohrmann und Rohrmann, 2005):

Father: For some time, we had the impression that Julia did not want to attract attention by way of successful achievements. Especially in school subjects that grab interest like math. This is why Tobias' giftedness was identified early: Giftedness in other domains such as languages is not as ostentatious as mathematical giftedness. We thought Julia explicitly assimilated her achievements to the class-average in order to avoid being second to none.

Primarily, Julia's mathematical self-concept was not as advantageous as Tobias' self-concept. For instance, she avoided situations that caused comparisons between herself and her brother believing she could not stand with his mathematical-achievements – furthermore, this feeling was affirmed by her environment. In contrast, she ascribed herself skills in other domains:

Interviewer: What do you think? Are you doing better at math or your brother?  
Julia: Tobias.  
Interviewer: Tobias?  
Julia: In contrast I am doing better at German.  
Interviewer: Are there any domains in which your skills exceed Tobias' skills?  
Julia: Yes, painting and writing. Especially writing in one's best handwriting. His handwriting is unreadable.

At first, merely Tobias was chosen to take part in "math for small pundits". Caused by pragmatical reasons like looking after the children, the parents asked to allow Julia to participate, too. Subsequently, Julia's mathematical self-concept was strongly affirmed by taking part in the project. In contrast, Tobias had a positive mathematical self-concept before participating in the project. This fact led to an extraordinary engagement in mathematics accompanied by a lot of joy solving difficult mathematical tasks on his part:

Mother: At first, she was afraid that she was not able to keep up with Tobias' achievements. We advised her to check out the atmosphere of the project and to quit immediately in case she didn't like it.  
Father: Now, she enjoys taking part in the project and she looks forward to every project-session.  
Interviewer: What do you think? Do they wish to be absolutely sure to be able to solve math-problems?  
Mother: I think they're sure to be able to. Possibly it might be influenced by Julia's self-confidence, but Tobias definitely would believe that.

In sum, the examples indicate the significance of giftedness-identification as a determinant that can influence mathematical self-concepts, because Julia's self-concept became more advantageous only after she took part at "math for small pundits": Therefore, the identification of her potential first caused that she realized her skills.

### *Attributions*

Questioned about his attributions on mathematical achievements, Tobias took the following stance:

- Interviewer: Imagine: You were not able to solve a mathematical task. Why didn't you succeed?  
Tobias: I think you didn't express the task's content correctly. Same thing at school: Teachers don't explain tasks correctly. This causes a lot of mistakes and even my parents often don't know what to do.  
Interviewer: You don't think it is up to you? If all tasks were explained correctly, could you solve them all?  
Tobias: Maybe there are some I can't solve because I don't understand them – but nearly all tasks.  
Interviewer: Imagine: You solved a mathematical task. Why did you succeed?  
Tobias: I don't know.  
Interviewer: Is it up to you? Did you just find a solution? Or do you think the task was too simple?  
Tobias: I don't know. Usually, the tasks are absolutely simple.

Tobias attributes mathematical failure in an external-stable, i.e. functional, way (difficulty of tasks). The mentioned internal-unstable aspect ("I don't understand them") seems to be caused by an understatement-effect as a consequence of the interviewer's questioning-style. His attributions on mathematical success are ostensibly external-stable ("the tasks are absolutely simple"). The fact that he provides to be able to solve "nearly all tasks" indicates a strong confidence in his mathematical skills – this can be interpreted as a proof of internal-stable attributions on mathematical successes. In contrast, Julia took the following stance:

- Interviewer: Imagine: You could not solve a mathematical task. Why didn't you succeed?  
Julia: I remember a situation: I read a task wrongly. As a consequence, the solution was incorrect.  
Interviewer: Imagine: You solved a mathematical task. Why did you succeed?  
Julia: Because I knew the task, for instance from a book or from school.

Julia attributes mathematical failure in an internal-unstable way (effort or concentration) and success in an external-unstable way (random). Therefore, her attributions are dysfunctional.

Even Tobias' functional attributions can partially just be concluded by interpretation. The example of the twins illustrates gender-specific differences that are often reported (cf. chapter 2). Julia's dysfunctional attributions indicate that the development of functional factors of motivation might be a long-term process with img children, too – maybe especially with girls.

### *Interests*

Tobias very early showed strong interest in mathematics. For instance, he perceived mathematical phenomena in his environment, and he occupied himself with mathematical tasks in his spare time. Julia developed interest in mathematics not until her huge potential was identified. Furthermore, it became one of several interests while she preferred artistic domains. According to that fact, she mostly likes mathematical tasks that contain artistic, creative or playful aspects (in contrast to Tobias). Though Julia's interest in mathematics developed in a positive way, mathematics kept a different significance for her and her brother:

- Father: Numbers cover Tobias' life. He always plays with numbers. By comparison, Julia's interest in numbers is less noticeable. Therefore, we didn't perceive her mathematical potential.  
Interviewer: How would you describe your children's interests in mathematics?  
Mother: Tobias' interest in mathematics is obviously in contrast to Julia's interest. She often avoids comparisons with her brother, and she doesn't want to be compared to him – just because she doesn't want to lose out.

Interviewer: Do mathematics play an important part in your children's mind?  
Father: Just in Tobias' mind.

In sum, the examples indicate the significance of giftedness-identification as a determinant that can influence a positive development of individual interests in mathematics. Furthermore, Julia had several interests that are partially more important than mathematics in her subjective view. This fact might obstruct the development of a stronger interest in mathematics. In contrast, Tobias focused strongly on mathematics.

### *Retrospection*

The reported case study illustrates the possible significance of the regarded factors as determinants on the development of giftedness. Just after her huge mathematical potential was identified, a more functional self-concept and a stronger interest in mathematics emerged with Julia. The factors of motivation, however, are still not completely developed functionally as shown by her attributions. Therefore, giftedness-identification seems to have a strong effect on the development of advantageous motivational factors. As to Julia's attributions, the inverted interpretation might be important regarding processes of diagnostics: Dysfunctional characteristics of motivational factors might obstruct the identification of huge potentials – for instance, they could be obscured by different interests. In this manner, the rare identification of girls' mathematical giftedness might be partially clarified if such characteristics could be found with girls who are mathematically gifted, but not identified.

### **Discussion**

Img girls and boys (in concordance with Wiecekrowski and Jansen, 1990) as well as n-img boys show functional mathematical self-concepts more often than n-img girls. Within the img group, there were not found any significant differences for attributions of both mathematical success and failure. Img girls and boys did not differ within the examined sample: They primarily attribute success internally and failure externally, i.e. functionally. This fact might be interpreted as proof of hypotheses 2a.1 and 2b.1 (in contrast to Wiecekrowski and Jansen, 1990; similar to Tirri and Nokelainen, 2011), but this assumption has to be assured by further studies. The study showed significant differences in n-img childrens' attributions of both mathematical success and failure. N-img girls more infrequently attribute success in an internal-stable way, but more often in an external-stable way than boys. Compared to boys, their attributions of failure tend to be internal-stable. Therefore, n-img girls tend to have dysfunctional attributions, while n-img boys are similar to img children. Finally, img (and n-img) girls have more interests than img and n-img boys on average (similar to Kerr, 2000). Within the n-img group, girls more often show dysfunctional characteristics of the regarded motivational factors than boys. By contrast, within the img group, dysfunctional characteristics rarely appear, and n-img boys are very similar to this group. Furthermore, the reported case study indicates a strong significance of motivational factors as determinants that influence the development of giftedness.

The results indicate that both functional self-concepts and attributions can be found – independently of the identification of giftedness – more often with boys. This might cause more efficient diagnostics of their giftedness because a teacher might perceive such characteristics primarily. By contrast, dysfunctional characteristics might lead to the fact that children do not develop a stronger preoccupation with mathematics. This might also apply to dysfunctional characteristics shown by children who have a huge potential that might be more difficult to identify. The findings of course are not suited to predict how self-concepts and attributions are developed with girls who are mathematically gifted, but not identified. The fact that n-img girls show dysfunctional characteristics more often than n-img boys and the results of the case study that indicate a strong impact of giftedness-identification on the development of giftedness lead to a thesis that must be put forward with great care: Huge mathematical potentials might be identified more infrequently with girls than with boys because girls more often show such dysfunctional characteristics. In that way, the results make a contribution to explain mathematically gifted girls' rare identification (for practical implications see Benölken, 2014).

Looking at the number of img girls using data of Benölken (2011) was useful because thus a suitable subsample could be ensured despite their rare identification. Moreover, the sample, especially the subsample of img children, is nothing more than an insufficient image of population, and its representativeness has to be seen as limited. In principle, the questionnaire was suited to the aims of the study. Moreover, the questionnaire also is



suited for a pragmatical use in classrooms because its design is appropriate for children, and it can be completed in a short time. However, self-concept, attributions and interests are strongly reduced in their conceptions, and their evaluation depends on very simple measurements. In addition, the external validity of the findings cannot be judged because established tools that regard criteria of quality were not used. In sum, the study has obvious limitations, and it is to be seen as an explorative one (for details see Benölken, 2014). Subsequent studies are well-advised to use established tools to prove the reported results and consider further motivational factors like attitudes. Furthermore, the significance of motivational factors as influences on the development of giftedness should be examined in subsequent qualitative studies.

## References

- Benölken, R. (2014). Begabung, Geschlecht und Motivation. Erkenntnisse zur Bedeutung von Selbstkonzept, Attribution und Interessen als Bedingungsfaktoren für die Identifikation mathematischer Begabungen. *Journal für Mathematik-Didaktik*, 35(1), 129–158.
- Benölken, R. (2011). *Mathematisch begabte Mädchen. Untersuchungen zu geschlechts- und begabungsspezifischen Besonderheiten im Grundschulalter*. Münster: WTM.
- Cohen, J. (1988). *Statistical Power for the Behavioral Sciences* (2nd ed.). Hillsdale: Lawrence Erlbaum.
- Dickhäuser, O. & Meyer, W.-U. (2006). Gender Differences in Young Children's Math Ability Attributions. *Psychology Science*, 48(1), 3–16.
- Dickhäuser, O. & Stiensmeier-Pelster, J. (2003). Wahrgenommene Lehrereinschätzungen und das Fähigkeitsselbstkonzept von Jungen und Mädchen in der Grundschule. *Psychologie in Erziehung und Unterricht*, 50(2), 182–190.
- Eccles, J., Adler, T. F., Futterman, R., Goff, S. B., Kaczala, C. M., Meece, J., & Midgley, C. (1983). Expectancies, Values and Academic Behaviors. In J. T. Spence (Ed.), *Achievement and achievement motives* (pp. 26–43). San Francisco: Freeman.
- Eid, M., Gollwitzer, M. & Schmitt, M. (2011). *Statistik und Forschungsmethoden* (2nd ed.). Weinheim, Basel: Beltz.
- Endepohls-Ulpe, M. (2012). Begabte Mädchen und Frauen. In H. Stöger, A. Ziegler & M. Heilemann (Eds.), *Mädchen und Frauen in MINT. Bedingungen von Geschlechtsunterschieden und Interventionsmöglichkeiten* (pp. 103–132). Berlin: Lit Verlag.
- Fölling-Albers, M. (1995). Interessen von Grundschulkindern. Ein Überblick über Schwerpunkte und Auslöser. *Grundschule*, 27(6), 24–26.
- Fuchs, M. & Käpnick, F. (2009). *Mathe für kleine Asse. Empfehlungen zur Förderung mathematisch interessierter und begabter Kinder im 3. und 4. Schuljahr* (Vol. 2). Berlin: Cornelsen.
- Hoberg, K. & Rost, D. H. (2000). Interessen. In D. H. Rost (Ed.), *Hochbegabte und hochleistende Jugendliche. Neue Ergebnisse aus dem Marburger Hochbegabtenprojekt* (pp. 339–365). Münster et al.: Waxmann.
- Hyde, J. S., Lindberg, S. M., Linn, M. C., Ellis, A. B. & Williams, C. C. (2008). Gender Similarities Characterize Math Performance. *Science*, 321, 494–495.
- Käpnick, F. (1998). *Mathematisch begabte Kinder*. Frankfurt am Main et al.: Peter Lang.
- Keller, C. (1998). *Geschlechterdifferenzen in der Mathematik: Prüfung von Erklärungsansätzen*. Zürich: Zentralstelle der Studentenschaft.
- Kerr, B. (2000). Guiding Gifted Girls and Young Women. In K. A. Heller, F. J. Mönks, R. J. Sternberg & R. F. Subotnik (Eds.), *International Handbook of Giftedness and Talent* (2nd ed., pp. 649–657). Amsterdam et al.: Elsevier.
- Kirschmann, K. & Röhm, A. (1991). Schulische Leistungsangst, Attribution und Leistung unter Berücksichtigung der Aspekte Geschlecht und Schultyp. *Zeitschrift für Differentielle und Diagnostische Psychologie*, 12(3), 177–184.
- Lindberg, S. M., Hyde, J. S., Petersen, J. L. & Linn, M. C. (2010). New Trends in Gender and Mathematics Performance: A Meta-Analysis. *Psychological Bulletin*, 136, 1123–1135.
- Ma, X. (2010). Gender Differences in Mathematics Achievement. Evidence from Regional and International Student Assessments. In H. J. Forgasz, J. Rossi Becker, K.-H. Lee & O. B. Steinthorsdottir (Eds.), *International Perspectives on Gender and Mathematics Education* (pp. 225–248). Charlotte, NC: Information Age Publishing.
- Marsh, H. W., Craven, R. G. & Debus, R. (1991). Self-concepts of Young Children 5 to 8 Years of Age: Measurement and Multidimensional Structure. *Journal of Educational Psychology*, 83, 377–392.
- Pohlmann, B. (2005). *Konsequenzen dimensionaler Vergleiche*. Münster et al.: Waxmann.
- Prenzel, M., Krapp, A. & Schiefele, H. (1986). Grundzüge einer pädagogischen Interessentheorie. *Zeitschrift für Pädagogik*, 32(2), 163–173.
- Pruisken, C. (2005). *Interessen und Hobbys hochbegabter Grundschulkinde*. Münster et al.: Waxmann.
- Rohrmann, S. & Rohrmann, T. (2005). *Hochbegabte Kinder und Jugendliche. Diagnostik - Förderung - Beratung*. München et al.: Ernst Reinhardt.
- Rost, D. H. & Hanses, P. (2000). Selbstkonzept. In D. H. Rost (Ed.), *Hochbegabte und hochleistende Jugendliche. Neue Ergebnisse aus dem Marburger Hochbegabtenprojekt* (pp. 211–278). Münster et al.: Waxmann.
- Rustemeyer, R. & Jubel, A. (1996). Geschlechtsspezifische Unterschiede im Unterrichtsfach Mathematik hinsichtlich der Fähigkeitseinschätzung, Leistungserwartung, Attribution sowie im Lernaufwand und im Interesse. *Zeitschrift für Pädagogische Psychologie*, 10, 13–25.
- Schütz, C. (2000). Leistungsbezogene Kognitionen. In D. H. Rost (Ed.), *Hochbegabte und hochleistende Jugendliche. Neue Ergebnisse aus dem Marburger Hochbegabtenprojekt* (pp. 303–337). Münster et al.: Waxmann.
- Shavelson, R. J., Hubner, J. J. & Stanton, G. C. (1976). Self-concept: Validation of Construct Interpretations. *Review of Educational Research*, 46, 407–441.
- Stapf, A. (2006). *Hochbegabte Kinder. Persönlichkeit, Entwicklung, Förderung* (3rd ed.). München: Beck.
- Tiedemann, J. & Faber, G. (1995). Mädchen im Mathematikunterricht: Selbstkonzept und Kausalattribution im Grundschulalter. *Zeitschrift*

- für Entwicklungspsychologie und Pädagogische Psychologie*, 27(1), 61–71.
- Tirri, K. & Nokelainen, P. (2011). The Influence of Self-Perception of Abilities and Attribution Styles on Academic Choices: Implications for Gifted Education. *Roeper Review*, 33, 26–32.
- Valtin, R. & Wagner, C. (2002). Wie wirken sich Notengebung und verbale Beurteilung auf die leistungsbezogene Persönlichkeitsentwicklung aus? In R. Valtin (Ed.), *Was ist ein gutes Zeugnis? Noten und verbale Beurteilungen auf dem Prüfstand* (pp. 113–137). Weinheim: Juventa.
- Weiner, B. (1986). *An Attributional Theory of Motivation and Emotion*. New York: Springer.
- Wieczerkowski, W. & Jansen, J. (1990). Mädchen und Mathematik: Geschlechtsunterschiede in Leistung und Wahlverhalten. In W. Wieczerkowski & T. Prado (Eds.), *Hochbegabte Mädchen* (pp. 134–151). Bad Honnef: Bock.

INTE 2014

# Globalization and internationalization in ELT: Methodology, technology and language policy at a crossroad in Brazil

Maria Carolina Porcino<sup>a</sup>, Kyria Rebeca Finardi<sup>b</sup>

<sup>a,b</sup>Universidade Federal do Espírito Santo, Avenida Fernando Ferrari, 514, Vitória, ES, cep.29075910, Brazil

---

## Abstract

The paper reflects on the impact of globalization and internationalization in education in general and in the English language teaching and learning (ELT) in Brazil in particular. Based on the assumption that access to information and technology is necessary to build social capital (Warshauer, 2003) and that this access requires some English knowledge and digital literacy (Finardi; Prebianca; Momm, 2013) the study reflects on the roles of ELT methodologies, technologies and language policies in Brazil. The article reviews ELT methodologies, technologies and language policies to suggest that both the resistance to and the uncritical use of English and technology may bring negative consequences to social development in Brazil. The study concludes that in the post method (Kumaravadivelo, 2003) and information era (Levy, 1999) we live in, technologies have a relevant and crucial role that should be critically considered in ELT methodologies. The study also suggests that the informed use of technologies and methodologies, allied with the teaching of English as an international language are essential to leverage the development and the internationalization of education in Brazil in a critical way in relation to the negative effects of globalization.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* Globalization; Internationalization; ELT Technology, Methodology, and Language Policy in Brazil

---

## 1. Introduction

One way to view globalization is through the free flow of goods and services which, allied to technology and the rapid flow of information across fading away borders, may result in an integrated global society. In the early 1990s globalization was associated with economic prosperity which is not always associated with positive effects. Still at the end of the same decade, globalization began to be perceived as a threat to local cultures in favor of a global culture, as demonstrated by the protests in Seattle in December 1999, indicating that globalization had managed to unite people around the world to protest against the effects of this global "integration" (Stiglitz, 2006 cited in Varghese, 2013, p.2). Despite these protests, the process of economic and social integration leveraged by globalization continued to advance steadily.

Globalization also contributed to the emergence of the information society (Levy, 1999) and knowledge economy (Varghese, 2013), which in turn, contributed to the internationalization of higher education (Shin; Teichler, 2014) defined as the process of integrating international, intercultural or global dimensions in the mission or function of a higher education institution which, in turn, reflects the effects of globalization (Knight, 2006 cited in Yonezawa, 2013, p. 59). In this scenario, universities are viewed as valuable assets for their intellectual capital, which is now seen as a relevant import and export product in the knowledge economy (Shin; Teichler, 2014).

Another effect of globalization is related to the technological advances, especially with regard to new information and communication technologies (hereafter ICTs), which enabled a more democratic and inexpensive flow of information, products and services, which in a globalized economy means millions of users connected to mobile devices, internet and social networks. This new flow of information and the affordances of ICTs changed the way we express ourselves in this new global and local scenario, both virtually and face-to-face. ICTs also changed the way we produce and acquire information and knowledge, as shown, for example, by the number of massive online open courses (MOOCs) offered with and without certification by world-class

universities. Some of the most popular MOOCs worldwide are Coursera, Udacity and EDX and in Brazil Open (from UNESP) and Veduca (from USP).

In Brazil, the population has witnessed these global and local tensions more vividly than ever before through the impact of social networks, specifically Facebook, used to trigger and spread public protests that started in June 2013 with the Free Pass Movement which is a social movement that advocates the adoption of zero tariffs for public transportation. The Brazilian movement was founded in a plenary session at the World Social Forum in 2005, in Porto Alegre, and gained prominence with the organization of protests in São Paulo and other Brazilian cities in 2013. Other important social movements such as the "rolezinhos" (events organized by young people through social networks to meet at shopping malls in Brazil) were also organized by this social network, to give just two examples of social movements triggered by the new way of relating to the world through the internet and Facebook. We can say that the internet has given more access to information whereas social networks have given more voice in the information era and both brought more autonomy in the search not only for information but also for expression channels. The number of people who exercise this autonomy in the pursuit of knowledge through MOOCs and their voice in the pursuit of expression through Facebook is evidence of this new way of relating to and with the world.

Autonomy in learning is considered a characteristic of postmodern education (Graddol, 2006; Shin; Teichler, 2014; Varghese, 2013), and in view of the widespread use of Facebook in Brazil coupled with the fact that most of the information online is in English (Graddol, 2006; Finardi; Prebianca; Momm, 2013), it would be logical to assume that Facebook could be used not only to organize protests in Brazil, but also to give voice and greater autonomy for English as foreign language learners who could have access to other registers, cultures and languages through the internet and social networks. Yet, Facebook is still undermined as a pedagogical tool and does not seem to have achieved these educational and communicational goals in Brazil.

Finardi, Cover, Santos, Peruzzo and Hildeblando Junior (2013) analyzed the potential of Facebook for meaningful English practice contrasting some of the possibilities of using this tool with theories of foreign language acquisition. Finardi, Cover, Santos, Peruzzo and Hildeblando Junior (2013) concluded that the interaction through Facebook represents a great potential for English as a foreign language practice still underused. Despite this suggestion, other studies show that this social network is not seen as a pedagogical tool, as shown by Finardi and Veronez (2013) who analyzed the use of Facebook as a communication tool between English teachers and learners and by Finardi and Pimentel (2013) who analyzed English teachers' and students' beliefs on the use of Facebook as a pedagogical tool. Both studies suggest that the resistance to the use of Facebook as a pedagogical tool for communication and practice in English is higher among teachers than among students and that both teachers and students tend to view Facebook as an entertainment tool with little or no pedagogic value.

These changes in society and in the forms we communicate and produce knowledge do not always reach schools and universities with the same speed they reach homes, though they probably reach higher education faster than schools due to the university intellectual capital appeal in the knowledge economy (Shin; Teichler, 2014; Varghese, 2013). The internationalization of higher education affects and is affected by globalization (e.g.: Shin; Teichler, 2014; Varghese, 2013), and the status and use of English as a foreign, international or academic language.

Finardi and Ortiz (2014), for example, analyzed the internationalization process of two Brazilian universities with different backgrounds and motivations to go international: a public university (whose motivation for internationalization was assumed to be academically-driven since they charge no fees) and a private university (whose motivation was assumed to be also financially-driven since they can charge fees). The analysis of the two institutions showed that the motivation to go international is inexistent in the private institution since the internal market is very large requiring no efforts to attract foreign students. The motivation to go international in the public institution analyzed exists and is academically-driven but faced with a number of challenges, among which the most pressing one is the linguistic barrier. Finardi and Ortiz (2014) concluded that the greatest obstacle for the internationalization of higher education in both universities investigated is the low level of English proficiency that prevents both academic mobility OUT– as shown in the case of the Brazilian internationalization program Science Without Borders, and IN, as shown by the small number of foreign students coming to Brazil each year. We believe that the scenario seen by Finardi and Ortiz (2014) is representative of most universities in Brazil.

Pinheiro and Finardi (2014) analyzed Brazilian internationalization policies enacted in the Science without Borders and English without Borders Programs. The Science Without Borders Program can be described as a program of academic mobility OUT and the reason for its low uptake of grants was mainly due to lack of English

proficiency of Brazilian candidates. In order to fill in this gap identified in the internationalization of higher education process in Brazil, the government launched in 2012 the English without Borders Program whose goal was to correct a historical deficiency in teaching English as a foreign language in that country. Pinheiro and Finardi (2014) concluded that a greater investment in English language teaching and learning, both in basic education and in higher education is needed to drive internationalization in Brazil. Yet, most internationalization actions are aimed at higher education leaving the problem of basic education still unattended in Brazil.

Finardi, Prebianca and Momm (2013) argue that in the current information society, both English as an international language and digital literacy are passports to information access and social inclusion as well as for social capital formation (Warschauer, 2003) which can be defined as the ability of individuals to generate benefits by means of their personal relationships or social practices. In this sense, Finardi and Porcino (2013) suggest the use of internet tools for teaching English as a foreign language based on the assumption that it is necessary to develop both language skills in English and digital literacy by means of internet resources for a global citizenship.

Despite these changes in society and the role of English and technology in it, there are barriers that seem to resist the effects of globalization, as for example, in the case of the resistance to include ICTs in education as shown by Teixeira and Finardi (2013) who analyzed a teacher training course for the use of ICTs in traditional classes. Teixeira and Finardi (2013) departed from Warschauer's (2003) concept of social capital that differentiates between two types of access to ICTs that can lead to the formation of social capital. According to Warschauer (2003), the limited access to ICTs includes access to equipment and does not necessarily lead to the formation of social capital. So as to guarantee social capital formation through the use of ICTs, Warschauer (2003) suggests that there should be broad access which implies the critical use of equipment available for education and individuals. Teixeira and Finardi (2013) concluded that the greatest obstacle for the use of ICTs in classrooms in Brazil is not related to the limited access to equipment, since universities and schools are in general, well equipped, but rather they conclude that the obstacle is related to the broad access to ICTs, i.e., to the use of equipment and technologies critically to generate benefits for users and their environments through this use. In this sense, we agree with Teixeira and Finardi (2013) who conclude that there needs to be more investment and effort in teacher training and education for the critical use of ICTs for a 21st century aligned education.

Regarding the role of technology in education, we can say that today, more than ever, technologies not only act as a pedagogical support, but change the very concept of teaching (and education), as this study intends to show. In a very succinct definition we can say that technologies are instruments created by men to shorten distances and facilitate actions (Almeida, 2010). The historical development of language teaching, particularly the teaching of English as a Foreign Language (Leffa, 2006), is inseparable from the trajectory of uses of technology for educational purposes (Paiva, in press) as we shall see in what follows.

The different language policies and technologies used with different English teaching methodologies in diachronic or synchronic ways served different purposes and objectives in Brazil. Yet, the analysis of language policies, technologies and methodologies in this paper suggests that globalization and the advent of internet changed the way we teach, learn, view and use English in Brazil. It seems that technology is no longer a mere supporting tool for teaching and learning and that English is no longer a mere foreign language in this gradually more globalized and international scenario in Brazil.

The internet, and especially the advent of the Web 2.0, besides reaffirming the status of English as an international language, also transformed the paradigms of teaching that language with new possibilities of interaction with and in that language and with its users around the world, providing opportunities for greater autonomy and collaborative construction and situated knowledge, to name but two advantages of the potential of this tool (Baladeli; Ferreira, 2012).

However, there are still many questions about the critical use of technology in English teaching methodologies. Having outlined this panorama, this paper aims to present a brief historical overview of the main methodologies that followed and at times coexisted in the teaching of English as a foreign language in order to discuss in what form (s) some of these methodologies used or appropriated technologies (and in some cases still do or can do) to achieve their educational goals and also briefly reflect on the implications of these uses and appropriations for teaching English as an international language in a globalized scenario and increasingly internationalized one in the case of higher education in Brazil.

## **2. ELT Methodologies, technologies and language policies in Brazil**

The earliest known methodology for language teaching is the Grammar-Translation Method (hereafter GTM) (Leffa, 1988). According to Franco (2010), since the GTM, English teaching has benefited from technology, given that the blackboard (also considered a piece of technology) was used to illustrate explanations and to present translations, word lists or structures and exercises. Books (mostly literary), in turn, also had a key role in GTM, since its reading was used to explain the structure of the target language making correlations with the learner's native language (Larsen-Freeman, 2000).

In response to the gap left by GTM regarding communicability (Leffa, 1988) and as a result of the Reform Movement (Richards; Rodgers, 2001), the Direct Method (hereafter DM) emerged as a proposal for the development of oral skills (Larsen-Freeman, 2000). In the DM the technologies used were in the form of visual aids, such as pictures and posters, used to maintain the exclusive use of the target language throughout instruction (Leffa, 1988). In the DM, technologies were seen as visual support tools to help learners' vocabulary acquisition.

The Reading Approach (hereafter RA) emerged in the late 30's (Leffa, 1998) and according to Richards and Rodgers (2001) its main objective was to develop learners' reading skills through exposure to texts. As the GTM, the RA benefited from technology in the form of books, only now they were more didactic and less literary than in the GTM (Franco, 2010).

The Audio-Lingual Method (hereafter ALM) (Borges; Paiva, 2011) focused on orality with particular emphasis on pronunciation since its main teaching strategy was the automatization through repetition of standard grammatical sentences (Larsen-Freeman, 2000) and the use of drills (exercises of repetition of a given structure by replacing one or more elements). The ALM drew upon many technologies, among which we highlight videos and audio players (Franco, 2010) used in classrooms in the 1940's for authentic teaching materials recorded (reproducing the speech of native speakers) and a kind of self-evaluation, since students could record their readings and repetition exercises to analyze their performance (Paiva, in press). Other technological resources like overhead projectors and/ or image projectors were also used in the ALM according to Franco (2010).

The emergence of the European Common Market in the 1970s reinforced the need for a more communicative teaching (Lyrio, 2012), which would enable the learner to communicate effectively in real contexts of language use (Larsen-Freeman, 2000). The Communicative Approach (hereafter CA) emerged with the need for a more communicative view of language and teaching and according to Larsen-Freeman (2000) it establishes the relationship between language and communication as inseparable. According to Leffa (1988), the CA is focused on students' communicative needs and integrates the four skills (reading, listening, writing and speaking). According to Larsen-Freeman (2000) the following methodologies are embedded in the framework of the Communicative Approach: the Task Based Approach (hereinafter TBA); the Content and Language Integrated Learning (hereafter CLIL) and the Participatory Approach (hereafter PA). These methodologies share and practice the principles of AC and what differentiates them is their focus. They will be briefly reviewed in what follows.

The TBA, according to Richards and Rodgers (2001) and as the name suggests, is focused on tasks. Ellis (2003) defines a task as a work plan that requires pragmatic use of the language in order to achieve a communicative result. Although there is no prescription for the use of technology in TBA, there are several possibilities to use and incorporate technologies in this methodology. A relevant and relatively current example is WebQuests (Dodge, 1995) which propose tasks using the Internet as the main search source. According to some authors (e.g., Santos, 2013; Finardi; Porcino, in press), WebQuests are compatible with the assumptions of the TBA.

Larsen-Freeman (2000) explains that CLIL aims at teaching diverse contents, not the language itself, through the target language and therefore, the target language is only the medium used for instruction (thus the term English Medium Instruction also used to refer to this methodology). CLIL is rather an implicit methodology of language teaching, since it gives little or no explicit or intentional focus to the structures of the target language (Richards; Rodgers, 2001). As in the previous methodology, CLIL does not suggest the use of technologies for teaching and learning the language, but we can also say that there are several possibilities of using technology in this method such as podcasts, social networks and blogs, since one can approach any content in the target language through these technological resources. As with the TBA, WebQuests also seem to fit in well with this methodology as shown in Bottetuit Junior and Coutinho's (2008) study which analyzed 483 WebQuests in English addressing the most diverse contents such as mathematics, science, physics, chemistry and history, to name but a few.

The PA focuses on civic education and according to Larsen-Freeman (2000) is a critical approach based on the work of Brazilian educator Paulo Freire. This methodology advocates meaningful and contextualized

learning of language considering the concept of "empowerment" and "giving voice" to the subject. As it is, the PA goes beyond language goals to reach social transformation objectives (Larsen-Freeman, 2000). Though technologies are not directly mentioned in this methodology, we believe that technology use nowadays, especially via the Internet, provides a very fertile ground for the practice of PA in the globalized world, especially regarding the development of a critical attitude about language and digital literacy (Finardi; Porcino, 2013; Finardi; Prebianca; Momm, 2013).

The CA, as well as the ALM, also used the computer as an important teaching resource. In the 1980's, personal computers and communicative teaching ideas spread fast. The union of these two gave rise, according to Warschauer and Healey (1998 cited in Leffa, 2006) to the emergence of the Communicative Computer Assisted Language Learning (CALL) approach. Leffa (2006) explains that although there were still structural exercises, this new phase of CALL brought more communicative exercises. Technology is perceived in communicative CALL as a "mediator", allowing user interactivity through contextualized activities. Perhaps it is here that technology goes from being seen as a tool to being seen as a mediator in language teaching methodologies.

A little later, according to Warschauer and Healey (1998 cited in Leffa, 2006), the emergence of the CD-ROM, multimedia computers and especially the Internet introduced the "integrative CALL" phase, which we continue to experience in English teaching nowadays. To Leffa (2006), these new technological artifacts allow the integration of the four skills in one activity, something that undoubtedly meets the assumptions of the CA. We can say that in the integrative CALL technology, especially through the internet, gains a central role in English teaching methodologies. Paiva (in press) explains that public and large-scale access to the Internet in the 1990's brought new forms of communication and opportunities for foreign language learners. There are now opportunities for interacting with native and non-native speakers anywhere via emails and social networks. For the first time, technology allowed the demise of artificial language experiments, as emphasized by Paiva (in press, p.9).

Richards and Rodgers (2001) believe that the CA is still the best option for foreign language teaching methodology though they point out that the crisis of the concept of methods in the 1990's brought the era of post-method where many authors (e.g. Kumaravadivelo, 2003) deny the existence of a perfect method. The search for the best method gave way to the search for more appropriate methods proposing eclectic or hybrid approaches (Brown, 2001; Finardi, 2012) which use techniques and procedures of various methods and technologies, combining face-to-face classes with virtual classroom environments.

The 21st century, together with the Web 2.0 heralds a new phase of interactions and language learning (Paiva, in press). Hypertexts changed the way we process information (e.g. Levy, 1993) and also brought new perspectives to writing and reading abilities. The Web 2.0 offers important pedagogic affordances for language teaching and learning such as social networks, wikis, blogs, smartphones and their applications (Paiva, in press). These gadgets are still timidly used in education for several reasons, but mostly because of fear and lack of teacher training (Franco, 2010). Paiva (in press) claims that we are progressing towards the standardization of these technologies, though we still have a long and arduous road ahead to incorporate them in education. Perhaps the biggest challenge to do so lies in the need to review teaching practices and educational policies.

### **3. Teaching English in Brazil at a crossroads with globalization and internationalization**

In what follows, we address critical issues regarding the teaching of English that affect and are affected not only by technologies and methodologies but also by globalization and internationalization of education. We intend to go a step beyond eclectic (Brown, 2001) and hybrid approaches (Graham, 2006, Finardi, 2012) or the post-method movement (Kumaravadivelo, 2003) to propose that the key to using technologies and methodologies for teaching English pervades the critical view of the content and medium taught.

As we have seen here, changes brought by globalization with its consequent internationalization of higher education, along with the use of technologies, especially the Internet, changed the status of and access to English in Brazil. Brazilian educational policies see English as just another foreign language, and as such, it can be taught, or not, in schools, since each institution has the right to choose which foreign language to teach after 5<sup>th</sup> grade. Even those schools which opt to teach English adopt a Reading Approach. Yet, private language institutes which teach English with a communicative approach abound, showing that though educational policies see English as a foreign language (that Brazilians should learn mostly to access information in the form of written texts), Brazilians see it as an international language (Finardi; Prebianca; Momm, 2013; Jordão, 2014) which implies they not only access but also produce information (integrating the four skills) in that language and

for communication mainly, detached from imperialistic cultures usually associated with this language.

The use of technology in and despite teaching methodologies, especially with the advent of the Web 2.0, changed the way English is taught, learned, used and seen in Brazil. Regardless of educational policies and or financial conditions to attend private language institutes, most Brazilians now access contents and information in English through the internet. Brazilian internationalization programs such as the English without Borders is evidence that at least in higher education, policies have changed to meet the requirements of a globalized and gradually more internationalized world. Yet, since CLIL, or other communicative approaches are not adopted in basic education where the Reading Approach to English teaching prevails, it is unlikely that the lack of proficiency in English is bound to be overcome by internationalization policies and or the possibilities of the Web 2.0 alone.

## References

- Almeida, L.H.T. (2010) Aprendizagens e tecnologias contemporâneas: um novo modo de ser e aprender. *Revista CAMINHOS EM LINGÜÍSTICA APLICADA*, Volume 3, Número 2, p.37-52.
- Baladeli, A. P. & Ferreira, A. J. (2012) Os letramentos digitais e sua interface com o ensino de línguas: empoderamento e cidadania na Web. In: Congresso anual da ABRAPUI, 3, 2012, Florianópolis. *Anais do III Congresso Internacional da ABRAPUI*. Florianópolis.
- Borges, E.F.V. & Paiva, V.L.M.O. (2011) Por uma abordagem complexa do ensino de línguas. *Linguagem & Ensino*: Pelotas, v.14, n.2, p. 337-356, jul./dez.
- Bottentuit Junior, J. & Coutinho, C. (2008) Análise das componentes e a usabilidade das webquests em língua portuguesa disponíveis na web: um estudo exploratório. *Revista de Gestão da Tecnologia e Sistemas de Informação*, Vol. 5, No. 3. p. 453-468.
- Brown, H. D. (2001) *Teaching by principles: an interactive approach to language pedagogy*. San Francisco: Longman.
- Dodge, B. *Some Thoughts about WebQuests*. 1995. Available at: [http://WebQuest.sdsu.edu/about\\_WebQuests.html](http://WebQuest.sdsu.edu/about_WebQuests.html).
- Ellis, R. (2003) *Task-based language learning and teaching*. Oxford: Oxford University Press.
- Finardi, K. & Prebianca, G & Momm, C. (2013) Tecnologia na Educação: o caso da Internet e do Inglês como Linguagens de Inclusão. *Revista Cadernos do IL*, vol. 46. p. 193-208.
- Finardi, K. & Veronez, T. (2013) Beliefs on the use of facebook as a communication tool between teachers and students. *Revista Contextos Linguísticos*, v. 7, p. 292-311.
- Finardi, K. & Pimentel, B. (2013) Crenças de professores de inglês sobre o uso do Facebook. *Revista Contextos Linguísticos*, v. 7, p. 238-253.
- Finardi, K. & Covre, J. M. & Santos, L. B. & Peruzzo, S. P. & Hildeblando Junior, C. A. (2013) Facebook as a tool for L2 practice. *Revista Contextos Linguísticos*, v. 7, p. 312-325.
- Finardi, K. & Porcino, M. C. (2013) Internet tools in the design of a task cycle for L2 teaching. *Revista Contextos Linguísticos*, v. 7, p. 273-291.
- Finardi, K. & Porcino, M.C. (in press) *Ensino de Inglês e Letramento Digital crítico: uma proposta de WebQuest*. Paper submitted to Revista Linguagem e Ensino on 07/04/2014.
- Finardi, K. & Ortiz, R. A. (2014) Globalization, Internationalization and Education: What is the connection?. In: INTCESS14- International Conference on Education and Social Sciences, 2014, Istanbul. *Proceedings of INTCESS14- International Conference on Education and Social Sciences*. Istanbul: Ocerint. v. 1. p. 45-53.
- Finardi, K. (2012) Technology and L2 learning: hybridizing the curriculum. In: III Congresso Internacional ABRAPUI, 2012, Florianópolis. *Language and Literature in the Age of Technology-Anais do III Congresso Internacional da ABRAPUI*. Universidade Federal de Santa Catarina. Beck, M. S. & Silveira, R. & Funk, S. B. & Xavier, R. P. (Orgs). Florianópolis: Universidade Federal de Santa Catarina. v. 1. p. 1-8.
- Franco, C. P. (2010) A tecnologia no ensino de línguas: do século XVI ao XXI. *Letra Magna*, v. 06, p. 18.
- Graddol, D. (2006) *English Next: Why global English may mean the end of "English as a foreign language"*. The English Company (UK) Ltd. British Council. pp.132. Available at: <http://www.britishcouncil.org/learning-research-english-next.pdf>.
- Graham, C.R. (2006) Blended Learning Systems: Definition, Current Trends, Future Directions. In: BONK, C.J. & GRAHAM, C.R. (eds.). *Handbook of Blended Learning: Global perspectives, local designs*. San Francisco, CA: Pfeiffer Publishing. p.41-54.
- Jordão, C. M. (2014) ILA – ILF – ILE – ILG: Quem dá conta? *Revista Brasileira de Linguística Aplicada*, v. 14, p. 13-40.
- Kumaravadevulu, B. (2003) *Beyond methods: Macrostrategies for language teaching*. NewHaven, CT: Yale University Press.
- Larsen-Freeman, D. (2000) *Techniques and Principles in Language Teaching*. Oxford: O.U.P.
- Leffa, V. J. (1988) Metodologia do ensino de línguas. In Bohn, H. I. & Vandresen, P. *Tópicos em linguística aplicada: O ensino de línguas estrangeiras*. Florianópolis: Ed. da UFSC. p. 211-236.
- Leffa, V. J. (2006) Aprendizagens de línguas mediada por computador. In: LEFFA, V. J. (org.) *Pesquisa em Linguística Aplicada: temas e métodos*. Pelotas: Educat. p.5-30.
- Lévy, P. (1993) *As tecnologias da inteligência*. São Paulo: Editora 34.
- Lévy, P. (1999) *Cibercultura*. São Paulo: Editora 34.
- Lyrio, A. L. L. (2012) Ensino comunicativo e Foco na Forma (FonF). *Litterae - Perspectivas do ensino de línguas e literaturas* -, v. 1, n 1, p. 22-47.
- Paiva, V.L.M.O. (in press) *O uso da tecnologia no ensino de línguas estrangeiras: breve retrospectiva histórica*. Available at: <http://www.veramenezes.com/techist.pdf>
- Pinheiro, L. M. S. & Finardi, K. (2014) Políticas públicas de internacionalização e o papel do inglês: evidências dos programas CsF e IsF. In: II Conel, 2014, Vitória. *Anais do II Conel*. Vitória: PPGEL, 2014. v. 1. p. 76-78.
- Richards, J.C. & Rodgers, T.S. (2001) *Approaches and Methods in Language Teaching*. Cambridge: Cambridge University Press.



- Santos, C.G. (2013) Reflexões a cerca do ensino baseado em tarefas como aporte teórico para a metodologia Webquest. *Revista Contextos Linguísticos*, v. 7, p. 62-78.
- Shin, J.C. & Teichler, U. (2014) *The Future of The Post-Massified University at the Crossroads*. Restructuring Systems and Functions. Jung Cheol Shin and Ulrich Teichler (Editors). Springer.
- Teixeira, D. & Finardi, K. (2013) Tics no ensino presencial: evidências de um curso de formação continuada na Universidade Federal do Espírito Santo. *Contextos Linguísticos*, v. 7, p. 79-96.
- Varghese, N.V. (2013) Globalization and higher education: Changing trends in cross border education. *Analytical Reports in International Education* Vol. 5. No. 1, pp. 7-20.
- Warschauer, M. (2003) Social capital and access. *Universal Access in the Information Society*, 2.
- Yonezawa, A. (2013) The Internationalization of the University as a Response to Globalization: an East Asian Perspective. In *The Future of The Post-Massified University at the Crossroads*. Restructuring Systems and Functions. Jung Cheol Shin and Ulrich Teichler (Editors). Springer.

INTE 2014

# Globalization, nationalization and rationalization

Gulnaz Zahid

*Center for Counseling and Career Advisory, National University of Sciences and Technology, Islamabad, H-12, Pakistan.*

---

## Abstract

This is the era of knowledge, connectivity, information flow, regional co-operation and inter-competition. Globalization is bringing new and emerging trends in various domains including education and is obviously a path maker to the new horizons in education. The grass-roots level issues impinge the adoption of global trends in education especially for the developing countries. All these areas lead to progress as well as to challenges. This paper illustrates a case of Pakistan and an example of emerging trend of career education is presented. A comparison of global trends and local realities show that a rationalization in approach is deemed important.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* Globalization; Emerging Trends; New Horizons; Career Education; Developing Countries; Challenges; Rationalization

---

## Introduction

Methods of career education like other areas of education receive influences from the global trends. It is generally observed that approaches of career education are adopted and adapted from the developed countries. However, in all this journey national level realities of the developing countries cannot be ignored. This paper is an attempt to highlight the challenges in mainstreaming and imparting of career education in the developing countries in light of the global trends. In light of the review, this paper offers recommendations with reference to career education suitable for the developing countries.

Globalization refers to the process in which jobs, currencies, data and ideas can be transmitted electronically without regard to national boundaries (Herr as cited in Athanasou and Esbroeck, 2010). This phenomenon or process brings forth both inter-regional competition and co-operation in all the fields including education. As a result, globalization opens new horizons in education along with the predicted and unpredicted challenges especially for the developing countries. The inter-regional flow of information linked to the new horizons in education is well-evident from a sway of information communication and technology in education and careers education from the developed to developing countries.

Al'Abri (2011) indicates that globalization affects educational policy of the developing countries in the same way as of the developed countries. While supporting and reinforcing this stance, this paper highlights that socioeconomic factors and mind sets of the developing countries can either facilitate or hinder educational development at national level in the light of globalization. This article also sheds light upon the importance of rationalization for policy framing and implementation in response to the cultural and contextual realities. Critical reflection on career education with reference to globalization and national/local realities can help both the developing and developed countries to plan the intervention strategies suitable and appropriate for the less developed areas. This can provide the realistic strategies to facilitate globalization and uplifting of the state of the developing countries in a practical and plausible manner.

Globalization has not only opened informational exchange from developed to developing countries but has also led to the career prospects across the borders. Now, the individuals are expected to develop skills and competencies so that they can attain better job opportunities and consequently they enter into inter-regional competition. For this, individuals require to develop skills to compete with individuals from other parts of the world. Migration for work is a typical example of competition between people from various regions but against a standard criterion. Inter-regional connectedness linked to the inter-competition and rapid flow of information across the borders and a need to develop employability skills throughout our lives call for career education both in the developed and developing countries.

Our need to develop skills throughout our lives calls for the adoption of new trends in order to improve employability which is challenging especially in the developing countries. Career education as result of globalization aims at developing skills to enter, sustain and grow one's career. Though field of career education emerged in UK, England and Sweden many years back, its emergence in Pakistani curriculum can be considered as a recent phenomenon and an obvious result of globalization.

The progress with reference to career education varies in the developed and developing countries. Careers education in the curriculum of United Kingdom appeared in 1970 and 1980s in response to various career theories such as by Super (1957) and after that DOTS Framework which refers to decision learning (D), opportunity awareness (O), transition learning (T) and self-awareness (S) by Law and Watts (1977). These theories made remarkable contribution in the area of career development and career education (Hooley, Marriott, Watts, and Coiffait, 2012). However, a consistent and sound focus on career development through curriculum is still required in the Pakistani context.

The existing status of career education in the National Curriculum of Pakistan (Ministry of Education, 2006) requires due reflection. Review of English Curriculum (Ministry of Education, 2006) shows that a focus upon career education begins mainly at the secondary level whereas at primary educational level life and study skills

earn a prime focus under the theme of education of vocation/ employment. In some of the renowned universities such as National University of Sciences and Technology, there is now a focus on career education for the university students through the establishment of Career Development Center ("Career Development," 2012). However, a continuous, comprehensive and research based focused on career education is required at all the educational levels. Despite of the fact that career education as a domain in curriculum earns firm position in the developed countries, its position and importance in curriculum of Pakistan still needs to be strengthened and research-based.

This existing status of career education in Pakistan is one of the examples of slow pace of adopting new trends despite of the globalization in education. Though career education has been mainstreamed in curriculum, it has still not earned a stable, consistent, evident and tested position. One of the reasons may be that due to other pressing issues majority do not realize importance of career education in mainstream education. Thus, despite of globalization and influx of information from one region to another, the causes of slow pace of development of career education in Pakistani context are strictly linked to the national issues.

Though globalization affects micro-level realities and realms, aligning micro-level realities in light of the global trends demand equal rate of socioeconomic development as compared to other regions of the world. The micro-level and national level issues may infringe or facilitate the adoption of global trends and inevitably can open or close new horizons to education. Hodkinson, Sparkes, and Hodkinson (1996) viewed importance of social structure for transition from education to work with reference to the process of schooling for different socio-cultural groups. This stance when applied at national level, the need of career education is influenced by the national priorities, mind-sets and quality of education along with the level of socio-economic development. National priorities and quality of education can be considered as the resultants of socioeconomic development of the country and hence these variables are inseparable.

When we assert that the progress of a developing country relies upon the level of socioeconomic development, then we can assume that a State faces pressures while putting forth the educational policies because it has to meet dual challenges, i.e., meeting global demands while integrating national-level realities.

National Education Policy (Ministry of Education, 2009) of Pakistan states the importance of career guidance starting from the secondary and upper secondary level rather than starting from primary level, perhaps because of the mind sets of general population and some educationists who believe that children at the primary level are too young for career education. This mind set has permeated almost in the whole society and has led to some of the textbooks which fail to provide comprehensive and sound information about the careers at the primary level. This can be considered as one of the reasons for high drop-out rate at primary level, because lack of career education is likely to lower student retention at the primary level of schooling. Farooq (2013) found that lack of interest in studies and in school as two important reasons for student drop-out at the primary level. This indicates that career education will be significantly helpful in the student retention especially when both students and their parents are educated about the careers. At policy level, it can open all possible avenues to bring a match between education, employability and in light of global trends.

The importance of national level realities is that they simply perform a job similar to that of the neurotransmitters in the human body. The global trends permeate the borders of any country only if the socioeconomic realities support for it. A country like Pakistan where poverty figure is 12.4 ("Poverty level," 2013), lack of importance of career education in the curriculum is primarily the result of scarce job offerings in the labor market and kinds of jobs offerings which are not only limited to meet the population's needs but noticeably many of them do not carry a massive influence on career development for many people. In such a situation, majority of the individuals may not prefer on matching their skills and potentialities with the offerings in the labor market as such an approach may limit their employability opportunities.

Other socio-economic conditions also pose a challenge with reference to career education in curriculum as a result of globalization. With the literacy rate as low as around 60% in 2013 (Khan, 2013), the underlying reasons for lack of general orientation towards career education is well evident. Furthermore, influx in urban areas for

jobs from the rural has created hindrances in the real implementation of the development plans and call upon for indigenous approach for career education.

Such national level issues should not be deemed as a complete hindrance in globalization of career education rather indicates the need to amend the national approaches to address the population demand of the developing countries preferably in the indigenous manner. Such an approach demands rationalization of approach in which global trends and models are adopted and adapted in the best possible manner for the best interest of people. For instance, in Pakistan, need of career education has still not emerged fully at the primary level both in attitude and policy. Therefore, we need to find avenues for the implementation of the educational methods suitable and acceptable in our context which can ensure educating children within the global context while meeting national expectations and perceptions at the same time.

It is noteworthy that globalization in education tends to influence developing countries more than their national issues (Ali, 2005). Adopting global trends without realizing the needs and demands at grass-roots level may be damaging for the policy implementation with effectiveness. Hence, rationalization in approach with reference to meeting and uplifting national standards within the framework of global trends is required. This is applicable when it comes to careers education within curriculum. Few educationists do not consider careers education as important at primary level when compared to the life-skills education. This demands for improvement of teaching learning of the life-skills to the extent that it can bring a significant improvement in the overall social adjustment of children. Therefore, countries need serious approaches in adoption and adaption of international trends and in order to bring relevance of educational content close to what is desirable.

It cannot be denied that globalization has entailed changes in perceptions of careers and their significance just like in other countries. Now in Pakistan, career is viewed as a life-long progression and deemed more important than merely holding a job. The central position of careers is now evident in our lives but the method which is appropriate and effective for teaching about the careers and preparing for them still need to be tested and this holds true for all the educational levels. The stance of limited job opportunity does not supersede the importance of right person for the right job and thus calls for career education.

Individual's immediate social context influence them and these social context do not operate in isolation from the global context. Bronfenbrenner's Theory ("Urie Bronfenbrenner,"1979) of human ecology shows the crucial role of human environment for the development. Thus, the immediate social contexts of the individuals need to be rationalized and that should incorporate gradual and gradual changes in light of globalization. This shows that a massive movement and separate curriculum of career education from the very beginning level of education may not be acceptable for people in Pakistan as the overall socio-economic conditions still needs to be improved and which affect our priorities. Therefore, a well-integrated form of career education within curriculum might be more acceptable rather than provided by a separate subject, especially at primary level. Again that requires a well and thorough research in light of the global trends.

## **Recommendations**

In light of global trends and national realities, strategies for career education can be adopted in Pakistan. Below given recommendations can provide direction for both the developing countries and the developed countries. Some of these strategies can be

By having need analysis from the multiple stakeholders on career education, its position can be firmly established. Introducing career education at all the educational levels cannot be done with confidence in absence of need analysis.

Need analysis should not only ascertain the significance of career education at all the educational levels but should also determine the types of content deemed necessary.

Life-skills which can positively affect career related attitude and behaviors should be tested and carefully mainstreamed in the curriculum.

Advocacy for career education by highlighting success stories from other countries having somewhat similar socioeconomic profile can be fruitful.

Small scale studies on career education can foster critical thinking with reference to the value of careers education and may provide basis for the large scale national-level focus.

Longitudinal studies on life and social skills can provide how effectively students are improving these skills and extent to which they contribute in their career choices, development and management.

Strategies for career counseling for people who are in rural areas deserves the exclusive focus while keeping in mind their unique characteristics and issues in order to tackle regional imbalance and disparity within the country.

Career orientation should be assessed at the highest level of primary schooling (Grade 5 in Pakistan) in order to provide recommendations for curriculum modification and improvement.

Though education for all has emerged as an important slogan but it needs to be connected with careers for all. It is only through culturally appropriate careers education that the educational needs of every child can be addressed in a realistic and practical manner. Again such a model of quality education needs to be tested at the small scale.

## Conclusion

National realities, especially in the developing countries call for the rational and feasible approaches to adopt global trends in education. Considering socio-economic realities lead to the culture-sensitive educational policy in light of the global trends in the field of career education.

## References

- Al'Abri, K. (2011). The impact of globalization on education policy of developing countries: Oman as an example. *Literacy Information and Computer Education Journal*, 2 (4),491-502.
- Ali, S. (2005). The influence of globalization on the national education policies of developing countries. *Journal of Educational Research*, 8 (1),14-21.
- Career development center. (2012). Retrieved from <http://www.nust.edu.pk/INSTITUTIONS/Directortes/CDC/About%20Us/Pages/Resume-and-Cover-Letter-Templates.aspx>
- Farooq, M.S. (2013). An inclusive schooling model for the prevention of dropout in primary schools in Pakistan. *Bulletin of Education and Research* , 35, (1),47-74.
- Herr, E.L. (2010). Social context for career guidance throughout the world. In J. A. Athanasou and Esbroecl, R. V. (Eds). *International Handbook of Career Guidance*..(pp. 45-67). Belgium: Springer
- Hodkinson, P., Sparkes, A.C., and Hodkinson, H. (1996). *Triumphs and tears: Young people, markets and the transition from school to work*. London: David Fulton Publishers.
- Hooley, T., Marriott, J., Watts, A.J., and Coiffait, L (2012). *Careers 2020 Options for future careers work in English schools*. London: The Pearson Think Tank. Retrieved from

<http://derby.openrepository.com/derby/bitstream/10545/251032/1/CAREERS%202020.pdf>  
Khan, G. M. (2013). *Literacy and Pakistan*. Retrieved from <http://x.dawn.com/2013/05/22/literacy-and-pakistan/>  
Ministry of Education, Government of Pakistan. (2006). *National Curriculum for English language*, Grades I- XII. Islamabad.  
Ministry of Education, Government of Pakistan.(2009). *National Education Policy*. Retrieved from <http://unesco.org.pk/education/teachereducation/files/National%20Education%20Policy.pdf>  
*Poverty level: Calculation methodology comes under scrutiny*. (2013). Retrieved from <http://rozetv.com/2013/09/07/poverty-level-calculation-methodology-comes-under-scrutiny/>  
*Urie Bronfenbrenner ecological theory*. (2011). Retrieved from <http://daviddutch.com/eacnewsletter/january/page6.php>

INTE 2014

# Gross-motor skills for potential intelligence descriptive study in a kindergarten

Mariarosaria Galdi, Cristiana D'Anna, Nicolina Pastena, Filippo  
Gomez Paloma<sup>a</sup>

<sup>a</sup>University of Salerno, Via Giovanni XXIII, Fisciano (SA) – 84084 - Italy

---

## Abstract

The aim of this study was to carry out a descriptive analysis to investigate possible relationships between mobility and cognitive development in children of the kindergarten. Method: The study evaluated 123 children, male and female, between the ages of 3 and 6 years. Motors tests for the evaluation of motor skills and the potential intelligence tests were performed on the entire group.

Results: The survey has highlighted a relationship between coordinative capabilities and intelligence potential. This study has focused more attention on two variables: potential intelligence and gross-motor skills. In the entire sample analyzed the correlation between them is significant, but not enough to suggest that there is a cause and effect relationship because other variables could be the causes of the effects. The trend of two variables in the individual groups divided by age groups (3,4,5 years old) presents positive values of the correlation coefficient. Conclusions: Motor activity, and particularly the training of coordinative capacity, could be one of the factors that contributes to increasing the potential for cognitive development in children.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* Motor skills; Gross-motor skills; potential intelligence; gymnastics; kindergarten.

---

## 1. Introduction

The last twenty years have seen an explosion of psychosomatic, psychoneuroendocrinology, biogenetics studies investigating on mind-brain. During the evolutive age, the mind-brain-body relationship, according to the recent discoveries in neuroscientific field, highlights that the links among brain-mental-physical activity are as narrow as the subjects are younger.

Motor sport activities involving the body, through guided, creative and flexible experiences, promote a harmonious relationship between consciousness and emotion, some interactions between the body and the environment, which sees the subject increasingly aware of his reactions, able to prepare, predict, control and use them. An active individual in each action and in his way of being, is a combination of emotional and cognitive functions, which allows the voluntary control of acting.

The corporeality has a constructive role in the relationship Me-World, which develops around the key idea of an "active body", which looks for reality in its various aspects and then redefines it in a constantly renewed dialogue with the environment, transforming, reshaping and recreating it. Motricity is, therefore, not only the starting point of any form of psychic development, but a real structure that becomes progressively mental logic, thought and word organization.

The body is considered a "medium" of knowledge and communication with oneself, with others and with the environment. Body action in its many expressions gets a representative value of personal identity, expression of one's own being that goes over the "physicality of its form" and assumes a crucial educational dimension in evolutionary time. The awareness of the totality of the person, the mind body unity, opens a new era for education that considers physical and mental appearance not only complementary but inseparable and interdependent.



In order to understand what is written so far and what we will try to prove in the next paragraphs, we should give a definition of "motor skills and intelligence".

### *Abilities and motor skills*

The word capacity means the set of individual physical or sport characteristics, which allows learning and various physical actions. The capabilities are subjective, partly linked to genetic factors and partly due to finalized training. Each of us has the same capacity, but the level of development is different. Motor skills can be seen first as a motor task: to pull the bow, to perform a wheel, to climb a tree, etc. In other words learned activities and those an individual is able to achieve in optimal time, with high possibility of success and minimum physical and mental energy use.

Motor skills determine the physical performance and can be divided into:

- conditional ability, physical condition and related specifically to the energy aspects of the movement;
- coordination capacity, dependent on the central nervous system, which is a member of the movement's control.

This is used conventionally, since the motor skills constantly interact with each other.

### *Intelligence definition*

Intelligence is defined as the general ability to adapt thought and needs to new situations and to solve them, i.e. as the ability to deal with a problem quickly, affordably and successfully. This definition, adopted by authoritative scholars (Plagent, Soddart, etc), even if with some terminological variation more than conceptual, seems the clearest among several didactic definitions. Some additional variations in the definition of intelligence rightly propose the "degree of intelligence" as the degree of skill to anticipate the experience, in a sort of imaginary experimentation through which the individual examines all the possible choices and through the imagination manipulates real or symbolic data on which it operates.

Stern and others define intelligence as the generic ability to use all the items acquired and all the possibilities of thought to set and solve new problems appropriately, whether abstract or concrete. A problem arises when an individual seeks a purpose and does not know how to achieve it. The smart guy is not only able to deal with the problem that arises, but even to find a way out to new questions that may arise (creativity is an aspect of intelligence: the divergent thinking of Guilford).

## **2. Objectives**

The objective of this research was to analyze the possible relationships between potential intelligence and gross-motor skills. For this purpose the study evaluated through field testing, the level of conditional and coordinative motor skills and assessment of potential intelligence.

Most of the studies are focused exclusively on physiological aspect, and in an experimental workshop context that severely limits the ecological validity of results, because motor and cognitive children performance are to be found in a real learning environment. Often to evaluate intelligence, reflecting the earlier consolidated learning, static measures were used; for this reason, they are not sensitive indices of learning skills.

Based on the assumptions that: the movement is closely related to a better and more effective brain health, sport through perceptual and motor skills allows the development of higher mental capacity, the increase of neurons stimulated by exercise provides an increase in the capacity to transmit information, the curiosity to analyze through a descriptive statistics the possible correlations between cognitive functions and physical performance, was born. The sport, in fact, stimulating the perception, the verification and the comparison of experience, improves the self-regulative ability to acquire greater decision-making autonomy. The progressive acquisition of independence that goes with it, has deeply influenced cognitive, emotional and explorative dynamics by increasing the sense of effectiveness.

## **3. Materials and methods**

### *3.1 The sample*

The sample consists of 123 children between the ages of 3 and 6 attending the public kindergarten "Don Alfonso De Caro", in Lancusi (Salerno). From a motor point of view, at this stage (3-6 years), the child is aware of his actions changed from involuntary automatic movements to global and organized ones. Knowledge is always tied to the body that becomes the vehicle of communication and expression of his way of being and, on the basis of the latter, it will activate a motor nature trail to reach the aims of the nursery school.

### *3.2 Tools*

One of the first issues in the setting of the research was to choose the Protocol to assess children's global motor skills. After the study of national and international literature, the choice fell on two protocols already widely used at international level:

INTE 2014

COORDINATIVE AND GENERAL ABILITIES TEST	
TEST	STANDARDIZATION
Assessment gross- motor skills Test TGM	Ulrich Dale A.

INTELLIGENCE TEST	
TEST	STANDARDIZATION
Potential Intelligence Test TIP	Fabio R.A. Erickson

The choice has considered some guidelines:

- the protocols were validated at international level;
- they were adapted to the school;
- they were available in our reality;
- they do not require expensive and unavailable tools.

### 3.2.1 *Ulrich D.A. Assessment gross-motor skills test*

A key component of most educational kindergarten and primary programs is the development of fine motor skills. During this period child's motor skills continue to evolve. An important aspect of motor monitoring is the early detection of children with difficulties in the context of physical activities and sports. Standardized and well organized test are therefore required, including basic motor skills.

- *Test Objectives*

The first objective in the construction of TGM was to create a test including content frequently used in teaching with children aged 3 up to 10 years. The second aim was to develop a test that could be used by a large number of professionals with a minimal amount of expertise. The third aim was to construct a test that can provide both regulatory and criteria results. The last goal was to consider a priority the qualitative assessment of the harmonic sequence of the development of gross- motor skills rather than the simple result of motor performance. Mastering the major gross-motor skills requires that the child develops a mature movement and this is more important than the quantitative results expressed in terms of time, distance and accuracy of performance.

- *The development of gross-motor skills*

Williams (1983) defines gross-motor development as "use progressively more and more skillful of the totality of the body in an activity that involves large muscle groups and that requires spatial and temporal coordination of simultaneous movement of several body segments". Gross-motor development covers mainly abilities used to move the body from one place to another (locomotion) and to move and take objects. Many authoritative scholars agree that gross-motor skills develop sequentially (Gallahue, 1982; Robertson, 1982; Williams, 1983; Zaichkowsky, Zaichkowsky and Martinek, 1980). It is generally accepted that people develop through the various motor steps with a different rhythm, which depends on biological and environmental factors (Malina, 1980; Rarick, 1982; Seefeldt and Haubenstricker, 1982).

Seefeldt and Haubenstricker (1982) noted, in fact, that people have problems that can reduce their learning potential in many other more advanced skills, when they are not able to perform proper levels in relation to skills and gross-motor basic schemes.

- *Description of the Test*

Gross-motor skills test is administered individually. It evaluates gross-motor capabilities of children aged between 3 and 10 years. The test measures twelve gross-motor skills, which are frequently teaching object with preschoolers and in primary school. Skills are grouped into two subtest, each of them assesses a different aspect of gross-motor development: the locomotion and the control of the object.

### 3.2.2 *Test of Potential Intelligence(TIP)*

TIP measures cognitive changes and elasticity in adapting to new situations in children and young people from 3 to 19 years. It is a "dynamic test" because, in addition to measuring the results obtained in the various tests, also provides a procedure of teaching within the situation test, which evaluates the level of potential development (in addition to the level of development already achieved) and to avoid the risk of getting wrong results not because of a real intellectual problem but for a social and cultural disadvantage. It consists of different items and it is suitable for various types of subjects: standard learning level students (to verify the potential intellectual development), pupils with any disadvantage due to their social or cultural background (which can lead to low performance of traditional tests), pupils with learning disabilities and students with low-performing random.

The tests are divided according to school level from kindergarten, primary school, secondary school of first grade and second grade secondary school. The simplicity of administration and interpretation of the results makes the instrument TIP useful not only for developmental psychologists, but also for teachers.

A shift of interest from product to process can be realized with dynamic indexes. The dynamic test is motivated by the inadequacy of conventional tests in providing accurate information on individual learning abilities, processes of change and plasticity of cognitive processes.

Dynamic indexes got in this research, measure the advices used by subject to solve problem in two steps:

- LEARNING, when the subject tries to solve new problems
- TRANSFER, when the subject uses problem solving learning for new and more difficult problem solving.

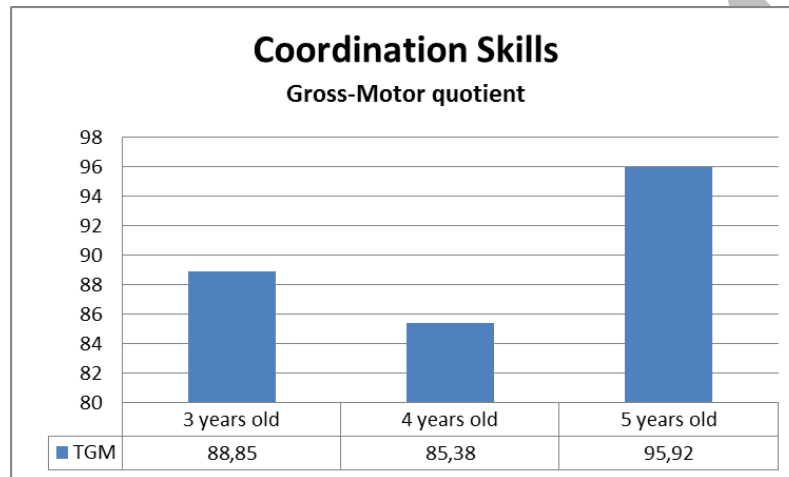
The test consists of 14 items (7 related to learning step and 7 related to transfer step). The last ones require the same rules to solve the problem of the previous items and a new rule that must interact with the others so that the subject can find a solution.

The suggestions are graduated to get the solution of the problem.

## 4. Results

From the analysis of the data, we have obtained several indexes that allow us to verify our hypothesis. We also developed different graphs that show the values of coordinative abilities, potential intelligence and correlation between TGM and TIP about the whole sample studied. The index of determination  $R^2$  is 0.5093. This figure shows that the model fit to the data is sufficient. There is a strong positive correlation between the two variables with a Pearson index  $r$  equal to 0.71, which highlights the existence of a significant link between the coordinating factor and cognitive function.

The weakness of this study is the fact that it would be necessary to study the phenomenon on a larger and heterogeneous sample.

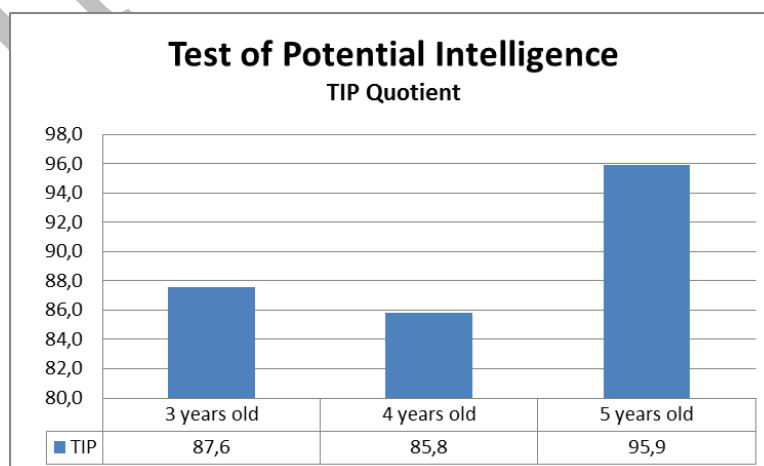


Graph shows the comparison between the average value of the intelligence quotient tests in three groups of potential reference.

#### QUOTIENT TIP

Pupils of 3 years old: 87,6	DS 3 years old: 9,107
Pupils of 4 years old: 85,8	DS 4 years old: 9,328
Pupils of 5 years old: 95.9	DS 5 years old: 10.669

Graph. 1: Test of Gross motor skills (All Sample)



Graph shows the comparison between the average value of the intelligence quotient tests in three groups of potential reference.

QUOTIENT TIP

Pupils of 3 years old: 87,6

DS 3 years old: 9,107

Pupils of 4 years old: 85,8

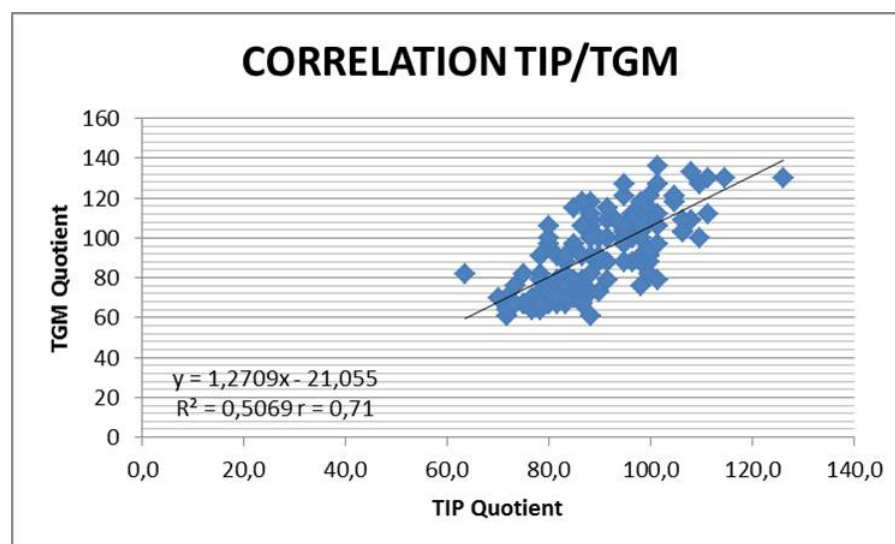
DS 4 years old: 9,328

Pupils of 5 years old: 95,9

DS 5 years old: 10,669

Graph 2: Test of Potential Intelligence (All Sample)

INTE 2014



Graph 3: Gross motor skills and Potential Intelligence correlation (All Sample)

## 5. Discussion and conclusions

The synthetic graphs just reported shows the comparison study, in which each variable evaluated is divided for study groups.

The biggest difference is appreciable in the coordinative capabilities and gross-motor skills, where the values attributed to children of 5 years are almost higher than those attributed to the sample of pupils of 3 and 4 years as well as the results of the evaluation of potential intelligence.

This research does not have a scientific value for the limited investigative sample. It gives, however, a significant value confirming data reported in other studies, a correlation between gross-motor skills and cognitive abilities. The next step will be to verify the findings on a larger sample. Considering the approach that several samples have shown to potential intelligence test it was, in fact, observed empirically as older children have faced the TIP with no problem. Among children a healthy competition was born finishing as early as possible without asking for many suggestions, but mostly it was shown the greater determination and their self-confidence.

Starting from this point of view, it is believed that these aspects can be found in people constantly engaged in open sport skills such as team games which are strongly conditioned by game situations, and then it could be interesting to evaluate whether or not that correlation exists.

In conclusion, the study has shown that there is a correlation between gross-motor skills and potential intelligence experience that takes us back to ancient times in which a healthy mind needed a healthy body.

We can also, through this study, identify children who are significantly delayed compared to peers in the development of gross-motor skills or cognitive development and who require a personal intervention, with an educational program within the gross-motor or cognitive development skills. It is also possible to evaluate individual progress and effectiveness of a program aimed at the recovery of individuals with disabilities or with special educational needs.

## References

Antonelli F., Salvini A. (1978). *Psicologia dello sport*. Roma: Lombardo Editore.

- Bethroz A. (1998). *Il senso del movimento*. Milano: McGraw-Hill
- Bruner J. (1998). *La mente a più dimensioni*. Bari: Laterza.
- Bruner J., Oliver. R., Greenfield P. (1968) *Studi sullo sviluppo cognitivo*. Roma: Armando
- Cunti A. *Lessico del corpo e del movimento*. Università degli studi di Napoli "Parthenope".
- D'Alessio Donnarumma M.D, D'Alessio C. *La danza dell'identità. L'io possibile*. Milano: Gribaudo
- D'Alessio C., Minichillo I. (2010). *Le neuroscienze e l'educazione*. Lecce: Pensa Editore
- Damasio A.R. (1995) *L'errore di Cartesio – Emozione, ragione e cervello umano*, Milano: Adelphi
- Fabio R.A. (2007). *TIP Test d'intelligenza potenziale*. Trento: Erickson.
- Gardner H. (2001) *Educare al comprendere. Stereotipi infantili e apprendimento scolastico*. Milano: Feltrinelli.
- Garufi G., Tafuri D., Vaira L. (2008). *Ginnastica. Teoria, metodologia e didattica*. Napoli: Casa editrice Idelson Gnocchi.
- Gomez Paloma F. (2013) *Embodied Cognitive Science. Atti incarnati della didattica*. Roma: Nuova Cultura
- Gomez Paloma F. (2004). *Corporeità ed emozioni. Una didattica psicomotoria per la costruzione del saper ... essere*. Napoli: Guida Editore.
- Gomez Paloma F. (2004). *Corporeità, didattica e apprendimento*. Salerno: Edisud.
- Kandel E. (2008). *Psichiatria, psicoanalisi e nuova biologia della mente*. Milano: Cortina
- Kandel E.R., Schwartz J.H. & Jessel T.M. (1994). *Principi di neuroscienze* a cura di Virgilio Perri, Giuseppe Spidalieri. Milano: CEA
- Le Doux J. (2002) *Il sé sinaptico*. Milano: Raffaello Cortina Editore.
- Lowen A. (1978). *Il linguaggio del corpo*. Milano: Feltrinelli
- Merleau Pounty M. (2003). *Fenomenologia della percezione*. Milano: Bompiani
- Meinel K. (2004). *Teoria del movimento*. Roma: S.S.S.
- Ministero della Pubblica Istruzione e della Ricerca (2012) – *Indicazioni nazionali per il curricolo della scuola dell'infanzia e del primo ciclo d'istruzione* Settembre 2012
- Notti A. M. (2008). *Strumenti per la ricerca educativa*. Salerno: Edisud.
- Piaget J. (1991). *La nascita dell'intelligenza nel fanciullo*. Firenze: Edizione italiana, Giunti e Barbera Ed.
- Schmidt R.A., Wrisberg C.A. (2000). *Apprendimento motorio e prestazione*. Società Stampa Sportiva. Roma
- Sibilio M. (2001). *Il corpo e il movimento: teoria, tecnica e didattica delle attività motorie per l'età evolutiva*. Napoli: Cuen Editore
- Sibilio M. (2005). *Lo sport come percorso educativo*. Napoli: Alfredo Guida Editore.
- Sibilio M. (2002). *Le abilità diverse*. Napoli: Ellisse – Gruppo Simone.
- Sibilio M. (2008). *Il gioco e le attività ludico sportive: cenni storici e codici pedagogici*. Lecce: Pensa Editore.
- Sibilio M. (2002). *Il corpo intelligente*. Napoli: Esselibri – Simone.
- Siegel D.J. (2001). *La mente relazionale. Neurobiologia dell'esperienza interpersonale*. Milano: Raffaello Cortina Editore.
- Ulrich D.A. (1985) *TGMD Test of Gross Motor Development*. Austin, Texas, USA: Pro-Ed.
- Vygotskij L.S. (1975). *Lo sviluppo psichico del bambino*. Roma: Editori Riuniti.
- Vygotskij L.S. (1990) *Storia dello sviluppo delle funzioni psichiche superiori e altri scritti*, a cura di Maria Serena Veggetti, Firenze: Giunti.
- Articoli da riviste internazionali:
- Tomporowski, Davis, Miller, Naglieri (2008). *Exercise and children's Intelligence, Cognition, and Academic Achievement*. Educ Psychol Rev (2008). 20: 111-131
- Castelli, Hillman, Buck, Erwin. *Physical Fitness and Academic Achievement in Third and Fifth Grade Students*. Journal of Sport & Exercise Psychology. (2007). 29:239-252.
- Podulka Coe, Pivarnik, Womack, Reeves, Malina. *Effect of Physical Education and Activity Levels on Academic Achievement in Children*. American College of Sports Medicine. (2006) 1515-1519.
- Pesce, Crova, Cereatti, Casella, Marchetti, Alessio, Bellucci. *Attività fisica e prestazione mentale nei preadolescenti*. Scuola dello Sport. (2010) n.86: 25-30.
- Sibley, Etnier. *The relationship between physical activity and cognition in children: a metaanalysis*. Pediatric Exercise Science. (2003) 15: 243-256.
- Tomporowski. *Cognitive and behavioural responses to acute exercise in youths: a review*. Pediatric Exercise Science. (2003) 15: 348-359.
- Keeley, Fox. *The impact of physical activity and fitness on academic achievement and cognitive performance in children*. International Review of Sport and Exercise Psychology. Vol. 2, No. 2, September 2009, 198-214.



# Grouping the mega university countries according to their similarities

Prof. Dr. Necat BERBEROĞLU<sup>a</sup> - Assoc. Prof. Dr. Bahar  
BERBEROĞLU<sup>b93</sup>

<sup>a</sup>Anadolu University, Faculty of Economics and Administrative Sciences, 26470, Eskisehir, Turkey

<sup>b</sup>Anadolu University, Open Education Faculty, 26470, Eskisehir, Turkey

---

## Abstract

The mega Universities are higher education institutions with more than one hundred thousand students. There are 57 mega universities in 25 countries. Anadolu University in Turkey is a mega university. We examined 23 mega university countries as of year 2011, by addressing the variables of Information Society, Population and Information and Communication Technologies. By using Multidimensional Scaling analysis we grouped these countries according to their similarities and we concluded that America is in the best condition and followed by UK and South Korea. Argentina is the country of greatest similarity with Turkey. The most distant countries are Nepal and UK.

Keywords: *Mega University, Information Society, Population, Information and Communication Technologies, Multi Dimensional Scaling*

---

## 1. Introduction

John S. Daniel in his book named Mega-Universities and Knowledge Media says; “In the last seven days, somewhere in the world, a new university campus should have opened its gates to students. Next week, in a different location, another new university ought to begin operations.” At the end of the last millennium in which the idea of the university has developed and changed, population growth is forcing governments to open new education institutions almost in all countries around the world. But none of these countries can create enough capacity in campuses to give people access to universities. A sizeable new university would now be needed every week merely to sustain current participation rates in higher education. New institutions are not being created at this frequency. A crisis of access lies ahead (Coomb, 1985; Daniel, 1998).

Increased demand for education and learning along with population growth has created a suitable environment for the formation of mega-universities in the world. Undoubtedly, such universities should need to use new information and communication technologies to deliver education and training to a wide mass of students and audience. This reality creates another important issue.

From this point of view, in our study first we identified mega universities in the world, then the home countries of the mega universities, and at last we clarified the number of mega universities in these countries. Then, we tried to evaluate countries by taking into account their population growth rates, their situation in creating information society, and the use of information and communication technologies in the country. We used one of multivariate statistical techniques as multidimensional scaling analysis (MDS) to reveal the similarities and differences of these countries. In our study we used data of year 2011, which can be reached from the website of the World Bank.

## 2. Mega Universities, Information Society and Communication Technology

There are a similar problems at all other levels of learning. Demand for all education and training has grown steadily in most parts of the world in recent decades and is likely to remain as an important issue in the future (Coombs, 1985). The earth's population will probably grow in the 21<sup>st</sup> century. Individuals and governments are increasing their ambitions for educational attainment and the acquisition of skills. In the industrialized world

---

<sup>93</sup> Tel: +90 222 3350580

E-mail address: [bdirem@anadolu.edu.tr](mailto:bdirem@anadolu.edu.tr)

there is increasing demand for post-secondary education and training. In the developing world, where the great majority of children are being born, countries are still struggling to achieve universal primary schooling and wider access to secondary education (Coombs, 1985; Daniel, 1998).

Higher education system and institutions are started to change in response to these challenges. A new type of university which is called mega university emerged in last three decades and these institutions are spreading every year, and they deliver pathways and lessons for the renewal of all other universities. This university type is open and distance teaching universities. Some of these new mega universities are, generally young but very large institutions.

The definition of a mega university combines three criteria: distance teaching, higher education, and size. Each is intentionally restrictive and important.

First, although many universities now offer both distance and classroom teaching, we defined mega universities as the institutions carrying open and distance education as the primary activity. In this way the special organizational arrangements established by such institutions to use technology for teaching at a distance stand out more clearly.

Second, although tertiary and secondary open and distance education institutions in the same country may share common features, the student profile, the nature of degree-level study and the research missions of universities make them special and distinctive.

Finally, setting a threshold of 100,000 active students for mega universities is an arbitrary way of selecting institutions that should be able to take advantage and gain from economies of scale and competent logistic opportunities.

These mega universities are generally powerful enough to challenge with crises in the numbers of access and educational costs. Each of these mega universities can mas a substantial proportion of the university students in its country and gives education to the students with a very small cost when compared with other universities. The success of mega universities is closely related with delivering their courses not only nationally but often internationally to students in their homes. By this way, these institutions allow students to choose place and time for their education. However, the cost structures and technological facilities of these universities, sometimes limit the available choices for students.

Generally these mega universities have led the renewal of educational forms, correspondence tuition and off-campus lecturing, but almost all of them had low status when ompared with campus aducation only a few decades ago. The reputation of the mega universities varies between countries and none of them can yet take the credibility of their distance education methods for granted in the near future. This makes the mega universities a subject, especially in two very important discussion topics. These two important topics are of course: First quality of the education, second the use and potential of technology in education.

Ready access to media and networks all over the country is clearly an advantage for mega universities. There is, of course, a danger that these institutions might use these facilities only because of their availability not for their effectiveness and do not need to construct sub-structures for new technologies.

Most universities are non-profit bodies belonging to the public sector. But just like the firms in the private sector, mega universities must take care of competitive advantage and increasing performance as important goals. Because, many of them in many countries started to depend more on student fees and other incomes than on the funds from the state.

Although the general concern is the competitive advantage of mega universities as total organizations, we need to focus especially on the use of technology for open and distance education. Interest in these types of learning, unites most of higher education, and all over the world the concerns of campus institutions and the mega universities are converging rapidly. In examining the role of technology in competitive advantage of the mega universities is especially interesting, because of their prior experience of the strengths and weaknesses of technology in open and distance education (Daniel, 1998).

The main educational advantage of online learning is that, this system enables students to learn in some different ways from traditional classroom teaching (or print-based distance education).

In a knowledge-based society there is a need for several skills such as; analysing and applying every kind of information and knowledge, seeking, independent and lifelong learning, problem-solving ability , creative thinking, and teamwork. The education of knowledge-based workers requires a different approach which enables

them to learn both inside and outside the schools or any other conventional higher education institutions. Such learners must be encouraged to analyse and criticize, they must be able to offer alternative solutions and approaches and be ready to take risks. This type of learning cannot be effectively carried in large lecture classes or in distance education through mass communications such as broadcasting (Bates, 2000).

It is argued that there is always an important relationship between the beliefs about the nature of knowledge and knowing, the skills needed in a knowledge-based society, and the choice of technology. For example, Postman (1993) argues that there is a strong link between technology and the modes of thinking. On the other hand, scientific thinking is mainly dependent on the 'objectivity' and linearity of printed material and allowing communication between scientists through printed journals.

If we start to move from linear to lateral thinking, we may have some gains in creativity but we may lose some certainty and predictability. Thus there may be strong advantages in combining print with Web-based learning. In this context, mega-universities with open and distance learning institutions have these strong advantages in terms of learning. More importantly; skills needed in the information society in recent years has been moved towards more constructive approaches in developing the skills needed in a knowledge-based society. This change placed more emphasis on information management and analysis and knowledge construction, rather than on comprehension and memory. Thus the creation of knowledge has become more important and technologies such as the Internet made it easier (Bates, 2005).

We examined 54 mega universities and saw that the expression of open or distance education exists in the names of 9 universities. Some of them have open or distance education faculties. However, all of these universities are benefiting from information and communication technologies. Therefore, distance education technology has an important place in the mega universities.

Table 1: Mega Universities and Countries

Countries	Numbers	Mega Universities
<b>Argentina (AR)</b>	2	University of Buenos Aires National University of Cordoba
<b>Brazil (BR)</b>	2	Estacio de Sa University Norte do Parana University
<b>China (CN)</b>	1	Shanghai Open University
<b>Dominican Republic (DO)</b>	1	Autonomous University of Santa Domingo
<b>Egypt (EG)</b>	2	Ain Shams University Cairo University
<b>France (FR)</b>	1	National Centre for Distance Education
<b>India (IN)</b>	9	Indira Gandhi National Open University University of Pune Andhra Pradesh Open University University of Delhi Sikkim Manipal University Osmania University Rajiv Gandhi Technical University Uttar Pradesh Technical University Madhya Pradesh Bhoj Open University
<b>Indonesia (ID)</b>	1	Universitas Terbuka
<b>Iran (IR)</b>	2	Islamic Azad University Payame Noor University
<b>Italy (IT)</b>	2	Sapienza University of Rome University of Bologna
<b>Korea Republic (KP)</b>	1	Korea National Open University
<b>Malaysia (MY)</b>	1	MARA University of Technology
<b>Mexico (MX)</b>	3	National Autonomous University of Mexico University of Guadalajara National Polytechnic Institute
<b>Nepal (NP)</b>	1	Tribhuvan University
<b>Pakistan (PK)</b>	3	Allama Iqbal Open University University of the Punjab University of Karachi
<b>Romania (RO)</b>	1	Spiru Haret University
<b>Russian Fed. (RU)</b>	1	Modern University for the Humanities

South Africa (ZA)	1	University of South Africa
Spain (ES)	1	National University of Distance Education
Thailand (TH)	1	Ramkhamhaeng University
Turkey (TR)	1	Anadolu University
United Kingdom (UK)	1	Open University
United States (US)	15	University System of Ohio
		State University of New York
		California State University
		University System of Georgia
		State System of Florida
		University of California
		Technical College System of Georgia
		University of Texas System
		Utah System of Higher Education
		University of North Carolina
		University of Wisconsin System
		University System of Maryland
		Texas A&M University System
		Pennsylvania State System of Higher Education
		Oregon University System

Reference: [http://en.wikipedia.org/wiki/List\\_of\\_largest\\_universities\\_by\\_enrollment](http://en.wikipedia.org/wiki/List_of_largest_universities_by_enrollment)

On the other hand, political, economic and technological developments started a strong movement towards internationalization. Increasing integration and interdependence of national economies are followed by the attempts towards economic integration at regional levels (Europe, South East Asia, North and South America, and East and Southern Africa). International and regional co-operation in education and training is often included in any kind of integration between different countries. Internationalization is encouraged by the development of information and communication technologies. By the help of such developments, international and regional markets for education and training emerged in many places in the world (UNESCO, 2002).

So far, basing on our argument we can say that a mega university in a country, the concept of information society and information and communication technologies are feeding and supporting each other, and they are very important concept which are closely associated with each other. So, we carried our study on these three main concepts, and identified the variables of our analysis in this framework.

### 3. Methodology

In our study, we used the multidimensional scaling analysis (MDS), which is one of the multivariate statistical analysis techniques named as perceptual mapping model. The general purpose of the MDS analysis is, with lesser number of dimensions, to represent the structure of objects (using the distance values) as close to their original form. Thus, when relations between objects are unknown by using distances between objects can identify these relationships (Berberoğlu, 2010). Complex relationships between objects or individuals in multi-dimensional data matrix is easily understandable with this analysis technique and is reduced further explainable size. The map composed at the results of the analysis, shows that objects which are close to each other are similar, while far objects are not similar (Lilien & Rangaswamy, 2003; Yenidoğan, 2008).

Similar to clustering and discriminant analysis, the MDS is among the Q analysis techniques; moreover, it is also among R analysis techniques due to its characteristic of dimension reduction. MDS operates directly on dissimilarities and no statistical distribution assumptions are necessary in it. According to the type of the variable, the calculated distances between objects can be represented with the least error in MDS by any form of regression method (linear, polynomial, monotonic) (Kalaycı, 2008).

To conduct MDS, a collection of similarity estimates between each pair of items in the stimulus set. For a set composed of  $k$  items,  $(k(k+1))/2$  proximities must be acquired, such that each item is compared to every other at least once. One of the main objectives of the MDS analysis is finding the best-fitting least-dimensional spatial map of the object, so in the analysis, determining the number of dimensions is also important (Akküçük, 2009; Berberoğlu, 2010).

The reliability and validity of the results in MDS must be tested. There exits two stages in testing the reliability and validity of the analysis. The first of these, known as the coefficient of determination  $R^2$  is to be interpreted.  $R^2$  is the square of the correlation coefficient which indicates how well the model represents the objects in a multi-dimensional scaling analysis. The desired value of  $R^2$  is %60 or over. The second stage which is needed to

test the reliability and validity of the findings is the interpretation of the stress values. Stress coefficient which is a measure of goodness of fit, indicates the quality of the MDS analysis and has been widely used (Dura, Atik, & Türker, 2004).

Shepard diagram shows the relationship between inter-object distance and dissimilarity for all pairs of objects in MDS. Shepard diagram is simply a scatterplot with dissimilarity on the horizontal axis and inter-object distance on the vertical axis. Now consider a linear or nonlinear regression model relating inter-object Euclidean distance as the response variable to dissimilarity as the predictor variable. The differences between the observed inter-object distances those predicted by the regression model (disparities) are the residuals from the regression model. These residuals can be used to measure the match between the calculated dissimilarities and the inter-object distances in the configuration (Kalaycı, 2008).

SPSS program gives two stress values as Young and Kruskal. These stress values can be calculated according to the distances between objects (Özdamar, 2004). The stress coefficients obtained as a result of the analysis is evaluated in Table 2:

Table 2: Stress and Goodness of Fit

Stress Value	Goodness of Fit
$\geq 0,20$	Poor
$0,10 < 0,20$	Fair
$0,05 < 0,10$	Good
$0,025 < 0,05$	Excellent
$0,00 < 0,025$	Perfect

### 3.1. Variables Used in the Analysis

The variables below, from the 2<sup>nd</sup> to 12<sup>th</sup> were obtained from the data of World Bank. We carried MDS analysis by using these variables:

- Mega University Numbers of Countries
- Electric power transmission and distribution losses (% of output)
- Residential fixed line telephone tariff (US\$ per month)
- Mobile cellular prepaid tariff (US\$ per month)
- Fixed broadband Internet access tariff (US\$ per month)
- ICT goods exports (% of total goods exports)
- ICT goods imports (% total goods imports)
- Secure Internet servers (per 1 million people)
- Internet users (per 100 people)
- Fixed broadband Internet subscribers (per 100 people)
- Age dependency ratio, young (% of working-age population)
- Population ages 15-64 (% of total)

### 3.2. The Countries Involved in the Analysis

As we have already mentioned, 23 home countries of the mega universities are examined in our analysis. These countries are Argentina (AR), Brazil (BR), China (CN), Dominican Republic (DO), Egypt (EG), France (FR), India (IN), Indonesia (ID), Iran (IR), Italy (IT), Korea Republic (KP), Malaysia (MY), Mexico (MX), Nepal (NP), Pakistan (PK), Romania (RO), Russian Fed. (RU), South Africa (ZA), Spain (ES), Thailand (TH), Turkey (TR), United Kingdom (UK) and United States (US). In reaching the variables used in the analysis we used especially the data set of World Bank. However, even though mega-universities exist in Bangladesh and Guatemala, these countries were not included in the analysis, because of the lack of statistical data related to other variables which we considered.

## 4. The Findings of the Analysis

In MDS analysis solutions are desired in three or lesser dimensions. Because in such cases the graphical representation of the objects or the units can be monitored and analyzed easily. When the number of dimensions increases the ground will be difficult to detect. So, we determined the number of dimensions, first as 2 and then as 3. When evaluating the obtained stress value from the result of MDS model constructed with 2-dimensions,

we see that the value of Young's stress value is being 0.11286 after the 4. iteration. Then, with a high  $R^2$  value such as 0.96019, Kruskal's stress values is found to be as 0.12377. According to Table 2, our model has a fair fit. Because of the fair fit we obtained in 2-dimensional model, we continue our analysis with 3-dimensions. The generated stress values which specifies the goodness of fitting in 3-dimensional model must be examined. First, we see that Young's stress value is 0.07091 after the 4. iteration. Then we see that, Kruskal's stress value is 0.07559, with a high  $R^2$  value such as 0.97664. These results, according to Table 2 shows us that our model has a good fit. When we look at the disparities, two closest states are Pakistan and India. The Indian sub-continent during the British rule included the present Pakistan and Bangladesh, and any educational developments during and subsequent to the rule are excluded today in describing the educational status of independent India. Today, while evaluating the level education in India and Pakistan we must consider the period passed under British rule (Panda, Venkaiah, Garg, & Puranik, 2006). It must be mentioned that Bangladesh is beyond our sample.

Argentina is the closest country to Turkey. Closest other countries to Turkey respectively, Romania, South Africa, Brazil, Dominican Republic, Mexico, Italy, Egypt and Russia. Berberoğlu (2010), with the title of 'Turkey And European Union On The Path Of Establishing Knowledge Society And Economy' cited that the closest country to Turkey is Romania. However, according to the variables considered in this study, Turkey has a remarkable similarity with countries in South America.

United States of America (USA), is the best country in its group, and varies widely from many states in the same group. However, UK is the nearest country to USA with 1.254 value. South Korea is following the United States with 1.300 value and also following UK 1.698 value. When we look at Disparities Matrix we see that the farthest countries are UK and Nepal and the second farthest countries are France and Nepal.

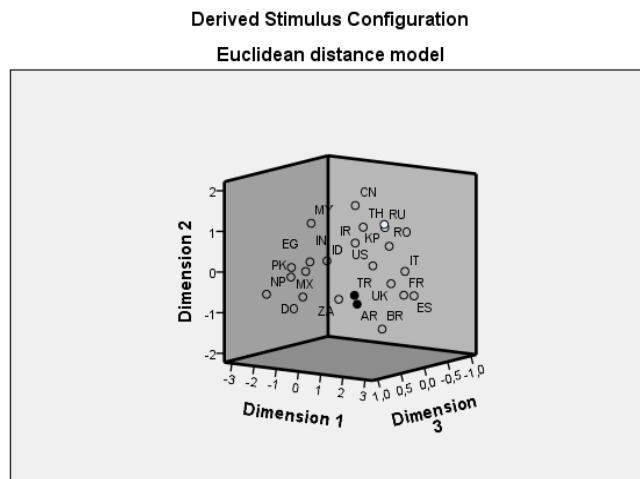


Figure 1: Euclidean Distance Model

With the help of Figure 1, the locations of Turkey and other countries are shown in 3-dimensional space. Turkey is highlighted with a dark point. However, as can be seen from the Figure 1, the closest country to Turkey is Argentina.

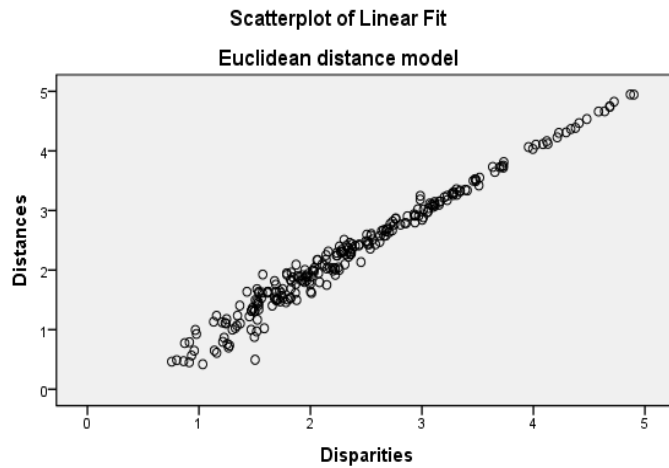


Figure 2: Shepard Diagram

According to the Shepard diagram, disparities between the objects and distances are fitting linearly with each other can be seen in Figure 2. One of the basic objectives in MDS is, the measurement of the similarity between the data directly obtained from the distance matrix and the estimated distances from the distance matrix generated. The linear relationship seen in Figure 2. shows that estimated distances fit the real values.

### 5. Results and Evaluations

In MDS analysis solutions are desired to be in three or lesser dimensions. Because when the number of dimensions grow in the analysis the detection gets difficult. So, we carried our analysis first by using only 2-dimensions, but we obtained fair fit. Then, we decided to use 3-dimensions and we entered 253 data related to 11 variables. After this choice, our analysis showed good fit with a high  $R^2$  value.

Table 3: Optimally scaled data (disparities) and Countries

Sorting	Distance Value (Optimally scaled data (disparities))	Countries
1.	0.755	Pakistan (PK) and India (IN)
2.	0.801	Romania (RO) and Russian Fed. (RU)
3.	0.862	Turkey (TR) and Argentina (AR)
4.	0.873	Pakistan (PK) and Indonesia (ID)
5.	0.913	France (FR) and United Kingdom (UK)
6.	0.915	France (FR) and Spain (ES)
7.	0.934	Nepal (NP) and Pakistan (PK)
8.	0.968	China (CN) and Thailand (TH)
9.	0.978	Spain (ES) and Italy (IT)
.	.	.
.	.	.
.	.	.
252.	4.869	Nepal (NP) and France (FR)
253.	4.901	Nepal (NP) and United Kingdom (UK)

When we look at the disparities, we can say that values below 1 and over 4 are especially noteworthy when their closeness to each other is emphasized. We tried to summarize these results in Table 3.

With the help of created perceptual map in 3-dimensional space, we saw that Argentina is the closest country to Turkey. After that, countries such as Romania, South Africa, Brazil, Dominican Republic, Mexico, Italy, Egypt and Russia was found to be close to Turkey. These results can be seen in Table 4.

Table 4: Close Countries to Turkey (according to their distances)

Sorting	Distance Value (Optimally scaled data (disparities))	Countries
1.	0.862	Argentina (AR)
2.	1.158	Romania (RO)
3.	1.159	South Africa (ZA)
4.	1.207	Brazil (BR)
5.	1.243	Dominican Rep. (DO)
6.	1.346	Mexico (MX)
7.	1.501	Italy (IT)
8.	1.538	Egypt (EG)
9.	1.568	Russian Fed. (RU)

As mentioned earlier, efforts in international and regional cooperation often contain joint projects and organizations related to education and training. Wherein, if geographical closeness is playing an important role for Turkey, closeness with Romania and then Russia is so striking. Therefore, to create alliances and cooperation with these countries in the fields of education and training may have important consequences for the future.

## References

- Akküçük, U. (2004). Çok Boyutlu Ölçekleme Tekniği Olarak Torgersen Ölçekleme Yöntemi ve Temel Bileşenler Analizi ile Karşılaştırması, ISSN-1302-1842, *Dumlupınar Üniversitesi, Sosyal Bilimler Dergisi*, Aralık, 25, s.312
- Bates A. W. (Tony), (2005). *Technology, E-learning and Distance Education*, Second Edition, ISBN: 0-415-28436-8 (hbk), ISBN: 0-415-28437-6 (pbk), Routledge, Taylor & Francis Group, London and New York, s. 139, 215
- Bates A. W., (2000). *Managing Technological Change: Strategies for College and University Leaders*, San Francisco: Jossey-Bass.
- Berberoğlu, B., (2010). Bilgi Toplumu ve Bilgi Ekonomisi Oluşturma Yolunda Türkiye ve Avrupa Birliği, *Marmara Üniversitesi, İktisadi ve İdari Bilimler Fakültesi Dergisi*, Cilt: XXIX, Sayı:2, s.111-131
- Coombs, P. (1985). *The World Crisis in Education: The view from the eighties*, OUP, Oxford
- Daniel, J. S., (1998). *Mega Universities and Knowledge Media Technology Strategies for Higher Education*, ISBN: 0 7494 2634 9, Kogan Page Limited, London, s. 4, 8, 29, 35, 68
- Panda, S., Venkaiah, V., Garg, S. & Puranik, C., (2006). *Tracing the Historical Developments in Open and Distance Education*, In S. Garg et al (Eds.) (2006) *Four Decades of Distance Education in India: Reflection on Policy and Practice*. New Delhi: Viva Books.
- Postman, N. (1993). *Technopoly: The Surrender of Culture to Technology*, New York, Vintage Books/ Random House.
- Dura, C., Atik, H., Türker, O., (2004). *Beşeri Sermaye Açısından Türkiye'nin Avrupa Birliği Karşısındaki Kalkınma Seviyesi*, 3. Ulusal Bilgi, Ekonomi ve Yönetim Kongresi, 2004, Bildiriler Kitabı, Eskişehir, s.15
- Kalaycı, Ş., (2008). *SPSS Uygulamalı Çok Değişkenli İstatistik Teknikleri*, Asil Yayın Dağıtım LTD. ŞTİ., 3. Baskı, ISBN 975-9091-14-3, s.379-399
- Lilien, G. L., Rangaswamy, A. (2003). *Marketing Engineering Computer Assisted Marketing Analysis and Planning*, Prentice Hall, New Jersey, s.128
- Özdamar, K. (2004). *Paket Programlar ile İstatistiksel Veri Analizi (Çok Değişkenli Analizler) 2*, Yenilenmiş 5. Baskı, ISBN: 975-6787-11-2, Kaan Kitabevi, s.501-518
- Yenidoğan, T. G., (2008). Pazarlama Araştırmalarında Çok Boyutlu Ölçekleme Analizi: Üniversite Öğrencilerinin Marka Algısı Üzerine Bir Araştırma, *Akdeniz İktisadi ve İdari Bilimler Fakültesi Dergisi*, (15), s.140.

## Internet References

[http://en.wikipedia.org/wiki/List\\_of\\_largest\\_universities\\_by\\_enrollment](http://en.wikipedia.org/wiki/List_of_largest_universities_by_enrollment) (Access Date:04.02.2014)

<http://unesdoc.unesco.org/images/0012/001284/128463e.pdf> (Access Date: 06.06.2013)

<http://data.worldbank.org/indicator> (Access Date: 05.03.2014)



# Health Education Survey Study with Parents of Gifted Students

Fatma ILDIR PELİTOĞLU, Sami ÖZGÜR

The attitudes, knowledge, and thoughts of gifted students, who have the potential of shaping the future and becoming the leaders of society, on health and health education are affected by various factors. One of these factors is the thoughts and behaviors of parents. The purpose of this study is to reveal the thoughts of parents of gifted students concerning the issue. To this end, the health and health education questionnaire previously prepared for teachers was revised and applied to parents. The data of this study conducted with parents of fourteen gifted students studying at Balıkesir BİLSEM shall only be evaluated within this scope. With the findings obtained from the study, the perspective of parents of gifted students on the issue shall be examined. Furthermore, these findings shall also be used in studies to be conducted with gifted students.

# Health education: strategy for sexual and reproductive care for women in custody

Tatiane Gomes Guedes <sup>a\*</sup>, Francisca Márcia Pereira Linhares <sup>a</sup>, Sheila Coelho Ramalho Vasconcelos Moraes <sup>a</sup>, Izabelle de Freitas Ferreira <sup>b</sup>, Tuanny Gomes Mendonça <sup>b</sup>, Fernanda Vasconcelos Silva <sup>c</sup>, Gabrielle Pessoa da Silva <sup>c</sup>, Jaciane de Almeida Costa <sup>c</sup>, Lais Angela da Silva Pessoa <sup>c</sup>, Myllena da Silva Santos <sup>c</sup>

<sup>a</sup> Professor of the Nursing Department of the Federal University of Pernambuco, Av. Prof. Moraes Rego, 1235 - Cidade Universitária, Recife - PE - CEP: 50670-901

<sup>b</sup> Nurse by Federal University of Pernambuco, Av. Prof. Moraes Rego, 1235 - Cidade Universitária, Recife - PE - CEP: 50670-901

<sup>c</sup> Nursing Academic of the Federal University of Pernambuco, Av. Prof. Moraes Rego, 1235 - Cidade Universitária, Recife - PE - CEP: 50670-901

---

## Abstract

The National Plan of Health in the Brazilian Prison System has as the main purpose to contribute to the control and/or reduction of the more often aggravations to the health of the prison population, by means of several strategic actions, among these, actions that target the sexual and reproductive health quality. In this perspective, the nurse, a productive professional of care in all the life circumstances, must act in this care area, respecting, in this way, the life, the dignity and the woman rights in detention. According to it was declared, this study aimed to perform educative actions giving focus on the prevention of Transmitted Sexual Diseases (STD)/Human Immunodeficiency Virus (HIV), the safe sexual practices, the family planning, the domestic violence and uterine and breast cancer prevention. The educative actions were developed in the Female Penal Colony: Recife, Pernambuco – Brazil. The achieve of the proposal target provided opportunity to the women in detention, to understand how to have the sexual and reproductive health, giving to them autonomy to a healthy life, based on the rights stated in the Brazilian Laws.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** Prisons; Women; Sexual and Reproductive Health; Health Education; Nursing.

---

\* Corresponding author. Tel.: +55(81)2126-3661  
E-mail address: tatiguedes@yahoo.com.br

## Introduction

The sexual and reproductive health is a right to women in detention, stated by the Brazilian Federal Laws. The Health and Justice Ministry, institute in 2003, by means of the Interministerial Decree N° 1777, the National Plan of Health in the Prison System. It has the objective of providing full attention to the health of the Brazilian prison population, including the sexual and reproductive health (Brazil, 2005).

Besides the Plan aforementioned, the Health Ministry of Brazil, in 2004, elaborated a National Policy of Full Attention to the Woman Health, in partnership with several sectors of the society and, in Chief of Departments of Unique System of Health (SUS). Such policy reflects, among other actions, on promotion of the sexual and reproductive health. Also domestic violence prevention and inclusion of historically excluded groups of the public politics in your specificity and necessities, like for example women in detention (Brazil, 2011).

The insalubrious and precarious environment of the prisons, together with the worst hygiene and health conditions of the convicts, allow the proliferation of epidemics and disease infections directly affecting directly in the health situation of all the prisoners in the Brazilian prison system. The breath diseases, such as: Tuberculosis and pneumonia, are more frequent. There are a lot of mental disturbances, however the levels of hepatitis, Transmitted sexual diseases STD/AIDS are the more alarming (Assis, 2007).

Based on the facts, it can be said that the main aggravations and diseases in the detention center arise, mainly, of the sexual and reproductive system. The questions related to the reproduction, as for example: Pregnancies and children, were not dealt appropriately. In this context, it is noticeable that the women in this kind of place are exposed to varied contingent of risks to the health, testifying the necessity of the access of this population to some action of attention to the health (Brazil, 2011).

The Health Education is considered a strategy of access to this situation, being comprehended as an activity that develops autonomy, responsibility of the people and communities with their health, besides being a transform social practice. As a result of this, it was permitted to elucidate healthy practices, acquiring of your memberships the empowerment, in other words ,the people and communities capability o to take decisions and responsibility by their health.

The nurse must act e use the Health Education as a tool to propitiate actions with the purpose to reduce the aggravations in sexual and reproductive aspects of women in detention. In virtue of the facts mentioned , the nurses need to know the reality that these groups are involved and rescue them by means of inclusive dialogue and active participation in the care process through providing to them knowledge to take decisions by habits, behaviours and life and health practice adjusted to their needs.

## Methodology

This presented study is originated from the Extension Project entitled. ‘ Sexual and Reproductive Health Care for woman in custody, of the Nursing Department of the Federal University of Pernambuco. Such project, started on March 2013, aimed perform weekly educative actions focusing on prevention of STD/HIV, in the safe sexual practices, in the family planning, on prevention of domestic violence and on the prevention uterine and breast cancer, following the principles recommended by the National Plan of Health in Brazilian Brinson System.

All the measures suggested here it will be implemented by means of educative groups with maximum of 15 women. There were educative actions to elucidate sexual and reproductive health for woman in detention. These groups were divided in 3 stages.

### First Stage

It took place through theoretical fundamental alerts about sexual and a reproductive health of the students who participated in the extension program. For a start, there were groups of study, about the basic principles of sexual and reproductive health in the Brazilian context. So, in this stage, these ones elucidate definitions related to education in health, considering the necessity of new educational methodologies that go beyond of the information, in other words, that stimulate the interest in participation and capability in the individual and group health.

### Second Stage

There was the formation of education and health groups. The definition of the educative themes was based on informations originated from a Research Project, of the Nursing Department, that aimed to search health problems experienced by women in detention. All the things considered identified the sexual and reproductive health as one of the main problems.

The educative actions were built using accessible, simple and clear language, enabling the empowerment to the healthy sexual and reproductive behaviour, with the purpose of facilitating the educative process. They utilized specific materials, visually attractive, produced by Semina Educative of Brazil, what's more videos with testimonies of domestic violence.

The educative material of the Semina (Photos of transmitted sexual diseases STD/HIV; Contraceptive methods in a notice board; Simulator of breast self examination; Simulator of how to use female/male

preservative), all these resources facilitated the discussions of the group about safe sexual behavior and the transmitted sexual disease STD/HIV.

#### Third stage

The educative groups were comprised with the use of active methodology in a pedagogic elucidation based on the woman participants, considering their previous knowledges and experiences about the issue referred. As a result of this there were educative actions proposing participative dialogue, providing new understandings and new health practices in the sexual and reproductive field.

That is to say that to the development actions in the sexual and reproductive area, methodologies were made established in the recommendations of the Sexual and Reproductive Health Guide, Health Ministry of Brazil (Brazil, 2010). Such ones indicated that the learning process give us pleasure and mobility in the way that they are related with the subject's life and allow them to have more comprehension about it. Thus it was evidenced that this was an fabulous resource to the daily qualification, enabling the solution of problems and difficulties.

### Results and Discussion

The STD/HIV prevention was dealt with focus on safe sexual practices, by means of using of the female and male preservatives. Such methods were presented, being the putting of the male preservative simulated in a penis prosthesis and the female in a pelvic model. Educative methods that permitted an enormous discussion. Also woman reports about the ways of utilize these preservatives.

According to Nicolau et al (2012) the education to the prevention of STD/HIV in the prison environment, using educative technologies, such as the simulators, favored the promotion of preservative use and, consequently, a safe and efficient sexual practice. The orientation about stages guarantee the best use of preservatives, the achieve of positive results related to the development of personal abilities in the handle and negotiation of this method contraceptive and preventive method. The construction of the knowledge to the correct use of the male and female preservative methods took place during all the educative process, by means of exchange of information and experience between professors and educators.

It worth to note that many participants did not have the knowledge neither information about the free access to female preservative. In this opportunity, it was divulgated by the group, the practice of safe sex, the distribution of the male and female preservatives in the detention center, demonstrating the worry of the group with the theme and the motivation to the prevention of transmitted sexual diseases STD/HIV.

Study indicates that the difficult of accessing of the population in general to the female preservative it was not due the lack of this contraceptive method in the units, but, also, the ausence of knowledge of the professionals, realized through their statement of myths, about the characteristic of this one not encouraged them to indicate this safe method in the double protection, influencing in a negative way and denying the population, your power of conscious and oriented choice (Oliveira, et al., 2008).

According the Health Ministry, the female preservative is only distributed in some health services and by Non Governmental Organizations. The high cost of this contraceptive not enable an investment in the same proportions of the male preservative, however, such investment becomes more important in the actual panorama of the aids in Brazil, due to the increasing of the number of cases among women (Brazil, 2003).

Related to the family planning, the education group were anchored in the rights established in the Brazilian Federal Constitution and in the Law N° 9.263 of 1996 that determine the equal access to the informations, the meanings, the methods and available techniques to the fecundation regulation (Brazil, 1996). Thus, it was presented the pros and cons of the main contraceptive methods, strengthen the free choice and being responsible by the use of these methods.

Family planning approach in the prison units is of extreme importance, considering the Brazilian Penal Execution Law that ensure to the detention Women the right to intimate visit of the partner. Because of this, the detention women need to have knowledge about the contraceptive methods and, what's more, to have access to them.

The access to the contraceptive methods is a barrier that detention women face in the Brazilian context. It is mandatory, in other words, that strategies be implemented to the free distribution of contraceptives, according to the Law of the Brazilian family planning, achieve detention women and, in this way, favored the responsible choice in having or not having children.

The domestic violence presented as life reality, in the life of women who received educative interventions, indicated the necessities of giving full attention to this issue in the prison context. In Brazil, the violence against the woman only has some importance with the implementation of the Health National Policy of full Attention to the Woman. Actually is considered a public health problem, being a complex and multicasual phenomenon.

The Education in health stimulated the critic conscious and the autonomy exercise of the autonomy in front of decisions in the individual and group area. It enabled the interaction of knowledges, reflections and expectations allowing the information knowledge to be taken into decision.

The uterine and breast cancer prevention was other approaching of the educative actions performed. The previous knowledge between these two pathologies gave direction to the active methodology used.

The breast self exam was simulated, by one of the participant women, with breast made of cloth, allowing the detection of nodules is the touch with hands. Such fact, motivated the perform of the monthly self exam as simple method and possible inside the prison environment. It worth to notice that in the detection of alterations. By means of self exam of breast, it must be opportunized, to this group in question, the more precise diagnostic of exam, like the ultrasonography and mammography. It is necessary, thus, the political implementation that guarantee the right to the medium and high health complexity in the Brazilian prison systems.

Referring to the educative actions to the uterine cancer prevention, the examination of Papanicolau was presented as the more efficient method to the detection of cancer injury. The simulation, of the referred examination, an acrylic pelvic model, originated discussions about afraid, myths and truths, ending the myths of the Papanicolau exam among the participant women.

Study performed in the state of Ceará – Brazil, With 672 results of exams in detention women indicated the presence of injury in high degree to the uterine cancer, noting the importance of caring of the uterine cancer in the female detention center (Lessa et al., 2012). The same study recommended changes in the prison health system, especially in the gynecologic services, such as the affective implementation of suitable schedule, and with professional satisfactory number that can guarantee individualized care and quality to the detention women, having as foundation the universal principle, used by SUS, in that all individuals has right to health, have them influence or not the social laws.

## Conclusion

The prison environment must be considered a space to allow the detention woman to have access to the information about sexual and reproductive aspects, being the Health Educations a strategy of low cost capable of motivating health's behaviours.

The educative actions performed in this study focused on prevention of transmitted sexual diseases STD/HIV, in the safe sexual practices in the familiar planning. These ones gave opportunity to the accomplish of the sexual and reproductive rights to the detention women, according to the National Plan of Health in Brazilian Prison System.

It is essential the role of the nurse professional in the Health Education context in the detention center. Function that objectives changes of behaviours and, consequently, the sexual and reproductive promotion.

What is more, it is believed that the insertion of the academic in this Nurse Extension Project constitute an important strategy of learning, contributing with the formation of nurses capable of overpass prejudices and decrease the social inequalities by means of taking care of people in vulnerable situations of authentic form, responsible critic and transformer.

## References

Assis RD. The Actual Reality of the Brazilian Prison . CEJ Magazine, Brasília, Year XI, n. 39, p. 74-78, Out./Dec. 2007.

Brazil. Health Ministry . National Coordination of Transmitted Sexual Disease and aids. Politics e directions of prevention of the STD/aids among women. Brasília, 2003.

Brazil. Justiça Ministry. Department of Actions of Strategic Programatic Strategic. Nacional Plan of Health in the Prison System. Brasília, 2005 [access in 2012 sep]. Available on [http://bvsmms.saude.gov.br/bvs/publicacoes/plano\\_nacional\\_saude\\_sistema\\_penitenciario\\_2ed.pdf](http://bvsmms.saude.gov.br/bvs/publicacoes/plano_nacional_saude_sistema_penitenciario_2ed.pdf)

Brazil. Law nº 9.263, January 12th, 1996. Regulamenta o §7º do artigo 226 the Federal Constitution, that deals with family planning, it establishes penalties and give other providences. Available on: <<http://www.providafamilia.org.br/doc.php?doc=doc29935>>. Access in: Nov 12th, 2007.

Brazil. Ministry of Health. Secretariat of Attention to the Health. Action Department Estratégic Programáticas. Sexual and Reproductive Rights in the full attention to the people health with Brasília, 2009.

Brazil. Ministry of Health. Secretariat of Attention to the Health de Atenção à Saúde. Department of Basic Attention. Sexual and Reproductive Health Guidebook. Brasília, 2010.

Brazil. Health Ministry. Department of Attention to Health. Department of Programatic Estrategic Actions. Política Nacional Política of Complete Attention to the Woman Health: Principles e Directions. Brasília, 2011.

Lessa PRA, Ribeiro SG, Lima DJM, Nicolau AIO, Damasceno AKC, Pinheiro AKB. Presence of interepithelial injuries of high degree among detention women of I intraepithelial of high degree : documental study. Nursing Latino-Am. Magazine . 2012; 20(2): 354-361.  
Nicolau AIO, Ribeiro SG, Lessa PRA, Monte AS, Ferreira RCN, Pinheiro AKB. Description of the socioeconomic and sexual reality of detention women. Acta paul. enferm. [online]. 2012; 25 (3): 386-392.

Oliveira NS, Moura ERF, Guedes TG, Almeida PC. Knowledge and promotion of the promotion of the use of the female preservative by professionals of reference units to STD/HIV of Fortaleza -CE: The female preservative needs to be distributed . Health Society Rev. 2008; 17(1): 107-116.

# Health literacy

Gülnur İlgün\*, İlkay Sevinç Turaç\*, Sevilay Orak\*

\*Hacettepe University, Ankara, Turkey

---

## Abstract

Health literacy has been defined as access to health services of individuals, understand and use health information systems, interpret health-related issue and make right decision. In recent years, the importance of health literacy has been rising from studies with positive results in worldwide. According to the research, rates of emergency visit, hospitalization, readmission in hospital and health care cost are decreased, patient-physician communication, mammography utilization rate, chronic disease screening rates are increased. In this study, the health literacy will be investigated and the importance of health literacy will be state.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* Health, Health literacy;

---

## 1. Introduction

Each diagnosis in health care, basic foundation of treatment attempt is doctor – patient relationship. Communication between doctor and patient is increases success of the treatment (Hardoff and Schonmann, 2001). To shorten length of treatment period and to increase nursing quality is directly proportional with adaptation level to recommendations given by doctor. Following doctor's advice is related to the communication quality of doctor and patient (Russo-Innamorato, 2011).

Doctor-patient relationship takes shape according to personalities of doctor and the patient. As well, doctor-patient relationship affect from many factors such as cultural, social, economic, psychological and ethics (Koch and Turgut, 2004).

In health care of patient, as the effect of doctor – patient relation, health literacy's impact is also important. Health literacy positively affects the health information, compliance to treatment and health results of patient (Bohlman et al., 2004). Although health literacy is a new concept for health systems, a wide range of researches have been done about this issue. Especially in the last decade, due to high range of information asymmetry in health care, number of health literacy related researches have been increased seriously. The aim of researches on health literacy is, to minimize knowledge level inequality problems between doctor and the patient (Russo-Innamorato, 2011; Baker, 2006; DeWalt, 2004; Nutbeam, 2000).

According to researches, lowness of health literacy can cause bad health results such as; weak doctor – patient relationship, increasing in hospitalization rate, decreasing in mammography usage rate, increasing in rate of consulting to emergency room, decreasing in vaccination rate, decreasing in proper drug usage rate, increasing in rate of applying to hospital again in 30 days, decreasing in cancer screening rate, increasing in disease and death rates (Berkman et al., 2011; Baker, 2007; Mitchell et al., 2012; Kripalani et al., 2010; Berkman et al., 2004; Davis et al., 2002; Rudd et al., 1999; Williams et al., 2002).

This study's aim is to form a general frame for health literacy. In this content, by mentioning the concept, importance of health literacy and used scaling factors in evaluating of health literacy; suggestions are developed to increase health literacy level.

## 2. Health Literacy Concept And Importance

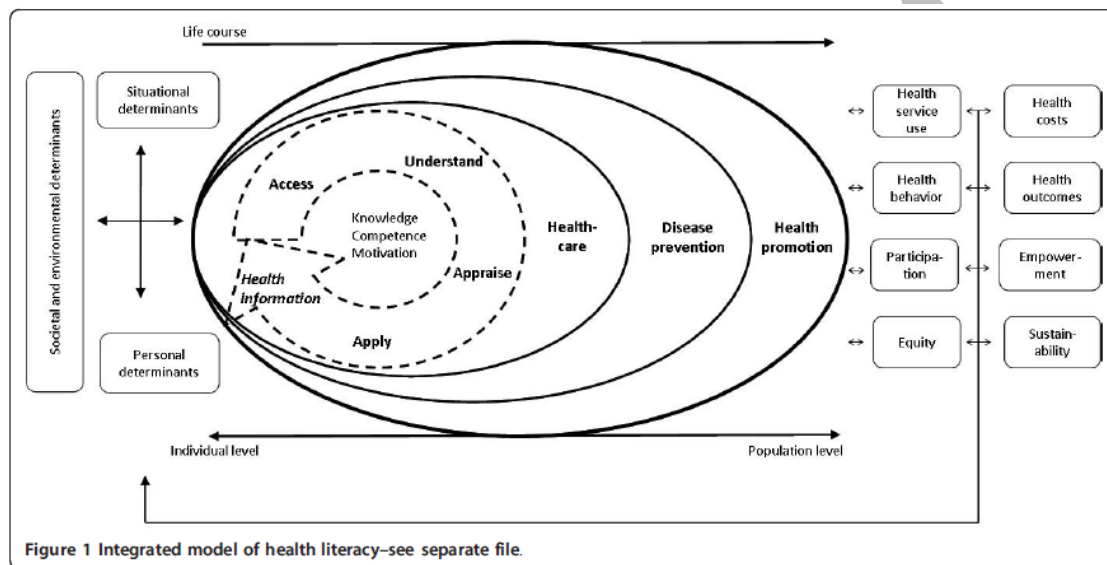
There are different opinions in relation to health literacy concept. Although politics increase about this subject, it is indicated that there is no accepted definition about health literacy concept. Health literacy should discuss component dimensions, this concept should functionalize in various scope, method and quality. Health

literacy research results from different countries indicate that comparing findings is not that simple (Sorensen et al., 2012).

World Health Organization describe health literacy as; social and cognitive skills that provide personal talent and motivation in understanding and usage of the information for to provide and pursue keeping healthy. Health literacy is more than getting a successful appointment and reading given brochure. Along with developing access to medical knowledge and using this information effectively, health literacy will become stronger (WHO).

American Medical Association (AMA) describes health literacy as; necessary procedures for treatment and ability to understand and provide primary health care and information that required to make proper health decisions.

Sorensen et al. (2012) based upon health literacy descriptions made, defines health literacy as concept related to: health motivation and disease prevention for lifelong enhancing or sustaining the quality of life, making health care decision in daily routine and persons knowledge, motivation, talents and literacy in consulting medical knowledge, evaluating, understanding and gaining access in discussing the decisions.



As can be seen in figure 1, there is interference between health literacy and social and environmental factors such as; socio-economic condition, occupation, job, income, social support, culture, language, peripheral and political environment, media consumption, fellows and family. Individual's age, gender, cultural level, disease experiences, provide sense organs functions or not such as vision and hearing, reading, comprehension with social and physical talent and cognitive level towards operations are also interference with situational determiners (Sorensen et al., 2012).

The importance of health literacy within positive results of studies is gradually increased in recent years. When examining the individual's healthy life form development tendency, it is observed that individuals, whom health literacy is high, are expressing that they have better health and their health literacy is increased. This situation decrease the hospitalization period and healthcare frequency of occurrence, in turn healthcare cost are decreased (MCCray, 2004).

Until recently, the interest of health literacy concept as intense in America and Canada, in past decade became more international. Although researches about health literacy were very few in The European Union between 1991 and 2005 years, due to subject importance is gradually increase, health literacy took its place in Europe health policy (Kondilis et al., 2006). In Europe Commission's 2008-2013 primary action plan clearly dwell on the development of health literacy (EU, 2007).

When we look up other studies that analyze the effects of health literacy; it has seen that stimulant health messages on cigarette boxes decreased the smoking behavior and left a positive impression on people who stop smoking in Thailand as in Turkey (Reddy et al., 2004). In Turkey, as the results of applied campaign of smoke-free air zone range, 38,6% smoking people mentioned that, campaigns are effective in thinking of quit smoking.



And it is seen that, smoking ban in indoor except public access and house, reacted positively and supported by 93.5% of participants (Tengilimoglu et al. 2013). In many research in Turkey, when children's fever go up, mothers still follow the wrong traditional methods to reduce fever of her child, but it is seen that as health literacy level increases, misapplications is decrease (Celasin ant the oth.2008).

In results of research work on the purpose of specify health literacy level and related factors of adults who are living chosen family health unit area in Manisa; only the half of the adults who participate in research, found enough in health literacy. In urban region, while health literacy sufficiency rate found higher, social class, education and following media are found as significant factors in health literacy (Dündar and Dede,2012).

Health literacy; facilitating access to health literacy, increasing relation quality between patient and health care presenters, provides better clinical education as regards personal need and opportunities. As a consequence, improvement that seen in clinical care results, health literacy have gradually increased importance due to leading development of health outputs (Nutbeam,2008).

### 3. Used Scales In Health Literacy

To measure the health literacy level, numerous test is existing as; Newest Vital Sign (NVS), the Rapid Estimate of Adult Literacy in Medicine (REALM), and the Test of Functional Health Literacy in Adults (TOFHLA), Wide Range Achievement Test (WRAT), The Short Assessment of Health Literacy for Spanish Adults (SAHLSA-50). Among these, the commonly used tests are the Rapid Estimate of Adult Literacy in Medicine (REALM), and the Test of Functional Health Literacy in Adults (TOFHLA). But there a lot of criticism such as, the measurement methods are not totally comprise health literacy theory, measures single dimension in general, falls short of currency and solidity analyses and has no cultural sensitivity (Pleasant et al.2011).

REALM, which designed to use in public health center and community health center, is one of the health literacy evaluation instrument that can be used only in 3 minutes and only in English (DeWalt et al.2004). Inside test, there is a list include 66 medical words. Patients are seeking to read and pronounce loudly the words towards easy words (oil, flu, and pill) to difficult ones (osteoporosis, impetigo). (Davis et al. 2006). Test results evaluating by specific scoring according to pronunciation of the words. Because of it easy to apply, test's preferability is superior (DeWalt et al. 2004).

TOFHLA; is more complicated health literacy evaluation instrument when more detailed evaluation is needed, preferred to REALM (Parker et al..1995). TOFHLA is using to measure functional health literacy such as arithmetic (diabetes level, blood pressure rate etc.) and reading-comprehension by using health materials. Can use both in English and Spanish. It is designed to apply approximately 20-25 minutes but it has short form that can be apply in 5-10 minutes (DeWalt et al.2004).

According to Gazmarariana et al.' study results, in general, 24% of patients' health literacy is insufficient, 12% of patients' health literacy is on marginal level. Participants who have insufficient health literacy are less informed about their illnesses in comparison with participants who have sufficient health literacy. In analyses, it is come up that health literacy is independently related to disease information (Gazmararian et al.2003).

### 4. Conclusion

Along with increasing the health literacy in society, being healthy/ living healthy will become a life style. People will start to paying attention to live healthy, keeping in training, breaking the bad habit like tobacco, cigarette and alcohol and avoiding from poor diet. Countries aiming to increase health literacy level by making public service ads over Media Company like internet, radio, television, and by informing and educating people over family doctors. To increase health literacy level, policy making and applying, and community oriented projects generalizing are required.

Because of TOFHLA which is used in measuring health literacy, applying in both English and Spanish, as to REALM applying only in English, a scale factor should be developed to specify health literacy in Turkey.

## References

- Baker D. W., Parker R. M., Williams M. V., Clark W. S., (1998). Health Literacy And The Risk of Hospital Admission. *Health Literacy and Hospitalization JGIM Volume 13, December*
- Baker, D. W. (2006). The Meaning And The Measure of Health Literacy. *Journal of General Internal Medicine*, 21(8), 878-883.
- Baker D. W., Williams M. V., Parker R. M. Gazmararian J. A. Nurss J. (1999).
- Baker, D. W., Wolf, M. S., Feinglass, J., Thompson, J. A., Gazmararian, J. A., & Huang, J. (2007). Health Literacy and Mortality Among Elderly Persons. *Archives of Internal Medicine*, 167(14), 1503-1509.
- Berkman, N. D., Dewalt, D. A., Pignone, M. P., Sheridan, S. L., Lohr, K. N., Lux, L., ... & Bonito, A. J. (2004). Literacy and Health Outcomes: Summary. AHRQ Publication.
- Berkman, N. D., Sheridan, S. L., Donahue, K. E., Halpern, D. J., Viera, A., Crotty, K., ... & Viswanathan, M. (2011). Health Literacy Interventions and Outcomes: an Updated Systematic Review.
- Bohlman, L.N., Panzer, A.M., Hamlin B. And Kindig, D.A. (2004). Health Literacy: A Prescription to End Confusion. Committee on Health Literacy. Institute of Medicine of The National Academies. (IOM). Washington, D.C.
- Celasin N, Ergin D, Atman Ü. Yüksek Ateş Şikayeti İle Hastaneye Yatırılan 0-6 Yaş Grubu Çocukları Olan Annelerin Yüksek Ateşe İlişkin Bilgi Ve Tutumları. *Fırat Üniversitesi Sağlık Bilimleri Dergisi*, 2008; 22 (6): 315 – 322
- Davis, T. C., Williams, M. V., Marin, E., Parker, R. M., & Glass, J. (2002). Health Literacy and Cancer Communication. *CA: A Cancer Journal For Clinicians*, 52(3), 134-149.
- Davis TC, Wolf MS, Arnold CL, Et Al. Development And Validation of The Rapid Estimate of Adolescent Literacy in Medicine (REALM-Teen): A Tool to Screen Adolescents for Below-Grade Reading in Health Care Settings. *Pediatrics*. 2006;118:E1707-1714
- Dewalt, D. A., Berkman, N. D., Sheridan, S., Lohr, K. N., & Pignone, M. P. (2004). Literacy and Health Outcomes. *Journal of General Internal Medicine*, 19(12), 1228-1239.
- Development of a Brief Test to Measure Functional Health Literacy. *Patient Education and Counseling* 38. 33–42
- Dündar P. E., & Dede B. (2012). Manisa'da Seçilen Kentsel Ve Gecekondu Bölgelerinde Yetişkinlerde Sağlık Okur-Yazarlığı Ve Etkili Faktörler. *15. Ulusal Halk Sağlığı Kongresi 2-6 Ekim 2012 Bursa*
- European Commission: Together for Health: A Strategic Approach for The EU 2008-2013. Com (2007) 630
- Gazmararian J. A., Williams M. V., Peel J., Baker D. W. (2003). Health Literacy and Knowledge of Chronic Disease. *Patient Education and Counseling* 51. 267–275
- Hardoff D, Schonmann S. (2001). Training Physicians in Communication Skills With Adolescents Using Teenage Actors as Simulated Patients. *Med Educ*; 35(3): 206-10.
- Koch E, Turgut T. (2004) Hasta-Hekim İlişkisinin Güncel Sorunları Ve Kültürlerarası Yönleri: Bir Bakış. *Türk Psikiyatri Dergisi*; 15 (1): 64-9.
- Kondilis BK, Soteriades ES, Falagas ME; Health Literacy Research İn Europe: A Snapshot. *Eur J Public Health* 2006, 16(1):113-113.
- Kripalani, S., Jacobson, T. A., Mugalla, I. C., Cawthon, C. R., Niesner, K. J., & Vaccarino, V. (2010). Health Literacy and The Quality of Physician-Patient Communication During Hospitalization. *Journal of Hospital Medicine*, 5(5), 269-275.
- McCray A. Promoting Health Literacy. *J Am Med Inform Assoc*. 2004;12(29):152-163.
- Mitchell, S. E., Sadikova, E., Jack, B. W., & Paasche-Orlow, M. K. (2012). Health Literacy and 30-Day Postdischarge Hospital Utilization. *Journal of Health Communication*, 17(Sup3), 325-338.
- Nutbeam, D. (2000). Health Literacy as A Public Health Goal: A Challenge for Contemporary Health Education And Communication Strategies Into The 21st Century. *Health Promotion International*, 15(3), 259-267.
- Nutbeam D. The Evolving Concept of Health Literacy. *Social Science and Medicine*. 2008. V.67. 2072–2078
- Reddy S, Gupta P. Report on Tobacco Control in India. Ministry of Health & Family Welfare, 2004, Government of India.
- Rudd, R. E., Moeykens, B. A., & Colton, T. C. (1999). Health and Literacy: A Review of Medical and Public Health Literature. *Office of Educational Research and Improvement*.
- Russo-Innamorato, L. (2011). Does The Quality of The Patient-Physician Relationship Moderate Predictors of Poor Adherence in Urban, Underserved and Vulnerable Patients With Chronic Illness? *PCOM Psychology Dissertations*.
- Parker R, Baker D, Williams M, Nurss J. The Test of Functional Health Literacy in Adults (TOFHLA): A New Instrument for Measuring Patients' Literacy Skills. *J Gen Intern Med*. 1995;10:537-545.
- Pleasant A, McKinney J. Coming To Consensus on Health Literacy Measurement: An Online Discussion and Consensus-Gauging Process. *Nursing Outlook*. 2011; 59(2):95-106.
- Sorensen, K., Broucke S.V., Fullam, J., Doyle, G., Pelikan J., Slonska, A., Brand, H., HLS-EU Consortium Health Literacy Project European. (2012). Health Literacy and Public Health: A Systematic Review and Integration of Definitions and Models. *BMC Public Health*, 12:80.

- Tengilimoğlu, D., Güzel, A., & Günaydın, E. (2014). Sosyal Pazarlama Kapsamında Dumansız Hava Sahası: Örnek Bir Uygulama. *İktisadi Ve İdari Bilimler Fakültesi Dergisi*, 15(2), 1-26.
- Williams, M. V., Davis, T., Parker, R. M., & Weiss, B. D. (2002). The Role of Health Literacy in Patient-Physician Communication. *Family Medicine-Kansas City*, 34(5), 383-389.

İNTE 2014

# HIGH SCHOOL STUDENTS' METAPHORIC PERCEPTIONS FOR THE CONCEPT OF CHEMISTRY

Aysegül, Derman  
aderman1977@gmail.com

The purpose of this study is to find out the high school students' perceptions for the concept of chemistry. For this purpose, the high school students were asked to complete the sentence of "Chemistry is similar to ... because ...". This study is a pattern of phenomenology. It was conducted with 1093 high school students in Gaziantep Provincial and Gaziantep-Nizip District Directorates for National Education in the spring semester of 2012-2013 academic year. The data obtained in this study were analyzed by qualitative analysis (content analysis) and quantitative analysis (Crosstab and Chi-square test X<sup>2</sup>) methods. As the result of the study, it is examined how the concept of chemistry has been expressed by the high school students. During the process of the study, metaphors –based on the statements- were taken under the themes according to their common features and the point of views they reveal. Regarding this, the metaphors have been identified in six different conceptual categories such as: "The structure and functioning of chemistry", "Chemistry as a means of understanding the case" and "Chemistry as a structure in life". In order to determine whether there are relations between the school type, grade level or gender and the 6 conceptual categories; Test of Independence (Chi-Square Test X<sup>2</sup>) was applied for three times and as a result a significant correlation was found. The general high school students were found to have produced the most metaphors in the categories of "Chemistry as a structure in life", "Chemistry as a complex, difficult and unpopular subject" and "The structure and functioning of chemistry". A significant correlation was also found between the

categories and the students' grade level. Except the 6. category, the 10. grade students were found to produce much more metaphors in all categories than the 11. and 12. grade students do. There is no significant relation between the categories and the students' gender. The students' metaphorical perceptions also indicate their perspectives and attitudes towards chemistry.

INTE 2014

# High scope project in Taiwan provides students both career exploration and preparation for further study

Ching-Ho Huang<sup>a</sup>, Chin-Guo Kuo<sup>b</sup>

<sup>a</sup>Faculty of NanGang Vocational High School, No.29, XingChun Rd, NanGang District, 115, Taipei, Taiwan

<sup>b</sup> Professor of National Taiwan Normal University, No162, Sec.1, HePing E. Rd, Daan District, 106, Taipei, Taiwan

---

## Abstract

The document introduces a pre-engineering program named High Scope Project. It was developed to incorporate engineering and energy concepts into technical courses of vocational high school in Taiwan. The contents of the program included 5 learning units, which were 36 learning hours in total and could be implemented as 2 credits of a semester. Quasi-experimental design was implemented to investigate whether the program is helpful for high school students in exploring engineering and technology occupations, and for attracting students to study engineering and technology majors in college. The results show that pre-engineering program of HSP benefits for vocational high school students both career exploration and preparation for further study.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* high scope project, pre-engineering program, vocational high school;

---

## Preface

High Scope Project (HSP) in Taiwan was developed by National Science Council, now named Ministry of Science and Technology, in 2006. To date, the National Science Council has founded two phases of HSP in high schools. The ultimate goal of HSP is to assist high schools and vocational high schools to develop school-based curriculum. Through innovating traditional curriculum, HSP seeks to improve the current science education system, to offer students a real-world learning environment, and to trigger students' curiosity and interests toward emerging technologies. The second phase, named HSP II, is a three-year program which has been in operation since 2011. The objectives of the HSP II are to: (Chang, 2014)

- 1) research and develop innovative and workable emerging technology curriculum so as to build up high-school students' scientific literacy.
- 2) improve teachers' professional scientific literacy toward emerging technologies, so as to inspire high-school students' attitudes toward active learning.

Taipei Municipal Nang Gang Vocational High School (NKHS) was selected to participate in HSP. It is one of 7 public vocational high schools in Taipei City. Most of the students in NKHS are going to enter university after graduating, but some of them do not know how to choose. They are afraid to make decision of future study. By means of participating HSP, NKHS has developed a pre-engineering program for the students.

Pre-engineering program mainly serves as a preparation course for the university engineering programs and education. The nature of courses is exploratory and preparatory. It is not professional or vocational courses and trainings. The program courses can be divided into two kinds in accordance with the education targets. The first kind of courses is given to students who are studying in engineering or plan to study in engineering majors in the university or two -year community institutes. The project offers them basic courses as preparation for transferring into professional engineering courses. Another kind of courses is given to middle and primary schools students. It offers concept courses, which helps students to understand the elements in engineering, the current situations of

---

\* Corresponding author. Tel.: 886-2-27825432 ext.2305; fax: 886-2-27882807.

E-mail address: gheruang@gmail.com

the job field and also offers students' opportunities to trial the occupations in engineering. This text deals with the latter kind of courses on vocational high school students. The study developed pre-engineering courses and carry on teaching experiment in order to investigate the following purposes:

Whether the courses help vocational high school students in exploring engineering and technology occupations;

Whether exploring pre-engineering courses contributes to attracting students to study engineering and technology majors in college.

### **Needs of career exploration for students**

Education of science and technology are very important to a country' s economy and development in science and technology. It is unanimous common understandings of governments and scholars all around the world that it is vital to strengthen the national engineering and science and technology education and to cultivate the ability to adapt to the rapid economy and social changes and fast-developing scientific and technological accomplishment to meet the challenge of the knowledge economy in the 21st century, and to strengthen the national economic competitiveness (ITEA,1996; Clinton, 1997; NAE,2001).

According to the U.S. government and academic studies over the last 20 years, US engineering education faces two problems: The attrition rates of the students attending engineering and engineering technology majors in universities and colleges are low, and, insufficient numbers of representatives of women and minority ethnic groups engaged in engineering occupations or studying engineering and engineering technology. The above results have caused uneven supply and demand in U.S.A.'s engineering and engineering technology personnel demand. The numbers of graduates from university cannot meet enterprise demands. The insufficiency of manpower is serious (Scarcella , 2004; Douglas, Iversen & Kalyandurg, 2004; Blais & Adelson, 1998). There are various reasons why there' s a high loss rate of students studying engineering and engineering technology in American universities and colleges and an imbalance of supply and demand in engineering and engineering technology. However, the main factors that lead to this situation are insufficient pre-engineering education and not offering proper exploration course during the stage of high school (Shuman, et al, 2004; Shirley, 2004; University of Nevada, Reno, 2004; Scarcella ,2004).

Super (1957 ) has divided personal career development into five stages: Growth stage (0-14 years old ), exploration stage (15-24 years old ), establishment stage (25-44 years old ), maintenance stage (45-65 years old ), and decline stage (over 65 ). High school students are at the exploration stage. Personal career choices are influenced by factors such as family background , idiosyncrasy , living environment ,etc. Personal ability, interest, needing, etc., will change due to trainings, environmental background and time ,etc. Therefore, school should represent positive active guider in helping students to carry on their job interest exploration and make correct choices on their directions in their future career.

Studies of the US scholars have proved that incorporating engineering concepts in courses or offer pre-engineering program at middle and primary schools stage (K-12 ) enables early understanding of engineering and science and technology knowledge. It is also contributive when students are determining their career and deciding whether oneself is suitable to study and obtaining employment in engineering or scientific and technological field. In addition, emphasizing the traits of hands on of pre-engineering and of science and technology that are within our daily life and surrounding may attract more students to choose to enter engineering or science and technology majors in universities and colleges. Moreover, they will be successful learners in university education since they have been well trained during high school pre-engineering education (Douglas, Iversen & Kalyandurg, 2004; Blais, 2004).

Ministry of Education of Taiwan has already noticed the achievements in implementing pre-engineering education to the students of middle and primary schools. Thus, they first promote the Nanotechnology K-12 Cultivation Program in the north district of Taiwan since 2002. This program trains middle and primary schools nanotechnology seed teachers, develop nanotechnology teaching materials, teaching activities, exhibition tours, etc. In addition, Ministry of Education (2004 ) of Taiwan has newly formally announced and listed "science and technology and engineering" into the provisional course outline of high school education as a option course choice in high school advanced living technology courses. Pre-engineering program of this study tally with the trend and provides opportunities in career exploration.

## Teaching activity planning and experiment design

The teaching activity of project of allowing that this text develops mainly based on the course procedure abbreviated as A-PIE (Analysis, Planning, Implementation and Evaluation, shown as Fig. 1 ) and also literature reviews and consult the experts. Pre-engineering teaching activities are studied and developed by researchers and carefully examined by scholars of education of science and technology. It is finally confirmed after being discussed in a specialist meeting. The contents of pre-engineering teaching activities are guided according to common key courses of “project oriented courses” of National Curriculum of Vocational High School issued by the Ministry of Education in Taiwan in 2010, and the course plan in the “Pathway to Engineering” in the US Project Lead the Way (PLTW). The teaching activities structure design is shown as Fig. 2.

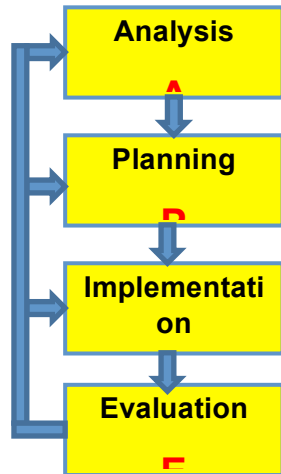


Fig. 1. Procedure of Curriculum Development

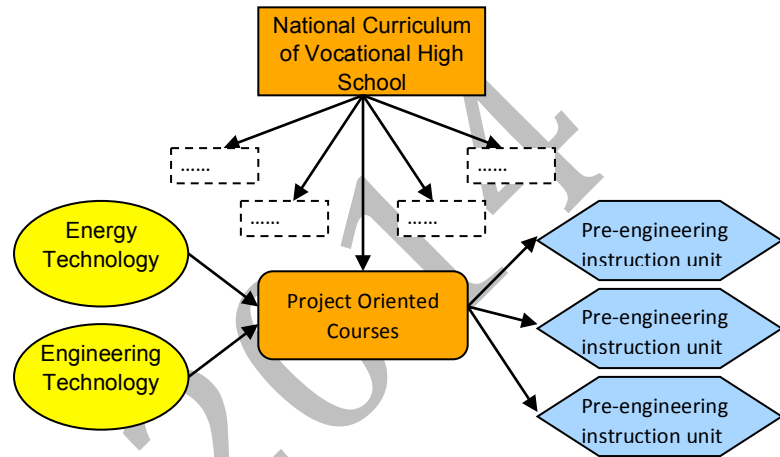


Fig. 2. The teaching activities structure design of pre-engineering program

The developed contents of the program included 5 learning units, which are introduction of energy and engineering technology, 3D model design and manufacture, materials and nanotechnology, renewable energy, and energy saving. They could be implemented as 2 credits of a semester that is 36 learning hours in total. Each instruction unit takes around 4 to 8 hours to finish. All of the 5 instruction units had developed completely, include lesson plan, instructional materials, classroom activities, and learning sheets.

The teaching experiment subjects were judgment sampled 4 classes from NKHS. The instructor of the teaching experiment is the same teacher who works and teaches the project oriented courses in the school for more than 20 years. The teacher has PhD degree and plenty of teaching experiences. Besides participating in the development of the research courses, the teacher also participated in discussing the experimenting procedures, teaching activities, pre- tests and post- tests, data collections, etc.

The quasi-experimental design adapted nonequivalent pretest-posttest design. The above-mentioned four classes were randomly selected two classes as the experimental group and the other two as the control group. Pre-engineering courses are carried in the experimental group while it is not carried in the control group. It adds up to 156 students from 4 classes. There are 23 female students and 133 male students. 79 of them are experiment group subjects and 77 of them are in the control group.

## Results and Discussion

### 1. Energy and engineering technology career exploration

This study conducted “interview” method to communicate with students face to face before pre-engineering program finished and to confirm whether the pre-engineering program can intrigue students’ exploration to career. On the other hand, the researcher also makes “energy and engineering technology career



explore” questionnaire which focus on learning interest, learning ability, learning content and working environment to test the hypothesis. The test results of research hypothesis are as follows:

The pre-engineering program of this study didn't assist students to aware the relationship between self learning interest and energy and engineering technology fields successfully: only 8.0% students thought project oriented course is helpful for them to arouse the interest of energy and engineering technology, control group and experimental group only takes 6.9% and 9.1% respectively, the percentage of test for homogeneity did not show significant difference.

The effect of assisting students understand self learning ability to energy and engineering technology field from the pre-engineering program of this study is not significant: there are 9.9% students agreed that project oriented course will be beneficial for their learning ability to explore energy and engineering technology, while control group and experimental group takes 8.3% and 11.5% respectively that the percentage of test for homogeneity was not in significant difference.

The pre-engineering program of this study is capable to help students understand the learning contents of energy and engineering technology: there are 54 students (34.6%) agreed that project oriented course is helpful to gain their recognition about learning contents of college energy and engineering technological field, control group and experimental group takes 21.1% and 49.2% that the percentage of test for homogeneity was in significant difference.

The pre-engineering program of this study is able to provide students with the ability to understand the working environment of energy and engineering technology: 41 students (26.3%) believed that project oriented course will assist their understanding about the working environment of energy and engineering technology, control group and experimental group takes 6.7% and 46.9% respectively that the percentage of test for homogeneity was in significant difference.

## *.2. Energy and engineering technology program selection*

The purpose of this study is to analyze whether the teaching activities of the devised pre-engineering program from this study can arise vocational high school students' interest to take energy and engineering technology program or not. According to the research method, feedback about program selection should be gathered from control and experimental group before pre-engineering program. After the completion of pre-engineering program, the program selection result collected from school will be the result of post test. The test data will be divided into three groups, including energy and engineering technology group, other engineering technology group, and social science group what will be analyzed by the statistical software SPSS 10.0.

By square distribution test ( $\chi^2$ ) of percentage of homogeneous test, the pre-test correlation of experimental and control groups' program selection was in significant difference ( $\chi^2 = 13.888$ , degree  $df=2$ , greater than critical value  $\chi^2_{.95(2)}=5.991$ ), besides, test the program selection difference via confidence interval of experimental and control groups what showed the result  $-0.44 < \psi < -0.24$ ) indicated that the percentage of selecting energy and engineering technology program from experimental group was lower than control group before conducting the pre-engineering program.

Furthermore, confirm the post-test correlation of experimental and control groups via square distribution test ( $\chi^2$ ) of percentage of homogeneous test, the result was in significant difference ( $\chi^2 = 37.317$ , degree  $df=2$ , greater than critical value  $\chi^2_{.95(2)}=5.991$ ). besides, test the program selection difference via confidence interval of experimental and control groups what showed the result  $0.052 < \psi < 0.70$ ) indicated that the percentage of selecting energy and engineering technology program from experimental group was higher than control group after conducting the pre-engineering program.

Based on the above test results, before the pre-engineering program, the percentage of selecting energy and engineering technology team from the students of experimental group was lower than the students of control group, however, after conducting pre-engineering program, the result came in opposite result. According to above statistical analysis, the condition revealed it was reasonable to reject null hypothesis in energy and engineering technology program selection, in other words, vocational high school students' willing to conduct pre-engineering program is significant correlated with their energy and engineering technology program selection.

## Conclusion

### *.3. Pre-engineering of HSP contributes to students' career exploration*

This study discusses whether pre-engineering activities are contributive to students in their career exploration in engineering and science and technology field which includes items in learning interest, learning ability, studying materials and working environment, etc. Majority of the students consider pre-engineering learning in living technology courses provide them with reasonable understanding of the contents in university engineering and science and technology learning and also the working environment of engineering and technological field, which helps them in their career exploration in engineering and technology. However, living technology courses did not achieve the goals in making the students realize whether they are interested in engineering and technology or whether they possess the ability to learn engineering and technology. A possible explanation may be the insufficient time of the research since this pre-engineering teaching and learning experiment is only 2 hours every week for only one semester.

### *.4. Pre-engineering learning of HSP attracts students to select engineering and technology courses*

The number of percentage that chose energy and engineering technology courses was lower in the experimental group. However, more students in the experimental group chose energy and engineering technology courses than them in the control group after the students in experimental group have received pre-engineering program. The result confirms pre-engineering program of HSP attracts students to select energy and engineering technology courses.

## Acknowledgements

Ministry of Science and Technology of Taiwan supported The research, the project No. NSC-102-2514-S-646-001- , and also sponsor the presentation of the international conference..

## References

- Blais, R. R.(2004). Engineering Concepts in Technology Education- including Principles of Engineering courses and Project Lead the Way (PLTW)- History, Status, Trend, Advantages, Limitations. Retrieved from <http://www.Oswego.edu/~waite/PLTWByDAgostino.doc>
- Blais, R. R. & Adelson, G. I. (1998). Partnerships in Education: Project Lead the Way Models a Program for Changing Technology Education. Tech Directions, 58(4), 40-43.
- Chang, C.Y. (2014). High Scope Program II in Taiwan. Retrieved from <http://w1.ceels.org/highscope/web/modules/tinyd0/index.php?id=9>
- Clinton(1997). President Clinton's Call to Action for American Education in the 21st Century—Technological Literacy. Retrieved from <http://www.ed.gov/updates/PresEDPlan/part11.html>
- Douglas, Iversen, & Kalyandurg(2004), Engineering in the K-12 Classroom--An Analysis of Current Practices & Guidelines for the Future. A Production of the ASEE EngineeringK12 Center, Retrieved from [http://www.engineeringk12.org/Engineering\\_in\\_the\\_K-12\\_Classroom.pdf](http://www.engineeringk12.org/Engineering_in_the_K-12_Classroom.pdf)
- International Technology Education Association, ITEA. (1996). Technology for All Americans : A rationale and structure for the study of technology. Technology for All Americans Project (TfAAP). VA:ITEA
- Ministry of Education (2004). Temporary curriculum framework for senior high schools. Taipei: Author. (in Chinese)
- National Academy of Engineering, NAE. (2001). Technically Speaking— Why all Americans need to know more about technology. Washington, D.C.
- Shirley, Donna (2004). Educating the Engineer of the Future. Retrieved from <http://www.eweek.org/site/News/Features/dshirley.shtml>
- Shuman, L. J., Delaney, C., Wolfe, H., Scalise, A. & Mary Besterfield-Sacre (2004). Engineering Attrition: Student Characteristics and Educational Initiatives. Retrieved from [http://www.engr.pitt.edu/~ec2000/grant\\_papers/Shuman+ASEE-99.PDF](http://www.engr.pitt.edu/~ec2000/grant_papers/Shuman+ASEE-99.PDF)
- Super, D.E.(1957). The Psychology of Careers. New York: Harper & Row.
- Scarcella, J.A. (2004). Pre-Engineering Education: Justification for its Inclusion in the TE Curriculum. Technology Education Division Report. Techniques (ACTE) 79(5).
- University of Nevada, Reno, NRU (2004). Engineering and Technology Literacy for High School Science and Math Teachers. Retrieved from <http://engr.unr.edu/~engr491/>

# Hiper Metinlerin (Hypertext) Yabancı Dil Dersleri İçin Önemi

Selma Akol<sup>95</sup>

*Doktora Öğrencisi, Friedrich-Schiller-Üniversitesi Edebiyat Fakültesi Yabancı ve İkinci Dil Olarak Almanca Enstitüsü, Jena 07743, Almanya*

*Araştırma Görevlisi, Trakya Üniversitesi Eğitim Fakültesi Alman Dili Eğitimi Anabilim Dalı, Edirne 22030, Türkiye*

---

## Özet

Son yıllarda bilişim teknolojisindeki hızlı gelişmeler hayatın her alanında olduğu gibi eğitimi de etkilemiştir ve yeni bir dönem başlamıştır. Bilgisayar teknolojisi aracılığı ile öğrenciler bir metinden başka birçok metine hızlı ve kolay bir şekilde geçiş yapabilmektedir. Elektronik bir ortamda metinden metine köprüler oluşturan birbiriyle bağlantılı bu metinler hiper metin (hypertext) olarak adlandırılmaktadır. Hiper metinler yabancı dil derslerinde öğrencilere aktif, özerk ve bilinçli çalışma imkânı sağlamaktadır. Bu nedenle hiper metinler yazılı metinlere göre yabancı dili öğrenme için daha elverişli olabilir. Bu bağlamda bu çalışmada geleneksel yazılı metinlerin yanında hiper metinlerin yabancı dil derslerinde kullanımı modern ve önemli bir araç olarak burada tartışılacaktır. Öncelikle hiper metinlerin yapısı incelenecektir. Daha sonra öğrencilerin dili öğrenme farklılıkları göz önünde bulundurulduğunda hiper metinlerin yabancı dil dersleri için önemi ve yabancı dili öğrenmeye katkısı üzerinde durulacaktır.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Anahtar Kelimeler:* Hiper Metin; elektronik ortam; internet; yabancı dil; eğitim

---

---

<sup>95</sup> Tel.: +49-17692892323; +90-5072200406

E-mail address: selma.akol@uni-jena.de; selma\_akol@hotmail.com

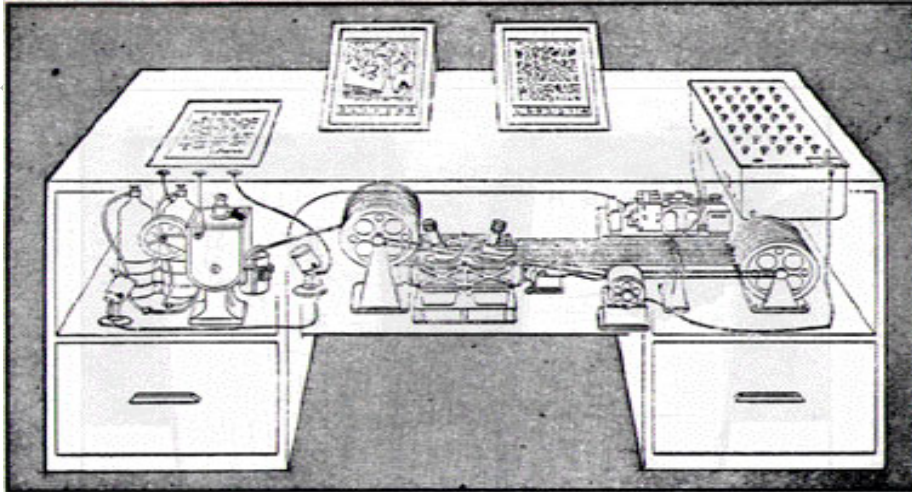
## Giriş

Son yıllarda bilişim teknolojisindeki hızlı gelişmeler hayatın her alanında olduğu gibi eğitimi de etkilemiştir ve yeni bir dönem başlamıştır. Bu gelişmelerden biride internettir. 1980’li yıllar internetin hayata geçirildiği yıllar olmasıyla birlikte bu dönemlerde internet eğitim ve öğretimde yaygın olarak kullanılmaya başlanmıştır. İnternet, değişik bilgisayar ağlarında olan insanların, dünyanın neresinde olurlarsa olsunlar, birbirleriyle aynı ağ üzerindeymiş gibi haberleşmelerini ve bilgilerini en verimli şekilde paylaşmalarını sağlayan bir teknolojidir (Karasar, 2004). İnternet ayrıca dünya genelindeki bilgisayar ağlarını birbirine bağlayan elektronik haberleşme aracı olarak da tanımlanabilir. İnternetin sağladığı bir olanakta hiper metinlerdir. Hiper metin yeni bir buluş değildir. Okuyucuya seçme imkânı, seçme özgürlüğü sağladığı için, ansiklopediler, dipnotların olduğu bilimsel yazılar ve sözlük gibi basılı materyallerde hiper metin olarak kabul edilmektedir. Hatta içerik kısmında ve baş sayfasında belli makalelerin ve yazıların gösterildiği popüler dergiler ve gazetelerde okuyucuya istediği yeri okuma özgürlüğü sağladığı için hiper metin olarak kabul edilebilir. Bu gibi basılı materyaller alfabetik bir şekilde kavramları içerdiğinden ve okuyucuyu not ve dipnotlarla ya da atıflarla başka kavramlara doğrusal olmayan bir şekilde yönlendirdiği için hiper metin olarak kabul edilmektedir. Fakat bu çalışmada hiper metin bilgisayar ve internet aracılığıyla ulaşılan doğrusal olmayan metinler olarak kabul edilecek ve incelenecektir.

Öğrencilerin dili öğrenme farklılıkları göz önüne alındığı zaman hiper metinlerin yabancı dil derslerinde kullanımı birçok avantaj sağlamaktadır. Hem dersin niteliğini iyileştirmek açısından hem de öğrencilerin başarısını artırmak açısından hiper metinler son zamanlarda tartışma konusudur. Bu yüzden bu çalışmada hiper metnin tarihine kısaca değinildikten sonra hiper metinlerin yabancı dil dersleri için önemi ve yabancı dili öğrenmeye katkısı üzerinde durulacaktır.

## Hiper Metin Nedir?

Hiper metin özellikle teknolojinin gelişmesiyle her alanda her insanın karşılaştığı bir kavram olarak karşısına çıkmaktadır. Hiper metin genellikle doğrusal olmayan metin olarak tanımlanmaktadır. Hiper metinler uzun yıllardır hayatımızda olmasına rağmen, tam anlamıyla ancak teknolojinin ilerlemesiyle hayatımıza girmiştir. Çünkü sözlük ve ansiklopedilerdeki birbirini takip eden bilgilerde hiper metinleri oluşturmaktadır. Ancak günümüzde hiper metin kavramı daha çok internet aracılığı ile sağlanan bilgilerin birbiriyle bağlantılı olması ve bu bilgilere bağlantılarla (link) ulaşılması anlaşılmaktadır. Hiper metnin öncüleri olarak Bush, Nelson ve Engelbart kabul edilmektedir. İlk olarak Vannevar Bush 1945 yılında yazmış olduğu “As we may think” adlı makalesini yayınladı ve bu makalesinde Memex (The Memory Extender= Hafıza Genişletici) isimli makinesini teorik olarak tanıttı.



Bu makaleye göre Memex isimli makine ekran, klavye ve seçim tuşlarının olduğu bir yazı masası şeklindeydi. Memex'in fikri en küçük bilgi birimlerinin ayrı ayrı kaydedilmesi idi. Ve bu bilgi birimleri birçok konu kapsamında ilişkili olduğu için daima yeni şekillerle birleştirilebilmekteydiler. Memex insanların belgeleri depolayarak, birbirleriyle ilişkileri sayesinde kolayca belgeleri bulabilmelerini amaçlamaktaydı (Huber, 2003). Bu makalesinde Bush günümüzde bilgisayar ve internetle kolayca yapabildiğimiz birçok şeyin Memex ile yapılabileceğinden bahsetmiştir. Daha çok bilgisayar insan etkileşimi üzerine çalışmalarıyla bilinen Engelbart ise hiper metnin gelişmesine büyük katkıda bulunmuştur. Daha sonra Amerikalı medya bilimci aynı zamanda internetin öncülerinden olan Ted Nelson 1965 yılında hiper metin kavramını keşfetmiştir (Storrer, 2000:222).

Hiper metin genel olarak doğrusal olmayan metin olarak tanımlanmaktadır. Jonassen (1986) doğrusal olmayan yazı olarak tanımlamakta ve yine Jonassen (1989) hiper metnin metin yığınlarından ve kısımlarından meydana geldiğini, düğümlerin ve ilişkisel bağlantıların (link) hiper metin sisteminin temel yapı taşları olduğundan, düğümlerin (nodes) bilgi parçalarının temel birimi olduğundan bahsetmektedir. Nielsen (1990) hiper metnin birbiriyle bağlantılı metnin parçalarından meydana geldiğini; Verreck/Lkoundi (1990) ise hiper metnin en karakteristik özelliğinin semantik ve pragmatik yollarla bilgi bloklarının birbirine bağlanması olarak ve Tergan (1997) hiper metin ve hiper medya sistemlerinin bir veritabanındaki bilgi birimlerinin doğrusal olmayan gösterimi, bilgisayar tabanlı bir özellik olarak tanımlamaktadır. Yine Kuhlen (1991) hiper metnin bütün tanımlarına göre en önemli özelliğinin bilgi birimlerinin doğrusal olmayan örgütlenme aracı olduğunu ifade etmektedir. Weis (2000) hiper metni bilgisayar yoluyla ağsal bir yapı şeklinde oluşturulan doğrusal olmayan metin olarak tanımlamaktadır. Elektronik bir ortamda metinden metine köprüler oluşturan birbiriyle bağlantılı bu metinler hiper metin (hypertext) olarak adlandırılmaktadır. Schubert ise hiper metinleri aktif kullanıcıya özgürlük sağlayan, metin düğümlerini (nodes) bağlantılar (link) üzerinden kendi seçtiği sırada birleştiren basılı ve dijital araçlardaki çoklu doğrusal yani doğrusal olmayan metinler olarak tanımlamaktadır (Schubert, 2008:119).

Günümüzde artık bazı kitaplara, gazetelere, dergilere ve sözlüklere çevrimiçi olarak ulaşmak mümkündür. Bu yüzden e-kitap, online gazete, online dergi gibi bir çok yeni kavram ortaya çıkmıştır. Fakat bazı e-kitaplara çevrimiçi ulaşılabilmesine rağmen, hiper metin olarak kabul edilmezler. Çünkü metnin kısımlarına ancak doğrusal bir şekilde ulaşılabilinmektedir, yani metnin kısımları arasında bağlantı yoktur. Bu hiper metnin yapısıyla ilgilidir. Bu yüzden burada hiper metinlerin yapısıyla ilgili kısa bir bilgi verilecektir.

### *Hiper Metinlerin Yapısı*

Hiper metinlerin günümüzde anlaşılan en önemli özelliği ağ (elektronik) ortamında bulunan metinler olmasıdır. Sözcük, cümle ve semboller gibi bir metnin öğeleri başka bir metnin kısmını işaret ederek görevlerini yaparlar. Hiper metinlerde bunlara kullanıcının dikkatini çekmek ya da kullanıcıyı yönlendirmek için altı çizili kelimelerle ve renkli kelimelerle ulaşılması sağlanır. İlk olarak kullanıcı bir işlemle başlangıç sayfasına ulaşır, buradan linklerle diğer sayfalara yönlendirilir. Eğer kullanıcı yönlendirmeyi takip etme işlemini seçerse, yönlendirilen metin kısmına ulaşır ve bir önceki metin kısmını terk etmiş olur.

Hiper metinlerde bağlantı çok önemlidir. Hiper metni diğer metinlerden ayıran özellikler bağlantılardır diyebiliriz. Çünkü kullanıcının başka bir bilgiye ya da aynı bilginin farklı bir bölümüne ulaşmasını sağlar. Bu bağlantılar iki öğeden oluşmaktadır. Bunlar çengel düğüm (anchor node) ve hedef düğüm (destination node)'dür. Kullanıcı çengel düğümde bağlantı bilgisiyle nereye gideceğini bilir, hedef düğümle ise istediği kaynağa sonuca ulaşır, yani hareketin sonucudur (Nielsen, 1995).

Hiper metinlerin temelinde metnin kısımlarıyla bir bağlantı sağlayan, birbiriyle bağlantılı ve bir arada tutulan bilgi birimleri yani yapıtaşları vardır. Bu tutarlılık olarak adlandırılmaktadır ve elektronik ortamda bir metnin hiper metin sayılabilmesi için şu koşullar yerine getirilmelidir: erişim tek tek seçilmelidir, yollar seçilebilmelidir

<sup>1</sup> Hayat dergisinin yeni baskısından "As We May Think" adlı makalenin orijinal resmi (Original illustration of the *Memex* from the *Life* reprint of "As We May Think") <http://history-computer.com/Internet/Dreamers/Bush.html> adresinden 19.05.2014 tarihinde alınmıştır

ve çıkış seçilebilmelidir. Öğrenciler geldiği yolu yani geri tuşunu kullanarak tekrar ana sayfaya ulaşabilirler ya da direk çıkış yapabilirler.

Hiper metinler geleneksel metin anlayışından çeşitli noktalarda ayrılmaktadır. Bunları Schubert (2008) şu şekilde sıralamaktadır:

- “Kullanıcıya anlama sürecinde seçme imkânları önünde bulunduğu için, hiper metinler doğrusal değildir (Kuhlen, 1991:12). Sadece metni üreten kişi tarafından verilen bir sıra yoktur, ayrıca metin düğümlerini (nodes)<sup>96</sup> seçici ve farklı biçimlerde birbiriyle birleştirme özgürlüğü vardır. Bu sebeple hiper metinler çoklu doğrusal (multilinear) olarak da adlandırılabilir (Fritz, 1999:222).
- Metin düğümlerinin dizileri değiştirilebileceğinden hiper metinler belli özdeşleşmiş bir başlangıç ve sona sahip değildir. Fakat genellikle hiyerarşik olarak ayarlanmış, ondan hiper linkler çıkan bir başlangıç sayfası (ana sayfa) olabilir.
- Hiper metinler geleneksel metinlerin aksine özerk ve kendi kendine yeten bir şey değildir; özellikle de potansiyel hiper linklerin eklenmesiyle aksine oldukça güçlü ağsal ve açık bir özelliktir.” (Schubert, 2008:118)

Ayrıca içeriğin bilgi değeri taşıması gerekmektedir, bu içeriğin güncel olması, güncelliğe ihtiyaç duyulması ve koşullara ve gereksinimlere bağlı olarak kişisel faydaları olmalıdır. Doğrusal metinlerin yapısına baktığımızda geleneksel bilgi yapısı içinde yani her kısmı yazar tarafından belirlenen sırayla birbirini takip eder. Hiper metinlerin yapısına bakıldığında ise okuyucuya her zaman her alana bağlantılarla (link) geçiş yapma olanağı sağlamaktadır. Hiper metinlerin yapısında hiyerarşik düzenden kaçınılır, bunun yerine daima seçim çeşitliliği sunulur. Günümüzde hiper metinle birlikte hiper ortam ve çoklu ortam kavramları da kullanılmaktadır. Hatta bazen birbirlerinin yerinde kullanılmaktadır. Eğer hiper metinlerdeki düğümler dinamik grafiksel ve işitsel bilgileri (bilgisayar animasyonları şeklinde hareketli resimler, çizgi filmler, video dizileri, müzik, ses ve konuşma dili vs.) içeriyorsa burada hiper ortam söz konusudur (Winter, 1998). Hiper ortamın hiper metinden farkı kullanıcının bir ses, bir video, bir resim ve ya grafik ile başka bir ortama bağlanabilmesidir. Çoklu ortamda kullanıcı metni okumakla kalmaz, izler, dinler ve görür. Günümüzde artık çoğu hiper metin bir ses, bir resim ya da video ile zenginleştirilmiştir.

Mülimedya farklı medya araçlarının bir araya gelmesi olarak anlaşılırken, hiper medya kavramı hiper metin yapısının oluşmasını sağlayan HTML (Hypertext Markup Language) aracılığıyla ve HTTP (Hypertext Transfer Protocol) aracılığıyla dünya çapında bağlanmasını sağlayan ağsal yapılanma olarak ayrılmaktadır. Hiper metinlerin internette kurmak için diğer metinlere bağlantıyı sağlayan uygun talimatların gerçekleştirilmesi gerekmektedir. Bu program dili olan HTML ile olmaktadır (Mainka, 2002). Ağda bütün medyanın hiper metin türünde bağlantısı WWW (World Wide Web)’in bir yapısal özelliği olarak kabul edilebilir.

### **Hiper Metinlerin Yabancı Dil Derslerinde Kullanımı**

70 li yıllardan beri tebeşir ve tahta gibi geleneksel ders araçları birçok medya aracının birleşimi ile zenginleştirilmiştir. Örneğin tepegöz, sesli kasetler ve videokasetleri, slâytlar ve televizyonlar sınıflarda ders anlatımında kullanılmaya başlanmıştır. Fakat ilk çoklu ortam birçok medya araçlarının birbiriyle etkileşimi sonucunda bilginin sadece kaydedilmesine ve sunulmasına değil aynı zamanda değiştirilebilmesine de izin vermiştir. Bilgisayar ve internet ile seslerin film kısımlarının, animasyonların ve grafiklerin elektronik bilgi olarak kolay ulaşılabilir olmasıyla derslerde kullanımı yaygınlaşmıştır. Özellikle yabancı dil derslerinde kullanımı dersin kalitesini artırmıştır ve teknolojiden daha fazla yararlanılmaya başlanmıştır. Teknolojiyle donatılmış dil öğretimi deyince akla gerçeğe yakın ve iletişimsel bir ders ortamı gelmektedir. Her öğrenci öğrendiği dilin konuşulduğu ülkeye gitme ya da bu dili ana dili olarak konuşan insanlarla karşılaşma imkânına sahip değildir. Bu yüzden dilin öğrenilebilmesi için derslerin gerçeğe yakın olması gerekmektedir. Böyle bir ders ortamında bilgisayar ve internetin rolü büyüktür.

<sup>96</sup> Metin düğümleri hiper metinlerin ana birimleridir. İçerik HTML ya da XML gibi metin tabanlı dillerle etiketlenmiş ve bağlantılarla (links) birbirlerine bağlanan metin düğümlerine ya da bilgi birimlerine dağıtılır. İçeriğin seçimi ve böylece metin düğümlerinin belirlenmesi yazarın amacıyla bağlantılıdır. Metin düğümlerinin içeriği tamamen farklı şekillerde gerçekleştirilebilir (sözlü, görsel, işitsel) (Zebrowska, 2013).

Yabancı dil derslerini düşündüğümüzde sadece basılı materyalleri kullanmak dersi sıkıcı ve monoton hale getirir. Günümüzde artık yabancı dil öğretiminin yapıldığı özel sınıflar bulunmaktadır. Yani bilgisayar laboratuvarlarında öğretim yapılmaktadır. Basılı materyallere kıyasla elektronik ortamda daha çok bilgi saklanmaktadır ve öğrencilerin istediği bilgiye rahatlıkla erişimleri mümkün olmaktadır. Böylece sıklıkla hiper metinlerle karşılaşmaktadırlar. Hiper metinlerin en belirgin özelliği metinlerin birbirine doğrusal olmayan bir şekilde bağlı olmasıdır. Öğrenciler bir metni baştan sona okumak zorunda değildir. İhtiyacı olan bilgiyi istediği gibi seçerek; ilişkili olan konuları ve kavramları seçerek bir metinden diğerine geçebilir. Yani hiper metinler öğrencilere daha fazla seçme özgürlüğü sunmaktadır. Böylece öğrenciler istenilen bilgiye farklı yollarla ulaşabilmektedir. Karadeniz bunu şu şekilde açıklamaktadır:

“Böylece öğrenci, kendi ilgi, ihtiyaç ve öğrenme stiline göre bilgiyi seçebilmekte ve ulaşabilmektedir. Bu da hiper ortamda bağlantılar yolu ile gösterilen kavramsal yapının; her öğrencinin bilgiyi yapılandırma sürecinde, farklı bakış açıları kullanarak yani ortamdaki bilgiye ulaşmada farklı yolları seçerek zihinsel yapılarını tekrar tekrar düzenlenmesini sağlamaktadır. Böylece durumdan duruma transfer edilebilen anlamlı bilgi edinilmektedir” (Karadeniz, 2006:17).

Dersin öğretmenleri hiper metinle dersi daha renkli hale getirmekte ve yabancı dilin öğrenimini kolaylaştırmaktadır. Basılı materyaller metin ve resimlerle sınırlıyken hiper metinler video, ses ve animasyonlarla zenginleştirilmiştir. Bu öğrenciye yabancı dili öğrenmede kolaylık sağlamaktadır. Örneğin ülke bilgisi dersinde hiper metinler aracılığıyla bir öğrenci sorularına kolaylıkla ve hızlı bir şekilde cevap bulabilir. Böylece istediğine ulaşan öğrencide bilgi kalıcı hale gelmektedir.

Geleneksel ders yöntemlerine göre dili öğrenmede ve öğretmede daha etkilidir. Dersin hocaları dijital tahta ya da projeksiyon ile yansıttıkları internetle hiper metinleri kullanarak dil öğretimi yapabilirler. Buda görselliği artırır. Dilin öğrenilmesini kolaylaştırır. Örneğin tek öğretmenin ya da sınıftan tek bir kişinin kullanımı yerine bütün sınıf eş zamanlı olarak eylemde bulunabilirler. Yani aynı anda tekrar edebilirler. Kısa zamanda bütün öğrencilerin düşünceleri, soruları, fikirleri ya da çözüm önerileri öğretmen tarafından toplanabilir. Bu yüzden hiper metinler eylem odaklı dersler için oldukça uygundur. Yeni yapılar eskisinin içine yerleştirilerek ve öğrenciler aktif olarak eylemde bulunurlar. Örneğin araştırma yolu ile öğrencilerin konu odaklı bireysel bilgi toplamaları, yani bilgiyi keşfetmeleri ve kendi kendilerine öğrenmeleri için gerçekleşir. Edebi metinleri açıklama ve bağlantı kurma (bağlam ve konu kapsamında) yoluyla yeniden yorumlama ve geliştirme yetenekleri gelişir.

### **Hiper Metinlerin Yabancı Dil Dersleri İçin Önemi ve Faydaları**

Hiper metinlerin yabancı dil derslerinde kullanımının getirdiği birçok avantaj bulunmaktadır. Hiper metinlerin sağlamış olduğu en önemli faydalarından biri bağlantılar yoluyla öğrencinin farklı bilgilere kolayca ulaşabilmesi, gözden geçirmesi ve üzerinde çalışabilmesidir. Ayrıca gerçeğe yakın ve iletişimsel bir ders ortamı sağlamasıdır. Hiper metinlerin derste kullanım alanı buna göre oldukça büyük olabilir.

Öğrenciler bir yabancı dili öğrenirken, pasif olarak değil kendilerinin aktif olduğu durumlarda dili daha kolay öğrenebilmektedirler. Özellikle kendi yaptıkları araştırmalarda ulaştıkları bilgi zihinlerinde daha kalıcı hale gelmektedir. Buda dilin öğrenilmesini kolaylaştırmaktadır. Hiper ortamlar öğrenciler için amaca uygun olarak uyarlanabilmektedir. Bu amaçla programlar geliştirilmiştir. Dili öğrenmeye yönelik hiper ortamlar oluşturulabilir. Uyarlanı hiper ortamlar öğrenme-öğretmeyi zenginleştirmektedir ve öğrencilerin öğrenirken onlara alternatif ve farklı yollar sunmaktadır. Böylece uyarlanı hiper ortamlar sayesinde öğrenciler kendi öğrenme hızlarına göre ilerlerler, program akışını belirlerler. Hiper ortamlar öğrencinin öğrenme ihtiyacına göre yapılanabilirler (Dağ & Geçer, 2007).

Öğrencilerin kendi sorumluluklarını alarak daha bilinçli olmalarına katkıda bulunur. Hiper metinlerin derslerde kullanılması öğretmenden çok öğrencinin derslerde aktif olmasını sağlar. Derslerde aktif olan öğrenci dili kullanmaya başlar ve daha kolay öğrenir. Hiper metin kullanılarak öğrencilerin grup halinde, etkileşim içinde çalışmalarına olanak sağlanabilir. Böylece öğrencilerin birbirlerinden öğrenme ortamı gerçekleşir. Hiper metinler farklı öğrenme yolları sağlayabilir. Her öğrenci farklı özelliklere sahiptir. Bu farklılıklar düşünüldüğünde ders içeriği ve yöntemi her öğrenciye göre ayrı ayrı düzenlenemez. Bu yüzden hiper metinlerin

yabancı dil derslerinde kullanımı bu farklılıkların bir karmaşa olmasını önler. Ve öğrenciler kendi öğrenme şekline göre hiper metinlerden faydalanır.

Öğrencilerin içsel farklılaşmalarını ortaya çıkarır. Yani derslerin esnek, bireysel ve öğrenme odaklı olmasında katkısı büyüktür. Öğrencilerin motivasyonlarını pozitif yönde etkiler. Bilgilerin organizasyonunu ve sunumunu kolaylaştırır. Takım çalışmaları için oldukça uygundur.

## Sonuç

Hiper metinlerin yabancı dil öğrenimi için birçok faydası bulunmaktadır. Çağımızın teknoloji çağı olduğunu kabul ederek dil derslerinde hiper metinlerin kullanımını yaygınlaştırmak gerekir. Sonuç olarak hiper metinler yabancı dil derslerinde şunları yerine getirmektedir (Roche, 2004):

- Hiper metinler modern etkileşimli dil öğretimi anlamında otantiktirler. Yani derslerin gerçeğe yakın işlenmesine katkıda bulunurlar.
- Öğrencilerin geleneksel yöntemlere göre bilgiye daha kolay ulaşmalarını ve bilginin kalıcılığını sağlar. Böylece farklı metin türlerine olan ilgileri artar ve yabancı dilde üretmelerine katkıda bulunur.
- Her öğrenci dili öğrenirken eşit seviyede öğrenemez. Bir öğrenci okumada iyiyken, diğer öğrenci konuşmada iyi olabilir. Bu göz önüne alındığında hiper metinler her öğrencinin seviyesine hitap eder.
- Öğrenciler dili öğrenirken ihtiyacı olan bilgiyi seçme özgürlüğüne sahiptir.
- Etkileşimli modern dil öğretimi olarak öğrencilerin dili/konuyu öğrenmeye olan ilgilerini artırır ve yaratıcı olmalarını sağlar. Buda öğrencilerin daha fazla bağımsız çalışabilmelerine katkıda bulunur.
- Hiper metinler farklı öğrenme tiplerine hitap eder, yani öğrenciye uyarlanabilir.
- Hiper metinler yapılandırmacı öğretim modellerine uygundur.
- Hiper metinler öğrencilerin kendi öğrenme süreçleri üzerine güçlü bir özerklik sağlar ve böylece kendi eksiklikleriyle motive olurlar. Motive olmuş bir öğrencinin dili öğrenmesi daha kolay olur.
- Öğrenciler hiper metinleri okuma esnasında linkler arası geçiş yaparak, kendi metinlerini oluşturabilirler.

## Kaynaklar

- Dağ. F.& Geçer. A.(2007). Uyarlanır Hiper Ortamların Eğitim Sistemine Getirdiği Katkılar. *Ulusal Teknik Eğitim Bilimleri Genç Araştırmacılar Sempozyumu Bildiri Kitabı* (UMES 2007).21-23 Haziran 2007, Kocaeli Üniversitesi, Cilt 2, 929-933
- Fritz. G. (1999). Coherence in Hypertext. In: Bublitz, W., Lenk, U. & Ventola, E. (Hgg.). *Coherence in Spoken and Written Discourse: How to Create it and How to Describe it*. Amsterdam: John Benjamins.
- Huber. O. (2003). Hyper-Text-Linguistik, TAH:Ein textlinguistisches Analysemodell für Hypertexte, Theoretisch und praktisch exemplifiziert am Problemfeld der typisierten Links von Hypertexten im www. München: Herbert Utz Verlag.
- Jonassen, D. H.&Cliffs, E. (1989). Hypertext/Hypermedia. New Jersey: Educational Technology Publications.
- Jonassen, D. H. (1986). Hypertext principles for text and courseware design. *Educational Psychologist* 2, 4 :269-292.
- Karadeniz. Ş. (2006). Öğretim Amaçlı Hiper Metin, Hiper Ortam ve Çoklu Ortamlar İçin Tasarım İpuçları. *Yüzüncü Yıl Üniversitesi Eğitim Fakültesi Dergisi*. Haziran 2006. Cilt: III, Sayı: II. 12-33
- Karasar, Ş. (2004). Eğitimde Yeni İletişim Teknolojileri: İnternet ve Sanal Yüksek Eğitim. *The Turkish Online Journal of Educational Technology* – TOJET October 2004, Volume 3, Issue 4 Article 16
- Kuhlen, R. (1991). Hypertext : ein nicht-lineares Medium zwischen Buch und Wissensbank. Berlin: Springer.
- Mainka, M. (2002). E-Learning im Deutschunterricht – Beispiel Telelernen Grundlagen und Anwendung. Inaugural-Dissertation zur Erlangung des Doktorgrades der Philosophie an der Ludwig-Maximilians-Universität München. 28.05.2014 tarihinde [http://edoc.ub.uni-muenchen.de/614/1/Mainka\\_Michael.pdf](http://edoc.ub.uni-muenchen.de/614/1/Mainka_Michael.pdf) adresinden alınmıştır.
- Nielsen, J. (1990). Hypertext and Hypermedia. Boston: Academic Press.
- Nielsen, J. (1995). Multimedia and Hypertext: The Internet and Beyond. Elsevier Ltd.
- Roche, J. (2004). Text and Hypertext. In: Foschi Albert, M., Hepp, M. & Neuland, E. (Hrsg.). *Texte in Sprachforschung und Sprachunterricht. Pisaner Fachtagung 2004 zu neuen Wegen der italienisch-deutschen Kooperation*. Iudicium, 183-197.
- Schubert. C. (2008). Englische Textlinguistik. Eine Einführung. Berlin: Erich Schmidt Verlag.
- Storrer. A. (2000). Was ist 'hyper' am Hypertext? In: Kallmeyer, W. (Hg.). *Sprache und Medien*. Berlin: Walter de Gruyter.
- Tergan, S. O. (1997). Multiple views, contexts, and symbol systems in learning with hypertext/hypermedia: A critical review of research. *Educational Technology*, July-August: 5-18.
- Verreck, W.A.&Lkoundi, A. (1990). From instructional text to instructional hypertext: An experiment. In: Mandl, H./ Jonassen, D.H. 263-276.
- Weis. U. (2000). Lesen in der Fremdsprache Deutsch. Eine empirische Studie zum Lesen linearer Texte im Vergleich zu Hypertexten.



Hamburg: LibriBooks on Demand Verlag.  
Winter, A. (1998). Arbeiten an und mit Hypertexten. Unterrichtswissenschaft 26/1, Heft 3, S. 32-50, Juventa Verlag GmbH.  
Żebrowska, E. (2013). Text-Bild-Hypertext. Frankfurt am Main: Peter Lang Edition.

INTE 2014

# How big is the world you can explore? A study of Chinese college students' search behavior via search engines

Tao Fu<sup>a</sup>, Kavita Karan<sup>b</sup>

<sup>a</sup> University of International Business and Economics, No. 10 Huixin Dongjie, Chaoyang District, Beijing, 100029, China

<sup>b</sup> Southern Illinois University Carbondale, 1100 Lincoln Drive, Carbondale, IL 62901, U.S.A.

---

## Abstract

This study examines how Chinese college students in China and abroad seek information via two search engines, Baidu and Google. An online survey of 257 college students found Baidu to be more popular mainly because users were familiar with its interface, and preferred its extensive Chinese resources, while Google was exceptional in offering English results and contributing to global visions. Educational levels affected the kind of information students' sought, their opinions on firewall and online censorship. The longer they studied abroad and the more educated they were, the more likely students would prefer Google to Baidu.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** information-seeking; search engines; Google; Baidu; Chinese college students

---

## Introduction and literature review

The application of the information and communication technologies (ICTs) to education has made reaching the unreachable possible all around the world (UNDP, 2005). The flexibility, low cost, and convenience of ICTs have made them widely popular for education in rural areas (Li, Duan, Fu & Alford, 2012), distance education (Karan, 2013), curriculum integration, teacher's professional development (Zhao & Xu, 2010) and e-textbooks or e-schoolbags (Wu & Ma, 2013). Learners benefit from the breadth and richness of learning and the accommodation of differences in learning styles (Carroll, 2011).

Inspired by the strategy of *ke jiao xing guo*, or invigorating China through science and education, Chinese universities saw the set-up of the "China Education and Research Network" (CERNET) from 1994 to the 2000s (Zhao & Jiang, 2010). The e-campus, or "an institution based on a campus network and the integration of digital resources, building up an e-educational administration portal, e-learning, distance education and multimedia broadband network, campus management information system" (Zhao & Jiang, 2010, p. 575), mushroomed in Chinese higher educational institutions. Students use online courseware to learn and review, exchange information and opinions via the Bulletin Board Systems (BBS), and access library resources via the campus computer network.

With the diffusion of the ICTs, e-learning has transformed into m(mobile)-learning and u(ubiquitous)-learning (Hwang, Tsai, & Yang, 2008). Information-retrieval is pivotal in this process. As a primary source, search engine facilitates information-seeking (Bilal, 2000; 2012). "Search engine is a searching tool providing information searching service to users, which can search, abstract, organize and process the internet information by referring to certain strategies and using specific computer programs" (Hou, Li, & Wen, 2010, p. 229). For digital natives, search engines are a ubiquitous electronic encyclopedia since learning happens at anytime and anywhere (Hwang, Tsai, & Yang, 2008). Search engines, such as Google, often include Wikipedia in the first several search results (Leaver, 2009). Students search to satisfy curiosity, solve problems and complete tasks (Yin et al., 2013). This learning-by-searching cognitive process (Yin et al., 2013) shows student's initiative in

---

· Corresponding author. Tel.: +1-618-967-5894  
E-mail address: kavita@siu.edu

acquiring knowledge (Hwang, Tsai, Tsai, & Tseng, 2008).

Chinese search engine users had reached 470 million at the end of June, 2013 (CNNIC, 2013). China Internet Network Information Center (CNNIC, 2013) found 98 percent of Internet users used comprehensive search engines<sup>97</sup> in the past half year. Comprehensive Search takes the lead with 43.1 percent of the market share, followed by Weibo or Microblogging search (17.3%)<sup>98</sup>, video website search (13.4%), and online shopping site search (9.9%) (CNNIC, 2013). Among search engine websites, almost all users accessing the Internet via computers used Baidu (97.9%), which means it outcompeted other competitors, such as Google (37.3%), 360 (31.5%), and Sogou (28.2%) (CNNIC, 2013). In the same vein, Baidu (96.3%) and Google (18.1%) took the first two places among cell phone search engine users (CNNIC, 2013). Although Google ranked the second place after Baidu in terms of penetration rate, it was the first-choice search engine to only 2.4 percent of computer users and 2.0 percent of cell phone users, compared to Baidu's 85.7 percent and 89.1 percent respectively (CNNIC, 2013). In terms of revenues, in the second quarter of 2013, Baidu reaped 81.4 percent, followed by Google (14.4%), Sogou (3.3%), and Soso (1.3%) (iResearch, 2013). Search engines have overtaken the library databases and physical libraries to become the most frequently used method for Chinese college students to seek information (Zhao, 2008).

Bilal (2000, 2012) scrutinized how children used search engines specially designed for kids. Kumar and Kumar (2012) examined how Indian academics used search engines to retrieve information. Jiang (2014)'s comparison of Baidu and Google disclosed how search engines may be altered to serve political purposes and self-interest. Alshare, Miller, and Wenger (2005) focused on college students' frequency of using search engines and their search features. Griffiths and Brophy (2005) found British students preferred commercial search engines. However, given the competitive nature of Chinese and English Search engines and regulations, no research has been done on how Chinese college students used search engines for educational purposes, which this study aimed to investigate.

RQ1: What are the patterns of search engines usage by Chinese college students?

Bonfadelli (2002) found people of high socioeconomic status (SES) in Switzerland were more information-oriented, but people of low SES were more entertainment-oriented when using the Internet. Hargittai and Hinnant (2008) suggested that young Americans with higher levels of education and of a more resource-rich background used the Internet more for activities that enhance their social capitals.

H1: Educational levels affect the type of information Chinese college students seek via search engines.

In view of the market share and popularity of Baidu and Google as seen above, this study focused on these two search engines for passing information and references to their peers. The popularity of Baidu stems from its ability in understanding cultural nuances, especially the Chinese language (Einhorn, Lee & Womack, 2010; Stone & Einhorn, 2010), and China's laws and restrictions on Google (Kaplan, 2013; Tan & Tan, 2012).

Robin Li, who co-founded Baidu in 2000, attributed Baidu's success to providing all the needed pages Chinese Internet users were looking for (Krazit, 2009). He even claimed, "If you can't find it on Baidu, you can't find it anywhere else" (Krazit, 2009).

Baidu understands the local market better and adapts to the needs of Chinese users faster than its rivals (Tan & Tan, 2012). It is more capable of parsing search terms in Chinese (Stone & Einhorn, 2010). Chinese and English have different language structures; Chinese is ideographical and character-based, while English is alphabetical and word-based (Chau, Fang & Yang, 2007). A word is composed of one or more characters with polysemy in Mandarin. To get the results that the Internet user is looking for, the search engine needs to understand the exact meaning of the search request (Madden, 2010).

Baidu understands consumer behaviors, and provides tools Internet users need in a search engine (Madden, 2010) and what is popular in the U.S. with customized Chinese characteristics (Stone & Einhorn, 2010). There are 11 links on Baidu's home page. Services specially designed to cater to the local taste include "*Baidu Knows*" - a Q&A service, "*Baidu Post-Bar*" - a popular bulletin board, and "*Baidu Encyclopedia*" - a made-in-China alternative to Wikipedia (Stone & Einhorn, 2010).

In addition to access, nationalist feelings may also be a factor that drives Chinese Internet users to websites designed by Chinese Internet companies (Madden, 2010; Thompson, 2006). Local consumers' nationalism may be a barrier to an enterprise that explores overseas markets (Dong & Tian, 2009; Li, 2009). Consumers rendered

<sup>97</sup> According to CNNIC, comprehensive search sites refer to traditional search engines, such as Baidu, Sogou, and Google, which provide any search results after keyword is entered.

<sup>98</sup> Based on the times users have searched.

nationalism in various ways to attach different meanings to Western brands and realize their imaginings of the Chinese nation. With a history of anti-foreign resentment, China is the place where nationalism germinates (Gao, 2012). Chinese have learned the lesson of imperialist invasions since the Opium War in 1840. The National Products Movement during the late 1920s instilled the conception that foreign products were treasonous and China-made goods patriotic (Gerth, 2003). The recent concerns have been the influx of foreign products and services that tend to jeopardize national security and threaten domestic business (Akhter, 2007). Dong and Tian (2009) suggested that “Chinese nation making via branded consumption choice continues” (p. 506), which reflected on how China had become one of the biggest markets for luxury brands (Economist, 2013; Li, Li & Kambele, 2012). In some narratives, the West and Western brands were taken as imperialist oppressors and instruments of domination (Dong & Tian, 2009). Is the search engines use a reflection of the spirit of nationalism or is it because of the limited access to other search engines?

RQ 2: What factors contribute to Baidu’s popularity among Chinese college students?

Google China became a licensed Internet service provider in China since December 2005 (Thompson, 2006). The search portal service for Chinese Internet users, Google.cn, was launched on January 27, 2006 (Tan & Tan, 2012; Thompson, 2006). Compared with Baidu, Google is more popular among white-class urban professionals who use English, like Western lifestyle, and pursue cosmopolitanism (Thompson, 2006). This resonates with Batra, Ramaswamy, Alden, Steenkamp and Ramachander (2000) in that foreign brands can attract the cosmopolitan elites with its symbolism of status-enhancing, exoticism and the desire for becoming a member of the global community. Although Google lagged behind Baidu in market share, the loyalty of Google users ranked first, according to iResearch (2012)’s study on China search engine user’s behavior. Google is also “the strongest site for conducting searches in English, which happens a lot in China” (Einhorn, Lee & Womack, 2010, p. 40).

H2: Educational levels affect Chinese students’ choice of Google or Baidu.

Censorship had been one of the concerns before Google came to China and contributed to its final decision to exit from mainland China, and redirect its services to Hong Kong (Tan & Tan, 2012). In 2002, Google was blocked for about two weeks, after which traffic coming into China from the world slowed down because of the Great Firewall (Thompson, 2006). Internet users who searched for banned items via Google experienced delays and shutdowns of several minutes that was detrimental to search engines that were supposed to provide results in milliseconds (Thompson, 2006). But Baidu, with its servers in China and within the Great Firewall, had no such problems (Thompson, 2006). Sergey Brin, a co-founder of Google, and his team decided to provide Google.cn to offer quick but censored search results and keep the uncensored Google.com available although the response sometimes was retarded (Thompson, 2006).

In 2010, Google announced that it had been the victim of “security attacks” and “online surveillance” in China (Tan & Tan, 2012, p. 470). Google moved its servers to Hong Kong to stop self-censoring in mainland China. Since then, when google.cn is entered at the address bar, the browser will be automatically directed to google.com.hk in mainland China (Tan & Tan, 2012). It means users in mainland China cannot access google.com without turning to proxy servers or other devices for help. Research results generated on google.com.hk and google.com are not identical.

Internationally, 45 percent of British students used Google as their first choice when retrieving information (Griffiths & Brophy, 2005). With Yahoo, Google received excellent overall rankings (Alshare, Miller & Wenger, 2005). Google was also the most popular search engine among faculty in an agriculture and technology university in India (Kumar, 2010) and medical students in Pakistan (Jadoon et al., 2011).

RQ 3: What factors contribute to Google’s popularity among Chinese college students?

RQ4: Does online censorship affect what Chinese college students can access via search engines and their choice of search engines?

Global education has great importance in today’s interconnected and globalized world. “Global awareness enhances students’ abilities to work collaboratively with persons of diverse backgrounds” (Crawford & Kirby, 2008, p. 57) and “to understand and seek solutions to global issues” (Crawford & Kirby, 2008, p. 57). The uncensored cyberspace with free information flows would function like the market place of ideas, which would in turn help foster Chinese college students’ global perspectives. However, some social networking sites (SNSs) and file sharing sites, including Twitter, Facebook, and YouTube, are blocked in China (Lum, Figliola & Weed, 2013). The websites of English news organizations, such as the *New York Times* and *Bloomberg Businessweek*

have been blocked since 2012 (Branigan, 2012). Most recently, Chinese authorities started to intensify the control over online streaming industry (Watt, 2014). According to Google, China blocked Gmail by making access to it either slow or inaccessible at all (Kan, 2011). Another obstacle to the students could be that they can only access websites with Chinese domain names in many Chinese higher education institutions. If they want to surf on websites with a non-Chinese IP, they would be charged an additional amount of money (Gao, 2013). The services or links available at Google include, but are not limited to, +You, Search, Images, Maps, Gmail, Play, YouTube, News, and Scholar (Table 1).

H3: Chinese college students in China use fewer services at Google than those studying abroad.

Table 1  
Google Services/Links

+You	Real-life sharing, rethought for the web
Search	Search billions of web pages
Images	Search for images on the web
Maps	View maps and directions
Gmail	Fast, searchable email with less spam
Play	Your music, movies, books, and Android apps available anywhere
YouTube	Watch, upload and share videos
News	Search thousands of news stories
Scholar	Search scholarly papers

Source: <https://www.google.com/intl/en/about/products/>

One of the repercussions of limited access to the Internet is Chinese college students gradually get used to the Internet status quo, which means they seldom get information from websites with non-Chinese domain names. They use Chinese portals such as Sina and Sohu for news and Renren and Weibo for social networking. With Google moving its servers to Hong Kong, about 85 percent of the Internet users in China use Baidu (Margolis, 2011). As a user said, "...if you want to know something about China, why would you ask a foreigner or trust what he says? In China, we say, 'If you want to know something, just Baidu.' Nobody would say, 'Just Google'" (Margolis, 2011, p. 38).

Guo and Wu's (2009) study showed that urban Chinese youth did not demonstrate a strong desire to access foreign-language media, which is a result more of a lack of English proficiency than the government's blockage. The media consumption among Chinese youth did not help shape their global visions of foreign countries (Guo & Wu, 2009). Considering the need for improved English proficiency and easier access to uncensored search results, hence:

H4: The longer Chinese students stay abroad, the more likely they would choose Google rather than Baidu.

## Method

Survey method (Wimmer & Dominick, 2009) was used to collect data from Chinese students from China and other countries. An online survey comprising of 27 questions was conducted from January 19 to March 11, 2014, on [www.sojump.com](http://www.sojump.com), a professional online survey site. Survey requests were sent to researchers' personal contacts in colleges and universities in Beijing and northeastern China and students in the United States with a combination of purposeful sampling and snowball sampling. The criterion was that the subjects should be Chinese college students studying in China and abroad. Students have access to more websites without being blocked, and have to use English more frequently after going abroad, which may affect their usage patterns and choice of search engines. The questionnaire was in English considering the participants' English proficiency, as college students, should be able to help them understand all questions. For questions with English words that may be difficult, Chinese translation was offered. The contacts either took the survey themselves or forwarded the questionnaire to other college students they knew of, or both.

A total of 283 responses were received. Incomplete responses were deleted. In the end, 257 (90.8%) effective questionnaires were generated for analysis. The data were analyzed using the Statistical Package for the Social Sciences (SPSS). The tests were conducted to find the level of significance, and wherever needed data were condensed to study the behavior patterns of search engine usage. Five items (maps, restaurants, traveling, shopping, and friends nearby) were combined as 'social'; three items (scholarly articles, knowledge Q&A, and encyclopedia) as 'educational'; and another five items (music clips, video clips, games, literature, and celebrities) as 'entertainment' by calculating the Cronbach's alpha to find out the types of information that college students accessed the search engines.

## Findings

Among the 257 respondents, about one third (35.0%) were males and the other two thirds (65.0%) were females. It was found that most of the universities to which the participants were affiliated had a bigger female population. The educational background of the participants scaled down from undergraduate (57.6%), master's (28.0%), doctoral (13.4%), including post-doctoral, students. More than half (56.0%) of the participants had never been abroad. They were affiliated with nationally top-ranking Chinese universities and some provincial colleges. The others have been abroad for several months up to five or six years. The great majority (98.1%) of the overseas participants was studying or had studied in at least seven states in the United States and some were from the United Kingdom, Canada and Hong Kong. Although Hong Kong is a special administrative region of China, considering the freer Internet access, this sample was taken as an overseas student in this study. About half (44.7%) of the participants have been connected to the Internet for over 10 years.

RQ1: What are the patterns of search engines usage by Chinese college students?

Participants in this study were veteran users of search engines. Only less than one tenth (9.7%) of the participants used search engines for less than four years.

Table 2  
Chinese Search Engine Usage in the Three Months before the Survey

Chinese search engines	Number of responses	Percent of responses	Percent of cases
Baidu	250	41.5	97.3
360	115	19.1	44.7
Youdao	106	17.6	41.2
Sogou	87	14.4	33.9
Soso	30	5.0	11.7
Easou	4	0.7	1.6
Yicha	2	0.3	0.8
Others	9	1.5	3.5

In the three months before the survey, participants used Baidu more than any other Chinese search engines based on a multiple-choice question. *360*, the search engine run by Qihu 360, a company known for its antivirus software; *Youdao*, released by the portal website, NetEase; and *Sogou*, launched by another portal website, Sohu, and gained popularity for its Chinese input, had certain loyal users, too. Other search engines such as *Soso*, *Easou*, and *Yicha* each accounted for less than 5 percent (Table 2). Among English search engines, Google (66.6%) outnumbered Bing (16.2%) and Yahoo (15.1%) by a huge margin (Table 3).

When searching at Baidu, 95.7 percent of users preferred using Chinese more frequently than English. More than two-thirds (69.7%) of users used English more frequently than Chinese when Googling.

Table 3  
English Search Engine Usage in the Three Months before the Survey

English search engines	Number of responses	Percent of responses	Percent of cases
Google	243	66.6	94.6
Bing	59	16.2	23.0
Yahoo	55	15.1	21.4
Others	8	2.2	3.1

H1: Educational levels affect the type of information Chinese college students seek via search engines.

The Cronbach's alpha was calculated to find out the types of information that college students accessed the search engines. The Cronbach's alpha for the 5 items (maps, restaurants, traveling, shopping, and friends nearby) reached an "acceptable" level (George and Mallery, 2003) ( $\alpha = .67$ ), so the 5 items were averaged into one composite variable named as "social" ( $M = 3.37$ ,  $SD = .71$ ). In the same vein, because the Cronbach's alpha for 3 items (scholarly articles, knowledge Q&A, and encyclopedia) reached a "good" level (George and Mallery,

2003) ( $\alpha = .76$ ), they were averaged into one composite variable named as "educational" ( $M = 3.79$ ,  $SD = .82$ ). The Cronbach's alpha for another 5 items (music clips, video clips, games, literature, and celebrities) was "acceptable" (George & Mallery, 2003) ( $\alpha = .61$ ), so these items were averaged into another composite variable "entertainment" ( $M = 3.43$ ,  $SD = .61$ ).

Then a one-way MANOVA was used to examine the association among three educational levels (undergraduate, graduate-master's, and graduate-doctoral) and the three composite variables (social, educational, and entertainment). The multivariate result was significant,  $F(6, 504) = 4.96$ ,  $p < .001$ , Wilk's  $\Lambda = .89$ , partial  $\eta^2 = .06$ , indicating a difference in the type of information sought via search engines by Chinese college students at all levels (Table 4).

Table 4  
Educational Level and the Selection of Search Engine Functions

Functions	Educational Level	M	SD	n
Social	undergraduate	3.25	.73	148
	master's	3.60	.65	32
	Ph.D.	3.39	.64	37
Educational	undergraduate	3.63	.85	148
	master's	3.96	.74	32
	Ph.D.	4.05	.72	37
Entertainment	undergraduate	3.42	.58	148
	master's	3.55	.64	32
	Ph.D.	3.24	.61	37

Given the significance of the overall test, the univariate main effects were examined. Significant univariate main effects for educational level were obtained for social information,  $F(2, 254) = 6.30$ ,  $p < .01$ , partial  $\eta^2 = .05$ , power = .90; educational information,  $F(2, 254) = 6.63$ ,  $p < .01$ , partial  $\eta^2 = .05$ , power = .91; and entertainment information,  $F(2, 254) = 3.32$ ,  $p < .05$ , partial  $\eta^2 = .03$ , power = .63. So H1 was confirmed.

RQ 2: What factors contribute to Baidu's popularity among Chinese college students?

For those who chose Baidu as their first-choice search engine, it was a result more out of a habit. They started with Baidu and became more used to its interface. Baidu's competence in offering extensive search results in the Chinese language contributed to its popularity. The support for domestic products and Chinese enterprises was the third reason for the participants to choose Baidu and its filtering of information did not bother the participants very much (Table 5).

H2: Educational level affects Chinese students' choice of Google or Baidu.

A chi-square test showed that the more educated the Chinese college students were, the more likely that they would choose Google over Baidu,  $\chi^2(2) = 37.25$ ,  $p < .001$  (Table 6). H2 was supported.

Table 5  
Factors to Baidu's Popularity

Reasons for choosing Baidu	Number of responses	Percent of responses	Percent of cases
Familiarity with the interface	88	25.3	66.7
Access to Chinese resources	66	19.0	50.0
Support to domestic products	55	15.8	41.7
Bad Google connection	39	11.2	29.5
Multifunctions at one site	38	10.9	28.8
Results optimization	34	9.8	25.8
Free music download	20	5.7	15.2
Less censorship	8	2.3	6.1

Table 6  
Educational Level and the Choice of Baidu or Google

		Undergraduate	Master's	Ph.D.	Total
Baidu	Count	100	23	9	132
	Percent	75.8%	17.4%	6.8%	51.4%
Google	Count	48	49	28	125
	Percent	38.4%	39.2%	22.4%	48.6%

RQ 3: What factors contribute to Google's popularity among Chinese college students?

Google gained its popularity among Chinese college students because it could provide the best search results

in English. They also wanted to learn more about different opinions with Google's results from all around the world to get an international perspective and make them more cosmopolitan. Academic articles generated by Google were helpful to college students who were pursuing academic work. Participants chose Google more out of its functions than habit, since the number of participants choosing familiarity with the interface as the reason for using Google was low (Table 7).

Table 7  
Factors for Google's Popularity

Reasons for choosing Google	Number of responses	Percent of responses	Percent of cases
Best results in English	85	26.7	68
To be more cosmopolitan	68	21.4	54.4
Links to academic articles	61	19.2	48.8
Results optimization	54	17.0	43.2
Familiarity with the interface	34	9.8	25.8
Multi-functions at one site	31	9.7	24.8

RQ4: Does online censorship affect what Chinese college students can access via search engines and their choice of search engines?

Most participants agreed that online censorship affected what they could access via search engines a lot (28.8%) or sometimes (52.9%). Another 11.7 percent of respondents were not affected by censorship.

As for censorship and the choice of search engines, 41.2 percent said "a lot" and 35.8 percent "sometimes". The rest did not care or thought there was not any connection between these two variables.

H3: Chinese college students in China use fewer services at Google than those studying abroad.

A MANOVA was used to examine whether studying in China and abroad had significant effects on Chinese college students' access to and use of different Google services. There was a statistically significant difference in access to and use of Google services based on whether students studied in China or abroad,  $F(9, 247) = 24.84$ ,  $p < .001$ , Wilk's  $\Lambda = .53$ , partial  $\eta^2 = .48$ . Given the significance of the overall test, the univariate main effects were examined. Specifically, whether Chinese college students studied in China or abroad had a statistically significant effect on their use of +You ( $F(1, 255) = 9.27$ ;  $p < .005$ ; partial  $\eta^2 = .04$ ), Search ( $F(1, 255) = 48.41$ ;  $p < .001$ ; partial  $\eta^2 = .16$ ), Images ( $F(1, 255) = 36.42$ ;  $p < .001$ ; partial  $\eta^2 = .13$ ), Maps ( $F(1, 255) = 107.80$ ;  $p < .001$ ; partial  $\eta^2 = .30$ ), Play ( $F(1, 255) = 7.69$ ;  $p < .01$ ; partial  $\eta^2 = .03$ ), YouTube ( $F(1, 255) = 135.34$ ;  $p < .001$ ; partial  $\eta^2 = .35$ ), News ( $F(1, 255) = 13.54$ ;  $p < .001$ ; partial  $\eta^2 = .05$ ), Gmail ( $F(1, 255) = 110.57$ ;  $p < .001$ ; partial  $\eta^2 = .30$ ), and Scholar ( $F(1, 255) = 42.93$ ;  $p < .001$ ; partial  $\eta^2 = .14$ ) (Table 8).

Table 8  
Geographic Locations and Use of Google Services

Google Service	Location	M	SD
+You	In China	1.74	.91
	Abroad	2.13	1.15
Search	In China	3.35	1.07
	Abroad	4.27	1.01
Images	In China	2.78	1.05
	Abroad	3.59	1.09
Maps	In China	2.72	1.09
	Abroad	4.09	1.01
Play	In China	2.08	1.01
	Abroad	2.43	1.04
YouTube	In China	2.03	1.14
	Abroad	3.75	1.21
News	In China	2.52	1.05
	Abroad	3.03	1.15
Gmail	In China	2.45	1.33
	Abroad	4.10	1.13
Scholar	In China	2.58	1.25
	Abroad	3.60	1.21

H4: The longer Chinese students stay abroad, the more likely they would choose Google rather than Baidu.

A chi-square test showed that the longer Chinese students stayed abroad, the more unlikely they would choose Baidu,  $\chi^2(4) = 53.39$ ,  $p < .001$ . The hypothesis was supported (Figure 1).



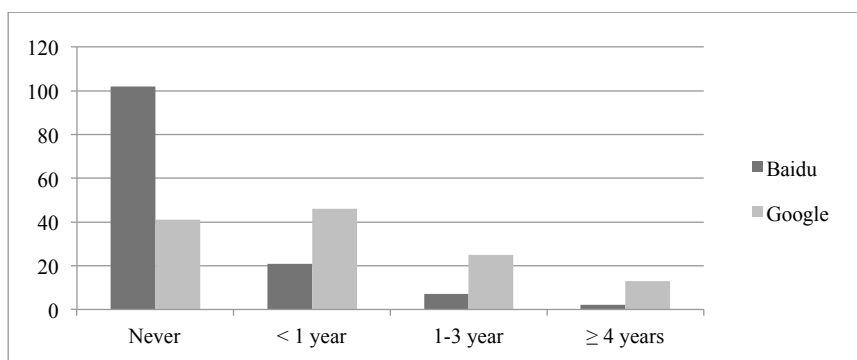


Figure 1. Length of going abroad and the choice of Baidu and Google

## Discussion & Conclusions

The current study showed that Chinese college students, at home and abroad, are veteran users of the Internet and search engines. Baidu and Google each had its loyal customers. Baidu gained its popularity because of its earlier exploration of the market as a domestic company, its competence in providing Chinese search results, and the customer's nationalistic support to domestic products. This resonated with CNNIC (2014)'s findings that habits, user experiences, brand names and emotional factors influenced which search engine to use. Chinese college students' fondness of Google originated from Google's extensive online results in English, its uncensored and varied opinions, and links to academic articles. Because of these features, Chinese college students tended to use English when Googling. More often, they used Chinese when searching at Baidu. Google users were more likely to be better educated and have studied abroad longer. Undergraduate students who had never been abroad were more likely to be Baidu users. Better-educated Chinese college students used search engines to look for academic articles and knowledge than their less-educated peers.

The results highlighted the importance of English proficiency to the choice of search engines. Lack of English competence would constrain Chinese college students' access to more diversified results from all around the world, especially considering the increasing use of English in academic publishing internationally (Lillis & Curry, 2010). The recent plan of reducing the total value of English from 150 points to 100 in the national university entrance examinations in 2016 would shift the attention and importance to Chinese, the language, whose value proposed to be increased from 150 to 180 (Kaiman, 2013). This will further debilitate Chinese college students' international competitiveness in the academic field and job market.

Censorship affected participants' choice of search engines, and what they could access via search engines. Moreover, censorship and blocking of social networking sites (SNSs) such as Facebook and specific content-related sites such as YouTube, would limit Chinese college students' access, exposure and interaction to important international events, information and people. Saw, Abbott, Donaghey and McDonald (2013) found that both international students from Canada, Malaysia, Norway, etc. and domestic students at Bond University, Australia, use SNSs for educational purposes. For both international and domestic students, the most popular SNS is Facebook, followed by YouTube, Twitter, and LinkedIn (Saw et al., 2013). Hargattai (2008) found choice of SNSs may limit individuals' opportunities to interact with those from different backgrounds. Being cut off from an international academic community, Chinese college students could only confine their education to a Chinese circle, especially in terms of instantaneous interaction.

Some participants have realized the negative effects of censored search results. As a respondent commented, it is "too bad, leaving us like deaf and dumb, ignorant, biased, self-conceited". Another referred to the Great Firewall of China as "a wall between people. Sometimes it protects them, but most times it isolates them." Interestingly, some respondents either did not care about this issue or thought censorship was "understandable" since "every country has its own way to maintain a safe environment for their citizens. According to one of the participants, "Though Firewall affects people's access to global information from other countries, it does not influence a lot [of our work]."

This study only looked into general search engine usage and their opinions on censorship by Chinese college students. Future research may focus on how students use search engines for educational purposes in a task-based way to get more concrete results. Most overseas Chinese students in this study had been abroad for less than a year and hence a comparison of their search engine use before and after they went abroad may not be salient enough at this point. Future study may concentrate on examining the same sample group's change in search engine use in these two time slots.

## References

- Alshare, K., Miller, D. and Wenger, J. (2005). An exploratory survey of student perspectives regarding search engines. *Delta Pi Epsilon Journal*, 47(2), 75-82.
- Akhter, S. H. (2007). Globalization, expectations model of economic nationalism, and consumer behavior. *The Journal of Consumer Marketing*, 24 (3), 142-150.
- Batra, R., Ramaswamy, V., Alden, D. L., Steenkamp, J. M., & Ramachander, S. S. (2000). Effects of brand local and nonlocal origin on consumer attitudes in developing countries. *Journal of Consumer Psychology*, 9 (2), 83-95.
- Bilal, D. (2000). Children's use of the Yahoo! Web search engine: I. Cognitive, physical, and affective behaviors on fact-based search tasks. *Journal of the American Society for Information Science*, 51(7), 646-665.
- Bilal, D. (2012). Ranking, relevance judgment, and precision of information retrieval on children's queries: Evaluation of Google, Yahoo!, Bing, Yahoo! Kids, and Ask Kids. *Journal of the American Society for Information Science & Technology*, 63(9), 1879-1896. doi:10.1002/asi.22675
- Bonfadelli, H. (2002). The Internet and knowledge gaps: A theoretical and empirical investigation. *European Journal of Communication*, 17, 65-85.
- Brangan, T. (2012, October 26). New York Times blocked by China after report on wealth of Wen Jiabao's family. *The Guardian*. Retrieved from <http://www.theguardian.com/world/2012/oct/26/new-york-times-china-wen-jiabao>
- Carroll, J. (2011). From encyclopedias to search engines: Technological change and its impact on literacy learning. *Literacy Learning: the Middle Years*, 19(2), 27-34.
- Chau, M., Fang, X., & Yang, C. C. (2007). Web searching in Chinese: A study of a search engine in Hong Kong. *Journal of the American Society for Information Science & Technology*, 58 (7), 1044-1054. DOI: 10.1002/asi.20592
- CNNIC (2013). A study report of Chinese Internet users' search behaviors 2013. (2013 zhongguo wangmin sousuo xingwei yanjiu baogao). Retrieved from <http://www.cnnic.cn/hlwfzyj/hlwxzbg/ssbg/201308/P020130828331153376173.pdf>
- CNNIC. (2014, January). The 33rd Statistical Report on Internet Development. (2014 zhongguo huanliang wangluo fazhan zhuangkuang tongji baogao). Retrieved from <http://www.cnnic.net.cn/hlwfzyj/hlwxzbg/hlwtjbg/201401/P020140116395418429515.pdf>
- Crawford, E. O., & Kirby, M. M. (2008). Fostering students' global awareness: Technology applications in social studies and learning. *Journal of Curriculum and Instruction*, 2(1), 56-73.
- Dong, L. & Tian, K. (2009). The use of Western brands in asserting Chinese national identity. *Journal of Consumer Research*, 36, 504-523. DOI: 10.1086/598970
- Economist, The. (2013, June 8). Luxury goods in China: Beyond bling. Retrieved from <http://www.economist.com/news/business/21579015-life-getting-harder-purveyors-luxury-china-growth-prospects-are-still>
- Einhorn, B., Lee, M., & Womack, B. (2010). Google stays in China. And Baidu keeps on winning. *Bloomberg Businessweek*, (4188), 39-40.
- Gao, Y. (2013, July 27). *Qiangnei de zhongguo gaoxiao jiujiu shao le shenme?* (What do Chinese higher education institutions within the "wall" lack of?) Retrieved from <http://cn.nytimes.com/education/20130727/cc27gaoyuxin/>
- Gao, Z. (2012). Chinese grassroots nationalism and its impact on foreign brands. *Journal of Macromarketing*, 32(2) 181-192. DOI: 10.1177/0276146711428808
- George, D., & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference. 11.0 update* (4th ed.). Boston, MA: Allyn & Bacon.
- Gerth, K. (2003). *China made: Consumer culture and the creation of the nation*. Cambridge, MA: Harvard University Press.
- Griffiths, J.R., & Brophy, P. (2005). Student searching behavior and the web: Use of academic resources and Google. *Library Trends*, 53(4), 539-554.
- Guo, K., & Wu, Y. (2009). Media consumption and global visions among urban Chinese youth. *China Media Research*, 5(4), 80-94.
- Hargattai, E. (2008). Whose space? Differences among users and non-users of social network sites. *Journal of Computer-Mediated Communication*, 13, 276-297.
- Hargattai, E., & Hinnant, A. (2008). Digital inequality: Differences in young adults' use of the Internet. *Communication Research*, 35(5), 602-621. DOI: 10.1177/0093650208321782
- Hou, H., Li, H., & Wen, J. (2010). A comparative study for search engines' business model: Base on the case of Baidu and Google. 2010 International Conference on E-Business and E-Government, 228-232.
- Hwang, G. J., Tsai, C. C. & Yang, S. J. H. (2008). Criteria, strategies and research issues of context-aware ubiquitous learning. *Educational Technology & Society*, 11(2), 81-91.
- Hwang, G. J., Tsai, P. S., Tsai, C. C., & Tseng, J. C. R. (2008). A novel approach for assisting teachers in analyzing student web-searching behaviors. *Computers & Education*, 51(2), 926-938.
- iResearch. (2012, August 9). 2011-2012 China search engine users' behavior research. Retrieved from <http://www.iresearchchina.com/reports/4350.html>
- iResearch. (2013, August 1). China search engine revenues surge to 9.28 bn yuan in Q2 2013. Retrieved from <http://www.iresearchchina.com/views/5052.html>
- Jadoon, N., Zahid, M., Mansoorulhaq, H., Ullah, S., Jadoon, B., Raza, A., & ... Shahzad, M. (2011). Evaluation of internet access and utilization by medical students in Lahore, Pakistan. *BMC Medical Informatics and Decision Making*, 11(37). doi:10.1186/1472-6947-11-37
- Jiang, M. (2014). The business and politics of search engines: A comparative study of Baidu and Google's search results of Internet events in China. *New Media & Society*, 16(2), 212-233.
- Kaiman, J. (2013, October 22). China to downgrade English section of college admissions test. Retrieved from <http://www.theguardian.com/world/2013/oct/22/china-english-college-test-gaokao>
- Kan, M. (2011, March 21). Google says China blocking Gmail access. Retrieved from [http://www.computerworld.com/s/article/9214845/Google\\_says\\_China\\_blocking\\_Gmail\\_access](http://www.computerworld.com/s/article/9214845/Google_says_China_blocking_Gmail_access)
- Karan, K. (2013). Online education: As university courses go online, do students get the right learning experience? 4<sup>th</sup> National Conference on E-learning and E-learning Technologies, 109-114.
- Krazit, T. (2009, September 23). Baidu CEO touts growth of China's search engine. Retrieved from [http://news.cnet.com/8301-30684\\_3-10360549-265.html](http://news.cnet.com/8301-30684_3-10360549-265.html)

- Kumar, D. (2010). Faculty use of internet services at a university of agriculture and technology. *Library Philosophy and Practice*. Retrieved from <http://digitalcommons.unl.edu/libphilprac/323/>
- Kumar, B. T. S., & Kumar, G. T. (2012). Search engines and their search strategies: The effective use by Indian academics. *Program: Electronic Library and Information Systems*, 47(4), 437-449. DOI 10.1108/PROG-03-2012-0009
- Leaver, T. (2009). Wikipedia: What's in it for teachers? *Screen Education*, 53, 53-60.
- Li, G., Li, G., & Kambele, Z. (2012). Luxury fashion brand consumers in China: Perceived value, fashion lifestyle, and willingness to pay. *Journal of Business Research*, 65(10), 1516-1522.
- Li, H. (2009). Marketing Japanese products in the context of Chinese nationalism. *Critical Studies in Media Communication*, 26(5), 435-456.
- Li, Y., Duan, Y., Fu, Z., & Alford, P. (2012). An empirical study on behavioural intention to reuse e-learning systems in rural China. *British Journal of Educational Technology*, 43(6), 933-948.
- Lillis, T. M., & Curry, M. J. (2010) *Academic writing in a global context: The politics and practices of publishing in English*. Milton Park, Abingdon: Routledge.
- Lum, T., Figliola, P. M., & Weed, M. C. (2013). China, Internet freedom, and U.S. policy. In Boyden, C. M. (Ed.), *Internet censorship and freedom in China: Policies and concerns* (pp. 1-28). New York, NY: Nova Science Publishers, Inc.
- Madden, N. (2010). Whether it stays or goes, Google wasn't winning in China anyway. *Advertising Age*, 81(3), 2.
- Margolis, Jonathan. (2011, August 15). Great wall of silence. *New Statement*, 36-39.
- Saw, G., Abbott, W., Donaghey, J., & McDonald, C. (2013). *Social media for international students – it's not all about Facebook*. *Library Management*, 34(3), 156-174.
- Stone, B., & Einhorn, B. (2010). How Baidu won China. *Bloomberg Businessweek*, (4204), 60-67.
- Tan, J., & Tan, A. (2012). Business under threat, technology under attack, ethics under fire: The experience of Google in China. *Journal of Business Ethics*, 110(4), 469-479. doi:10.1007/s10551-012-1494-0
- Thompson, C. (2006, April 23). Google's China problem (and China's Google problem). *The New York Times*. Retrieved from [http://www.nytimes.com/2006/04/23/magazine/23google.html?pagewanted=1&\\_r=1&ei=5090&en=972002761056363f&ex=1303444800](http://www.nytimes.com/2006/04/23/magazine/23google.html?pagewanted=1&_r=1&ei=5090&en=972002761056363f&ex=1303444800)
- UNDP (2005). *Promoting ICT for human development in Asia: Realizing the millennium development goals*. New Delhi: Elsevier.
- Watt, L. (2014, April 28). Four US shows ordered off Chinese websites. *The Southern Illinoisian*, p. 2A.
- Wu, Y., & Ma, X. (2013). Theory and practice on E-textbook and E-schoolbag: A new world of development on educational communication. *China Media Report Overseas*, 9(4), 20-31.
- Yin, C., Sung, H. Y., Hwang, G. J., Hirokawa, S., Chu, H. C., Flanagan, B., & Tabata, Y. (2013). Learning by searching: A learning environment that provides searching and analysis facilities for supporting trend analysis activities. *Educational Technology & Society*, 16(3), 286-300.
- Zhao, G. (2008). *International comparative research on ICT use in education*. Nanjing: Jiangsu Education Press.
- Zhao, G., & Jiang, Z. (2010). From e-campus to e-learning: An overview of ICT applications in Chinese higher education. *British Journal of Educational Technology*, 41(4), 574-581. doi:10.1111/j.1467-8535.2010.01085.x
- Zhao, J., & Xu, F. (2010). The state of ICT education in China: A literature review. *Front. Educ China*, 5(1): 50-73. DOI 10.1007/s11516-010-0006-1

# How can I do? The representations of secondary school student-teachers about school practices

Laura Sara Agrati<sup>a</sup>, Chiara Gemma<sup>b99</sup>

<sup>a-b</sup>University of Bari, P.zza Umberto I, Bari 70121 - Italy

---

## Abstract

University of Bari carried out an investigation among future secondary school teachers. It aimed at recognizing their representations towards the school environment they are about to enter.

The investigation had the following two level-structure:

- thanks to the *analysis of the questionnaire about representations* filled out by 300 student-teacher, some features of the “average student” and the “average teacher” was created;
- thanks to the *text analysis* of the papers written by a representative sample it was possible to get to know some of the strategies considered efficient to solve critical cases etc.

Cross data analysis allows to achieve more complex and detailed representations, thus leading to more in-depth analysis, as far as didactic research is concerned, and more detailed indications, as far as training plans design is concerned.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** Classroom Teacher Education, High School Teacher Education

---

## 1. Introduction

Students who start a training path to become teachers are not a *blank slate* but they have their own – completely personal, not formal, and often unaware – representations about the school, teaching and students learning procedures.

Such representations matter when it comes to starting a teacher training path. In Italy, the latter is long, complex and frequently changing due to political reasons, that influence and affect how the training itself and the first teaching experiences – carried out during the training period – are evaluated.

The different characters who perform a role in the future teacher training period (teachers, tutors, mentors, etc.), and who have the main task to prepare the teachers to professional *habits*, cannot ignore the influence of those representations and operate starting from a “level zero” of their training.

This is why, thanks to the research suggestions (Tillema, 1998; Rayou, 2008), qualifying teachers degree courses offer more and more useful training tools (such as interviews with the tutors, reflexive practice labs, educational autobiographies etc.) so that a future teacher can get to know the representations that the students have *before*, *during* and *after* entering the school as trainees.

This essay presents the investigation carried out by University of Bari at the qualifying training course for secondary school teachers (called TFA which stands for “*tirocinio formativo attivo*”), taking place in the wider course of General Didactics.

Such investigation was meant to analyze in depth, through a semi-structured questionnaire, the knowledge of the representations about the school practice and the *images* (Baillauquès, 1996) of “average student” and “average teacher”. The latter can help or affect evaluations and choices so that the involved characters in this training process – aimed at future teachers – can receive some suggestions.

In particular, the characters involved are:

- internship tutors, working around deconstructing misconceptions (Krebs, 1999) and modifying student-teacher schemes;

---

\* Corresponding author. Tel.: +39 0805714359

E-mail address: laurasara.agrati@istruzione.it; chiara maria.gemma@uniba.it

- curriculum designers, working to choose efficient solutions to train professional teachers (Altet, 2009).

## Theoretical framework

### *Student-teacher representations*

Studies about reality representations that people have - arose from sociology and social psychology researches (Moscovici, 1981) - have the advantage to open new perspectives and go beyond that *truism* that has often affected traditional research settings (reality is self evident and what the subject thinks of it has no relevance in its knowledge).

Representations defined as: "ordinary, everyday attitudes, which are often less naïve than they appear (...) conceptions (that) are actually social constructions, with a multiplicity of significances" (Mugny, Carugati, 1989, ix) – are, instead, strictly connected to different social behaviors and ways of thinking and behaving of every single person (Mugny, Carugati, 1989). As far as teacher education is concerned, we refer to early 80s investigations about the "Teacher Thinking" aimed at knowing school workers representations about teaching, students, classroom climate (Elbaz, 1983). These studies had the honor to set up a new perspective about the teaching practice and about the complex teaching-learning dynamics itself and to understand the clear difference between *formal knowledge* and *thought knowledge* (Shulman, 1986).

The investigations, in particular those about the representations of the student-teachers, gave the opportunity to unlock further investigations perspectives about training curriculum and the connections between the theoretical path (university course) and practical path (internship and laboratories) (Tillema, 1998).

Schmidt e Knowles (1995), using Jordell model, demonstrated that the "beginner teachers" (the *novice*) behave depending on four different levels of influence when they face concrete situations of everyday school life for the first time:

- *personal*: biography, previous experiences, personal education;
- *environmental*: class, context, students, teacher- student integration;
- *institutional*: colleagues, managers, parents, but also curriculum and administration settings;
- *structural*: in particular referring to the *economical, social and political* influences the school is affected by.

Therefore, four could be the groups of factors influencing initial teacher training:

- personal stories and past actions models defining the behaviour;
- personal comprehension of oneself in the teaching role;
- problems associated to planning, teaching and class management;
- problems associated to school context and relationships with tutors or mentors.

## Method

The investigation involved 300 student-teacher attending the General Didactics course within the qualifying training pathway called TFA (Tirocinio Formativo Attivo) accessible only through a strict selection and that requires the future teacher to commit for about a year in courses, laboratories and internships.

This study was carried out based on a quasi-experimental design (Campbell, 1988; Becchi, 1997) involving two groups on a non casual sample and has followed two phases:

- in the first one - March 2013 - 300 student-teacher who had signed up for the Course were given a semi-structured *questionnaire* about representations to be filled out. Data about the two sections "average student" and "average teacher" were analyzed;
- in the second - May 2013 – open questions belonging to the questionnaire were analyzed. In them, student-teachers described some strategies to solve complex cases. According to lexical-textual approach, a representative part of the *corpus* (60 out of 300) was analyzed. These 60 items were chosen based on personal *curriculum* and *experience* - to evaluate the constancy of observed data through the structured items (Migliore, Tuzzi, 2006; Bolasco, 1999).

### *Participants*

The 300 student-teacher belonging to the Course in General Didactics of the TFA have several different

features: they are graduated in different areas (humanistic, scientific, law etc.), are slightly mainly women (62%), are 32 years old and have 3 years of unqualified teaching experience on average. All the student-teachers had already attended 80% of the internship in school – corresponding to about 320 hours- when they were asked to fill out the questionnaire.

Two groups have been taken into consideration in analyzing the questionnaire:

- the *first*, younger, have no previous teaching experience, except the internship (we define them *beginners*);
- the *second*, older and with direct experience in the subject they are training for or in other areas, in addition to the internship (i.e: training courses, University lessons as a ph.d) (we define them *experts*).

These features have been cross-checked with the data arose from the analysis of the representative group whose open answers have been chosen to be analyzed.

#### *The questionnaire about representations*

The questionnaire about representations was given out to 300 students following a meeting to present the investigation. It is a structured questionnaire made of 30 items –20 of which multiple choice – divided in 2 sections: the “average student” and the “average teacher”. It was built through experimental interviews and the re-elaboration of the *Questionnaire about representations of the profession* confirmed by Kempf and Rousvoal (1994; Rousvoal, 1993).

Studies that used the questionnaire to collect data about the representations of the teaching practice, prevailing in France since the 70s (Codol, 1969; Abric, 1970) proposed - and confirmed - reference models coming through research. Items about characteristics of the *students* refer to 4 typologies (Trinquier, Clanet, 2001):

- enthusiast: he manifests a favorable attitude and is satisfied of the formative context;
- co-operator: he underlines positive and negative aspects of the lived formative experiences;
- detractor: he polarizes the negative attitude on the sterility and the shortage of relationships in the formative context;
- defeatist: he advances neither criticisms nor praises to the context and he doesn't look for stable contacts.

Items about the *teacher* features refer to 5 typologies:

- practical-reflexive: he is able to take and to elaborate the aspects of the organizational context and to report this as useful information for the intervention;
- wise: he considers as principal finality of the education the learning of the contents and their structuring;
- technical: he considers as principal finality of the education the learning of the abilities in their practical application;
- artist: gives importance to the creative and intuitive aspects of the learning;
- social actor: gives importance to the relational and interactive aspects (Houpert, 2005).

#### *The open answers*

The open answers allow us to get qualitative data that enrich the research models but are difficult to analyze unless we use inductive and *a posteriori* classifications (Giuliano, La Rocca, 2008).

We decided to investigate about *efficient teaching practice* representations through an inductive approach because literature does not provide us with unambiguous models to refer to: we refer to the detailed and technical investigation by Mc Ber (2000), as well as the well know study by T. Gordon.

Two open questions completed the questionnaire. Participants were asked to describe a complex teaching situation and the strategies used to solve it. Sixty selected answers were considered representative of the referral groups (*beginners* and *experts*) and semi-automatically analyzed with NVivo7 software through bottom-up code generation (Mugny, Carugati, 1989).

## **Results**

### *4.1 The questionnaire about representations*

A descriptive treatment of the data was carried out through the calculation of *averages*, *standard diversion* ( $\sigma$ ) and *standars scores* ( $z$ ) of the obtained values.

Furthermore, a *variance analysis* (ANOVA) is being carried out based on the comparison between the two groups of student-teachers features according to the data arose in the descriptive phase.

A considerable relation has been observed between *beginners* group and *experts* group figures about the items related to “average student” and “average teacher”.

The statistical comparison between the first and the second group of student-teacher presented a significant difference for all the items ( $p < 0.001$ ). This is why we will now focus on the arisen differences.

#### - The “average student”

If we compare the answers about the items describing the “average student” we may realize that there’s a substantial similarity between the two groups about typologies *cooperator* and *defeatist*, (fig. 1): the typology *cooperator* appears most frequently in both groups– slightly more among the *experts* – and the typology *defeatist* appears less frequently in both groups– but always slightly more among the *experts*.

The interesting difference arises instead in the *enthusiast* and *detractor* typologies: the beginners group uses frequently the definition of enthusiast (second mostly used definition), while the experts use it less often (they use it the least).

An inversion can be observed even in the *detractor* typology that is very frequent among the beginners (the second mostly used), and a lot less used among the experts.

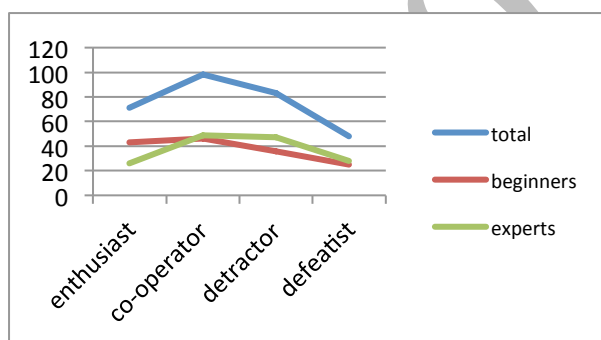


Fig. 1. - The “average student” answers

#### - The “average teacher”

Comparing the answers about the items describing the “average teacher”, a clear difference between the two groups can be underlined about all the typologies (fig. 2).

While beginners consider more frequent the *wise* and *artist* typologies, experts consider practical-reflexive and social actor as predominant. These two typologies in particular have a totally different importance in the two groups: considerable among the experts – as anticipated – and totally low among the beginners.

We will furthermore focus on this after the analysis of the open answers.

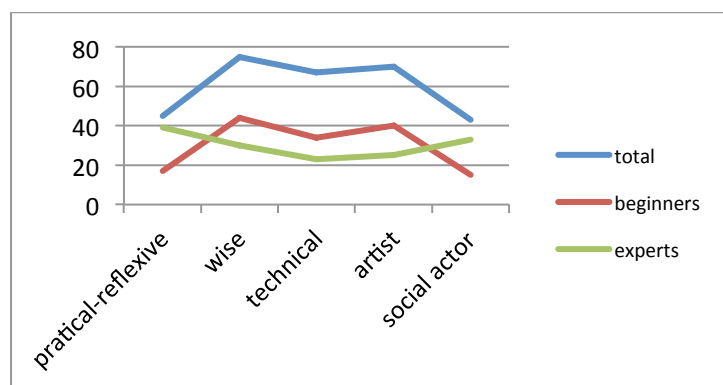


Fig. 2. - The “average teacher” answers

#### 4.2 The open answers

As we previously stated, *years of experience* are one of the features taken into consideration to generate codes. More categories have been created based on the context of use of key concepts (through the concordances analysis).

Let's focus on the “coding families” (Glaser, Strauss, 1967) grouped under the codes *practical-reflexive* and *social actor* since they are significantly not consistent in relation to the structured items analysis.

Analyzed texts belonging to the experts subgroup show a wider presence of terms and expressions categorized under the code *practical-reflexive* and *wise* as well as terms referring to the code of *social actor*

### Discussion

Some information, useful to the debate, may be obtained by cross-checking the data arose by the structured items with the open answers results.

In brief, we could consider that about the “idea of student” there are few differences between the beginners and the experts, instead, about the “idea of teacher” there are a lot of considerable differences.

Among the *experts* student-teacher prevails:

- an image of a student who generally cooperates to the success of the learning activity but who often criticizes the teachers, his friends and his own job; He is also rarely enthusiast about the proposed activities;
- an image of a teacher as situation analyst who uses the relevant social context resources (colleagues, families, support staff etc.) to solve the *deadlock*.

Among the *beginners* student-teacher prevails instead:

- an image of a student who is always available to collaborate in the activities, very enthusiast of the proposed activities and scarcely disapproving the didactic situations he is part of;
- an image of a teacher who lever on his/her formal and personal knowledge and solves complex situations with intuition and sometimes “brilliance”.

Following the analysis of the open answers, however it is possible to make some *corrections* to this images of “average teacher”:

- among the experts, personal and theoretical knowledge stands out as a resource to solve controversial situations;
- among the beginners, the relevant social context stands out as a resource to solve such situations.

### Conclusion

Compared to previous investigations about teachers representations carried out through questionnaire (Houpert, 2005) where the *practical-reflexive* typology prevails on the *wise*, this study made it possible to notice that such components - and the subsequent images - strictly depend on the involved student-teacher features, especially if



open questions are taken into consideration.

Looking at personal descriptions, it has been possible to enrich the characteristics of the arisen representations based on the structured items of the questionnaire. We are hereby willing to remember that it has highlighted the *wise* component in the experts subgroup and the *social actor* one in the beginners subgroup. These data had not arisen beforehand.

Given the *corpus* representativeness (60 texts out of 300 student-teacher), evidence allows us to claim, in general, how useful quali-quantitative investigations are and to promote the use of text analysis as information source of the representations of the involved subjects.

The investigation provides us with more complex representations of the student-teacher. They are as well strictly connected to the specific local conditions. This suggests:

- further in-depth analysis in the didactics field to go further through the *training biographies*. They would highlight the preexisting knowledge foundation and the criteria taken into consideration by future teachers when approaching the profession, beyond the profiles indicated by the regulations and confirmed by the academy ;
- more precise indications, as far as qualifying courses design is concerned. For example it could be useful to cross-check curriculum components (courses, laboratories and internships) more, through the narrative and reflexive training tools, to allow an effective encounter – and a fruitful mutual influence – between *pedagogical tradition knowledge* and *experience knowledge* (Gauthier, 1997; Damiano, 2007).

This will anyway depend more on a concrete and perceptive politics who will listen to the bottom up proposals than on the available resources.

## References

- Abric, J.C., (1970). Image de la tâche, image du partenaire et coopération en situation de jeu. *Cahiers de psychologie*, 13, 71-82.
- Altet, M., (2009). Professionnalisation et formation des enseignants par la recherche dans les IUFM: avancées et questions vives. In J. Clanet (Ed.), *Recherche et formation des enseignants : quelles articulations ?* (pp. 19-32). Rennes: PUR.
- Baillauguès, S., Kempf, M & Rousvoal, J., (1994). *Représentations du métier et de la formation chez les futurs enseignants*, Paris: Biennale de l'Éducation et de la Formation.
- Baillauguès, S., (1996). Le travail des représentations dans la formation des enseignants. In L. Paquay, M. Altet, E. Charlier P. Perrenoud (dir.), *Former des enseignants professionnels* (pp. 41-61), Bruxelles, De Boeck.
- Becchi, E., (1997). *Sperimentare nella scuola*. Firenze: La Nuova Italia.
- Bolasco, S., (1999). *Analisi multidimensionale dei dati*. Roma: Carocci.
- Campbell, D. T., (1988). *Methodology and epistemology for social science: selected papers*. Chicago: University of Chicago Press.
- Codol, J.P., (1969). Représentation de soi, d'autrui et de la tâche, dans une situation donnée, *Psychologie Française*, 14 (3), 217-228.
- Damiano, E. (2007). *Il sapere dell'insegnare*. Milano: FrancoAngeli.
- Elbaz, F., (1983). *Teacher Thinking: A study of practical knowledge*. New York: Nichols.
- Gauthier Cl., (1997) (dir.), *Pour une théorie de la pédagogie. Recherches contemporaines sur le savoir des enseignants*. Bruxelles: De Boeck.
- Giuliano, L., La Rocca, G., (2008). *Analisi automatica e semi-automatica dei dati testuali*. Milano: LED.
- Glaser, B., Strauss, A., (1967). *The discovery of grounded theory: strategies for qualitative research*. New York: Aldine de Gruyter.
- Houper, D. (2005). En quoi la formation continue des enseignants contribue-t-elle au développement des compétences professionnelles?. *Cahiers pédagogiques*, 435, 45-57.
- Krebs, R., (1999). *Scientific development and misconceptions through the ages: a reference guide*. Westport, Conn: Greenwood Press.
- McBer H., (2000). *Research into teacher effectiveness: a model of teacher effectiveness*. London: DfEE/The Stationery Office.
- Migliore, A., Tuzzi A. (2006). *Children's representations of educational experience: Comparative results of qualitative and lexical-textual analyses of in-depth interviews*. Società Italiana di Statistica, Proceedings of the XLIII Scientific Meeting–Plenary sessions and Invited sessions, University of Torino, 14–16 June 2006, 81–92.
- Moscovici, S., (1981). On social representations. In Forgas J. P. (Ed.), *Social Cognition*. London: Academic Press.
- Mugny, G., Carugati, F., (1989). *Social representations of intelligence*. New York: Cambridge University Press.
- Rayou, P., (2008). Ni guerre, ni paix. Tensions et malentendus dans la formation. In Ph. Perrenoud, M. Altet, Cl. Lessard (dir.), *Conflit de saviors en formations des enseignants. Entre savoirs issus de la recherche et savoirs issus de l'expérience* (pp. 77-89). Bruxelles: De Boeck.
- Rousvoal, J., (1993). *Les représentations du métier d'enseignant. Influence des actions de formation*. Paris : INRP.
- Schmidt, M., Knowles, J.G. (1995). Four Women's Stories of Failure as Beginning Teachers. *Teaching and Teacher Education*, 11(5), 429–444.
- Shulman, L., (1986). Those who Understand: Knowledge Growth in Teaching. *Educational Researcher*, 15(2), 4–14.
- Tillema, H., (1998). Stability and Change in Student Teachers' Beliefs about Teaching. *Teachers and Teaching: Theory and Practice*, 4 (2), 217–228.
- Trinquier, M. P., Clanet, J. (2001). Pratiques d'études et représentations de la formation chez les étudiants de première année : quelle limite à l'hétérogénéité ?. *Revue Française de pédagogie*, 136, 31-40.

# How does a taxi driver use geometry?

Aytaç Kurtuluş<sup>a</sup>, Tuba Ada<sup>b</sup>

<sup>a</sup>*Eskişehir Osmangazi University, Eskişehir, 26450, Türkiye*

<sup>b</sup>*Anadolu University, Eskişehir, 26470, Türkiye*

---

## Abstract

Euclidean geometry, which is often covered in mathematics curriculum in primary and secondary education, fails to meet all the requirements in daily life. For example, a taxi driver cannot use Euclidean geometry in cities using a grid city plan. At this point, what method should be used because distance ‘as the crow flies’ cannot be used? The solution of this problem requires the use of a non-Euclidean geometry, Taxicab geometry. The aim of this study is to raise awareness of non-Euclidean geometries by means of activities comprehensible to secondary education students, who are considered to have made a certain progress in terms of level of geometric thinking.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* Taxicab geometry, Euclidean geometry, secondary education students.

---

## Introduction

Although no other type of geometry except for Euclidean geometry hadn’t been taught until the 19th century, geometry showed a huge improvement in this century, like other academic disciplines. Geometry developed more than estimated due to its scope and division into different branches. As a result of this, Euclidean geometry, the only type of geometry taught in previous centuries, became a sub-field of large mathematical theories of space. Euclidean geometry, which is often covered in mathematics curriculum in primary and secondary education, fails to meet all the requirements in daily life. There are currently more than 50 types of geometry (Malkevitch 1991). This diversity indicates the richness of modern geometry, but it also forces curriculum organizers to answer the question “Which subjects and concepts of geometry should be covered in school curricula from pre-school education to higher education, and which level should they be included at?” (Ministry of National Education, 2010). Focusing on this situation with a striking illustration, this study tries to point out to the need for non-Euclidean geometries. For example, a taxi driver cannot use Euclidean geometry in cities using a grid city plan that consists of horizontal and vertical roads. At this point, what method should be used because distance ‘as the crow flies’ cannot be used? The solution of this problem requires the use of a non-Euclidean geometry, Taxicab geometry. Transportation becomes easy using the distance function defined in Taxicab geometry. The aim of this study is to raise awareness of non-Euclidean geometries by means of activities comprehensible to secondary education students, who are considered to have made a certain progress in terms of level of geometric thinking. Although Taxicab geometry is very similar to Euclidean geometry, the concept of distance is defined in a different way in Taxicab geometry. This study aims to introduce the activities designed for secondary education students using this feature of Taxicab geometry and to come up with suggestions for teachers.

## Taxicab Geometry with Activities

Before giving a definition of Taxicab geometry, secondary school students can be involved in an introductory activity. Students can be assigned the role of a taxi driver and they can explore Taxicab geometry by means of the relationship between the subject and daily life. In this way, they can be introduced to a type of geometry different from Euclidean geometry and, at the same time, they can see its real life implications. The following activities can be used as sample exercises that students can do.

### Activity 1: How does a taxi driver use geometry?

Imagine that you are a taxi driver in Savannah, Georgia and its street map is given below. At the end of the day, you are supposed to fill in the daily log that your boss gives to you. Your boss asks you to pick up and drop off passengers 5 times throughout the day.

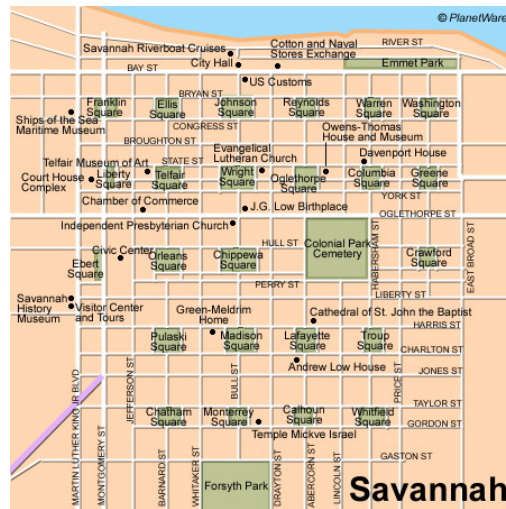


Figure 1: Street map of Savannah city

1. For this activity, you will use the map given in Figure 1. You will decide where to pick up and drop off a passenger, but you should determine different routes for each of the five journeys. The stops (i.e. the places to pick up and drop off passengers) are indicated by black points on the map.
2. You should determine the stops to pick up and drop off a passenger and write them in the daily log (see Table 1). You should make sure that the route you will choose is the shortest one.

Table 1: The daily log in Taxicab Geometry

Rounds	Passenger Pick-up Points	Passenger Drop-off points	Measure of the streets (Taxicab Geometry) km
1-Blue			
2-Green			
3- Red			
4- Orange			
5- Purple			
			Total km:

3. You should write the number of journeys and draw your route on the map in different colors for each round (see Figure 2 for an example). After drawing a route on the map, you should measure the journey distances using a ruler for each round and write it in the daily log.

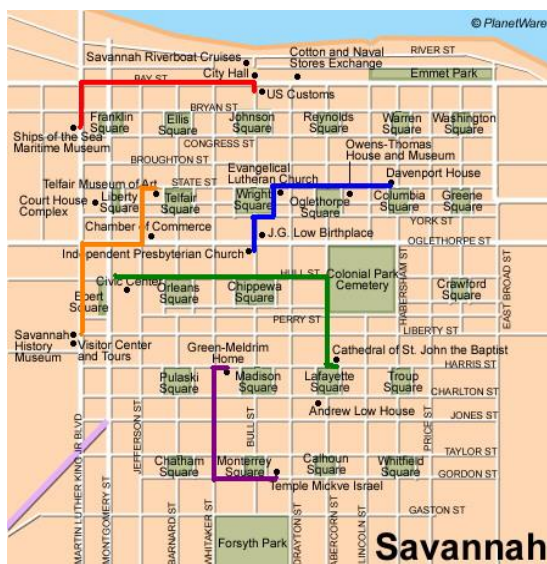


Figure 2: Sample routes for 5 rounds

4. Since 1cm on the map represents 100 m, you should specify the distance of each round in the daily log.
5. You should state the total distance of the journeys for the day.
6. After performing the first five steps, measure the least distance between the Passenger Pick-up and Passenger Drop-off points based on the straight line, or “as the crow flies”, (Euclidean Distance). Measure this for each round and fill in the daily log(see Table 2).

Table 2: The daily log in Euclidean Geometry

Rounds	Passenger Pick-up Points	Passenger Drop-off points	Measure of the crow flies (Euclidean Geometry) km
1-Blue			
2-Green			
3- Red			
4- Orange			
5- Purple			
			Total km:

7. Compare the results obtained from the two tables (Table 1 and Table 2).
    - a) What is the sum of the distances when the taxi driver follows the routes between the passenger pick-up and drop-off points for each of the rounds determined? \_\_\_\_\_ How many km are the distances measured “as the crow flies”? \_\_\_\_\_
    - b) Compare the sum of the distances when the taxi driver follows the routes and the sum of the distances measured “as the crow flies” \_\_\_\_\_
    - c) Does the taxi driver cover more distance when he or she follows the routes determined or the routes determined “as the crow flies” (Euclidean Distance)?
- By looking at the tables, can we suggest that the distance between two points measured “as the crow flies” (Euclidean Distance) is always more than the distance covered when the taxi driver follows the routes? If yes, why? If no, why?

By means of this activity, students get the opportunity to measure the distance between two points in both Euclidean geometry and in Taxicab geometry without knowing the definition of it. Taxicab geometry is quite different from Euclidean geometry, which most of us know. In Taxicab geometry, it is

possible to move through mutually perpendicular horizontal and vertical lines when moving between two points. Imagine that you are a taxi driver in a city with a grid street plan. The taxi driver only follows the roads. He or she just drives straight or can turn left or right at a right angle. As two points are connected with a straight line in Euclidean geometry while two points are connected with the routes followed by a taxicab, the latter type of geometry is named Taxicab geometry.

As seen in Figure 3, a taxi driver must use horizontal and vertical lines going from point A to point B unless he or she has wings and can fly. Therefore, because the route from A to B would not be blue, it would be more than  $\sqrt{41}$ . The taxi driver can follow the red, yellow or green routes from A to B, but not the blue route. In this case, which one is shorter: the red, yellow or green one? As you can see, all the three routes are nine blocks away (see figure 3).

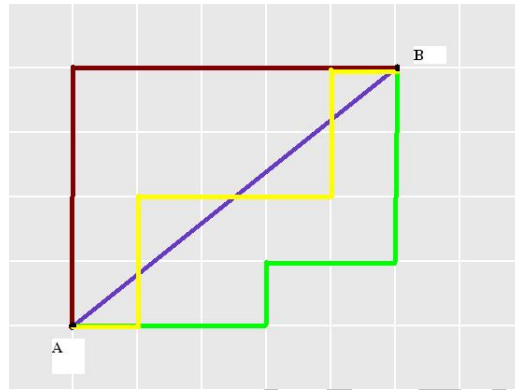


Figure 3: Sample routes for round five

If we find “the distance formula” for the taxi driver considering the other possible starting points and destinations, we can conclude that the taxi driver uses  $d_T(A, B) = |x_B - x_A| + |y_B - y_A|$  to measure the distance between  $A(x_A, y_A)$  and  $B(x_B, y_B)$ .

d) If we know the taxicab distance between two points, can we measure the Euclidean distance between these points?

This step aims to have students realize that it is necessary to add together the lengths of two vertical edges of a right triangle in Taxicab geometry and it is necessary to calculate the hypotenuse of the right triangle in Euclidean geometry. In this way, as a part of “Geometry and Measuring” subject in Grade 8, students “learn about the Pythagorean relation, they can solve related problems, they can perform real-life applications of the Pythagorean relation, and they can find the distance between two given points on the coordinate plane using the Pythagorean relation”. By means of these activities, they are also introduced to Taxicab geometry, which is a type of non-Euclidean geometries.

*Activity 2: How does a ropeway driver use geometry?*

A new transportation project in Ankara city plans to reduce travel time to 13.5 minutes by ropeway transportation from 25-30 minutes by bus or private vehicles. According to this project, the first stage of the ropeway transportation system has three stations and alternative station points are given so that locations of the stations can be determined accurately (i.e. the shortest distance in terms of cost and time. Which of the points given in Figure 4 could be the correct locations? Explain the reasons for your choice.

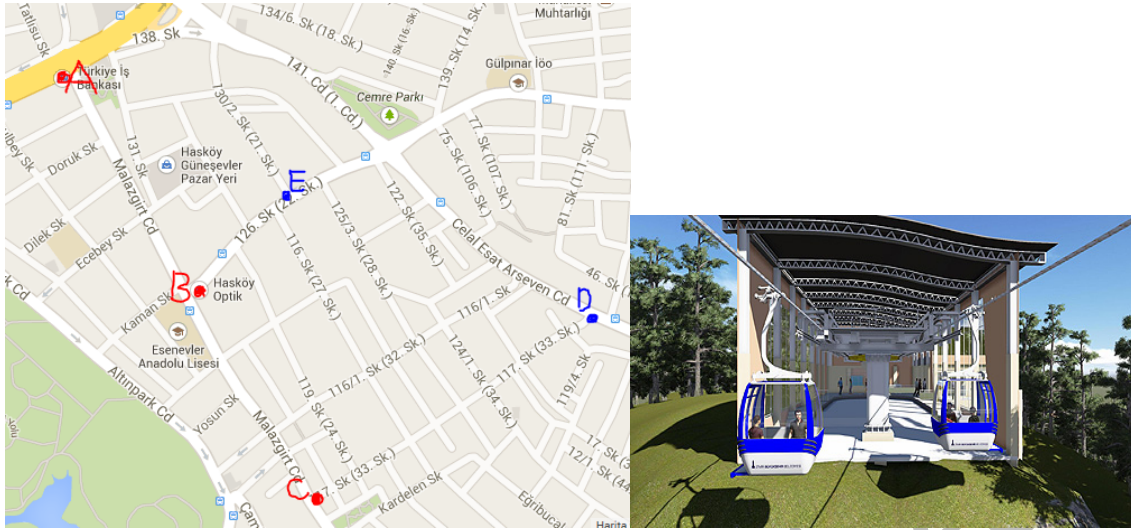


Figure 4: Location of alternative station points of ropeway transportation system

By means of this activity, students will discover that Euclidean distance is favorable when they measure the distances between the stations that are not on the same route in the map given in Figure 4. When they use the existing routes, on the other hand, they will discover that Taxicab distance is more convenient. They will realize that the Taxicab distance and Euclidean distance between the three routes on the same route are equal. For example, the Taxicab distance and Euclidean distance between the stations A, B, and C on Malazgirt Street are equal. However, because there are no roads between the stations A, E, and D station, the Taxicab distance and Euclidean distance between them are not equal (see Figure 4). Therefore, locating the ropeway transportation stations on a route covering the points A, E, and D is favorable. In this way, while determining the three stations, students will compare the distances by measuring the Taxicab distance and Euclidean distance on the grid plan (i.e. a graph consisting of horizontal and vertical lines) of the city. As a result of this comparison, they will finally discover that Euclidean distance is more advantageous in terms of the distance between the points on non-horizontal or non-vertical (curved) lines.

Taxicab geometry, which everyone meets and uses unconsciously most of the time, has many uses in everyday life. In Taxicab geometry, many basic concepts that we are familiar with in geometry are different from Euclidean geometry (e.g. circles and squares).

### Activity 3: Differences between Taxicab geometry and Euclidean geometry

A convention is held in a city with a grid plan (see Figure 5). In order to make sure that transportation is convenient, guests will stay at hotels at certain distances from the convention center.





Figure 5: The convention grid plan

*Your task:*

Find the number of the hotels located five or less blocks away from the convention center?

What is the locus of the points five blocks away from the convention center?

In Figure 6, the yellow point represents the convention center and the blue spots indicate the hotels. Students are expected to assume that the guests will get to the convention center by taxicabs or on foot, use the area within five blocks away from the center and the horizontal and vertical roads (Taxicab distance) on the map, and obtain the red square in Figure 6 using the ruler. In this case, this square actually indicates a circle in Taxicab geometry (Ada& Kurtuluş, 2012).

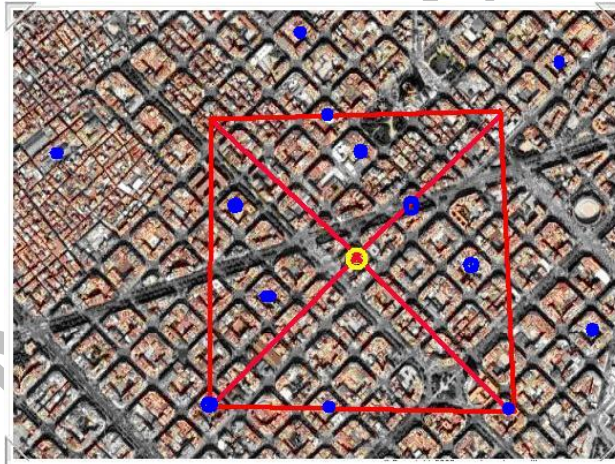


Figure 6: Points that are five blocks away from the convention center

The aim of this activity is to remind students that points at equal distances from a particular point indicate a circle and to have them discover that circle is actually a square they obtain in Figure 6 in Taxicab geometry.

Since this city has a grid plan, the roads are mutually perpendicular horizontal or vertical lines. When we consider the city grid plan on a vertical coordinate system with its origin as the convention center, the quadrilateral in Figure 6 corresponds to the square in Figure 7 in rectangular coordinate system.

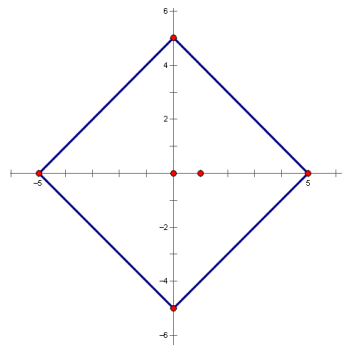


Figure 7: Points that are five blocks away from the convention center

At this stage, the question that may come to mind is, “Does the square in Figure 6 correspond to a circle in Taxicab geometry?” If this shape is to create a taxi circle, it should conform to the definition of circle. When the circle formed by the points that are five units away from the center  $(0,0)$  is considered, the point  $(5,0)$  is five units away from the center and the point  $(5,5)$  on this shape is 10 units away from the center. The point  $(5,5)$  cannot be on the circle according to the definition of circle. Therefore, a square located horizontally in the coordinate plane cannot be a taxi circle. What is the difference between the squares in “Figure 7 and Figure 8”? Although both of them are squares in Euclidean geometry, the square in Figure 7 indicates a circle in Taxicab geometry, but the square in Figure 8 indicates a square in Taxicab geometry (Janssen, 2007).

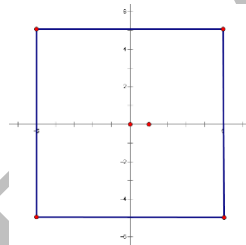


Figure 8: A square in Taxicab geometry and Euclidean geometry

By means of this activity, students will recognize some of the differences between Euclidean geometry and Taxicab geometry.

### 3. Conclusion

Menger (1952) described Taxicab geometry saying, “You will like geometry. Don’t say that it is impossible. You can say that geometry is boring. It has become stereotyped and dead for centuries, but you are wrong. Geometry is fun, genius, beautiful and deep and very important. Geometry is alive and it is developing day by day. Just follow the development of the geometric world of planar shapes over centuries”. The aim of this study, which is based on the question “how does a taxi driver use geometry?”, is to have secondary school students explore Taxicab geometry. Research suggests that learning Taxicab geometry improves students’ problem solving skills and helps them better understand Euclidean geometry (Janssen, 2007; Ada & Kurtuluş, 2012; Ada, 2013; Milner, 2007; Fout, Marker, Lotz & Porter, 2012). However, the literature about this subject is mostly about high school and university level. On the other hand, secondary school mathematics curriculum aims to improve students’ problem solving, reasoning, mathematical communication and linking skills. In fact, introduction of Euclidean geometry to students at an early age will help them develop these skills at an early age.

As can be seen in the activities, we could suggest that Taxicab geometry is one of the most appropriate geometries among non-Euclidean geometries. Also, it is recommended that secondary school mathematics curriculum include activities revealing the role of mathematics in our daily lives. Taxicab geometry supports curriculum with this aspect as well. According to the mathematics curriculum, students in Grade 7 “are provided



with activities that help them relate determining locations in the coordinate system and real life situations”. As a part of geometry and measuring subject, Grade 8 students “are provided with activities about real life applications of the Pythagorean relation and activities about finding the distance between two points given in the coordinate system by using the Pythagorean relation.”(MEB, 2013). In the light of this, students could be shown that the sum of the legs of a right triangle gives taxi distance and the hypotenuse gives Euclidean distance, and this situation could be linked to the Pythagorean relation. Secondary school teachers could promote students’ motivation about problem solving skills by covering these activities in Taxicab geometry, which provide students with real life applications in teaching geometry and define the distance between two points in a different way from Euclidean geometry, in their lessons. In addition, by means of introducing Taxicab geometry, which is a non-Euclidean geometry, teachers can have students compare it with Euclidean geometry. In this way, covering these activities in teaching-learning process could help students have a better understanding of the structure of Euclidean geometry.

## References

- Ada, T. & Kurtuluş A. (2012). Project-based learning to explore taxicab geometry, *Problems, Resources, and Issues in Mathematics Undergraduate Studies PRIMUS*, 22(2), 108-133.
- Ada, T. (2013). Teaching activity-based taxicab geometry. *Educational Research and Reviews*, 8(16), 1421-1436.
- Fout, N., Marker, J., Lotz, L., & Porter, S. (2012). Taxicab Travel: Mathematically Touring Baltimore. *Ohio Journal Of School Mathematics*, (66), 1-8.
- Janssen, C. (2007). Taxicab Geometry: Not the Shortest Ride Across Town (Exploring Conics with a Non- Euclidean Metric). <http://www.math.iastate.edu/thesisarchive/MSM/JanssenMSMSS07.pdf>
- Krause, E.F. (1975). *Taxicab geometry*, Addison - Wesley Publishing Company, Menlo Park, CA, 88p.
- Malkevitch, J. (1991). *Geometry's Future*. MA: COMAP., Arlington.
- MEB, (2013). Ortaokul Matematik Öğretim Programı (5-8) <http://ttkb.meb.gov.tr/www/guncellenen-ogretim-programlari/icerik/151>
- Menger, K. (1952). *You will like geometry*, *Guildbook of the Illinois Institute of Technology Geometry Exhibit, Museum of Science and Industry*, Chicago, IL
- Milner, W. (2007). In Manhattan  $\pi$  Is 4: Taxicab Geometry. *Mathematics In School*, 36(4), 33-34
- Smith, C. (2013). Is That Square Really a Circle?. *Mathematics Teacher*, 106(8), 614-619.

# How effective is critical reading in the understanding of scientific texts?

Ferdi Akin<sup>a</sup>, Özlem Koray<sup>b,100</sup>, Koray Tavukçu<sup>a</sup>

<sup>a</sup>Primary School of Yayla, 67000, Zonguldak

<sup>b</sup>Bülent Ecevit University, Department of Science Education, 67300, Kdz. Ereğli, Zonguldak

## Abstract

Reading which is among basic linguistic skills has a significant position in individuals' intellectual life. This is due to the fact that perception, meaning construction, information retrieval and the reuse of the acquired information in communicative processes in written communication is heavily dependent upon reading activities. Though the question of whether physical components or cognitive processes are more effective in the reading process has been answered differently by various researchers, the consensus upon the nature of this activity is the fact that it is a rather complicated process. In order to explain this complicated process as much as possible, the concept of critical reading has recently been put forward as a model in education. Critical reading can be regarded as an attempt of "re-reading" which requires handling many concepts affecting our life directly or indirectly with a wider perspective. The aim of this study is to investigate the effect of a science and technology lesson arranged within the context of critical reading on students' academic achievement, critical thinking and critical reading skills. The sample of the group of the study which was conducted in 2011-2012 academic year spring term in Zonguldak is composed of 8<sup>th</sup> grade elementary school students. The study is quasi-experimental and has pre-test, post-test control group design. The quantitative data used to test the research hypotheses is collected by means of an academic achievement test, critical thinking scale and critical reading scale and the data was analysed applying independent and dependent sample t-tests via SPSS Statistical Analysis Software. As a result of the study, it was found out that the experimental group performed better than the control group in terms of academic achievement, critical thinking and critical reading skills and the difference in achievement was statistically significant.

© 2014 The Authors. Published by Elsevier Ltd. Peer-review under responsibility of the Sakarya University.

**Keywords:** Reading, Critical Reading, Scientific Texts.

---

<sup>100</sup>Corresponding author. Tel.: + 90-372-3233870; fax: +90-372-3238693.

E-mail address: ocankoray@gmail.com

## 1. Introduction

Reading which is among basic linguistic skills has a significant position in individuals' intellectual life. This is due to the fact that perception, meaning construction, information retrieval and the reuse of the acquired information in communicative processes in written communication is heavily dependent upon reading activities. Reading is among the most important activities conducted by humans (Güneş, 1997:2; Sert, 2010:13; Ateş, 2008:16). In today's societies, reading is considered as indispensable for a life of high quality (Bahadır 2012:2). Researchers have pointed out that reading is the main way of acquiring information and they support that reading skill is the pre-requisite for individual success in all walks of life. Besides, with a similar approach, they define reading as an action which adds meaning to and shapes our life and provides us with different points of view (Yılmaz Fındık 2012:15; Güneyli, 2003:22).

The action of reading begins with written signs and letters (Sakaryalı, 2011:5; Kantemir, 1997:22; Temizkan 2007:19). Another important concept which is emphasized upon the conduction of reading is the contribution of physiological issues to reading (Arıcı, 2012:5-6; Topuzkanamış, 2009:9; Yalçın, 2002:47; Tanıgök, 2006:1). Another very important concept in the action of reading is the fact that it requires a cognitive process (Susar Kırmızı, 2008:97; Çelik, 2006:19). Though the question of whether physical components or cognitive processes are more effective in the reading process has been answered differently by various researchers, the consensus upon the nature of this activity is the fact that it is a rather complicated process (Özdemir, 2007:29). Within this complicated process, the writer-reader relationship also attracts attention. Researchers agree upon the idea that a special connection is established between the writer and reader during the reading process (Kuşçu, 2010:68; Demirel ve Şahin, 2006:81; Özdemir, 2007:32). Under the light of research, reading can be considered as a complicated action within which the understanding and meaning construction processes are conducted within physical, cognitive, individual and sociological sides playing an important role in individuals' fulfilling themselves; a reader-writer relationship constructed by means of certain codes and symbols within the process which can be named as "fiction" and taking these into consideration, reading can be evaluated as a noble human activity.

The concept critical reading, recently put forward as a model approach especially in education, can be regarded as an attempt of "re-reading" which requires handling many concepts affecting our life directly or indirectly with a wider perspective. The most important part in the literary variety of the concept which implies numerous novelties is the emphasis on ideal reading and reading beyond text. Arıcı (2012:46) defines critical reading as "ideal reading" He supports that critical reading is being in a communicational interaction with the text and the ability to comment and evaluate the text. An individual's ability to keep what he has read in his mind for a long time can only be possible with critical reading. Özdemir (2007:18) points out that critical reading can be conducted by people who can be called "intellectual", he also emphasized that the way to enlightenment passes through critical reading, developing a personal competency limitation for critical reading. According to Aşlıoğlu (2008:7), a reader who is not critical can not exceed the level of perception in cognitive processes whereas a critical reader can acquire competencies at levels of analysis, synthesis and evaluation. In sum, critical reading indicates beyond the text and reading along with fully understanding the text (McLaughlin ve Devoogd, 2004:13; Molden, 2007:50; Comber, 2001:2; Stripling, 2008:37).

Critical reading requires a process of active communication where comments and evaluation on the text are conducted. In critical reading, the text being read forms the basis for other readings while reading of various texts form the basis of the text being read at that time, and besides, though the reading process ends, the meaning transmission of the text is still in progress. These qualities critical reading possesses are quite sufficient for information and production age. In order to be aligned with the age, it is necessary to create different and new information by means of inherent information and thinking processes. The active nature of critical reading has a setting which can enable the realization of this structure.

The aim of this study is to investigate the effect of a science and technology lesson arranged within the context of critical reading on students' academic achievement, critical thinking and critical reading skills. In this study, the aim was to improve "text reading" skills which are the main focus of Turkish lessons within the context of critical reading and to enable the use of these skills in Science and Technology lessons for the understanding of scientific texts by making use of interdisciplinary approach.

### 1.1. Research Questions

1. Is there statistically significant difference between the academic achievement levels of the experimental group where critical reading processes were applied and those of control group where regular processes indicated in the curriculum after the application?
2. Is there statistically significant difference between the critical thinking levels of the experimental group where critical reading processes were applied and those of control group where regular processes indicated in the curriculum after the application?

3. Is there statistically significant difference between the critical reading levels of the experimental group where critical reading processes were applied and those of control group where regular processes indicated in the curriculum after the application?

## **2.Method**

### *2.1.Research Model*

The research is quasi-experimental and has pre-test, post-test control group design. The quantitative data used to test the research hypotheses is collected by means of an academic achievement test, critical thinking scale and critical reading scale and the data was analysed applying independent and dependent sample t-tests via SPSS Statistical Analysis Software.

In this study, the effect of “analysis of scientific texts depending on critical reading” on the experimental group was investigated. The variables to be tested in the study were determined in accordance with the purpose of the study, the learning environment was designed in a suitable way for the subjects and lessons and the experimental application was conducted taking the fore-knowledge and readiness levels of the students into consideration.

### *2.2. Sample*

This research was conducted in the classes 8-D (N=27) and 8-E (N=27) in Gazi Elementary school which is located in the city of Zonguldak in 2011-2012 academic year. The groups were randomly assigned as experimental and control. In the process of analysing the equality of the groups, the number of students, the mark averages of the students in 7th grade, the average grades of science and technology lesson taken during the first term and the pre-test results (AAT, CTT, CRS) were taken into consideration. In order to investigate whether the groups are equal, independent samples t-test was performed and it was found out that the groups were equal in terms of all the variables mentioned.

### *2.3. Data Collection Instruments*

The data collection instruments used to gather data from the students within the study are as follows:

**Academic Achievement Test (AAT):** The academic achievement test is composed of multiple choice questions adhering to the curriculum of the subjects food chain, photosynthesis, recycling and alternative energy sources in the unit “Living things and Energy” The distribution of the questions according to the aims and difficulty levels was taken into consideration, besides, the content validity of the test was maintained by asking for six experts’ points of view. The first academic achievement test which is composed of 50 questions was applied on 126 students and the reliability analysis was performed using Iiteman software and with the data obtained, the final form of the test was reduced to 32 questions. The reliability value of the academic achievement test which was applied on experimental and control groups as pre and post test with a duration of 40 minutes was found to be 0,79.

**Critical Thinking Test (CTT):** In order to determine the critical thinking levels of the students participating the study Cornell Critical Thinking Level X test was used. It was stated that the test which was developed by Ennis and Millman (1985) can be used on students at grades between 4 and 14. The necessary permissions were obtained to use the test which was adapted into Turkish by Mecit (2006) and the reliability was determined to be 0,75. The first section of the test is composed of 4 exemplary questions and the second section is composed of 72 questions which have the choices “A,B,C” The required duration to answer the test which was used on the experimental and control groups as pre test and post test was 50 minutes.

**Critical Reading Scale (CRS):** The critical Reading Scale developed by Ünal (2006) was used in order to determine the students’ critical reading levels and the necessary permissions were obtained from the researcher. The reliability of the likert scale which has 22 items and options “Always”, “Usually”, “Rarely”, and “never” was found to be 0.88.

### *2.4. Experimental Processes*

The experimental processes were initiated by the application of AAT, CTT, CRS pre-tests to the students in experimental and control groups. During the application, the education offered to the experimental group was “based on critical reading” Before the teaching process of the experimental group was initiated, five texts parallel to the aims of the subject “Living things and energy” were selected from science and technics journals. The titles of these texts are as follows: Food Chains, Senses of Plants, Photosynthesis, Cycles in the Nature and

Alternative Clean Sources of Energy. Around the framework of these texts, critical reading activities were created by the researcher (Appendix 1) and by using these activities, the researcher attempted to make the participants acquire both the aims of the unit and those of critical reading. The first two texts / activities were allotted 7 lessons each of which were 40 minutes and the remaining three texts / activities were allotted 6 lessons each, and with the application of pre and post tests, the research took 10 weeks in total. The activities were carried out by the Science and Technology teacher, and the researcher attended the lessons as an observer. Before assigning each text, the students were assigned research about the subjects so that they could have prior knowledge of the subjects. During the process, the lessons in the control group were arranged in a student-centered way possessing attention-taking, inductive elements and making aware of the aims as required in the curriculum. Six weeks were allotted to the subject for teaching. In the last week of the process, AAT, CTT, CRS were applied on both experimental and control groups.

## 2.5. Data Analysis

In this study, t tests were applied with SPSS data analysis software in order to determine whether there were significant differences between the experimental group where learning processes based on critical reading were applied and control group where constructive learning processes stated in the curriculum of Ministry of Education in terms of academic achievement, critical thinking and levels of critical reading. In order to test whether there is significant difference between the experimental and control groups in terms of academic achievement, critical thinking and levels of critical reading, independent samples t-test was conducted and the significance level of 0,5 (95% confidence interval) was used in the data analysis.

## 3. Findings

### 3.1. Findings and Comments on the Sub-problems

In order to test the 1st, 2nd and 3rd sub-problems stated as “Is there statistically significant difference between the academic achievement, critical thinking and critical reading levels of the experimental group where critical reading processes were applied and those of control group where regular processes indicated in the curriculum after the application?” AAT, CTT, CRS were applied as post test on experimental and control groups after experimental processes. The data obtained was analysed with t-test (for independent groups) in order to test whether there was significant difference between groups and the findings were presented in Table 3.1, Table 3.2 and Table 3.3.

*Table 3.1. “Independent Samples t-test” Results of AAT Post Test Scores of Experimental and Control Groups*

Group	N	X	S	df	t	p
Control	27	16,37	5,49	52	-3,36	0,001*
Experimental	27	21,92	6,58			

\* p < 0.05

It is clear from Table 3.1. that the AAT post test mean score for experimental group is 21.92 while the same mean score is 16.37 for the control group. It was found out that there was statistically significant difference in the post test scores for the variable of academic achievement between experimental and control groups ( $p=0.001$ ;  $p<0.01$ ). When the mean and standard deviation values are taken into consideration, it is clear that the difference is in favour of the experimental group.

*Table 3.2. “Independent Samples t-test” Results of CTT Post Test Scores of Experimental and Control Groups*

Group	N	X	S	df	t	p
Control	27	35,25	7,89	52	-3.004	0,004*
Experimental	27	41,33	6,93			

\* p < 0.05

It is clear from Table 3.2. that the CTT post test mean score for experimental group is 41.33 while the same mean score is 32.25 for the control group. It was found out that there was statistically significant difference in

the post test scores for the variable of critical thinking between experimental and control groups ( $p=0.004$ ;  $p<0.01$ ). When the mean and standard deviation values are taken into consideration, it is clear that the difference is in favour of the experimental group.

*Table 3.3. "Independent Samples t-test" Results of CRS Post Test Scores of Experimental and Control Groups*

Group	N	X	S	df	t	p
Control	27	3,32	0,65	52	-2.09	0,04*
Experimental	27	3,65	0,50			

\*  $p < 0.05$

It is clear from Table 3.3. that the CRS post test mean score for experimental group is 3.65 while the same mean score is 3.32 for the control group. It was found out that there was statistically significant difference in the post test scores for the variable of critical reading between experimental and control groups ( $p=0.04$ ;  $p<0.05$ ). When the mean and standard deviation values are taken into consideration, it is clear that the difference is in favour of the experimental group.

#### 4. Result And Recommendations

The results obtained from the research findings can be stated as follows: It was found out that there were significant differences in terms of the variables academic achievement, critical thinking and critical reading between the experimental group where critical reading processes were applied and the control group where regular processes indicated in the curriculum were applied. It was found out that all the differences between the groups are in favour of the experimental group. It can be stated that the findings acquired are supported by similar research findings: In the experimental study carried out by Bağdat (2009), it was found out that critical thinking skills such as dealing with texts from different perspectives, commenting, accepting or rejecting the idea proposed, analysing, performing synthesis and evaluation using the data formerly obtained were improved in classes where students are equipped with critical thinking skills. In Çam (2006)'s study where he analysed the relationship between the visual reading levels and their skill of comprehension, critical reading skill and Turkish lesson academic achievement levels of elementary school fifth grade students, it was found out that there was significant relationship between reading and comprehension skill, between critical reading skill and academic achievement level in Turkish lesson. In David's study which he conducted in 2009 about teaching of critical reading and improving this skill, he had experimental and control groups with the same academic profiles. In the study, it was found out that the group where critical reading activities were conducted had a better performance in terms of reading skills (Cited in. Özensoy, 2011:83). In another study, it was found out that teaching of liberal arts with critical thinking skills improved students' academic achievement levels, critical thinking skills and attitudes towards the lesson better than traditional methods (Güzel, 2005). In another study named "Critical Reading Lessons and Motivation in English Language Teaching Prep Class Students" it was found out that critical reading activities during the lesson improved communication among students and motivation towards reading lessons (İçmez, 2009). In the study conducted by Koray and her colleagues (2007) creative and critical thinking based science lab activities improved scientific process skills and academic achievement levels of prospective elementary school teachers. Özensoy (2011) investigated the effect of liberal arts lessons arranged with critical reading on students' critical thinking skills. In the study, it was found out that the activity in the experimental group increased the critical thinking skill scores of the students in a statistically significant way.

In the current study, the following recommendations can be made in the light of the findings and the results obtained: Teachers' following the critical reading approach in other lessons such as Science and Technology, Liberal Arts, Turkish, Mathematics, Art, Music, etc. can increase students' academic achievement levels as well as it can contribute significantly in acquiring and improving sophisticated thinking and reading skills. The new curriculum of Ministry of Education includes critical thinking and critical reading skills with constructive approach. The approach depending on learning with critical reading should be more frequently emphasized in the curriculum in all levels of education beginning from the first grades of elementary school. Thus, teachers can realise the fact that it is not sufficient for their students to do only reading activities, and that comprehension, research and questioning are significant.

#### References

Arıcı, A.F.(2012); *Reading Education*, 3rd Edition, Pegem Akademi, Ankara.

- Aşlıoğlu, B. (2008); "Importance and means of improving Critical Reading for Cognitive Learning" Journal of D.U. Ziya Gökalp Faculty of Education 10, 1-11.
- Ateş, M. (2008); "The relations between reading abilities of students at the second stage of primary school and their attitudes to Turkish lesson and their academic achievement were studied" PhD Thesis, Selçuk University, Institute of Social Sciences, Department of Turkish Education, Konya.
- Bağdat, S. (2009); "The effect of critical thinking on reading skills: A constructivist perspective" MA Thesis, Gazi University, Institute of Cognitive Sciences: Ankara.
- Bahadır, E. (2012); "According Programme for International Student Assessment (PISA 2009), investigation of variables that affect Turkish students' reading skills by regions" MA Thesis, Hacettepe University, Institute of Social Sciences, Department of Cognitive Sciences, Ankara.
- Comber, B. (2001); "Negotiating critical literacies" National Council of Teachers of English, 6(3), 2-6.
- Çam, B. (2006); "The Relationship between visual reading level and reading understanding, critical reading and Turkish lesson academic success of elementary school students" MA Thesis, University, Institute of Social Sciences, Eskişehir.
- Çepni, S. (2005); *Introduction to Research and Projects*, 2nd Edition, Trabzon.
- Çelik, C. E. (2006); "Comparison of Silent and Loud Reading with Reading in Mind" Journal of D.U. Ziya Gökalp Faculty of Education 7, 18-30.
- Demirel, Ö. and Şahinel, M. (2006); *Teaching of Turkish for Turkish and Elementary School Teachers*, 7th Edition, Pegem A Publications, Ankara.
- Fındık Yılmaz, L. (2012); "PISA 2009 results; evaluating the reading achievement of resilient students and disadvantaged low achievers" MA Thesis, Hacettepe University, Institute of Social Sciences, Department of Cognitive Sciences, Ankara.
- Güneyli, A. (2003); "Testing the impact of text type differences on the comprehension abilities of reading" MA Thesis, Ankara University, Institute of Social Sciences, Department of Teaching of the Turkish Language, Ankara.
- Güneş, M. (1997); "An analysis of primary school students' reading and attention levels in terms of certain variables" MA Thesis, Gazi University, Institute of Social Sciences, Department of Elementary school teaching, Ankara.
- Güzel, S. (2005); "The effect of critical thinking skills based on social studies to fourth grade students at primary education on learning outcomes" MA Thesis, Mustafa Kemal University, Institute of Social Sciences, Hatay.
- İçmez, S. (2009); "English Critical reading lessons and motivation for English Language Teaching Preparatory class students" Theory and Practice in Education, 5(2), 123-147.
- Kantemir, E. (1997); *Written and Verbal Narration*, Nurol Printing, Ankara.
- Kırmızı Susar, F. (2008); "The effect of creative drama technique on attitude and comprehension strategies in Turkish teaching" Pamukkale University Journal of Faculty of Education, 23, 95-109
- Koray, Ö., Köksal, M. S. , Özdemir, M.& Presley, A.İ. (2007); "The effect of creative and critical thinking based science lab activities on academic achievement and scientific process skills" İlköğretim Online, 6(3), 377-389.
- Kuşçu, H. (2010); "The role of Turkish teachers' on the development? of verbal and written expression skills and reading and listening talents of the primary school second level students? according to constructive approach" MA Thesis, Yeditepe University, Institute of Social Sciences, İstanbul.
- McLaughlin, Maureen ve DeVogd, G. (2004); "Demystifying Critical Literacy" Theory and practice critical literacy: Enhancing students' comprehension of text. USA: Scholastic, 11-15.
- Molden, K. (2007); "Critical literacy, the right answer for the reading classroom; Strategies. Reading Improvement" Spring, 44(1), 50-56.
- Özdemir, E. (2007); *Critical Reading*, 7th edition, Bilgi Publications, Ankara.
- Özensoy, A. U. (2011); "The effects of the social studies course, organized for critical reading, on students' critical thinking skills" PhD Thesis, Gazi University, Institute of Cognitive Sciences, Ankara.
- Sakaryalı, S. F. (2011); "Primary types of applications for the fourth and fifth grade reading Turkish textbook" MA Thesis, Uşak University, Institute of Social Sciences, Uşak.
- Sert, A. (2010); "Investigation of sixth grade elementary students reading comprehension skills the evaluation of some variables" MA Thesis, Selçuk University, Institute of Cognitive Sciences, Department of Cognitive Sciences, Konya.
- Stribling, M. S. (2008); "Using critical literacy practices in the classroom" The NERA Journal, 44 (1), 34-38.
- Tanığak, D. (2006); "The importance of proper reading in reading texts" MA Thesis, Selçuk University, Institute of Social Sciences, Department of Turkish Education, Konya.
- Temizkan, M. (2007); "The effect of reading strategies on reading comprehension in the primary school" PhD Thesis, Gazi University, Institute of Cognitive Sciences, Department of Turkish Education, Ankara.
- Topuzkanamış, E. (2009); "Preservice teachers' levels of reading comprehension and usage of reading strategies" MA Thesis, Balıkesir University, Institute of Social Sciences, Department of Turkish Teaching, Balıkesir.
- Yalçın, A. (2002); *Methods of Teaching Turkish*, Akçağ Publications, Ankara.

### Example of Activity on Review of Scientific Texts applying Critical Reading

First, students were assigned simple research topics so that they can have foreknowledge about the texts to be read.

1. LESSON 1: The title of the text to be read was analysed with the students. During this analysis, students made some deductions, evaluated these deductions and related them with their own Daily life. In order to grant them with foreknowledge and help them to relate them with daily life, the students were given correct and incorrect images, patterns and musical items and they were asked to question them and relate them with the text.
2. LESSON 2: The students came up with the subject of the text deducing from the clues provided and the title. Texts which they had formerly read about the subject determined were discussed in class. They guessed when, why, by whom the text could have been written and they questioned their own aims.
3. LESSON 3: The text was distributed to the students as a whole and was read once by the students. They shared what they understood with their classmates. The text was divided into parts in sentences taking subject unity into consideration. The sentences or parts determined were analysed in order (what are the keywords? What are the most important statements or words?). While the sentences were being analysed, the thinking processes were also included in the study (Why these words? Could there be more suitable statements? Could it be more explanatory?). The students wrote down the information they considered important in the text. They accessed the meanings of some unknown words using the class library. They questioned the relationship between the parts of the text.

4. LESSON 4: The students summarised the text with the main components. They determined the linguistic structure, narration properties and type of the text. They were helped in recognizing the relationship between the images, musical items, patterns they were provided and the text. They related some components with their own lives and acquired foreknowledge. The relationship between the personal values, attitude and the context of the text was questioned.
5. LESSON 5: The students put forward the subject, ideas and main idea and questioned them. They questioned the reality of the ideas in the text. They questioned the reliability of the data sources the author used in the text and checked the conclusions the author reached by the author. Besides, they made deductions about the author.
6. LESSON 6: The students were provided with the information about in which journal and when the text was published, and they were asked to question the validity of the text today. They were asked to re-write the text and create alternative endings. They made alternative comments by comparing different texts on similar subjects. A creative thinking process about the topic of the text was initiated and it was discussed in class.

INTE 2014



# How to effectively integrate technology in the foreign language classroom for learning and collaboration

Maria de Lurdes Martins<sup>101</sup>

*Polytechnic Institute of Viseu, Av. Cor. José Maria Vale de Andrade, Campus Politécnico, 3504-510 Viseu, Portugal*

---

## Abstract

This project aims to investigate the potential of Web 2.0 tools in the development of communicative competence in English language amongst undergraduate students. The theoretical framework that underpins this study is rooted in national and European policies emerging from the Bologna Process. It focuses first of all on the role of the English language in the fulfilment of Bologna stated goals and, secondly, it analyses the methodological and pedagogical challenges derived from the objectives and guidelines established. Besides this, the Bologna Process is also understood within a changing economic and social landscape, where ongoing innovation in Information and Communication Technologies have generated a rapid production and dissemination of information on a global scale. This new framework has originated new challenges as far as English language teaching and learning in higher education is concerned. These include the creation of a dynamic environment leading to both dialogical and dialectical learning, thus enhancing opportunities to communicate and act through and in English. The methodological approach adopted in this study consisted of an action research project over two semesters in the course units: English II and English III, from the degree course in Tourism at the School of Technology and Management, of the Polytechnic Institute of Viseu. Stemming from the core theme of each course unit and intended learning outcomes, interactional tasks using Web 2.0 tools and involving the construction of collaborative outputs were designed and implemented. The analysis of the information retrieved points to a markedly positive impact of Web 2.0 tools on the implementation of interactional tasks in English language learning in higher education. The students' active involvement in solving authentic tasks, the encouragement of cultural awareness, and the development of individual and collaborative (meta) competences all attest to the importance of social networks, wikis and podcasts in English language learning. This study represents an innovative and very positive contribution for applied linguistics studies, legitimising Web 2.0 applications as an exceptional strategy in meeting the goals raised by Bologna.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

**Keywords:** integrate technology, foreign language, learning

**Keywords:** Foreign Language Learning; Higher Education; Social Networked Learning; Web 2.0.

---

## Computer Assisted Language Learning: an overview

Continuous developments in ICT over the last 60 years have had strong implications in foreign language teaching and learning. The emergence and dissemination of the concept of CALL (Computer Assisted Language Learning) is an example of the growing interest of teachers and researchers for this area of knowledge. The evolution of the concept is closely related to the findings in the area of ICT. The work of Warschauer (2000) should also be highlighted, since the author has developed an ongoing research work related to this theme, namely trying to systematise different stages of CALL (see Table 1)

---

\* Corresponding author. Tel.: +351 232480500.  
E-mail address: lurdesmartins@estv.ipv.pt

Table 1. Different stages of CALL.

Stage	Technology	Pedagogical approach	Computer use	Teacher role
<b>Behaviourist Structural</b>	Mainframe	Grammar-translation and audiovisual	Translation exercises Drill-and-practice	Only source of information Instructor
<b>Communicative</b>	Personal computer	Communicative approach	Role-plays Textual reconstruction Simulations Ensino implícito da gramática	Activator Facilitator
<b>Integrative</b>	Multimedia and Web-based apps.	Content-based learning	Authentic social contexts Exercises combining Reading, Reading, listening and writing	Supervisor Mentor

The first phase, associated with behaviorist learning theories is characterised by activities of stimulus-response and repetitive exercises. Next we have the communicative phase, which is based on a communicative approach to teaching and learning and the focus lies now on the effective use of language. Originality is encouraged and textual reconstruction activities and role-play are promoted. The integrative phase coincides with the development of multimedia technology and the emergence of new theories which argue that language learning is a social construction. According to this perspective, students should be confronted with rich and authentic learning environments.

Although Warschauer had not developed a fourth phase, he already pointed out some directions for the evolution of computer-mediated language learning and he named this new stage as intelligent. The main goal of intelligent CALL is to prepare students for active citizenship in a global and networked society. The author highlights the fact that it is essential to be able to find, evaluate and critically interpret information available on the Web, stating that “students themselves create their ‘texts’ from their own selection of materials from a variety of sources. In teaching, reading, we will have to go behind how to decode texts, or understand them and pay increasing attention to how to explore and interpret the vast range of online texts” (Warschauer&Healey, 1998).

The second aspect to be considered relates to an effective online writing, since that is ubiquitous in the knowledge society and was reinforced by the advent of Web 2.0. The authors stress that the development of a digital literacy is also one of the goals of teaching and learning foreign languages, and the ultimate purpose is that the learner becomes active, autonomous, independent and able to plan her/his “active, conscious, and purposeful self-regulation of learning” (Oxford, 2003). This intelligent phase, features the concept of multimodality, which refers not only to the variety of media available today and the different ways of constructing meaning, but also the possibility of combining these modes more easily in an orchestration of meanings (Kress, Jewitt, Ogborne, & Tsatsarelis, 2001).

#### *Web 2.0 and dialogical and dialectical English language learning*

Web 2.0 open, participatory and social nature has given dialogue a prominent place in the knowledge building process. The construction of meaningful learning will greatly depend on learners’ capacity to engage in the creation and maintenance of dialogical processes. However, the primacy of dialogue in learning does not directly emerge from the spread of Web 2.0. Dialogue, according to Ravenscroft (2011), “is coevolving with these technologies, which arguably provide social opportunities that are more open, and are used more often than was previously possible with the traditional methods of communication, dialogue and discourse” (Ravenscroft, 2011). Associated with dialogue, we have the concepts of dialectics and dialogic, which have been suggested as a structural pedagogy for the twenty-first century (Dalsgaard, 2008); (Ravenscroft, Wegerif& Hartley, 2007). Hence, we consider dialectics and dialogic as two relevant dimensions that focus on complementary aspects of the role of dialogue in the learning process. While dialectics emphasizes cognitive and epistemic dimensions, dialogic gives primacy to emotional and interpersonal dimensions. The interrelation of the two dimensions in the learning process is emphasised by Ravenscroft, Wegerif& Hartley (2007). “the desire to reason to progress towards a rational synthesis does not have to override the need to understand others, and likewise, the desire to

understand others does not have to override the often pragmatic need to reach a rational consensus that links to purposeful action in a context” (Ravenscroft, Wegerif& Hartley, 2007).

The integration of these principles in the structuring, planning and execution of communicative tasks is both complex and challenging. First of all, the process begins with a multiplicity of definitions and views of ‘task’. Regarding this, Ollivier&Puren (2011) as a result of a critical analysis of different perspectives listed and summarised the most relevant characteristics of a task:

- Focus should be on meaning and the mobilisation of language skills should come naturally when attempting to solve the task;
- The completion of a task leads to an accurate outcome;
- A task is not, generally, exclusively linguistic;
- Resolution of a task involves social interaction;
- Task execution is affected by certain constraints and limitations;
- Solving tasks involve the deployment of cognitive processes and different skills;
- Tasks involve different steps or sub-tasks;
- Tasks should privilege authenticity.

Authenticity is also emphasised by Nunan (2004), who distinguishes between real world or target tasks and pedagogical tasks. The Common European Framework of Reference for Languages (CEFR) also alludes to real-life, target or rehearsal tasks, conceived as “tasks are chosen on the basis of learners’ needs outside the classroom, whether in the personal and public domains, or related to more specific occupational or educational needs” Council of Europe (2001). Ellis (2003) goes deeper on this matter and refers to two types of authenticity: situational and interactional. Situational authenticity is related to real world activities, while interactional authenticity demands that learners’ communicative reaction or response is genuine, similar to the real world. In our view, Web 2.0 has promoted new opportunities for foreign language classes, allowing the implementation of tasks that involve both types of authenticity. In addition, Ollivier&Puren (2011) present a diagram that emphasizes the role of interaction and co-action in performing a task, stressing the role of Web 2.0 as a privileged space for the assessment of co-action.

## Methodology

The main question underlying this study is the following: How to Effectively Integrate Technology in the Foreign Language Classroom for Learning and Collaboration?

In order the previous question, two main objectives were formulated:

- Harness the potential of Web 2.0 tools in the teaching and learning of English in higher education.
- Identify the strengths and weaknesses of using Web 2.0 tools in English language learning for the collaborative construction of knowledge in higher education.

The methodological approach adopted for this study consisted of an action research project (see Figure 1) over two semesters, according to Stringer (2007), in the English II and English III course units from the degree course in Tourism at the School of Technology and Management, Polytechnic Institute of Viseu. The researcher felt the need to revise her teaching practices, given that students, who lacked motivation and prior learning, were used to teacher-centered approaches, and were not autonomous in English language learning. Stemming from the core theme of each course unit and intended learning outcomes, interactional tasks using Web 2.0 tools and involving the construction of collaborative outputs were designed and implemented.

This research focused on a mixed, combining the potential of the quantitative and qualitative methods for a deeper understanding of the phenomenon under study. Thus, with regard to the quantitative analysis, we used descriptive statistics to present the descriptions of the observed data. After the process of collecting, classifying and organizing data, we sought to synthesize and represent in an intelligible form the information obtained. Regarding qualitative data analysis, it was carried out through content analysis

In order to aid the process of data analysis, we used the software WebQDA, a computer program for the qualitative research developed at the University of Aveiro. The program aims to help researchers to deal with non-numeric and unstructured data, allowing you to edit, view and link documents. At the same time, it allows to create categories, encode, manage, filter, research and question data in order to answer research questions.

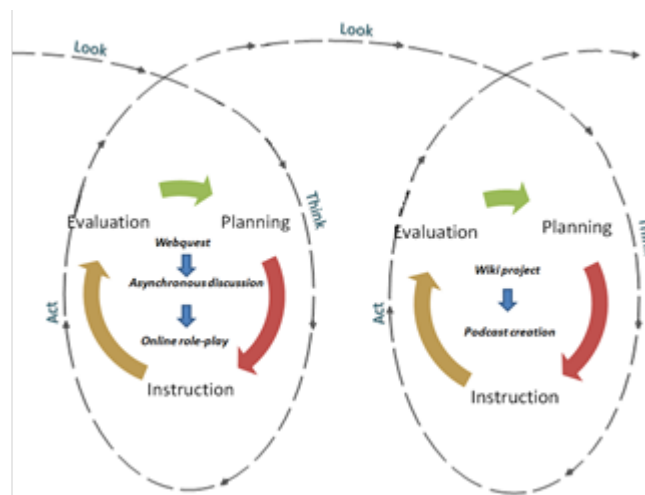


Fig. 1. Action research plan, adapted from Stringer (2007)

The planning of tasks took into account data analysis from a preliminary demographics questionnaire, more precisely students' low familiarity with Web 2.0 tools, as well as the fact that most of them never had the opportunity to use them in educational settings. The learning outcomes set for the different activities were defined according to the Common European Framework of Reference for Languages, level B2 (comprehension and production) and level B1 (interaction).

Activities from the first research cycle stem from the theme "Organising and planning a trip to London", and include the following tasks:

- The completion of a Webquest entitled "Discover London" whose aim was to motivate students for involvement and participation in the project, also familiarising them with some aspects that they would need to explore in some depth in the following stages of the project. At the end of the activity data was collected by means of a questionnaire in order to ascertain the impact of the activity on students' motivation and willingness to work collaboratively online.
- Asynchronous discussions, in which the main objective was to build a virtual learning community in English, using for this purpose Grouply social network where students would, at this stage, interact online, discussing and negotiating a collaborative solution for the challenges presented. At the end of the activity focus groups were held with the students involved in order to find out their opinions on possible strengths and weaknesses of the activity regarding course unit's contents learning also concerning English language learning process.
- Online role-play, where students organized into groups and assuming specific roles would have to organise a visit to London for a group of 25 students. Social network Grouply was again used, and communication between the different roles performed by exchanging emails. The completion of the activity followed a specific weekly timeline and involved, in most cases, a thorough research on the part of students. It was an authentic activity, since in addition to situational authenticity, interactional authenticity was also encouraged. In order to monitor the development of the activity, students were asked to write a reflection each week, mentioning what they had learned, the main difficulties encountered, and also assessing group dynamics. At the end of the activity focus groups were held in order to reflect both on the collaboratively constructed output, and the communication processes underlying it.

The second research cycle unifying theme was "On Tour" and two moments can be identified:

- The construction of a wiki, where students would, collaboratively create a 2-day themed itinerary in the city of Viseu, also providing a detailed written description of the main tourist attractions included in the itinerary. Data collection process was aided by an observation grid filled by the investigator during the course of the activity, considering criteria as students' openness to the activity and also in relation to collaborative work; pre-writing activities developed by participants; integrity and fairness of contributions; textual organization, coherence and cohesion and constructive editing. Taking into account the criteria listed, a questionnaire was also created, in order to find out students' opinions.
- The creation of a podcast, aimed at students, in pairs, to present an oral description of the tourist attractions included on the wiki, thus complementing the work done in the previous activity. Data collection

process was similar to the previous activity. A checklist for the assessment of podcasts developed by the students was used including criteria such as the podcast structure, presentation, technical aspects and collaboration. Students were also asked to complete a questionnaire, for later data triangulation.

## Findings

Data analysis points to a markedly positive impact of Web 2.0 tools on the implementation of interactional tasks in English language learning in higher education. The use of authentic materials related to professional domain of the study cycle was extremely positive, because in addition to leveraging students' motivation, it also allowed them to contact with a rich and varied input in English, stimulating reading and an autonomous exploration of these resources, namely finding out unfamiliar vocabulary. Actually, leaning new vocabulary was very much emphasized at different stages of the research cycle. Students also felt the need to engage themselves in conducting new research in English language in order to be able to respond to the challenges given, thus developing research, critical analysis and selection of information skills, what we consider extremely important in the current educational context, as pointed out in the theoretical framework of this project, particularly through the lens of the Bologna Process, which defends the role of higher education in the formation of autonomous, reflective and critical citizens, able to contribute positively to building a knowledge society and able to continue the journey of lifelong learning. Contact with authentic materials and, as such, culturally contextualized, also contributed to the development of a critical cultural awareness, namely familiarization with patterns, routines, behaviours and customs of a given community, key aspect in building a democratic society. Table 2 summarises the most relevant findings of each task implemented.

Table 2. Summary of findings.

Task	Main strengths	Main difficulties
Webquest "Discover London"	Increased motivation; Vocabulary acquisition; Opportunities for the development of communicative competence in English; Contact with meaningful tourism-related information.	Understanding the information displayed on some websites.
Asynchronous Discussions	Vocabulary learning; Writing skills; Information sharing; Metacognition skills.	Collaborative work; Written comprehension; Fear of exposure.
Online role-play: planning a school trip to London	Writing skills; Vocabulary learning; Increased opportunities to use English; Cultural awareness.	Collaborative work; Selection of accurate information.
Wiki project: Visit Viseu	A positive attitude toward online group collaboration;  Integrity of contributions;  Fulfilment of agreed-upon roles; Constructive additions and revisions to improve the project outcomes.	Most information sources were only available in Portuguese;  Portuguese – English translation using Google Translate Linguistic performance correlated with a lack of strategic competence in using available tools.
Podcast creation: Viseu attractions you mustn't miss!	Accurate information and succinct concepts are presented;  Students' assessment of the final output is positive;  Students' perceptions are influenced by their metalinguistic awareness.	Delivery is hesitant, and choppy, giving the impression of reading;  Enunciation, expression, rhythm are sometimes distracting.

As far as the impact of the use of authentic materials and situations is concerned, it should be noted that results obtained in the second research cycle are somewhat different from the previous cycle, which results from the nature of the tasks implemented. In common we have the importance of implementing authentic tasks in promoting motivation and autonomy in research and exploitation of resources. However, the fact that students had to build a wiki on the main tourist attractions of the city of Viseu led students to privilege materials in Portuguese, despite being aware of the existence of materials in English. It is true that there was a concern with selecting the most relevant information and to adapt it to the desired text typology, which proves positive. The main problem lays in the fact that students prefer to write their descriptions in Portuguese first, opting subsequently by translating the whole text into English, in some cases relying solely on online translation tools, not being able to critically evaluate the outputs and correct them.

## **Discussion**

The use of authentic materials proved to be very positive, since students were confronted with authentic language, which, most of the times, is different from the one that commonly appears in textbooks, where the practice is confined by the language structures and vocabulary defined for a given level of proficiency and, therefore, decontextualized from their speakers, values and cultural norms. It also allowed respecting students' idiosyncrasies and learning styles, given that activities combined face-to-face with e-learning. Another aspect that should be highlighted is the promotion of autonomy in conducting research in English language and the promotion of strategic competence, since students frequently used online translation tools and online dictionaries. The creation of the learning community "English for Tourism" in Grouply social network was the driving force of the collaborative work developed over the two semesters. In order to play an active role in the asynchronous discussions students needed to understand and select relevant information to later write a comment sustained at specific facts. This way, it was possible to promote eclectic learning, combining reception and interaction activities.

Students recognised Web 2.0 potential in learning English, emphasizing the acquisition of vocabulary and the development of writing skills. This was mainly due to increased opportunities to communicate in English outside the physical walls of the classroom. Also, the sharing of ideas among participants contributed to the production of more complete outcomes and it also promoted an increased metalinguistic awareness.

Regarding interactional authenticity, there was a concern with the sociolinguistic appropriateness of their written productions. Collaborative work was transverse to the different activities and constituted both a strength and an obstacle to the proposed activities. This difficulty in working collaboratively as a class can be explained by the innovative character of the tasks implemented. It is common practice for students to complete work in pairs or small groups, but not so when the group is constituted by all the students in the class.

## **Concluding remarks**

This study represents an innovative and very positive contribution for applied linguistics studies, legitimising Web 2.0 applications as an exceptional strategy in meeting the goals raised by Bologna, allowing us to highlight the following aspects:

- Web 2.0 enhanced English language learners among undergraduates has allowed an active involvement of students in solving authentic tasks, combining both situational and interactional authenticity, and articulating different linguistic activities defined by the CEFRL, thus contributing to the development of a plurilingual and pluricultural competence.
- Students who participated in both action research cycles developed capabilities to manage their own learning process, making decisions about contents and materials (what), strategies (how), time / pace (when) and space (where).
- The dialectical, dialogical and actional approach used promoted a deeper student involvement in interactive processes, through the use of diverse strategies, hence promoting the development of skills leading to improvements in English language teaching and learning in higher education.
- There was a correlation between linguistic performance and the strategic use of available tools, namely the use of cognitive and metacognitive strategies by some learners, allowing them to plan and monitor their learning process, becoming aware of the strategies used to solve the proposed tasks and, ultimately, their language learning strategies.

As we have argued in the theoretical framework, the implementation of a EHEA is intrinsically related to the development of a multilingual and multicultural competence on the part of Europeans. We also emphasized the role of foreign languages in pursuing three of the ultimate goals of the Bologna process, namely mobility, employability and lifelong learning. The tasks implemented throughout the project, by favoring a dialogical, dialectical and actional language learning approach, contributed to the development of a reflective, active and critical attitude on the part of learners, enabling them to communicate and interact in an increasingly interconnected and markedly more multilingual and multicultural society.

This was a rather innovative research project that allowed a connection between communication and action, using for that purpose a wide array of meaningful and authentic materials and resources. Although in recent years there has been an increased interest in the use of Web 2.0 tools for language learning, such is sometimes conceived within a cognitivist or constructivist approach, not maximizing the potential of these tools at the level of interaction and co-action. The implementation of authentic tasks made it possible to implement more interesting and social and cognitively stimulating activities, hence fostering effective collaboration among students. Students could anticipate communicative transactions from the professional area of their study cycle, with additional opportunities to communicate in English, which not only increased language use, but also allowed them to be innovative by conceiving a real product to the general public.

## References

- Council of Europe. (2001). *Common European Framework of Reference for Languages: Learning, Teaching and Assessment*. Cambridge: Cambridge University
- Dalsgaard, C. (2008). From transmission to dialogue: Personalised and social knowledge media. *MedieKultur. Journal of media and communication research*, 46, 18-33.
- Ellis, R.(2003). *Task-based language learning and teaching*. Oxford: Oxford University Press.
- Kress, G., Jewitt, C., Ogborne, J. and Tsatsarelis, C. 2001. *Multimodal teaching and learning: The rhetorics of the science classroom*. London and New York: Continuum.
- Nunan, D. (2004). *Task-Based Language Learning*. Cambridge: Cambridge University Press.
- Ollivier, C. & Puren, L. (2011). *Le web 2.0 en la classe de langue*. Paris: Editions Maison des Langues.
- Oxford, R. (2003). Language learning styles and strategies: Concepts and relationships. *International Review of Applied Linguistics in Language Teaching Journal*, 41(4), 271-278. <http://web.ntpu.edu.tw/~language/workshop/read2.pdf>
- Ravenscroft, A. (2011). Dialogue and connectivism: A new approach to understanding and promoting dialogue-rich networked learning. *The International Review Of Research In Open And Distance Learning*, 12(3), 139-160. <http://www.irrodl.org/index.php/irrodl/article/view/934>
- Ravenscroft, A, Wegerif, R, & Hartley, R. (2007). Reclaiming thinking: Dialectic, dialogic and learning in the digital age. In Jean Underwood & Julie Dockrell (Eds.), *Learning through Digital Technologies* (pp. 39–57). *British Journal of Educational Psychology Monograph Series*, 2(5).
- Stringer, E. (2007). *Action Research*. London: Sage.
- Warschauer, M. & Healey, D. (1998). Computers and language learning: An overview. *Language Teaching. Language Teaching*, 31, 57-71. [http://www.gse.uci.edu/person/warschauer\\_m/overview.html](http://www.gse.uci.edu/person/warschauer_m/overview.html)

## Acknowledgements

The Portuguese Foundation for Science and Technology (FCT) through the project PEst-OE/CED/UI4016/2014, and the Center for Studies in Education, Technologies and Health (CI&DETS)..

# Identity issues among post-secondary nonnative students in an english speaking country

Mehdi Rahimian<sup>102</sup>

University of Manitoba, Winnipeg R3T2N2, Canada

---

## Abstract

An important issue in education is the learners' identities. In major metropolitan areas, universities host students from multiple backgrounds. These students bring multiple identities to the classroom. Respectively, an inaugural element of identity is the learners' multiple linguistic backgrounds. In this paper, the relationship between the learners' identities and their linguistic backgrounds is discussed. It is proposed that in post-secondary classes, the issues of identity need to be considered appropriately. Specifically, multiple identities of the learners need to be acknowledged and accommodated. Incorporation of the learners' multiple first languages can act as a facilitative tool from both educational and psychological perspectives.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* Language and identity; post-secondary education; non-native students

---

## Introduction

Identity is a complex socio-psychological issue that has been used in different disciplines. After the phrase *identity crisis* was introduced by Erickson in 1960s, the term identity has been used by scholars and researchers in different disciplines, including second language acquisition (SLA) (for example Matsumoto, 2009; Fearon, 1999; Nakagawa & Kouritzin, 2009). As defined in *Cambridge Dictionary of Psychology* identity is a "catchall-phrase used throughout the social sciences to refer to the way individuals understand themselves and are recognized by others" (Matsumoto, 2009, p. 244). Accordingly, different disciplines use the term identity in different ways, thus it is impossible to have "a single definition that fits all uses" (p. 244). The importance of identity in second language (L2) education has been recognized and explored after Norton Peirce (1995) introduced the term into the discipline.

Identity can act as a determining factor in academic settings, especially when it comes to the discourse of academics. As mentioned by Duff (2010), identity along with "the negotiation of institutional and disciplinary ideologies and epistemologies are core aspects of the production and interpretation of academic discourse" (p. 170). Moreover, in academic settings, identity is one of the significant factors contributing to academic literacies, and lack/unfamiliarity of academic identity among students may impose an undesired situation for both L2 speakers and L1 speakers new to the settings (Duff, 2010). Therefore, addressing the issues of identity in post-secondary level is crucial and constructive not only for L2 speakers, but also for L1 speakers outside the academic genre. On the other hand; from an educational perspective, the interrelatedness of language learning; identity, or identity shift; and cultural issues places language teachers/instructors, as well as content L2 instructors, in a central position "to address educational inequality" issues (Hawkins & Norton, 2009, p. 2; Pessoa & Freitas, 2012). Appropriate identity initiations, then, can contribute significantly to the educational equality and success. Consequently, language teachers and educators, as well as content instructors, academic advisors, and other academic individuals involved in programs related to L2 speakers/learners, need to have plans ready to responsibly address issues of identity in post-secondary education.

Consequently, in this paper, first different groups affected by identity issues in an L2 context at post-secondary level are defined. Then, from these groups, identity issues of international students, immigrant students, and exchange students in English speaking countries will be discussed. Finally, some suggestions are made to address issues of L2 learners/speakers' identities in academic settings.

---

\* Corresponding author.

E-mail address: rahimiam@cc.umanitoba.ca



## Identity and its relevance to SLA studies

SLA research deals with multiple levels of personality and (language) socialization. Socio-psychological aspects of identity make it an integral part of SLA discussions. As Garcia (2009) and Coyle (2013) discuss, identity issues are involved in classes that use languages other than the learners' first language. The inauguration of identity in SLA discussions was by Norton Peirce (1995). Respectively, the inclusion of identity in SLA discussions has become more and more popular in the field. Acknowledging the failure of theories at the time in recognizing the social integration of language learners in L2 learning contexts, Norton Peirce (1995) emphasized the role of investment in SLA. In other words, she initiated a discussion proposing that investment in L2 is a contributory factor in the L2 achievements, and this investment is integrated in L2 learner's identity issues. Since L2 speaker-students in post-secondary education going to universities in English speaking countries are socially situated in an L2 context; their social identity has to be considered and researched by L2 researchers. As discussed by Richards and Schmidt (2010), identity is "a person's sense of themselves as a discrete separate individual, including their self-image and their awareness of self" (p. 268). Another important feature of identity that needs to be considered in L2 education is its changing and flexible nature (Norton and Toohy, 2011). With respect to the changeability nature of identity, and with inseparability/hybridity nature of plurilinguals' identities (Burnapp, 2006; Talmy, 2008), one can expect flexibility and change in the L2 learner's identity in both his/her L1 and L2 and in the relationship of them together.

L2 speaker students studying at post-secondary level in English speaking countries may come from different backgrounds. These students may belong to one of these backgrounds: immigrant students, who have usually immigrated to an English speaking country with their parent(s); exchange students, who reside in an English speaking country for a short period of time that is normally less than a year and then return to their home universities; international students, who come to study in an English speaking country for a degree; refugee students, who have come to an English speaking country due to life threatening issues in their native countries; and minority students, who have lived in an English speaking country since birth but have spoken English as a second or non-home language. In the following sections, I first discuss three groups: immigrant students, exchange students, and international students followed by some pedagogical suggestions for dealing with their identity issues.

### *Immigrant students*

Immigrant students at the post-secondary level are students who reside in an English speaking country, usually as the result of their parent(s) decision to immigrate to the country. This group of students can be divided into two sub-groups: a) those who have spent a number of years in the host country going to school before entering university, and b) those who immigrate to an English speaking country after high school and enter university.

### *Exchange students*

The term exchange student in the area of SLA has not been defined clearly. However, English dictionaries have some definitions for exchange students. For example, Merriam Webster defines an exchange student as "a student from one country received into an institution in another country in exchange for one sent to an institution in the home country of the first". This is a concise and informative definition; however, it does not identify the tentative time of the exchange program. Another dictionary definition is by dictionary.com that has a slightly different definition for exchange student: "a secondary-school or college student who studies for a period, usually one year, at a foreign institution as part of a reciprocal program between two institutions or countries". This definition is more informative when one tries to distinguish international students from exchange students. The following is the definition of exchange student as used in this paper: "an exchange student is a student who goes to another university in another country to spend a short time, usually 1-2 semesters, and then returns back to his/her home university". Sometimes, these students are required to pass courses in the exchange program and sometimes they are not; however, they receive their certificates from their home universities. In addition to defining an exchange student, this definition has addressed two more concerns: period of stay and sense of belonging, which can be interrelated. In the literature, the terms used to refer to these students are study abroad students (for example Kauffmann, 1992) and sojourners (for example Church, 1982; Sobre-Denton and Hart, 2008; Pitts, 2009). However, using the term exchange students is probably a better choice because of its neutrality.

Ortaçtepe (2013) defines international students as students who are “enrolled in the institutions of higher education in the host culture” (p. 217). However, for the scopes of this paper, an international student is defined as a nonnative speaker student enrolled in a university at an English speaking country to obtain a degree. These students can be categorized into two sub-groups: 1) those with plans to stay in the English speaking country upon completion of their degrees; and 2) those with no plan to reside in the English speaking country after graduation, and mainly want to return to their native countries.

### **Identity issues of immigrant postsecondary students**

The time of arrival to the host country can influence a students’ success in their post-secondary education. Cots and Nussbaum (2008) report on identity formation and affiliation of two students in Catalonia. They explored the immigrant family children identity formation considering school as a social institute acting as a facilitator of the identity formation process. Specializing their focus on two critical aspects of social practice, peer interactions and adult interaction, Cots and Nussbaum (2008) acknowledge the facilitative effects of these two social practices in their study. They concluded that these social activities will play “key role[s] in determining [the students’ future] ‘academic success’, depending on the students’ participation and engagement in them” (bracket have been added, p. 17). Thus, peer practice and adult interaction are the two skills that can be achieved by immigrant young adults during school years before entering university. As pointed out by Cots and Nussbaum (2008), these skills can contribute to the students’ future academic success when they enter university. Therefore, immigrant students who arrive to an English speaking country prior to their post-secondary studies, and thus have a chance to go to the new country’s schools, may have a chance to learn two essential skills of: 1) peer interaction and 2) student-adult native interaction. As discussed by Cots and Nussbaum (2008), adult interaction can be viewed as a tool for “conflict resolution, individual academic assessment or feedback on their personal work” (p. 18). In another study, Talmy (2008) studied the role of school in language socialization. Talmy, basing his argument on language socialization as an area of “fundamental contingency and multidirectionality of socialization”, reports that his participants developed unique new identities, dissimilar to their own and school identities (p. 620). He argues that language socialization is not guaranteed by nature, rather an “analytical attention” is required to study the “unpredictability, contestedness, and fluidity of socialization, as it is or is not achieved” among all individuals dealing with that (p. 640).

A significant observation in the case of immigrant students is that schooling at the secondary level can act as a facilitative effect orienting the L2 speakers for their post-secondary education. This can privilege immigrant students coming to a new country at their school ages and going to school prior to university. As it was discussed earlier, they may gain two facilitative attributes that can be difficult to achieve at university level: student-peer interaction skill and student-adult interaction skills (Cots and Nussbaum, 2008). The former can help in interacting with other classmates or lab-mates effectively and continue building social networks through which their new identity can be developed, as social networking was reported to play a crucial role in identity formation (Ortaçtepe, 2013). The latter can assist the students in interacting with university professors and administration in effective ways.

With respect to the identity issues of new immigrant students going to universities in English speaking countries without going to primary and secondary schools, there has not been enough research, if any. Their identity issues can be categorized under immigrants’ identity issues. However, with respect to their lack of socialization skills specific to the country/community, they might have identity issues dissimilar to their fellow students who immigrated to the host country one or a few years before finishing high-school. Respectively, their identity issues can be studied to discover more about their unique situation and what they have to go through in the process of identity formation.

### **Identity issues of exchange students**

It is surprising that not only identity issues of exchange students have not been addressed enough by researchers, but also other issues and problems have not been thoroughly addressed. In fact, there are few sources available in the literature addressing exchange students. Pitts (2009) reports on a study on sojourners, a term used to refer to exchange students. She noticed a gap between these students’ expectations and “the reality of the sojourn” (p. 450). It is argued that exchange programs provide students with identity and intercultural development opportunities (Anderson, Lawton, Rexeisen, & Hubbard, 2006; Pitts, 2009). However, in both of these papers identity development is not discussed as related to language development and vice versa, and none

of the papers define what they mean by identity. In another research, Sobre-Denton and Dan Hart (2008) reported on their study on adjustment strategies offered by exchange student trainers in student training programs. In their study, it is acknowledged that exchange student coordinators, among other factors, address linguistic issues. They also argue in favour of communication quantity as a determining factor in individuals' experiencing culture shock, which can affect and be affected by identity issues. In other words, if an exchange student has more interactions with the L2 culture; chances are higher that he/she experiences higher levels of culture shock.

Exchange university students, with respect to the specific social orientations they have, may have specific identity issues similar to or different from international students. Their temporary position in the host culture and language may have two aspects: 1) they may be perceived, and they may regard themselves, as temporary visitors who do not need to integrate into the host culture and life, 2) their social situation and issues may remain unattended by themselves and/or others, whether in the host culture or in the research. There is not enough literature specifically addressing identity issues of exchange students and how these issues may affect their linguistic development in SLA. This lack of research can be regarded as a rationale for saying some or all of exchange students' identity issues may remain unchecked. What can be mentioned is that temporariness of their program may assist them in minimizing communications with the host culture to avoid identity formation issues/problems. At the same time, minimization of interactions with the host community may preserve their original identity and linguistic level and hinder their development in these two aspects.

### **Identity issues of international students**

Ortaçtepe (2012, 2013), distinguishes among international students and study abroad students. She defines international students as those who plan to reside in the host country after their studies. However, she does not specifically include other student groups, such as exchange students and immigrant students, and it seems that other groups fall under study abroad category. Ortaçtepe (2013) studied an international student's cultural struggles in his L2. Her case participant was a Turkish male student doing his PhD at the United States. After giving elaborate explanation of the situation her participant has been through, she concludes that the student's identity is struggling for two main desires: recognition and networking in the L2 context. Ortaçtepe (2012, 2013) distinction between international students and studying abroad students is not clear and informative enough. It seems that she categorizes students who go overseas for a short period in one of their home university's partner universities, and students who travel abroad for doing a degree under the same category with study abroad students. I believe that the natures of these two groups are different and the former group is better to be categorized as exchange students, while the latter can be categorized as international students. She also argues that international students are those who are "being enrolled in the institutions of higher education in the host culture, not only spend more time abroad but also might continue their stay abroad even after the end of their studies"(p. 217). On the other hand, the definition presented in this paper has a higher categorizing power with respect to international students, and it opens the way for a better understanding of the psycho-sociological issues of these students.

Identity issues of international students enrolled in universities in English speaking countries have been explored in the literature. Burnapp (2006) studied a group of international students in the UK while they were enrolled in an English for Academic Purposes course. He argued that expecting total acculturation is not a legitimate expectation from international students and hybridity should be expected and accepted in the areas of learning style and identity formation. Identity is a fluid entity that is formed in a joint effort, and is negotiated and formed in interaction among people (Haugh, 2008). Respectively, if the international students in a country do not find enough chances to negotiate their L2 identities with the speakers of L2, then their L2 identities might stay underdeveloped.

As it is discussed by Ortaçtepe (2013), for international students, two important determining factors in language socialization are "the purpose and length of stay in the host culture" (p. 217). The final plan of an international student can attribute to his/her position with respect to social integration and identity formation issues. For example in case of unwillingness to stay after graduation, an international student may be reluctant to invest a lot in his/her social and identity development in the L2, and thus his/her linguistic developments may be affected. Therefore, it can be argued that international students who have plans to stay in the host culture/country will have a higher tendency in socialization and identity formation in their L2, which can affect their language socialization as well. On the other hand, international students planning to stay temporarily in the host country, for example to get a bachelor's degree, may be less willing to socially and linguistically interact with the host culture, and thus develop a different identity than the former group.

Planned length of stay or portrayed planned length of stay, may also affect power relationship between a host community and the international students. For example, if an international student informs the host community that he/she is planning to leave the country upon completion of his/her degree, the L2 community's perspectives and assessments of him/her situation might differ from when he/she informs them of planning to stay in the host country after graduation. Planning to stay or depart after graduation can affect the socialization; with respect to the amount, genre, and positioning; of the student in the L2 community. In each situation, the type and amount of information shared with the student may differ; and the linguistic registers may differ, as well as topics being discussed. For example, people in a host culture might be more willing to showcase a perfect fancy image of their country and community if they know an international student does not have any firm plans to stay in the country after completing his/her education. At the same time, the host community may try to whitewash the breaking bad news or ignore it when the bad news is about their country.

### **Addressing identity issues in language education**

Identity is one of the important issues that needs to be considered by SLA teachers and educators in all levels including post-secondary education. This would include language as well as content instructors. There are multiple ways to approach identity issues, some of which will be elaborated on here. Reporting on different projects and research in SLA and second language education, Lotherington and Jenson (2011) discuss that the incorporation of the learners' multiple L1s will help the learning process through accommodating the learners' "self-affirming" identities (p. 237). Use of their first language can help students understand the language and content material better. At the same time, by employing this approach, the learners' plurilingual identities are recognized and acknowledged (Cummins, 2009; Stille & Cummins, 2013). The use of L1 for facilitating L2 classes can help the L2 speakers/learners feel being recognized and their "self-affirming" identities being accommodated in the instruction (Lotherington & Jenson, 2011, p. 237). This has the potentiality of removing at least some of the identity problems, or suppression/marginalization senses that these students may feel. On the other hand, the learners' potential tendency to maintain some specific L1 identities can function as a resistance to use pragmatic norms of the host culture (Taguchi, 2011). In other words, the L2 learners/speakers may feel that using the L2 cultural norms is equivalent with giving up their own cultural identities, and as unwilling as they might be to give up their own identities through using L2 pragmatic norms, they may resist adapting L2 pragmatic norms. But by acknowledging the L2 learners' identities through identity negotiations, use of their L1s, and implementing a plurilinguistic perspective to language and content instruction; educators can hope to remove some of these identity issues.

It was reported that plurilingualism can be used as an effective factor in language classrooms in general (Askildson, Kelly, & Mick, 2013; Bickel, Shin, Taylor, Faust, & Penniston, 2013). Therefore, having a liberal attitude toward the language of instruction, and thus using the learners' L1(s) strategically, can enhance both the class experience and language and content instruction. The latter has high applicability in post-secondary education where students in multiple disciplines may require reading material in languages other than their L1.

Another asset in addressing issues of second language and identity is the use of new technologies, including computer games and interactive courses. Through computer games, which can be educational games, the learner creates a virtual identity (Lotherington & Jenson, 2011) that can communicate with the other players. Considering the face threatening acts as obstacles in developing patterns and practicing L2 (Richards & Schmidt, 2010), one solution can be masking the real identity/face of the person in the virtual game, and involving the language learners in easier linguistic risk taking situations. This way, the SLA learners will find better chances of practicing their L2 and negotiating their linguistic hypotheses about the L2. Another beneficial effect of new technological developments in language learning, as well as content learning, is the use of interactive self-paced courses in which the learners interact with computers/websites to study and pass the courses. Numerous papers discuss the benefits of interactive courses in different disciplines, but unfortunately there is not enough coverage of the benefits and defects of (specifically) interactive courses in SLA literature (some exceptions are Bender, 1998; Ariza & Hancock, 2003). In these courses, a student normally can study any section of his/her choice as many times as he/she wishes, without any consequences including face threatening acts. Respectively, the students' identities are respected indirectly, and linguistic-identity developments can often be adjusted with the students' preferred rate. This can remove anxiety related issues, too. With the developed cognitive abilities of post-secondary students, these courses have the potentiality of serving them in productive ways.

Classroom environment and culture can significantly affect social interactions and social identity formation for the L2 speakers/learners. As elaborated by Dörnyei (2009), both individual and social behaviours are considered in sociocultural theories, with "social identity ... often seen to override personal identity" (p. 236). He

also explains that in discussions related to “classroom environment”, two aspects of instructional and non-instructional components are distinguished, with latter being “the main social arena for students, offering deeply intensive personal experiences such as friendship, love, or identity formation” (p. 237). In my experience, the general culture and environment of a department and faculty or school are also contributory factors in socialization or de-socialization of the post-secondary students. Therefore, language and content instructors can promote the L2 speaker/learners’ identity developments in post-secondary education by creating a socially welcoming and interactive environment for the L2 speaker/learners.

Motivation and desire issues of L2 learners/speakers are also related to their identity. Identity can have effects on a language learner’s perceptions of himself/herself and others; and thus be a determining factor to the person’s motivation (Dörnyei & Ushioda, 2011; Coyle, 2013). In fact, as argued by Coyle (2013), the “learner identity and the classroom environment together are crucial determinants of motivation” (247). According to Coyle (2013), learner’s identity intersects and overlaps with learner’s engagement and learning motivation. Sometimes imagined/assumed identities of a language, as a symbol of the speakers’ assumed/imagined identities, can affect the learners’ desires for learning that language. For example, imagined/assumed identities of English speaking people may be perceived as positive and wealthy (Motha & Lin, 2013, p.4). One has to notice that desires and identities are interlinked (Norton, 1997; Motha & Lin, 2013). When it comes to English language; then, the assumed identity is connected to “securing access to material (and social) resources” (Motha & Lin, 2013, p. 11). This can make the job of a language, and content, instructors easier at first, when the learners are desired to gain those identities. However, in the long run, specifically in English speaking countries, the imagined/associated identities of the English speakers as wealthy individuals will crack and collapse as the learner may discover more about the inner problems and poverties in his/her host country. At this stage, the language, and content, instructors’ job will become more difficult when they want to deal with his/her students’ desires and identities. One solution to this can be negotiating desired selves and identities with the L2 speakers in a truthful way, rather than posturing the teachers’ way through the students’ imagined identities. By honest communication of realities of the host country, both students and teachers will benefit. The students will hopefully have less painful truth trauma, after discovering annoying facts about the host culture and country; and the instructors benefit from less unmotivated students at later stages of curricula.

Another identity related factors is the fluidity and on-going nature of identity that has been emphasized by researchers (for example Norton & Toohey, 2011; Ortoy, 2013; Motha & Lin, 2013), and needs to be considered by SLA professionals. For language teachers, it is suggested not only to consider the fluidity nature of identity, but also to address and negotiate identities with language learners in an on-going manner (Motha & Lin, 2013). These negotiations can help the learners to be prepared for potential changes and know that they are not alone in the transient stages. However, care should be taken when addressing identity, because negotiation of identities is totally different from dictating identity. Motha and Lin (2013) pointed out “to assume that TESOL professionals of any linguistic identity know better than their students what is best for them would be, at best, presumptuous” (p. 23). Therefore, the L2 language and content instructors at post-secondary education have to be meticulous and selective when dealing with L2 speakers’ identity issues.

Teaching formulaic language is another useful and highly productive tool in L2 instruction that can help with social construction and identity formation of the L2 learners. According to Burdelski and Cook (2012), teaching formulaic language to L2 learners can be a tactful investment. The L2 learners may utilize formulaic language effectively to socialize with other speakers of the L2. This can help the L2 learners in constructing their social identities better. Another function of formulaic language is “in socializing novices to gender identity” (p. 180), which will facilitate their communications in the L2. At post-secondary level, because of factors such as age and social status, stakes are higher for the L2 learners when they communicate with others, so appropriate use of formulaic language can mean a success in communications with peers of similar and different gender(s) as well as with university professors and administrators.

In sum, dealing with L2 speakers/learners’ identity is one of the most important issues that needs to be appropriately addressed in SLA research and practice. Post-secondary L2 learners going to universities in English speaking countries may come from different backgrounds, which require specific attention with respect to their identity issues. In this paper, identity issues of L2 speakers at post-secondary level in English speaking countries were classified based on their background and future plans, and some of their identity issues were explained. Based on the research in SLA, suggestions for addressing L2 learners’ identities were made. The area requires more attention and research to shed light on different minor groups affected by identity issues in L2.

## References

- Anderson, P. H., Lawton, L., Rexeisen, R. J., & Hubbard, A. C. (2006). Short-term study abroad and intercultural sensitivity: A pilot study. *International Journal of Intercultural Relations*, 30(4), 457-469.
- Ariza, E. N., & Hancock, S. (2003). Second language acquisition theories as a framework for creating distance learning courses. *The International Review of Research in Open and Distance Learning*, 4(2).
- Askildson, L. R., Kelly, A. C., & Mick, C. S. (2013). Developing Multiple Literacies in Academic English Through Service-Learning and Community Engagement. *TESOL Journal*, 4(3), 402-438.
- Bender, D. (1998). What's Special About Special Libraries?-SLA and the Continuous Education Challenge. *Inspel*, 32(4), 197-204.
- Bickel, B., Shin, J. K., Taylor, J., Faust, H., & Penniston, T. (2013). Learning English Internationally While Engaging Communities Locally: Online EFL Supporting Community Learning for Young Leaders. *TESOL Journal*, 4(3), 439-462.
- Burdelski, M., & Cook, H. M. (2012). Formulaic Language in Language Socialization. *Annual Review of Applied Linguistics*, 32, 173-188.
- Burnapp, D. (2006). Trajectories of adjustment of international students: U-curve, learning curve, or Third Space 1. *Intercultural Education*, 17(1), 81-93.
- Cots, J. M., & Nussbaum, L. (2008). Communicative competence and institutional affiliation: Interactional processes of identity construction by immigrant students in Catalonia. *International Journal of Multilingualism*, 5(1), 17-40.
- Coyle, D. (2013). Listening to learners: an investigation into 'successful learning' across CLIL contexts. *International Journal of Bilingual Education and Bilingualism*, 16(3), 244-266.
- Cummins, J. (2009). Pedagogies of choice: Challenging coercive relations of power in classrooms and communities. *International Journal of Bilingual Education and Bilingualism*, 12(3), 261-271.
- Church, A. T. (1982). Sojourner adjustment. *Psychological bulletin*, 91(3), 540.
- Dörnyei, Z. (2009). Individual differences: Interplay of learner characteristics and learning environment. *Language Learning*, 59(s1), 230-248.
- Dörnyei, Z., & Chan, L. (2013). Motivation and vision: An analysis of future L2 self images, sensory styles, and imagery capacity across two target languages. *Language Learning*.
- Dörnyei, E. Z., & Ushioda, E. (Eds.). (2009). *Motivation, language identity and the L2 self* (Vol. 36). Multilingual Matters.
- Duff, P. A. (2010). Language socialization into academic discourse communities. *Annual Review of Applied Linguistics*, 30(1), 169-192.
- Fearon, J. D. (1999). What is identity (as we now use the word). Unpublished manuscript, Stanford University, Stanford, Calif.
- Garcia, O. (2009). *Bilingual education in the 21st century: A global perspective*. Chichester: Wiley-Blackwell.
- Exchange student (2013). In *dictionary.com*. Retrieved on December 10, 2013 from <http://dictionary.reference.com/browse/exchange+student?s=t&path=/>
- exchange student. (2013). In *Merriam-Webster.com*. Retrieved on December 10, 2013, from <http://www.merriam-webster.com/dictionary/exchange%20student>
- Hagh, M. (2008). The discursive negotiation of international student identities. *Discourse: Studies in the Cultural Politics of Education*, 29(2), 207-222.
- Hawkins, M. & B. Norton (2009). Critical language teacher education. In A. Burns & J. Richards (eds.), *Cambridge guide to second language teacher education*. Cambridge: Cambridge University Press, 30-39.
- Kauffmann, N. L. (1992). *Students Abroad: Strangers at Home. Education for a Global Society*. Intercultural Press, Inc., PO Box 700, Yarmouth, ME 04096.
- Lotherington, H., & Jenson, J. (2011). Teaching multimodal and digital literacy in L2 settings: New literacies, new basics, new pedagogies. *Annual Review of Applied Linguistics*, 31(1), 226-246.
- Motha, S., & Lin, A. (2013). "Non-coercive Rearrangements": Theorizing Desire in TESOL. *TESOL Quarterly*.
- Matsumoto, D. (2009). *The Cambridge dictionary of psychology*. Cambridge, UK: Cambridge University Press.
- Nakagawa, S., & Kouritzin, S. (2009, March 23). Interrogating the power of identity as an analytical and theoretical construct. Paper presented at the annual meeting of the American Association of Applied Linguistics (AAAL), Denver, Colorado.
- Norton, B. (ed.) (1997). Language and identity. *TESOL Quarterly* 31.3 (special issue).
- Norton, B., & Toohey, K. (2011). Identity, language learning, and social change. *Language Teaching*, 44(04), 412-446.
- Ortaçtepe, D. (2012). *The development of conceptual socialization in international students: A language socialization perspective on conceptual fluency and social identity*. Cambridge, UK: Cambridge Scholarly Publishers.
- Ortaçtepe, D. (2013). "This Is Called Free-Falling Theory not Culture Shock!": A Narrative Inquiry on Second Language Socialization. *Journal of Language, Identity & Education*, 12(4), 215-229.
- Peirce, B. N. (1995). Social Identity, Investment, and Language Learning\*. *TESOL quarterly*, 29(1), 9-31.
- Pitts, M. J. (2009). Identity and the role of expectations, stress, and talk in short-term student sojourner adjustment: An application of the integrative theory of communication and cross-cultural adaptation. *International Journal of Intercultural Relations*, 33(6), 450-462.
- Richards, J. C. Schmidt, R. (Eds.). (2010). *Longman dictionary of language teaching and applied linguistics* (4<sup>th</sup> edition). London: Longman.
- Sobre-Denton, M., & Hart, D. (2008). Mind the gap: Application-based analysis of cultural adjustment models. *International Journal of Intercultural Relations*, 32(6), 538-552.
- Stille, S., & Cummins, J. (2013). Foundation for Learning: Engaging Plurilingual Students' Linguistic Repertoires in the Elementary Classroom. *TESOL Quarterly*, 47(3), 630-638.
- Taguchi, N. (2011). Teaching pragmatics: Trends and issues. *Annual Review of Applied Linguistics*, 31(1), 289-310.
- Talmy, S. (2008). The cultural productions of the ESL student at Tradewinds High: Contingency, multidirectionality, and identity in L2 socialization. *Applied Linguistics*, 29(4), 619-644.
- Wan, T. (1990). *Factors associated with academic stress experienced by international students in U.S. universities: Testing a cognitive model of stress* (Unpublished doctoral dissertation). State University of New York at the University at Albany, Albany, NY.

# Il digital storytelling come filo d'Arianna tra le generazioni

Barbara Bruschi, Alessia Rosa

*Department of Philosophy and Educational Sciences – University of Turin, via Gaudenzio Ferrari 9, Turin 10124, Italy*

---

## Abstract

L'educazione valoriale costituisce un percorso di ricerca e scoperta che si sviluppa attraverso la condivisione e la mediazione tra i soggetti coinvolti. Nel quotidiano i media svolgono un importante ruolo di socializzazione valoriale e per tale ragione meritano attenzione nella progettazione dei percorsi di educazione ai valori. La ricerca "Il digital storytelling come Filo d'Arianna tra le generazioni" ha sperimentato le potenzialità della narrazione e del digital storytelling come strumento di educazione e riflessione valoriale transgenerazionale, cercando di fare incontrare prospettive lontane dal punto di vista generazionale.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* educazione ai valori; digital storytelling; media education

---

## L'educazione ai valori e la media education un'alleanza vincente

Il concetto di valore è ampio e sfaccettato, considerabile sia come elemento del comportamento sia come principio di un sistema che guida l'agire dei soggetti che ne fanno parte. In estrema sintesi possiamo affermare che il concetto di valore fa riferimento ad una dimensione stabile di ciò che è desiderabile per un individuo e per una società (Zatti, 1997), e che appartiene al mondo interno dell'individuo, ma è ampiamente condizionato dal contesto culturale, sociale di cui il singolo fa parte.

I valori sono stati per lungo tempo, nella storia umana, un patrimonio trasmesso all'interno di specifici contesti culturali, attraverso le relazioni interpersonali e il confronto diretto con esperienze e realtà circoscritte. La loro evoluzione è stata caratterizzata da processi perlopiù lenti frutto talvolta di confronti e scontri tra generazioni. A fronte dell'ampia diffusione mediatica assistiamo oggi al moltiplicarsi delle agenzie di socializzazione, alla globalizzazione di specifiche prospettive in merito a ciò che debba essere considerato giusto e desiderabili, a nuove forme di condivisione e confronto che costituiscono potenziali elementi di partecipazione globale.

I media non propongono solo specifiche letture del reale, ma, soprattutto attraverso la rete, consentono ad ognuno di partecipare attivamente alla costruzione valoriale del reale stesso. Se in epoca pre-web era infatti possibile agire sul sistema mediatico principalmente attraverso specifiche regole di consumo o attraverso l'associazionismo, oggi la riduzione dei costi delle tecnologie, la facilità di utilizzo e in particolare la possibilità di una condivisione veloce e continua offrono la possibilità di intervenire attivamente sul sistema. Condizione necessaria e irrinunciabile affinché queste potenzialità possano realizzarsi concretamente è la disponibilità di conoscenze e competenze specifiche, non solo e non tanto per ciò che attiene l'impiego delle tecnologie, ma in particolare rispetto alla loro dimensione sociale. La cittadinanza attiva, all'interno dell'universo mediatico si configura quindi in prospettiva globale e con una doppia istanza: da una parte vi è la l'agire con e attraverso i media per sostenere percorsi finalizzati al "benessere" comune, nel rispetto delle differenze di idee e opinioni; dall'altra vi è la necessità di attivare forme di mediazione per chi non è in grado di esprimere, all'interno del sistema dei media, prospettive, opinioni e valori.

Allo stato attuale la possibilità di essere rappresentati diviene cifra dell'esistere: accanto a importanti realtà sociali, culturali e valoriali misconosciute, in quanto escluse dal circuito mediatico, vi sono contesti, prospettive

---

· Corresponding author. Tel.: +39-11-6703168; Fax: +39-11-6703164.

E-mail address: barbara.bruschi@unito.it.

e valori così rappresentati da essere assunti come “pseudo-universali”. Ne deriva, pertanto, che il digital divide riveste un ruolo fondamentale nello sviluppo valoriale della società odierna.

In una realtà fortemente mediatizzata come quella attuale è indispensabile una riflessione sul concetto stesso di valore e una sua ricollocazione dal punto di vista educativo e media-educativo. In questa sede si assume che l'educazione ai valori rappresenti un percorso personale, in cui l'intento dell'agire educativo consiste nell'individuazione e nella giustapposizione di quegli elementi che consentono al soggetto di riflettere criticamente sulle proprie concezioni valoriali del reale, cercando di rafforzarle, modificarle e ampliarle. L'obiettivo più ampio e a lungo termine è quello di favorire il passaggio da una morale eteronoma ad una autonoma, da un approccio prerazionale alle questioni valoriali ad una prospettiva razionale, da una visione della realtà valoriale egocentrica ad una prospettiva autotrascendente.

L'educazione ai valori così concepita si caratterizza per l'utilizzo di metodologie attive che consentano ai ragazzi di indagare l'universo valoriale che li circonda, esplorandolo e sperimentandone le peculiarità. Non serve un'educazione di trasmissione finalizzata all'acquisizione di atteggiamenti, rapporti e norme socialmente riconosciute, quanto una pedagogia problematizzante, impostata sulla comunicazione e sul dialogo all'interno di un sistema di gruppo. In uno scenario così definito, le capacità narrative e di confronto divengono elementi cardine in una prospettiva educativa a lungo termine volta a incentivare, nelle generazioni, la capacità di accogliere punti di vista differenti, di confrontarsi con l'altro, di negoziare le proprie scelte e posizioni in funzione di un approccio esistenziale fondato su una dimensione comunitaria e accogliente.

Tale approccio risulta fondamentale in quanto in grado di rispondere efficacemente alle richieste generate dai nuovi contesti del quotidiano a seguito dell'intesa diffusione delle pratiche tecnologiche: parlare di realtà oggi significa definire i tratti di una dimensione esistenziale che integra al suo interno piani differenti, ma fortemente integrati tra loro. Ciò che accade negli spazi della rete ha conseguenze sulla vita di tutti i giorni e viceversa. Pertanto risulta fondamentale coniugare l'educazione ai valori con quella mediaeducativa al fine di sviluppare nelle persone quelle competenze digitali ormai riconosciute come imprescindibili nel processo di formazione alla cittadinanza attiva e critica. Da questi presupposti nasce il progetto presentato in questa sede dal titolo “Digital storytelling come filo d'Arianna tra le generazioni”.

### **Il piano del progetto di ricerca**

Le potenzialità della narrazione e del digital storytelling come strumento di condivisione, educazione e riflessione valoriale transgenerazionale, sono state l'oggetto della ricerca “Il digital storytelling come Filo d'Arianna tra le generazioni” che durante l'anno scolastico 2013/2014 ha coinvolto un gruppo di adolescenti in un percorso di media educativo e di educazione ai valori. Nello specifico il progetto è stato indirizzato ad un gruppo di adolescenti appartenenti a due differenti tipologie scolastiche e ad un gruppo di anziani afferenti ad una associazione cittadina. Il progetto si è incentrato sui valori della libertà e del lavoro. La scelta di tali valori è stata determinata dalla complessità e frammentarietà che assume il loro significato e dalla loro capacità di declinarsi in un numero rilevante di accezioni (si pensi ad esempio alla libertà di espressione, alla libertà di movimento, alla libertà di stampa, di voto così come al diritto al lavoro, alla fatica del lavoro, al lavoro minorile e così via). Inoltre, i temi della libertà e del lavoro sono risultati di particolare interesse in funzione delle persone coinvolte nel progetto: da una parte gli studenti ovvero giovani che si apprestano ad entrare nel mondo del lavoro; dall'altra gli anziani che da questa realtà sono già usciti e che ne hanno però una profonda conoscenza e una grande esperienza esistenziale. Un discorso analogo risulta valido per ciò che attiene la libertà e la sua declinazione nei differenti contesti socio-culturali: mentre gli adolescenti tendono a definire la libertà entro i confini della sfera strettamente personale (libertà di scelta scolastica, libertà nel tempo libero) gli anziani coinvolti nel progetto sono portatori di esperienze di libertà in gran parte determinate dalla dimensione storica e sociale in cui hanno vissuto una parte fondamentale della loro vita e corrispondente con i grandi conflitti mondiali e con il periodo post-bellico. Eventi, questi, che hanno fortemente condizionato le loro esistenze soprattutto sul piano della libertà intesa nelle sue varie accezioni. Questa apparente distanza nella rappresentazione dei concetti/valori costituisce un punto di partenza fondamentale sia sul piano della “memoria” sia su quello del confronto/rapporto intergenerazionale e ha trovato nella coniugazione tra sistemi narrativi e tecnologie un valido alleato per la definizione d'interventi educativi transgenerazionali.

### *Tema e obiettivi*

Il progetto semi sperimentale intende esplorare l'efficacia di un intervento educativo finalizzato a supportare la formazione di valori sociali (nello specifico del lavoro e della libertà) in un gruppo di preadolescenti,



attraverso il digital storytelling, secondo il modello della media education (vedi sezione teorica del presente lavoro).

Il progetto intende:

- Analizzare le capacità dei ragazzi di leggere e comprendere le scelte valoriali del testo filmico;
- Analizzare le competenze nella rielaborazione concettuale dei valori di libertà e lavoro;
- Sviluppare negli adolescenti competenze relative all'impiego efficace delle tecnologie attraverso le pratiche narrative (digital storytelling);
- Ridurre la distanza tra generazioni attraverso una maggiore conoscenza reciproca;
- Valorizzare l'esperienza dell'anziano attraverso la condivisione;
- Promuovere, attraverso le storie, i valori della libertà, della pace, dell'altruismo e più in generale della cittadinanza.

#### *Problema*

Sulla base della letteratura analizzata ci si è posti il problema di definire quali interventi media educativi siano effettivamente in grado di ampliare l'orizzonte valoriale dei più giovani per favorire un'individuazione di valori personali autentici in contrapposizione a un'assunzione acritica dei messaggi valoriali veicolati dai media.

In particolare, ci si è interrogati circa le possibilità che un media-educator, esterno al corpo docente, riesca, attraverso un percorso di educazione ai valori, a portare il gruppo classe verso il raggiungimento dei seguenti obiettivi:

- Ampliare il proprio orizzonte valoriale;
- Modificare i valori che influenzano i soggetti nei loro atteggiamenti e comportamenti interpersonali;
- Aumentare le conoscenze e le competenze rispetto ai valori della libertà e del lavoro;
- Individuare valori propri ed autentici all'interno dei testi mediali comunemente fruiti;
- Scegliere comportamenti riferiti a strutture valoriali autonome nell'ambito di situazioni problematiche proposte attraverso sequenze filmiche scelte ad hoc;
- Scegliere comportamenti morali a tutela della collettività nell'ambito di situazioni problematiche proposte attraverso sequenze filmiche scelte ad hoc;
- Rielaborare le prospettive valoriali di soggetti anziani attraverso digital storytelling autentici.

#### *Ipotesi*

Sulla base delle teorie analizzate, del percorso educativo e del modello d'intervento che verrà in seguito dettagliato sono state formulate le seguenti ipotesi generali:

- Ipotesi1. I testi mediali, opportunamente selezionati e strutturati, possono rappresentare un valido strumento per la rilevazione delle competenze valoriali e di analisi critica degli adolescenti;
- Ipotesi 2. Il digital storytelling consente un efficace ampliamento delle capacità espressive degli adolescenti rispetto a questioni complesse come quelle relative ai valori della libertà e del lavoro;
- Ipotesi3. Lo storytelling e il digital storytelling rappresentano validi mediatori nell'incontro intergenerazionale;
- Ipotesi4. Le competenze di comprensione dei testi mediali determinano differenze nelle capacità espressive durante la produzione di testi mediali;
- Ipotesi5. La competenza tecnologica colma le lacune contenutistiche;
- Ipotesi6. La produzione di testi mediali attiva forme di cooperazione e condivisione delle competenze.

#### *Campione*

La definizione del campione è stata operata tenendo in considerazione alcuni fattori ritenuti particolarmente significativi. Essi sono:

- Il comune di residenza: si è scelto di lavorare in una piccola realtà di provincia piuttosto che in una dimensione metropolitana in quanto si riteneva che l'ambiente relazionale intra e inter-generazionale sarebbe stato fortemente differente, rispetto a quello cittadino, e più orientato alla vita comunitaria e associativa. Inoltre, anche per ciò che attiene le rappresentazioni e le aspettative dei giovani si è ritenuto che potessero essere ben diversificate e connotate rispetto alla varietà che tendenzialmente caratterizza i contesti metropolitani (Grimaldi, 2006).
- La tipologia di percorso formativo soprattutto in rapporto all'accesso al mondo del lavoro. Si è scelto di coinvolgere gli studenti di un percorso tecnico (Istituto per geometri) finalizzato alla formazione

professionale e a una diretta immissione nel mondo del lavoro e gli studenti di un Liceo Classico che, tradizionalmente, rimanda l'ingresso nel mondo del lavoro all'acquisizione di un titolo di studio corrispondente alla laurea.

- La specificità degli insegnamenti: tecnico-pratici nel primo caso, umanistici nel secondo;
- L'età dei giovani: si è scelto di lavorare con ragazzi e ragazze di età compresa tra i 15 e i 16 anni. Il presupposto di partenza è che in questo periodo della vita i soggetti abbiano già cominciato a maturare una loro posizione valoriale, ma non siano ancora giunti a un processo definitivo di formazione e che possano pertanto essere ancora sufficientemente disponibili a un processo di riflessione e rielaborazione critica (Nucci, 2001).
- Le differenze di genere: gli studi tecnici tendono ad essere ancora scelti in prevalenza dai ragazzi così come gli studi classici sono generalmente privilegiati dalle ragazze (Ballarino & Schadee, 2010).

Le due classi individuate sono entrambe appartenenti all'Istituto di Istruzione Superiore "Arimondi - Eula" Savigliano-Racconigi e più in dettaglio sono: la 2° A geometri composta da un totale di 26 allievi (6 femmine e 20 maschi); la 5° Ginnasio costituita da 28 allievi (24 femmine e 4 maschi).

### **La struttura del percorso di educazione ai valori**

A seguito del confronto tra i ricercatori coinvolti ed il corpo docente è stata definita la struttura del percorso di educazione ai valori della durata complessiva di 16 ore (8 incontri da due ore) incentrato sull'approccio media educativo. La media education non si caratterizza per una metodologia codificata quanto piuttosto per un insieme di pratiche che ne definiscono gli interventi, declinati in proposte di analisi e produzione. All'interno di tali processi è centrale la considerazione delle modalità di fruizione dei soggetti coinvolti, al fine di massimizzare i processi di transfert cognitivo evitando il rischio di proporre percorsi decontestualizzati e di limitata ricaduta.

Nel percorso qui dettagliato le fasi di analisi e produzione hanno eguale importanza e son state declinate nei seguenti incontri:

Primo Incontro. Il percorso è iniziato con una breve presentazione del progetto e la somministrazione del test sulle storie di cui daremo conto in modo dettagliato nel paragrafo relativo agli strumenti.

Secondo Incontro. Le sequenze filmiche inserite nel questionario hanno rappresentato uno spunto di riflessione e condivisione tra gli allievi che si sono confrontati sulle risposte fornite. In questa fase i ragazzi e le ragazze sono stati invitati a individuare altri prodotti filmici di loro conoscenza che affrontassero tematiche simili. Al termine sono stati coinvolti in un gioco di ruolo il cui obiettivo era la definizione della carta dei valori di una città immaginaria.

Terzo Incontro. È stato presentato il metodo del digital storytelling attraverso alcuni esempi (in lingua inglese) che sono stati oggetto di analisi da parte degli studenti con l'obiettivo di cogliere le specificità del metodo. Sulla base di quanto esposto e attraverso un lavoro di gruppo i ragazzi hanno iniziato a progettare i loro digital storytelling, a partire dalla definizione dei valori di libertà e lavoro.

Quarto incontro. Durante l'incontro i ragazzi hanno condiviso le loro idee progettuali, i testi scritti e parte delle immagini scelte. Successivamente sono state spiegate le modalità di montaggio video attraverso software open source. A conclusione il gruppo ha elaborato, sulla base delle riflessioni condivise, il testo di un'intervista da somministrare agli anziani che avrebbero incontrato a breve.

Quinto incontro. In questa fase gli studenti hanno incontrato gli anziani coinvolti nel progetto. Dopo un breve momento di presentazione collegiale dell'iniziativa i ragazzi e le ragazze sono stati suddivisi in gruppi e hanno cominciato a intervistare gli anziani. Tutti gli studenti hanno avuto modo di interagire con gli anziani intervenuti e solo successivamente i diversi gruppi hanno scelto su quale intervista concentrare il lavoro di produzione delle digital stories. La fase di progettazione e realizzazione dei prodotti è avvenuta al di fuori della realtà scolastica: gli studenti si sono organizzati e autogestiti.

Sesto incontro. Durante l'ultimo incontro le classi hanno presentato i loro digital storytelling e si sono confrontati con gli anziani in merito ai risultati. A conclusione è stato somministrato il secondo questionario.

### *Gli strumenti per la rilevazione dei dati*

La maggior parte degli studi sui valori è condotta attraverso la somministrazione di questionari, nell'ambito di ampie inchieste quantitative in cui agli intervistati viene chiesto di esprimere il loro grado di accordo con affermazioni relative alle principali dimensioni valoriali della loro società. Una variante di questo approccio è la richiesta di definire quanto (a loro giudizio) determinati comportamenti siano considerabili ammissibili, o ancora di indicare il grado di accuratezza con cui specifiche frasi o certi aggettivi li descrivono.

Sono stati individuati due possibili rischi all'utilizzo di tali approcci in relazione al contesto di nostro interesse: la semplificazione degli stati degli intervistati e la distorsione delle loro risposte.

Per quanto riguarda la semplificazione degli stati, la scarsa presenza nella letteratura di riferimento circa le modalità secondo cui i giovani considerano i valori del lavoro e della libertà determina una difficoltà nell'individuare posizioni di stato che non rischino di essere stereotipate e basate sulla visione dell'adulto. La definizione di un numero ridotto di scelte comportava poi il rischio di raccogliere risposte fornite in modo meccanico o addirittura volontariamente mendace al fine di adeguarsi alle aspettative del contesto scolastico.

Inoltre la scelta è stata condizionata dalla volontà di prendere in considerazione le modalità di lettura ed interpretazione che i soggetti coinvolti nel progetto applicano nell'analisi delle rappresentazioni riferite ai valori di "libertà" e "lavoro". Il concetto di rappresentazione si riferisce alla peculiarità dei media di mostrare mediazioni del reale e non il reale stesso. Le rappresentazioni mediatiche conducono il pubblico a vedere il mondo a partire da prospettive predeterminate e ciò implica la necessità di specifiche riflessioni sulle ideologie e i valori che conducono alla scelta di tali porzioni del reale (Buckingham, 2003). Quanto sin qui affermato ha portato a individuare nei test proiettivi lo strumento più adeguato per la rilevazione di questi dati. Più nello specifico, si è scelto di adottare la variante del test narrativo proposta da Marradi (2005). Tale tecnica si basa sul fatto che valori e atteggiamenti guidano le scelte nelle situazioni "cruciali" (Trinchero, 2011) in cui il soggetto è chiamato ad esprimere la propria posizione tra le opzioni disponibili.

Alla scelta viene dunque attribuito un valore fondante per l'esistenza in quanto espressione valoriale concreta.

A differenza della tecnica delle storie più tradizionale si è deciso di usare l'arte narrativa filmica ciò ci ha permesso di rilevare parallelamente le capacità di lettura e comprensione di questo specifico linguaggio da parte dei ragazzi. La visione di interi film risultava onerosa in termini di tempo e cognitivamente più complessa in quanto implicava la comprensione di un più ampio intreccio narrativo.

Sono dunque stati scelti 6 sequenze di film che trattavano i valori del lavoro e della libertà. L'individuazione dei film è stata complessa e ha impegnato i ricercatori in più fasi. Sono stati selezionati prodotti su cui le classi non avessero già lavorato in precedenza e si è optato per film non "cult" tra i giovani e con posizioni valoriali chiare ed esplicite. A conclusione di tale operazione di riflessione sono stati scelti i seguenti prodotti: "Uomini di Dio" (Xavier Beauvois, 2010), "Tutta la vita davanti" (Paolo Virzì, 2008) e "L'uomo che verrà" (Giorgio Diritti) per il test iniziale; "Finché c'è guerra c'è speranza" (Alberto Sordi, 1974), "Le donne del sesto piano" (Philippe Le Guay, 2011) e "L'ultimo dei Samurai" (Edward Zwick, 2003) per la somministrazione conclusiva.

Nella fase di somministrazione i ricercatori hanno fornito, per ciascun film, solamente il titolo e il nome del regista al fine di evitare possibili condizionamenti derivanti dalle spiegazioni. Dopo la visione di ciascuna sequenza gli studenti sono stati invitati a rispondere alle domande aperte del questionario.

Il questionario è stato suddiviso in tre ambiti (per un massimo di sei domande per film): nel primo si indagava la comprensione del testo filmico, nella seconda si chiedeva un giudizio sui comportamenti dei personaggi, nella terza sezione si ponevano quesiti di immedesimazione e scelta valoriale.

### *Il digital storytelling*

Il digital storytelling è apparso immediatamente coerente con le finalità del progetto. Attraverso questa metodologia si è in grado di lavorare su una serie di aspetti particolarmente significativi per l'indagine. Primo fra tutti va evidenziato l'approccio media-educativo insito in questa pratica narrativa: le tecnologie nel digital storytelling costituiscono degli amplificatori comunicativi ed emozionali e ben si prestano a quel lavoro profondo di analisi e riflessione critica indispensabili per lo sviluppo delle competenze digitali delle nuove generazioni. Inoltre, esso nasce dalla fusione tra la tecnologia e le pratiche narrative che rappresentano un elemento di forza e grande intensità nella nell'educazione valoriale. I valori, come già ricordato altrove in questo testo, rappresentano un elemento fondamentale sia a livello individuale, per ciò che attiene la formazione dell'identità e del sé, sia sul versante sociale in termini di condivisione e definizione del senso di appartenenza. Tutti questi processi sono, come dimostra ormai da tempo, l'ampia letteratura di settore, fortemente potenziati e favoriti dalle pratiche narrative: attraverso la storia di sé e degli altri si capisce meglio la propria realtà.

La realizzazione di digital stories permette ai ragazzi e alle ragazze il passaggio dal ruolo di "consumer" a quello di "prosumer" ovvero di consumatori e produttori di testi mediali. La dimensione produttiva costituisce un elemento fondamentale per lo sviluppo della capacità di analisi, per il potenziamento della capacità espressiva, ma soprattutto per l'accesso alla dimensione creativa che dovrebbe accompagnare sempre più l'impiego dei media e, in particolare, l'accesso ai social network.

Non va inoltre dimenticato il ruolo che la dimensione narrativa può svolgere nell'incontro tra generazioni: attraverso le storie sono possibili un coinvolgimento e una conoscenza reciproca difficilmente raggiungibili attraverso strategie differenti.

## Risultati

Le digital stories realizzate nella fase precedente l'incontro con gli anziani sono caratterizzate, in prevalenza, da una profonda critica al sistema dei media: molti prodotti tendono a mettere in risalto una rappresentazione negativa del ruolo esercitato dai messaggi mediali nei confronti delle persone soprattutto per ciò che riguarda la possibilità di un'espressione libera del sé e della propria individualità. Ad essere sotto accusa è, innanzitutto, la capacità di standardizzazione esercitata dai messaggi pubblicitari che viene rappresentata come un forte vincolo per l'esercizio della libertà di espressione. Un altro elemento che emerge è rappresentato dal valore attribuito al denaro come mezzo di realizzazione dei propri sogni e delle proprie attese. Sia nella scelta dei testi, sia in quella delle immagini la dimensione economica emerge ed è messa ancora più in risalto dai riferimenti alla crisi economica in corso.

Da evidenziare una carenza nell'assunzione di responsabilità verso le situazioni in cui sono negati i diritti civili e umani: la maggior parte degli studenti opera una sorta di delega nei confronti di coloro che sono definiti "potenti" ovvero verso chi esercita un certo potere. Sul piano dello stile va rilevata una forte tendenza alla riproduzione delle forme narrative di tipo scolastico tipiche degli elaborati scritti.

Le narrazioni digitali successive all'incontro con gli anziani rappresentano una trasposizione dei loro racconti e anche in funzione di questo mettono in risalto una scelta di contenuti differenti, ma soprattutto sono, tendenzialmente accomunate da una forma di ottimismo e di speranza verso il futuro che sembravano assenti nei lavori precedenti. Le rappresentazioni sono focalizzate sui temi dell'autorealizzazione attraverso l'impegno, sull'autonomia di pensiero e sulla speranza nel futuro.

Dal punto di vista tecnico, tranne che in un paio di casi, non si rilevano particolari competenze: sia la scelta dell'apparato iconografico sia della colonna sonora e il montaggio non sono particolarmente interessanti e tendono a mettere in evidenza l'influsso dei messaggi mediali.

Rispetto alle ipotesi formulate possiamo affermare che:

- Come ipotizzato attraverso l'analisi dei testi mediali prodotti con le digital stories si è potuto rilevare che gli studenti non sembrano, tranne in un paio di casi, particolarmente in grado di riflettere criticamente sui messaggi valoriali dei testi che fruiscono, mentre risultano più competenti quando si tratta di produrre rappresentazioni valoriali;
- In generale possiamo affermare che attraverso la narrazione mediale i ragazzi e le ragazze sono stati in grado di trasmettere un'ampia gamma di contenuti, riferiti al contesto valoriale, anche se la qualità delle espressioni sicuramente ha rappresentato un ostacolo rispetto alle potenzialità espressive;
- Sia dall'osservazione partecipata sia dai prodotti realizzati possiamo affermare, con un certo grado di sicurezza, che lo storytelling e il digital storytelling rappresentano validi mediatori nell'incontro intergenerazionale;
- I prodotti realizzati dimostrano, in ampia misura che le competenze di comprensione dei testi mediali determinano differenze nelle capacità espressive durante la produzione: i ragazzi che tendenzialmente avevano manifestato una conoscenza dei testi mediali più approfondita sono anche stati in grado di realizzare prodotti migliori dal punto di vista sia espressivo, sia contenutistico sia tecnico.
- I risultati raggiunti dimostrano che le criticità nell'elaborazione dei contenuti non viene colmata dalla competenza tecnologica;
- Un dato particolarmente importante è rappresentato dalla constatazione che la produzione di testi mediali attiva forme di cooperazione e condivisione delle competenze favorendo il lavoro di gruppo e le dinamiche relazionali all'interno della classe.

In conclusione, tra i risultati ottenuti si possono evidenziare:

- Il passaggio, da parte degli adolescenti, dal ruolo di consumer a quello di producer con la conseguente acquisizione di competenza critica rispetto ai linguaggi dei media;
- La partecipazione attiva da parte degli anziani nelle attività narrative con gli adolescenti e nella promozione di messaggi positivi rispetto ai valori del lavoro e della libertà;
- La definizione di un processo di partecipazione attiva nella riflessione valoriale e nella condivisione intra e inter-generazionale.

Possiamo dunque affermare che la narrazione anche attraverso le moderne forme del digitale rappresenta, all'interno del labirinto mediatico attuale, un efficace filo di Arianna tra le generazioni.

## References

- Ballarino, G., & Schadee, H. (2010). Genere, origine sociale e disuguaglianza di istruzione nell'Italia contemporanea. *Sociologia del lavoro*, 120(4), 170-193.
- Becker, B. W., & Connor, P. E. (1981). Personal values of the heavy user of mass media. *Journal of Advertising Research*, 21(5), 37-43.
- Buckingham, D. (2003). *Media education: literacy, learning, and contemporary culture*. Cambridge Polity in association with Blackwell.
- Cavarero, A. (2005). *Tu che mi guardi, tu che mi racconti: filosofia della narrazione*. Milano: Feltrinelli.
- Demetrio, D. Anzaldi, E. (2003). *L'educatore auto(bio)grafo: il metodo delle storie di vita nelle relazioni d'aiuto*. Milano: UNICOPLI.
- Frazel, M. (2010). *Digital storytelling guide for educators Eugene*, OR International Society for technology in education.
- Grimaldi, R. (2006). *Disuguaglianze digitali nella scuola: gli usi didattici delle tecnologie dell'informazione e della comunicazione in Piemonte*. Milano: F. Angeli.
- Kearney, M. (2011). A learning design for student-generated digital storytelling. *Learning, Media and Technology*, 36(2), 169-188.
- Lambert, J. (2013). *Digital storytelling: capturing lives, creating community*. New York: Routledge.
- Marradi, A. (2005). *Raccontar storie: un nuovo metodo per indagare sui valori*. Roma: Carocci.
- Nucci, L. (2002). *Educare il pensiero morale: la costruzione del sé e i concetti di giustizia, diritti, uguaglianza e benessere*. Gardolo Trento: Erickson.
- Robin, B. (2006). The educational uses of digital storytelling. *Society for Information Technology & Teacher Education International Conference*, 1, 709-716.
- Trinchero, R., & Tordini, M. (2011). *Responsabilità e disagio: <<una>>ricerca empirica sugli adolescenti piemontesi*. Milano: Angeli.
- Yang, Y. T. C., & Wu, W. C. I. (2012). Digital storytelling for enhancing student academic achievement, critical thinking, and learning motivation: A year-long experimental study. *Computers & Education*, 59(2), 339-352.
- Zatti, A. (1997). Lo studio dei valori nella letteratura psicologica. In M. Bellotto (Eds.), *Valori e Lavoro* (pp. 51-82). Milano: Franco Angeli.

# Images of chemical scientists through Turkish primary students' eyes: implications for curriculum and instruction

Hünkar Korkmaz<sup>a\*</sup>, Nilgun Secken<sup>b</sup>

<sup>a</sup>*Hacettepe University, Faculty of Education, Department of Educational Sciences, Division of Curriculum and Instruction, Ankara 06800, Turkey*

<sup>b</sup>*Hacettepe University, Faculty of Education, Department of Secondary Science and Mathematics Education, Division of Chemistry Education, Ankara 06800, Turkey*

---

## Abstract

This study investigated the images of chemical scientists held by Turkish primary students by gender. The Draw a Chemical Scientist Test was administered to 542 students from an urban area. A Chi-Square Test of Independence was used to test for statistically significant differences between gender groups. Significant differences were found between girls' and boys' images of chemical scientists in terms of some aspects. It is thought that the findings of this research will contribute to the development of chemistry education, to the researchers studying on gender issues, cultural diversity, and also to the international literature on chemistry education. While DACST is a feasible and simple method, future studies should supplement it with interviews for deeper understanding of students' constructs

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* images of chemical scientist, science education, chemistry curriculum, instruction, primary students

---

## Introduction

Chemistry was developed greatly throughout the 20<sup>th</sup> century. An outcome of this development was the introduction of chemistry in the curriculum of elementary and secondary education, either as part of science course or as separate disciplines (Salta & Tzougraki, 2004). Chemistry education, or often chemical education, has two principal purposes: to teach the basic concepts students need to undertake further education in chemistry (and other science-related disciplines) and to develop scientific literacy. Science educators have agreed that the development of scientific literacy should be an important goal of the school curriculum. In this context, current science education reform urges that every student be frequently and actively involved in exploring the natural world in ways that resemble how scientists work (Luehman & Markowitz, 2007). Understanding how scientists build, evaluate, and apply scientific knowledge in a scientific inquiry context is a core part of scientific literacy as a science curriculum goal (American Association for the Advancement of the Science [AAAS], 1993; Fensham & Harlen, 1999; OECD, 2000). Students' images of science (Driver, Leach, Millar & Scott, 1996) and their images of scientists are widely accepted as important aspects of their scientific literacy (National Research Council, 1996) and have important implications for how they learn and engage with science in a classroom context (Hofer, 2001).

Many studies have examined gender differences in images of scientists. Manzoli et al (2006), working with 48 Grade 3 students from Italy, found that girls were more likely to draw female scientists, but that they often asked permission to do so. In addition, the girls' drawings typically depicted biological or medical sciences; the boys' drawings typically included more technology. In a study, Losh, Wilke, and Pop (2008) investigated elementary school students' conceptualization of scientists. The researchers also found that girls were more likely than boys to draw female scientists and that girls were more likely to draw figures in which gender could be determined.

Song and Kim (1999) investigated Korean students' images of the scientists. In their study, the data, quantitative and qualitative, from the responses of a total of 1137 from the different groups (ages 11, 13, and 15) were analyzed to calculate the relative frequencies of some identified patterns of responses and to make comparisons between different genders and different age groups. They found that there were some differences between the gender groups: girls more frequently mentioned "experiment" while boys did "research." In

addition, nearly three quarters of the students (74.4%) identified the scientists as male while only 16.1% did as female. There was a clear difference according to the respondents' gender: in trend girls drew a much higher proportion of female scientists. In 2001, Gounselin (2001) conducted a study on images of scientists held by 373 middle school students and found that male students depicted scientists as males, but females depicted scientists as both male and female.

In this study, it was examined the images of students at middle school level and explore the contexts and implications. In many countries, middle school is the last opportunity for students to relate to science and technology in any organized framework. It is also the period when students decide whether to take science as a major subject at high school level or stop learning science subjects (Scherz & Oren; 2006). Therefore, it is necessary to promote the development of positive images and attitudes toward scientific topics including chemistry at this critical time. The responsibility of science education to shape scientific attitudes is highlighted by DeBoer's (2000) review of the history of science education. The eight goal is summarized as "Preparing citizens who are sympathetic to science" which is understood to refer to promotion of positive scientific attitudes, including a willingness to make use of scientific expertise (Cited in Scherz & Oren; 2006).

Over the past 50 years, a growing body of research has been conducted on people's images of science and scientists. Much of this research has focused on children's images in general science context rather than a specific science context such as biological science and scientists, astronomical science and scientists, physical science and scientists, and chemical science and scientists. There is a lack of information in how students view chemical science and scientists. This study is aimed to provide descriptive information about students' images of chemical science and scientists in terms of various aspects including stereotype images, alternative images, and additional images by gender.

## Method

This study employs a survey design (Creswell, 1994) using a projective instrument adapted from Draw a Scientist Test (Chambers, 1983) to collect the perceptions of primary school students.

### Sample

The study group consisted of five hundred forty-two primary students (269(49.6%) boy and 273(50.4%) girl) taken from the seventh or eighth grade of three urban schools located in the same city in Turkey. All these schools have a heterogeneous population from middle and lower middle socioeconomic backgrounds. For this study, researchers assumed that the 7th and 8th grades students at the primary school level were appropriate to exploring students' images of chemical scientists. At the primary school level in Turkey, Integrated science curriculum is given including biology, physics, chemistry, astronomy, and geology. Chemistry topics are taught intensively in these grade levels than other grade levels. The students at this level are more aware of chemistry as a separate science discipline.

### Instrument

The instrument used in this study is based on Chambers' (1983) Draw a Scientist Test (DAST), a projective instrument designed to reveal students' images of a chemical scientist as to gender groups. The test requires students to draw a scientist using stick figures and other graphical rendition of their impression. The DAST was adapted for this study and the researchers refer to the adapted instrument as Draw a Chemical Scientist Test (DACST). DACST was revised through a pilot study carried out with about 150 students of different grade levels at primary school level.

The Draw a Scientist Test Checklist (DAST-C) developed by Finson et al. (1995) was adapted to design a scoring rubric including two sections. The seven *standard images* of a scientist identified by Chambers (1983) were adapted as the first section of DACST checklist shown Table 1. The second section of the DACST checklist represents the *alternative images* of a chemical scientist including gender, age, and ethnic origin. Ethnic minority representation was practically *nonexistent*. In other study on Turkish primary students (Turkmen, 2008) was explained the reason of this situation as following two sentences. One possible explanation is all Turks are Caucasian and students probably have never seen any black or Hispanic or Asian people. Undoubtedly, students did not depict any minority people as a scientist. Thus, the researchers considered these three indicators and eliminated the ethnic origin indicator for Turkish sample. These indicators and specific

descriptors were added in the DACST checklist because they showed up frequently in the drawings of students during a pilot test. A third category, *additional images of chemical scientist* including emotions, natural setting of work, and nature of scientific work.

### *Administration of the DACST*

The students in this study were instructed to draw their perceptions of a chemical scientist on a blank sheet of paper. On the back of paper, they were asked to clarify ambiguities their drawings. These questions were included (1) Briefly, describe the images of the chemical scientist you drew; and (2) What is the chemical scientist doing? Students were also instructed to write their gender, school, and grade level on the upper right hand corner of the drawing. Teachers were selected based on their willingness to volunteer. Students who participated in the study were randomly assigned to their classes by school administration prior to the opening of school and the initiation of the study. Teachers and the researcher gave the instrument during their science classes and provided students with unlimited time to complete all items.

### *Analysis of the DASCT*

During the pilot study, inter-coder reliability for the drawings was 0.95, using Miles and Huberman's (1994) formula (total agreements/total codes). Each coder used the DACST checklist to analyze the drawings from all of the subjects. The students' drawings were coded into a set of categories as shown Tables 1–3. For the analysis of the data from the DASCT, quantitative and qualitative data obtained were frequently grouped into patterns the responses in order to give relative frequencies and percentages of the patterns. Also, chi-square analyses were conducted to determine if gender differences in student images were present.

## **Results and Discussions**

The analyses of the drawings reveal that a chemical scientist is perceived by the Turkish primary school students in this study as a mosaic of the standard image of scientists, alternative images and have additional characteristics specific to scientists who study chemistry.

### *The standard image of a chemical scientist*

All seven indicators of the standard images of a scientist (Chambers, 1983) were present in the subjects' drawings of a chemical scientist. Table 1 shows the frequencies, percentages, and chi-square results of indicators of a standard image of a chemical scientist drawn by the gender of subjects.

Table 1. Frequencies, percentages, and chi-square for DAAST

Rank order of the Standard image of a Scientist (Chambers, 1983)	Girl (n=273) f(%)	Boy (n=269) f(%)	$\chi^2$	P	Significance Level
1-Lab coat(3)	130(47.6)	126(46.8)	.0333	.864	NS
2-Eyeglasses(5)	109(39.9)	92(34.2)	1.904	.183	NS
3-Facial growth of hair(6)	95(34.8)	107(39.8)	1.436	.249	NS
4-Symbols of research (1)	249(92.2)	220(81.8)	10.326	.002	*
5-Symbols of knowledge(4)	115(42.1)	101(37.5)	1.185	.293	NS
6-Technology(2)	197(72.2)	177(65.8)	2.564	.115	NS
7-Relevant captions(7)	64(23.4)	38(14.7)	7.698	.006	*

The rank order of Chamber's list was used for comparison (See, Column 1 in Table 1). The rank order of the indicators were different to Chamber's list except the indicator "relevant captions". In this study, symbols of research, technology, and lab coat were ranked as the first three indicators by the students. These findings can be explained the effects of historical time. Chambers did his study before thirty-one years. This century, 21<sup>st</sup>



century, is defined as science and technology age. The students' drawings are seen association of symbols of research and technology with computers. Two samples for students' drawings were given Appendix 1.

Also, as indicated in Table 1, there were statistically significant differences by gender for two indicators including symbols of research and relevant captions of standard images. More girls in this study depicted a chemical scientist sing research symbols ( $X^2(1, N=542) = 10.326, p < 0.05$ ) relevant captions ( $X^2(1, N=542) = 7.68, p < 0.01$ ). Another account from Narayan (2009) is typical of the gender analysis found in the interpretation of DAST drawings: "Females more than males drew their scientist in a laboratory setting with symbols of knowledge such as books, charts, etc., and symbols of research.

### 1. Alternative images of a chemical scientist

When the drawings were analyzed for alternative images, it was interesting to observe the candor with which the subjects drew many alternative images of a scientist that helped define their perceptions of a chemical scientist. Six indicators assessed in this category are (8) gender, (9) age, (10) indications of danger, (11) presence of light bulbs, (12) mythic images, and (13) indicators of secrecy. Indicator 8, "gender," was expanded to "male," "female," and "gender-neutral." Indicator 9, "age of scientist," had three choices that included "young aged," "middle aged" and "elderly scientist" to accommodate the subjects' perceptions. Table 2 summarizes the responses to the indicators on the alternative images on a chemical scientist.

**Table 2. Frequencies, percentages, and chi-square for DAAST**

Alternative images (Finson et al., 1995)		Girl (n=273) f(%)	Boy (n=269) f(%)	$X^2$	P	Significance Level
8-Gender						
	Male	122(44.7)	134(49.8)	1.428	.263	NS
	Female	124(45.4)	93(34.6)	6.642	.011	*
	Male &female	13(4.8)	46(17.1)	21.264	.000	*
9-Age						
	Young aged	58(21.2)	81(30.1)	5.585	.019	*
	Middle aged	207(75.8)	181(67.3)	4.856	.029	*
	Elderly scientist	7(2.6)	7(2.6)	.001	1.00	NS
10-Indications of danger		74(27.1)	64(28.8)	.784	.430	NS
11- Presence of light bulbs		26(9.5)	34(12.6)	1.336	.275	NS
12- Mythic images		1(0.4)	3(1.1)	1.037	.370	NS
13- Indicators of secrecy		9(3.3)	8(3)	.046	1.00	NS

As indicated in Table 2, the girls drew female ( $X^2(1, N=542) = 6.642, p < 0.05$ ) and middle aged ( $X^2(1, N=542) = 4.586, p < 0.05$ ) scientists more than boys. Also, the boys drew young ( $X^2(1, N=542) = 5.585, p < 0.05$ ) and both male and female ( $X^2(1, N=542) = 21.264, p < 0.05$ ) scientist. Although there was no a significant difference, more boys (n=134, 49.8%) drew male scientist than girls (n=122, 44.7%).

The single most widely studied variable in DAST research has been that of gender. Mead and Metraux (1957) noted that when asked to write essays about scientists, both male and female high school students mostly described male scientists. In the original DAST study, out of nearly 5,000 students tested, 28 girls, and no boys, drew female scientists (Schibeci and Sorenson, 1984; Kelly 1985). To a greater or lesser degree, almost all the hundreds of DAST studies observed this gender divide, as indicated in a recent review of the DAST literature. "A survey of students from across the United States found that only 14 percent of the drawings by girls and 8 percent of the drawings by boys depicted female scientists, and only 20 of the 1,600 drawings by both girls and boys depicted scientists of color (Fort and Varney 1989). A study of undergraduate biology and liberal studies

majors showed that students in both groups drew more male scientists than female scientists, and only female students from both groups drew female scientists (Rosenthal 1993). Another study found that children in kindergarten through twelfth grade primarily drew pictures of male scientists (Barman 1999), and older students were less likely to draw female scientists than were younger students." It is also not surprising that males tended to draw their scientist as a male while females drew both male and female scientists.

#### *Additional images of a chemical scientist*

The additional images specific to a chemical scientist were depicted in three indicators of the DACST checklist. These indicators are (14) emotions depicted, (15) natural setting(s) of work, and (16) nature of scientific work. Indicator 14, the emotions of a chemical scientist, was expanded to include joy, hope, and sadness. Indicator 15, the settings of work, was expanded to include common environments in which chemical scientists perform their work. Finally, indicator 16 serves to record the nature of scientific work including science process skills drawn and described by subjects. The indicator named "type of scientist," which existed on the original checklist developed by the Thomas and Hairston (2003), was not used in this study. Generally, the type of scientist was generic; a small percentage of the pictures drawn depicted a chemical scientist. Table 3 summarizes the additional images of a chemical scientist analyzed from the drawings of the subjects.

**Table 3. Frequencies, percentages, and chi-square for DAAST**

Additional images (Adapted from Thomas & Hairston, 2003; Korkmaz, 2009, 2011)		Girl (n=273) f(%)	Boy (n=269) f(%)	$\chi^2$	p	Significance Level
14-Emotions						
	Joy and hope	155(65.8)	154(57.1)	.012	.931	NS
	Sadness	53(19.4)	72(26.8)	4.127	.052	NS
	Neutral	65(23.8)	43(16)	5.199	.024	NS
15-Settings of work						
	Indoor	236(86.4)	224(83.3)	1.064	.338	NS
	Outdoor	12(4.4)	10(3.7)	.160	.828	NS
	Combination of indoor and outdoor	7(2.6)	6(2.2)	.064	1.00	NS
16-Nature of scientific work						
	Observing	33(12.1)	5(1.9)	.495	.525	NS
	Testing samples with scientific instruments	17(6.2)	11(4.1)	1.264	.261	NS
	Collecting data	17(6.2)	11(4.1)	.153	.733	NS
	Experimenting	202(74)	179(66.5)	3.601	.061	NS
	Reporting	10(3.7)	5(1.9)	1.639	.295	NS
	Working cooperatively	13(4.8)	10(3.7)	.364	.671	NS
	Teaching	1(0.4)	3(1.1)	1.037	.370	NS
	Presenting a study/research	4(1.5)	1(0.4)	1.772	.373	NS
	Reading a book	21(7.7)	21(7.8)	.438	.542	NS
	Thinking about a research idea	10(3.7)	11(4.1)	.066	.827	NS
	Finding a chemistry formula	14(5.1)	9(3.3)	1.059	.395	NS
	Planning a research/project	11(4)	7(2.6)	.895	.473	NS

---

The indicator for “emotions” helps to assess the expressions depicted in the drawings. The most of the drawings by the students in both gender groups express joy and hope that chemical scientists will rescue the earth from war and diseases. The most popular setting of work drawn by the students was the indoor. The most common perception in both gender groups about the nature of scientific work by a chemical scientist drawn and expressed by the students were experimenting. These findings were supported each other. Generally, in chemistry, an experiment was done a laboratory, indoor, setting.

The researchers examined the chemistry subjects in Turkish primary science curriculum content, regional matters, and concluded that the lesson and activities in chemistry unit in science curriculum context influenced primary school students. There were lessons on chemical weapons, life story of Madam Curie and her studies related to radiology, medicine, and others. The most of the visuals in students’ books, a chemical scientist was presented doing an experiment in laboratory, indoor, setting.

### **Implications to Curriculum and Instruction in Science Education**

The results of this study are important for curriculum developers, teachers, policy makers, and institutions with science/chemistry education, science/chemistry teacher preparation and enhancement programs. Information about students’ images of scientists can guide in formulating educational aims and objectives, designing curriculum content and instructional practice to accommodate students’ prior knowledge and personal experiences.

This study also has implications for the schools and the community. It has been shown that not all students have the same educational experiences. Schools and communities must provide equal opportunities for all students without regard to gender such as the effective schooling, extra educational help, and support systems they need to meet the educational standards demanded by the society. Teachers and schools should also recognize that students come to school with diverse backgrounds and provide constructive educational experiences, including science-related experiences, which build on those backgrounds.

In addition, the implications of this study are clear for textbook publishers and TV programmers. As indicated by Sjöberg (1993) the textbooks, mass media such as magazines, newspapers, and televisions, especially TV, play an important role in the formation of students’ images of scientists the students at primary school level textbooks influence students’ images of science and scientists. Publishers and TV programmers must take care to promote gender-neutral and positive images of science and scientists represented in their publications and programs (Silversten, 1993).

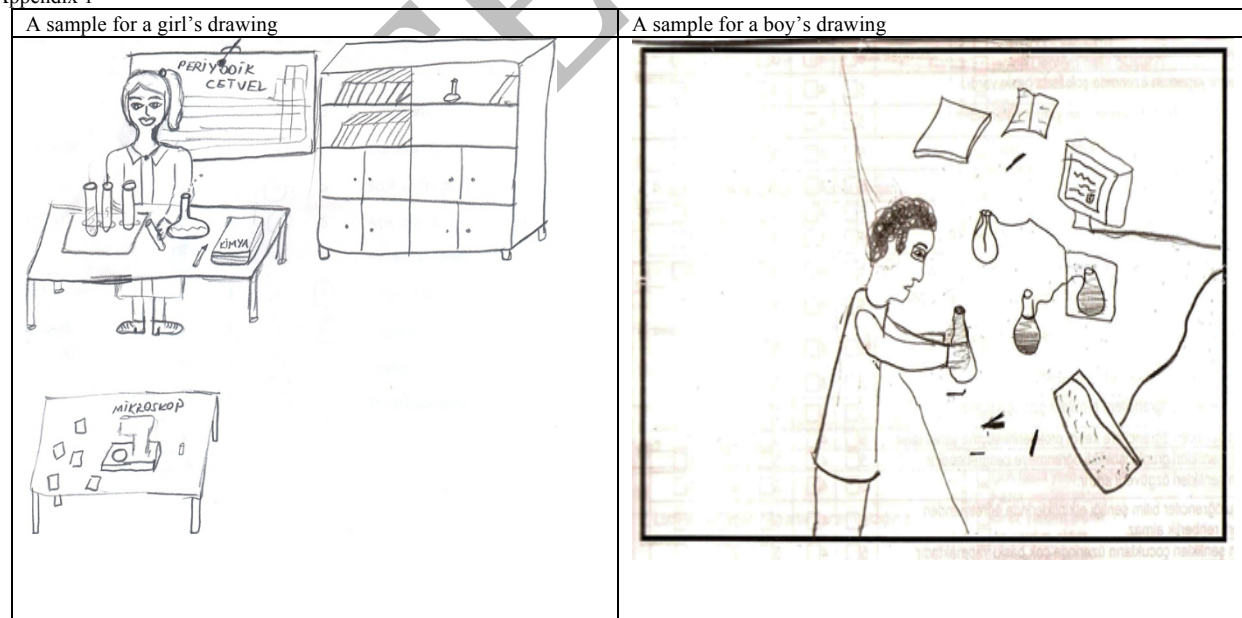
Although, in this study, the participants in both gender groups have been educated through the same curricula, the results of this study show that they hold different images of scientists who do chemistry in terms of some aspects. The reason for this different result may be interpreted as providing unequal opportunities for gender groups in schools or outside of school. Knowing students’ images by gender is important to build an effective learning and teaching environment in science and chemistry education for all. Teachers at the primary school level play a vital role in creating students’ images of science and scientists. In this context, the results of this study provide useful information to those engaged in primary school science education. A clearer understanding of primary school students’ images of scientists has implications for the science teachers of primary school students. Once teachers know what images of scientists who do chemistry may possess by gender, teachers can modify their teaching, perhaps by including visitors who represent science and chemistry related occupations, organizing field trips to see “science/chemistry in action,” involving more equal hands-on science/chemistry activities in terms of gender, and bringing more science books and stories about female scientists in science/chemistry to the classroom. These experiences should provide exposure to a variety of role models, including female scientists, scientists from different cultures, and scientists conducting research in both field and laboratory settings.

In light of the results of this study, we suggest to investigate the relationship between students’ images and attitudes toward chemistry and their subsequent decisions about secondary school science majors and university chemistry programs. There are, of course, limitations to this study. The assertions made cannot be generalized from this small sample to all Turkish primary students. The assertions generated can provide an indication only of the images of science and scientists related to chemistry held by the wider population of primary school students. In conclusion, this study extends the literature on students’ images of chemical scientists. The general impression gained is that there is a need for improvement in students’ images of chemical scientists. In today’s scientifically and technologically expanding science and technology age, it is important for teachers and other educators to be aware of students’ existing images of chemical scientists and to provide appropriate avenues for change.

## References

- American Association for the Advancement of Science (AAAS). (1990). *Science for all Americans*. New York: Oxford University Press.
- Chambers, D. W. (1983). Stereotypic images of the scientist: The draw-a-scientist test. *Science Education*, 6, 255-265.
- De Boer, G. (2000). Scientific Literacy: Another look at Its Historical and Contemporary Meanings and Its Relationship to Science Education Reform. *Journal of Research in Science Teaching*, 37(6), 582-601.
- Driver, R., Leach, J., Miller, A., & Scott, P. (1996) *Young people's images of science*. Buckingham: Open University Press.
- Fensham, P.J., & Harlen, W. (1999). School science and public understanding of science. *International Journal of Science Education*, 12, 755-763.
- Finson, K. D., Beaver, J. V., & Cramond, V. L. (1995). Development and field test of a checklist for the draw-a-scientist test. *School Science and Mathematics*, 95, 195-205.
- Gounselin, Walter. B. Jr (2001). "How Do Middle School Students Depict Science and Scientists?" Ph.D. thesis, Mississippi State University, Publication Number: AA13005589; ISBN: 9780493146751; Source: Dissertation Abstracts International, Volume: 62-02, Section: A, page: 0444.; 80 p.
- Losh, S. C., Wilke, R., & Pop, M. (2008). Some methodological issues with "draw a scientist test" among young children. *International Journal of Science Education*, 30, 773-792.
- Luehmann, A.L. & Markowitz, D. (2007). Science teachers' perceived benefits of an out-of-school enrichment programme: Identity needs and university affordances. *International Journal of Science Education* 29(9) 1133-1161.
- Manzoli, F., Castelfranchi, Y., Gouthier, D., & Cannata, I. (2006). Children's perceptions of science and scientists. *Proceedings of the 9th International Conference on Public Communication of Science and Technology*. Seoul, Available at <http://www.pcst2006.org/>
- National Research Council. (1996). *National Science Education Standards*. Washington, DC: National Academy Press.
- OECD. (2000). *Measuring student knowledge and skills: The PISA 2000 assessment of reading, mathematical and scientific literacy*. Paris: Organisation for Economic Cooperation and Development.
- Scherz, Z. & Oren, M. (2006). How to change students' images of science and technology. *Science Education*, 90, 965-985.
- Salta K and Tzougraki C (2004) Attitudes toward chemistry among 11th grade students in high schools in Greece. *Science Education*. 88(4) 535-547.
- Silverstein, M.L. (1993). State of the art: Transforming ideas for teaching and learning science, a guide for elementary science education. (GPO #065-000-00599-9). Washington DC: U.S. Government Printing Office.
- Sjoberg, S. (1993) Gender equality in science classrooms. In B. J. Fraser (Ed.) Research implications for science and mathematics teachers. Volume 1. Key center monograph number 5(pp. 31-36). (ERIC Document Reproduction Service No. Ed 370 767)
- Song, J., & Kim, K.-S. (1999). How Korean students see scientists: the images of the scientist. *International Journal of Science Education*, 21, 957-977.
- Thomas, J.A., & Hairston, R. (2003) Adolescent Students' Images of an Environmental Scientist: An Opportunity for Constructivist Teaching. *Electronic Journal of Science Education*. [Online] 7(4), 1-25
- Turkmen, H. (2008). Turkish primary students' perceptions about scientist and what factors affecting the image of the scientists. *Eurasian Journal of Mathematics, Science and Technology Education*, 4, 55-61.

## Appendix 1-



# Impact of self-esteem and gratitude disposition on happiness in pre-service early childhood teachers

Haeik Hwang, Hyunmi Kang<sup>103</sup>, Jeonghwa Tak, Sieun Lee

*BK21 Plus Eco-Edu System Research Team, Department of Early Childhood Education, Pusan National University, South Korea*

---

## Abstract

The purpose of this study was to examine the relationship among the Self-esteem, Gratitude disposition and Happiness in Pre-service Early Childhood Teachers. The subjects in this study were 192 Pre-service Early Childhood Teachers in Busan in South Korea. The findings of the study were as follows: First, the early childhood teachers considered the level of their own Happiness, Self-esteem and Gratitude disposition to be above average. Second, there was a significant positive correlation among their total scores of Happiness, Self-esteem and Gratitude disposition. And there was a significant positive correlation among the subfactors of Happiness, Self-esteem and Gratitude disposition. Third, the independent variable that made the largest prediction of Happiness was Self-esteem, followed by Gratitude disposition.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* Pre-service Early Childhood Teachers, Self-esteem, Gratitude disposition, Happiness

---

## Introduction

True Happiness can be defined as a happiness that enjoys positive emotion of joy and value and is meaningful (Ben-Shahar, 2007). That changes negative mind-set into positive one, and shows how to change one's life (Lopez, 2008). Individuals can achieve this Happiness through their own efforts, and it's consequently required to pay attention to individual people's inner, positive psychological characteristics that can promote their Happiness.

Early childhood teachers who take care of infants, toddlers or preschoolers, who are in a critical period of development, on behalf of their parents have a primary impact on their growth and development, and their emotional status should be taken seriously. Happiness plays a crucial role in success at work (Boehm & Lyubomirsky, 2008). A happy teacher is satisfied with what he or she do, and that is linked to the improvement of his or her productivity as a member of society (Streimikiene & Grundey, 2009). Happy early childhood teachers who are satisfied with their job can bring various sorts of Happiness to preschoolers and their parents (Lopez, 2008), and can exert a direct influence on preschoolers as well (Mäntylä, Uusiautti & Määttä, 2012). Indeed, Happiness is more vital for the improvement of early childhood education than anything else. The positive psychological state of early childhood teachers such as love, gratitude, optimism and hope, which are necessary for being happy, makes it possible to predict or ensure the success of early childhood education (Yang, 2013), and those who want to be early childhood teachers should check and develop their own positive psychological characteristics that could make themselves happy.

The purpose of this study was to examine the Self-esteem and Gratitude disposition of pre-service early childhood teachers, among their various positive psychological characteristics, as inner personal characteristics affecting Happiness. It's basically meant to determine what factors could improve the Happiness of pre-service early childhood teachers in an effort to be of use for their happy, positive role performance and make some suggestions about pre-service education.

There are various Happiness-affecting inner personal characteristics. Among them, Self-esteem could be said as a positive evaluation of oneself. This consists of self-value, which is to consider oneself to be worth loving, and of confidence, which is to believe that one is competent enough to do what he or she have to do (Coopersmith, 1967). Self-esteem becomes better when the two elements are combined. Specifically, the Self-esteem of parents has an impact on that of their children, and it's very worth doing to look into the Self-esteem of early childhood teachers who raise preschoolers on behalf of their parents.

---

\* Corresponding author. +0-000-000-0000  
E-mail address: flourishkang@hanmail.net

A lower Self-esteem is more likely to be concurrent with negative psychological experience such as depression, anxiety, fury or fear. One who has a higher Self-esteem is less likely to experience such negative psychology or can easily overcome it even if he or she experiences it (Son, 2011). Furthermore, a higher Self-esteem serves to relieve stress and bring Happiness (Baumeister, Campbell, Krueger & Vohs, 2003), and that makes it easier to lead a more successful life by respecting others as well as oneself, and exerts a positive influence on every part of life (Hooper, 2012). Everybody is bound to experience negative emotion in their lifetime such as difficulties, adversity, fury or despair, and those whose Self-esteem is better can lead a healthier and happier life at that time.

Another psychological characteristic on which this study focused is Gratitude disposition. Gratitude is a noun for the adjective Gratitude. As for the lexical meaning of gratitude, that is a word that stemmed from Latin 'gratia' or 'gratus' that denotes favor, and that means graciousness, grace or Gratitude (Emmons & McCullough, 2003). Smith (2007) defined it as a word of greeting that offers the most immediate and direct compensation. Gratitude disposition is what conceptualizes gratitude into a dimension of emotional personality trait, and refers to a generalized emotional disposition of thanking others (McCullough, Emmons & Tsang, 2002).

Teachers who have a better Gratitude disposition find a more positive meaning in not only positive incidents but neutral or negative incidents and elaborate it, and negative incidents exercise a less lasting influence on them (Kang, Lee & Jang, 2014; Kim & Lee, 2011; Adler & Fagley, 2005). In a study, the selected pre-service early childhood teachers were asked to keep a gratitude journal, and that was found to affect their Gratitude disposition, Self-esteem and Happiness (Yang, 2013). Another study found that writing thank-you letters made the subjects happy for nine months even after the study was completed (Lyubomirsky, 2008), and a better Gratitude disposition was found to be concurrent with better subjective wellbeing (Kim, 2012; Watkins, Woodward, Stone & Kolts, 2003), and with better Self-esteem and better physical health (Emmons & McCullough, 2003). Indeed, Gratitude disposition can be regarded as one of vital characteristics that promotes the Happiness of early childhood teachers and has a positive impact on their Self-esteem and physical health.

In a word, it could be inferred that the Self-esteem and Gratitude disposition of pre-service early childhood teachers have an impact on their own Happiness, and the two were key factors for true Happiness. So it's required to analyze how the Self-esteem and Gratitude disposition of pre-service early childhood teachers affect their Happiness.

The purpose of this study was to examine the influence of the Self-esteem and Gratitude disposition of pre-service early childhood teachers on their Happiness in an effort to justify the necessity of the improvement of the Self-esteem and Gratitude disposition of pre-service early childhood teachers. This study is expected to make a contribution to the development of programs geared toward promoting Self-esteem and Gratitude disposition and to make some suggestions on the importance of the Happiness of pre-service early childhood teachers and how to help them lead a happy life as early childhood teachers.

Three research questions were posed:

1. What are the Self-esteem, Gratitude disposition and Happiness of pre-service early childhood teachers?
2. What is the relationship of Self-esteem and Gratitude disposition to Happiness in pre-service early childhood teachers?
3. What is the relative explainability of the Self-esteem and Gratitude disposition of pre-service early childhood teachers about their Happiness?

## **Method**

### *Subjects*

Bulleted lists may be included and should look like this: The subjects in this study were 200 pre-service early childhood teachers who were selected by random sampling from the city of Busan, South Korea. After a survey was conducted, the answer sheets from 192 respondents (96%) were selected for analysis except for eight ones that included some errors or were incomplete. As for the general background of the subjects, 59 respondents who were 19 years old (30.7%) made up the largest age group, and 49 respondents who were 21 years old made up the second biggest group (25.5%). 150 respondents were attending three-year-college (78.1%). By academic year, 84 respondents were freshmen (43.8%), and 60 respondents were in their senior year (31.3%). Thus, the rates of the freshmen and the seniors were relatively higher.

## *Instrumentation*

### **1) Self-esteem Scale**

The instrument used to assess Self-esteem was Rosenberg(1965)'s Self-esteem Scale, which was adapted for use in this study. This consisted of five positive Self-esteem items and five negative Self-esteem items, and a five-point Likert scale was utilized. Concerning the answers to negative items 3, 5, 8, 9 and 10, reverse operation was done, and a higher Self-esteem score meant a better Self-esteem .

### **2) Gratitude Disposition Scale**

The Gratitude Disposition Scale used in this study was composed of six items and took a prosocial and challenging approach to Gratitude disposition(McCullough, Emmons & Tsang, 2002). A five-point scale was utilized, and reverse operation was done as to items 3 and 6. A higher score meant a better Gratitude disposition.

### **3) Happiness Scale**

Kwon and Kim's unpublished scale was utilized based on Seligman(2002)'s method that made it possible to assess Happiness in a scientific way. This scale consisted of three sections and 21 items. The three sections were pleasure life, meaningful life and engagement life, and a five-point scale was used.

## *Procedure*

After questionnaire was produced based on theories about the self-esteem, Gratitude disposition and Happiness of pre-service early childhood teachers, a pilot survey was conducted to test the adequacy of the content construction of the questionnaire. And then a main survey was conducted on the 200 pre-service early childhood teachers with their consent for three weeks from November 15 to December 3, 2013.

## *Data Analysis*

The collected data were analyzed by a statistical package PASW WIN 18.0. Descriptive statistics analysis was made to obtain statistical data on mean and standard deviation to find out their awareness, and Pearson product-moment correlation coefficients were calculated to look for the correlation between the variables. A stepwise multiple regression analysis was made to compare the relative influence of the variables, and Durbin-Watson value and VIF value were calculated to see if the basic assumptions of regression analysis were satisfied or not.

## **Results**

### *Awareness of Self-esteem , Gratitude Disposition and Happiness*

When the awareness of the pre-service early childhood teachers about their own Self-esteem, gratitude disposition and Happiness was analyzed, they got a mean of 3.63(SD=.65) in Self-esteem and a mean of 3.92(SD=.63) in gratitude disposition, which were both above average. In terms of Happiness, they got a mean of 3.44(SD=.54) in total happy life. To be specific, they scored highest in meaningful life(M=3.56, SD=.58), followed by engagement life(M=3.55, SD=.55) and pleasure life(M=3.32, SD=.69). Thus, the pre-service early childhood teachers sought after more relationship-oriented meaningful life than the pleasure of life.

Table 1. An example of a table

Sub-factor	M	SD
Self-esteem	3.63	.65
Gratitude disposition	3.92	.63
Pleasure life	3.22	.69
Meaning life	3.56	.58
Engagement life	3.55	.55
Happiness	3.44	.54

### 3.2. Correlation of Self-esteem and Gratitude Disposition to Happiness

When the correlation of the Self-esteem and gratitude disposition of the pre-service early childhood teachers to their Happiness was analyzed, happy life had a positive correlation with Self-esteem ( $r=.71$ ,  $p<.001$ ) and gratitude disposition ( $r=.38$ ,  $p<.001$ ), and that was especially correlated a lot with Self-esteem. Regarding the correlation between Self-esteem and Happiness, Self-esteem was most correlated to engagement life ( $r=.66$ ,  $p<.001$ ), followed by meaningful life ( $r=.64$ ,  $p<.001$ ) and pleasure life ( $r=.61$ ,  $p<.001$ ). As for Gratitude disposition, this had the closest correlation with meaningful life ( $r=.42$ ,  $p<.001$ ), followed by engagement life ( $r=.37$ ,  $p<.001$ ) and pleasure life ( $r=.25$ ,  $p<.01$ ). Self-esteem was highly linked to feeling happy by pursuing a purpose of life and trying to attain it in an immersive manner, and gratitude disposition was bound up with feeling happy by seeking after relationship-oriented meaning in life.

Table 2. Correlation of Self-esteem and Gratitude Disposition to Happiness

Sub-factor	Pleasure life	Meaning life	Engagement life	Happiness
Self-esteem	.61***	.64***	.66***	.71***
Gratitude disposition	.25**	.42***	.37***	.38***

\*\*\* $P<.001$ , \*\* $P<.01$

### 3.3 The Impact of Self-esteem and Gratitude Disposition on Happiness

To determine how much the Self-esteem and Gratitude disposition of the pre-service early childhood teachers affected their Happiness, the relative influence of the variables was analyzed in relation to Happiness, pleasure life, meaningful life and engagement life.

The following table shows the influence of the Self-esteem and Gratitude disposition of the pre-service early childhood teachers on overall Happiness. To check the multi-collinearity of the variables, VIF value was calculated, and Durbin-Watson value was calculated as well, which indicated the mutual influence of measurement errors of dependent variables. As a result, Durbin-Watson value stood at 2.00, which came close to base line 2 which meant a normal distribution curve. And VIF value stood at 10 or less as well. Thus, the prerequisite of multiple regression analysis was satisfied.

Table 3. Impact of Self-esteem and Gratitude Disposition on Happiness

	B	$\beta$	$t$	$R^2$	$\Delta R^2$	VIF	F
The constant	.58						
Self-esteem	.54	.65	12.41***	.53	.50	1.11	105.61***
Gratitude disposition	.28	.18	3.38**		.03	1.11	

\*\*\* $P<.001$ , \*\* $P<.01$ ,

As a result of analyzing the influence of the Self-esteem and Gratitude disposition of the pre-service early childhood teachers on their Happiness, the two variables had an approximately 53% explainability about Happiness. Out of the two, Self-esteem had a 50% explainability, and when Gratitude disposition was added, they had a 53% explainability in total. When F value was calculated to determine the adequacy of the regression model, that stood at 105.61, which was significant at the  $p<.001$  level of significance. The findings implied that Self-esteem was a more influential variable than Gratitude disposition for the happy lives of the pre-service early childhood teachers.

Second, the following table shows the influence of the Self-esteem and Gratitude disposition of the pre-service early childhood teachers on pleasure life. When the multi-collinearity of the variables was checked, Durbin-Watson value stood at 1.73, which came close to base line 2 that denoted a normal distribution curve. VIF value stood at 10 or less as well. Thus, the prerequisite of multiple regression analysis was satisfied.

Table 4. Impact of Self-esteem and Gratitude Disposition on Pleasure life

	B	$\beta$	$t$	$R^2$	$\Delta R^2$	VIF	F
The constant	.53						
Self-esteem	.62	.60	9.84***	.38	.37	1.11	57.77***
Gratitude disposition	.13	.07	1.09		.01	1.11	



\*\*\* $P < .001$

As a result of analyzing the influence of the Self-esteem and Gratitude disposition of the pre-service early childhood teachers on their pleasure life, the two had an about 38% explainability about it. Out of the two, Self-esteem had a 37% explainability, and when Gratitude disposition was added, they had a 38% explainability in total, as there was an increase of one percent. When F value was calculated to grasp the adequacy of the regression model, that stood at 57.77, which was significant at the  $p < .001$  level of significance. The findings signified that Self-esteem was a more influential variable than Gratitude disposition for the joyful lives of the pre-service early childhood teachers.

Third, the following table shows the influence of the Self-esteem and Gratitude disposition of the pre-service early childhood teachers on meaningful life. When the multi-collinearity of the variables was checked, Durbin-Watson value stood at 2.08, which came close to base line 2 that meant a normal distribution curve, and VIF value stood at 10 or less as well. Thus, the prerequisite of multiple regression analysis was satisfied.

Table 5. *Impact of Self-esteem and Gratitude Disposition on Meaning life*

	B	$\beta$	<i>t</i>	$R^2$	$\Delta R^2$	VIF	F
The constant	.43						
Self-esteem	.50	.56	10.03***	.46	.41	1.11	81.38***
Gratitude disposition	.41	.25	4.41***		.05	1.11	

\*\*\* $P < .001$

As a result of analyzing the influence of the Self-esteem and Gratitude disposition of the pre-service early childhood teachers on meaningful life, the two variables had an approximately 46% explainability about it. Out of the two, Self-esteem had a 41% explainability, and when Gratitude disposition was added, there was an increase of 5 percent, and the variables had a 46% explainability in total. To check the adequacy of the regression model, F value was calculated, and that stood at 81.38, which was significant at the  $p < .001$  level of significance. The findings implied that Self-esteem was a more influential variable than Gratitude disposition for the meaningful lives of the pre-service early childhood teachers.

Fourth, the following table shows the influence of the Self-esteem and Gratitude disposition of the pre-service early childhood teachers on engagement life. When the multi-collinearity of the variables was checked, Durbin-Watson value stood at 2.10, which came close to base line 2 that meant a normal distribution curve, and VIF value stood at 10 or less as well. Thus, the prerequisite of multiple regression analysis was satisfied.

Table 6. *Impact of Self-esteem and Gratitude Disposition on Engagement life*

	B	$\beta$	<i>t</i>	$R^2$	$\Delta R^2$	VIF	F
The constant	.78						
Self-esteem	.51	.60	10.77***	.46	.43	1.11	82.23***
Gratitude disposition	.29	.19	3.30***		.03	1.11	

\*\*\* $P < .001$

As a result of analyzing the influence of the Self-esteem and Gratitude disposition of the pre-service early childhood teachers on engagement life, the two variables had an about 46% explainability of it. Out of the two, Self-esteem had a 43% explainability, and when Gratitude disposition was added, there was an increase of three percent, and they had a 46% explainability in total. When F value was calculated to check the adequacy of the regression model, that stood at 82.23, which was significant at the  $p < .001$  level of significance. The findings implied that Self-esteem was a more influential variable than Gratitude disposition for the active lives of the pre-service early childhood teachers.

## Discussion

In this study, how the Self-esteem and Gratitude disposition of the pre-service early childhood teachers affected their Happiness was investigated. The level of their self-perceived Self-esteem, Gratitude disposition and Happiness were above average, and the former two had a positive correlation with the latter. As for relative influence, Self-esteem exerted a larger influence on the happy lives of the pre-service early childhood teachers, and Gratitude disposition was less influential.

Self-esteem is identified as a variable that makes it possible to feel good about one's past, present and future, to make the most use of personality strengths and potential by being immersed in life in pursuit of self-

realization, to find meaning in daily life and to consider oneself worthwhile. This is a variable to predict subjective well-being (Seligman, 2002), to view oneself as competent and valuable, and to have a positive impact on amicable interpersonal relationships, caring and prosocial behavior (Rayn & Deci, 2000). Gratitude disposition is a variable to boost positive emotion, life satisfaction, vitality and optimism and to relieve depression and stress (Peterson & Seligman, 2004), and that was found to exercise a positive influence on the Happiness of the pre-service early childhood teachers. Given the findings of the study, the improvement of college courses that are offered to provide pre-service education for pre-service early childhood teachers is required. The kinds of courses that can foster Happiness, Self-esteem and Gratitude disposition should be offered, and personality education should be more strengthened as well. In addition, how pre-service early childhood teachers could be helped to improve their Gratitude disposition and Self-esteem in everyday life in association with their future job to ensure sound, successful job performance should carefully be considered.

## References

- Adler, M. G., & Fagley, N. S. (2005). Appreciation: Individual differences in finding value and meaning as a unique predictor of subjective Well-Being. *Journal of Personality*, 73(1), 79-114.
- Baumeister, R. F., Campbell, J. D., Krueger, J. I., & Vohs, K. D. (2003). Does High Self-esteem Cause Better Performance, Interpersonal Success, Happiness, or Healthier Lifestyles?. *Psychological Science in the Public Interest*, 4(1), 1-44.
- Ben-Shahar, T. (2007). *Happier: Learn the secrets to daily joy and lasting fulfillment*. NY: McGraw-Hill.
- Boehm, J. K., & Lyubomirsky, S. (2008). Does Happiness promote career success? *Journal of Career Assessment*, 16(1), 101-116.
- Coopersmith, S. (1967). *The antecedents of Self-esteem*. SF: Freeman & Co.
- Emmons, R. A., & McCullough, M. E. (2003). Counting blessings versus burdens: An experimental investigation of gratitude and subjective well-being in daily life. *Journal of Personality and Social Psychology*, 84(2), 377-389.
- Hooper, J. (2012). *What children need to be happy, confident and successful*. London: Jessica Kingsley Publishers.
- Kang, S. J., Lee, J. Y., & Jang, J. I. (2014). The Moderating Effects of Gratitude Disposition and Interpersonal Competence on the Relationship between Teachers's Teaching Flow and Happiness. *The Journal of Korea Open Association for Early Childhood Education*, 22(1), 257-277.
- Kim, K. M., & Lee, Y. S. (2011). Development and validation of the Gratitude Scale. *Korea Journal of Counseling*, 12(6), 2029-2046.
- Kim, S. S. (2012). An analysis of the relationship between pre-service early childhood teachers' character strengths and their Happiness. *The Journal of Child Education*, 32(4), 35-53.
- Lopez, S. J. (2008). *Positive Psychology: Pursuing Human Flourishing*. London: Praeger.
- Lyubomirsky, S. (2008). *The how of Happiness*. NY: Penguin.
- Mäntylä, O. Y., Uusiautti, S., & Määtä, K. (2012). Critical view point to early childhood education teachers' well-being at work. *International Journal of Human Sciences*, 9(1), 458-483.
- McCullough, M. E., Emmons, R. A., & Tsang, J. (2002). The Gratitude disposition: A conceptual and empirical topography. *Journal of Personality and Social Psychology*, 82(1), 112.
- McCullough, M. E., Emmons, R. A., & Tsang, J. A. (2003). The Gratitude disposition: A conceptual and empirical topography. *Journal of Personality and Social Psychology*, 82, 112-127.
- Peterson, C., & Seligman, M. E. P. (2004). *Character strengths and virtues: A handbook and classification*. New York: Oxford University Press and Washington, DC: American Psychological Association.
- Rosenberg, M. J. (1965). When dissonance fails: On eliminating evaluation apprehension from attitude measurement. *Journal of Personality and Social Psychology*, 1, 28-42.
- Seligman, M. E. P. (2002). *Authentic Happiness*. NY: Free Press.
- Seligman, M. E. P. (2002). *Positive psychology, positive prevention, and positive therapy*. In C. R. Snyder, & S. J. Lopez (Eds.), *Handbook of positive psychology* (pp.3-9). London: Oxford University Press.
- Smith, A. (2007). *The Theory of Moral Sentiment*. NY: DoverPubns.
- Streimikiene, D. & Grundey, D. (2009). Life satisfaction and Happiness: The factors in work performance. *Economics & Sociology*, 2(1), 9-26.
- Sun, A. N. (2011). *The power of Self-esteem calling Happiness*. Seoul: Soulmate.
- Watkins, P. C., K. Woodward, T. Stone, & R. L. Kolts. (2003). Gratitude and Happiness: Development of a measure of gratitude, and relationships with subjective well-being. *Social Behavior and Personality: An International Journal*, 31(5), 431-451.
- Yang, J. H. (2013). The effects of thanks journal writing on preservice early childhood teacher's gratitude, Self-esteem, and Happiness. *The Journal of Child Education*, 33(2), 259-280.

# Implementation of hog edge detection algorithm on fpga's

Berkant BAŞA104

<sup>a</sup>Sakarya University, Faculty of Computer and Information Sciences, Department of Computer Engineering, 54187, Sakarya TURKEY

---

## Abstract

In recent years, HOG (Histogram of Oriented Gradients) algorithm has get popularity. Researchers tend to use HOG algorithm for recognizing objects in images. HOG algorithm is used object recognition with very high success rate. Hardware reinforcement is very important studying on large size and complex images to perform image processing techniques. In this study, it is aimed to implement HOG algorithm on FPGA (Field Effect Gate Array) structure for edge detection in digital images. Hence, HOG algorithm runs on FPGA to recognize different geometrical figures in the images. Objects' vertical and horizontal edges have sharpened using edge detection algorithms to calculate magnitude and angles of the local gradients. The performance of proposed system is observed with very high success rate.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* FPGA, HOG, EDGE,

---

## Introduction

In literature because of different product and military applications have numerous difficulties such as article sorting and identification. In recent years, researchers are focused on these difficulties and proposed some resolutions which are simple but operative. The HOG algorithm is first suggested for recognition of pedestrians by Shashua et al [11]. And also Dalal used the algorithm in complex environment to recognize the human being [1]. After all successful implementations are took place in literature and started to use in many applications such as real time license plate recognition, face recognition. In another study, Smash et alare proposed YSA adapter classifier based on FPGA for real time face recognition problems. In this context, the study is proposed the HOG edge detection algorithm based on FPGA. So it is aimed to use HOG algorithm with hardware advantages such as high level performance. However there are many studies about real time object identification, there are a few hardware based studies based on hardware platform such as FPGA in literature. In this direction, there are 125 different form that has different directions and different scales are illustrated by using HOG method and a classifier that based on rule are used successfully to identify over FPGA by using VHDL.

## HOG

Lately, the usage of side direction histograms in the concept of image classification is getting popular. Likewise, as the first time the usage of intensive and local gradient direction histograms (HOG) is proposed by Shashua and Dalal. At this method the purpose is to recognize the image as the group of local histograms [1, 9]. These histograms engage the numbers at the area of image's local gradient directions that are head out. The realization of HOG is in order of:

- The reception of gradient from image
- The set off histogram directions for specified locations
- The normalization of histograms in the specified in location groups

Moreover, to normalize the local histograms is made at the area that is named block at inside image for progressing the performance by measuring the intensity in this block area.

---

\* Corresponding author. Tel.: +905375063887; +37744830008; fax: +0-000-000-0000 .

E-mail address: basaberkant@gmail.com; basa\_berkant@hotmail.com

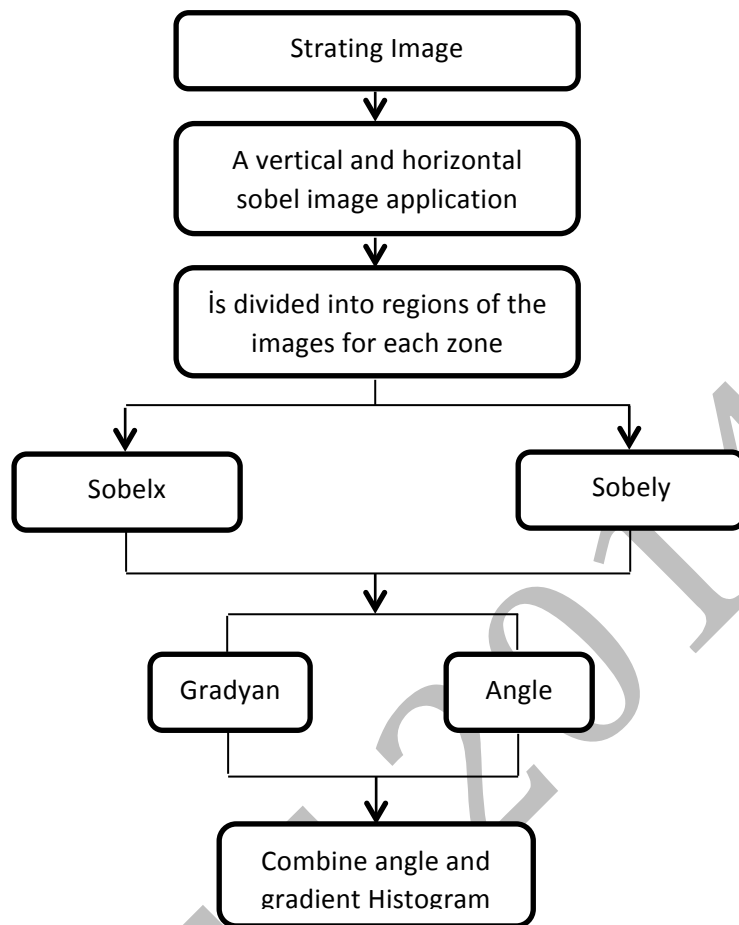


Figure.1: HOG algorithm flowchart [9].

HOG is a type of “quality descriptor”. The target of a quality descriptor is to generalize the object in that way that the same object produces as close as possible to the same characteristic descriptor when viewed under different circumstances. This makes the categorization task easier. The HOG descriptor was illustrated by Dalal&Triggs in 2005 as a characteristic set for object identification tasks. At that time, this narrative descriptor outperformed existing characteristic sets for human recognition significantly. The main idea is that local object manifestation and form is characterized by the allocation of local intensity gradients or border directions, without precise knowledge of the equivalent gradient or edge positions [1]. HOG is one of the recognized characteristics for object recognition. HOG characteristics are calculated by taking direction histograms of edge intensity in a local region [4]. Local object appearance and form can often be characterized rather well by the allocation of local intensity gradients or edge detection. HOG characteristics are calculated by taking direction histograms of edge intensity in local region. HOG characteristics are used in the SIFT descriptor suggested by Lowe [6]. Mikolajczyk et al. stated in [7] that the best corresponding results were found by the SIFT descriptor.

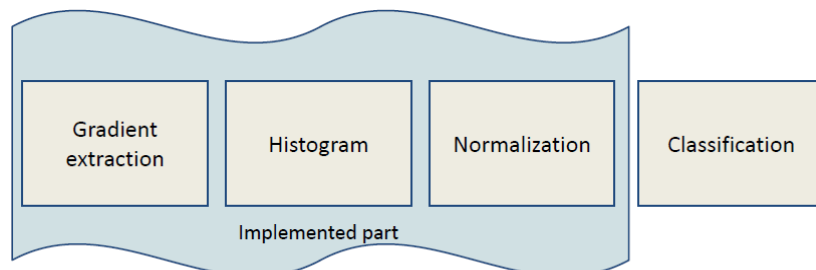


Figure.2: Histograms of Oriented Gradients for Human Detection [2].

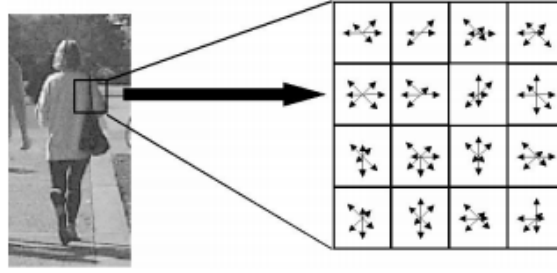


Figure.3. Extraction Process of HOG features

The HOG characteristics are taken out from local regions with  $16 \times 16$  pixels. Histograms of edge gradients with 8 preferences are calculated from each of  $4 \times 4$  local cells. The edge gradients and directions are attained by utilizing Sobel filters. Thus, the total number of HOG characteristics becomes  $128 = 8 \times (4 \times 4)$ .

### Descriptor Calculation

The HOG descriptor is calculated for each detection window with the process string illustrated in fig. 4.

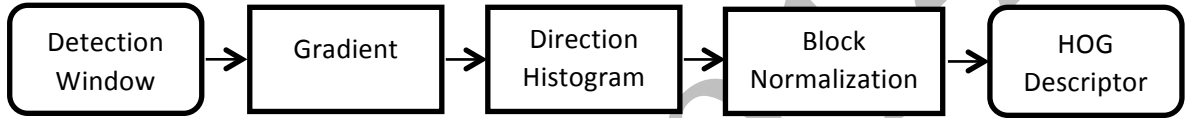


Fig.4: HOG descriptor computation scheme.

HOG descriptor calculation scheme. The default detector illustrated by Dalal&Triggs is based on a recognition window that covers  $64 \times 128$  pixels. First of all, the intensity gradient in x- and y route and the resulting degree and direction angle is calculated for the respective image area. For demonstration of the two-dimensional gradient vectors, see fig. 5.

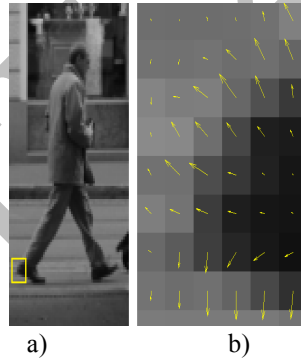


Fig. 5a: Pedestrian example from [INRIA]. Fig. 5b: Gradients calculated for an image part. The red arrows characterize the two-dimensional gradient vector  $[g_x g_y]^T$ . degree is encoded by the vector length, direction by the vector perspective. The next step is shown as direction binning and constitutes the essential nonlinearity of the HOG descriptor. The detection window is separated into  $8 \times 16$  rectangular local spatial areas called cells (Fig. 6). The  $8 \times 8$  cell pixels are then discredited into 9 angular bins according to their gradient direction. Each pixel provides a weighted vote for its consequent angular bin; the vote is a function of the gradient degree at the pixel. This way the information is compacted to a 9-dimensional space per cell. The angular histogram bins are equally spaced over  $0^\circ - 180^\circ$ .

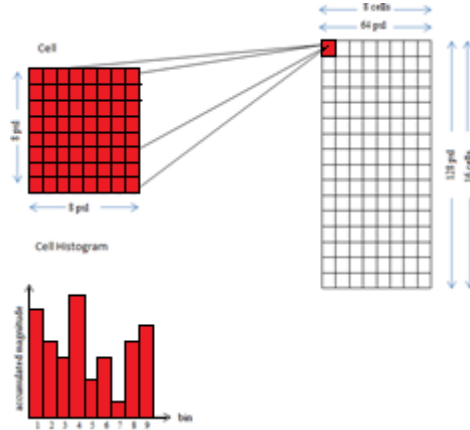


Fig.6: Division of detection window into cells. Histogram generated for a single cell [1].

Gradient strengths vary over a broad range due to shadows, local variations in clarification and foreground-background difference. Therefore local contrast normalization is necessary for good performance. Likewise, groups of 2x2 adjacent cells are considered as spatial regions called blocks. Each block is constituted by a concatenation of the corresponding four cell histograms, resulting in a 36-D characteristic vector that is normalized to unit length, using the L2 norm. The final HOG descriptor is constituted by a concatenation of all these normalized block responses. In fact, blocks typically convergence with each other in a sliding-window fashion so that each cell reply appears several times in the final feature vector, each normalized with respect to a diverse block. The default block stride is 8 pixels (1 cell), resulting in a fourfold coverage of every cell. To sum up: Each detection window is constituted by 7x15 blocks, a block consisting of 2x2 cells, a cell is constituted by a 9-bin histogram, giving a total of  $(7 \times 15) \cdot (2 \times 2) \cdot 9 = 3780$  characteristics [1].

### Histogram Multiplication

At this phase, we already know the angular bin (1-9) for each pixel. Then 9 binary single-channel images  $J_K$  are produced for each bin  $L$ , where the value 1 denotes that the pixel's gradient direction lies within the consequent angular range, 0 indicating the opposite. In a second phase, we multiply each of these 9 binary bin images  $J_K$  with the gradient degree  $|G(x,y)|$ , providing 9 non-binary degree-weighted bin images  $M_i$ .

For every sliding window position, the histogram access of a specific bin  $L$  in a particular cell can be easily calculated by accumulating the pixel intensity values (representing the degree) over the cell region within  $M_i$ . In command to calculate these histogram entries for all possible sliding window positions over the entire image professionally, current publications work with IMAPs [10], [2].

We found that this approach is not reasonable with our development platform because of constraints in terms of barriers. in its place we convolute the following sum filter kernel  $K_s$  with the nine degree-weighted bin images  $M_i$ .

$$B_i = K_s * M_i K_s = \begin{bmatrix} 1 & \dots & 1 \\ \vdots & \ddots & \vdots \\ 1 & \dots & 1 \end{bmatrix} \text{equation 1}$$

### Histogram and normalization

- The matrix of gradient is divided in cells
- Histogram of gradient directions for each cell, weighted by the gradient degree
- The adjacent cells are grouped in blocks
- The cell histograms inside are normalized, in order to equalize the luminance among close cells [2].

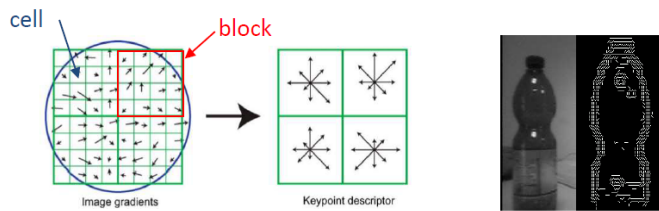


Fig.7: Histogram and Normalization [2].

## FPGA

Modern field-programmable gate arrays (FPGAs) contain hundreds of thousands of search for tables (LUTs), hundreds of surrounded memories, and hundreds of multipliers connected through a programmable interconnect fabric. Clearly it is intractable to program the FPGA at the granularity of these individual components. However, with modern synthesis and layout tools, it is possible to explain a design simply by writing logical appearances, a level higher than gates, and leasing the tools do the rest. Register transfer level (RTL) design is a well-liked discipline for describing these logical aspects. It allows the designer to state the design by describing the logic between each pair of register phases. This allows her to cautiously control register-to-register logic depth while releasing her from selecting the actual gates and their mapping to the FPGA. Very High-Speed Integrated route Hardware Description Language (VHDL) is one well-liked programming language that supports RTL hardware descriptions [4].

### FPGA Design Constituents

Our design calculates the HOG descriptor for all window positions (pixel-wise) of the entire border. In addition to the HOG descriptor, a reference copy of the current border is transferred through an individual direct memory admission (DMA) channel. In the following, we present each individual system constituent. We report difficulties we faced and show our way of undertaking these issues with respect to the limitations of the fast prototyping stage.

### Timing synchronization

The pixel frequency of the stream delivered by the camera is higher than the plan frequency; hence defense the image first into on-board DDR-RAM is necessary in conditions of timing synchronization. Nonetheless the frequency decrease from camera to FPGA is no bottleneck, since for further processing a set of pixels can be read from the image buffer in a parallel style.

### Scaling

With the recent experimental arrangement of our infrastructure-based system, the distance of the camera to the observation zone is large compared to the dimensions of the observation zone itself. As a result of this arrangement, variations in Pedestrian sizes are insignificant and the descriptor is calculated for one single scale level. The scale factor was set to a manually chosen value that shrinks the actual pedestrian size to the length of the image patches used for training [3]. For applications that necessitate multiple scale levels, the FPGA design can be customized accordingly. The maximum number of scale levels is fixed by the available hardware resources.

### Gradient Calculation

The first step for producing the HOG descriptor is to calculate the 1-D point derivatives  $G_x$  and  $G_y$  in x- and y-direction by convolving the gradient masks  $M_x$  and  $M_y$  with the raw image  $I$ :

$$G_x = M_x * I \quad M_x = \begin{bmatrix} -1 & 0 & 1 \end{bmatrix} \quad \text{equation 2}$$

$$G_y = M_y * I \quad M_y = \begin{bmatrix} -1 & 0 & 1 \end{bmatrix}^T \quad \text{equation 3}$$

On the basis of the derivatives  $G_x$  and  $G_y$  we then calculate the gradient degree  $|G(x,y)|$  and direction angle  $\phi(x,y)$  for each pixel. The gradient degree shows the gradient strength at a pixel:

$$|G(x,y)| = \sqrt{G_x(x,y)^2 + G_y(x,y)^2} \quad \text{equation 3}$$

We do not omit the extraction of the square root since the performance study of Dalal&Triggs describes best results with this Euclidean metric [1]. In our FPGA implementation, the square root operator interrupts decimal places, as we do not examine effects on categorization accuracy. The gradient degree is simply employed as a weighting factor for the direction histogram. The gradient direction angle can be calculated straightforward as the following from:

$$\tan(\phi(x,y)) = \frac{G_y(x,y)}{G_x(x,y)} \quad \text{equation 4}$$

Nevertheless, calculating the arctan () on an FPGA is expensive. As reported by Cao&Deng, there are hardware friendly estimation algorithms available, but they are commonly iterative and slow down the system's speed. On

the other side, using lookup tables (LUTs) requires large numbers of memory which would increase system's costs. They propose to unite the gradient direction calculation with the angular binning step. Thus we are able to directly discretize the pixel's gradient angle into bins without calculating the angular value explicitly. Following this approach [12], we introduced two advances. We increased the number of bins from 4 to 9 in order to achieve better categorization performance. Furthermore, we brought in a scheme for quantizing the pixel's gradient angle that avoids the use of signals and cuts down the demanded bit width for relational operators.

### HOG Edge with FPGA

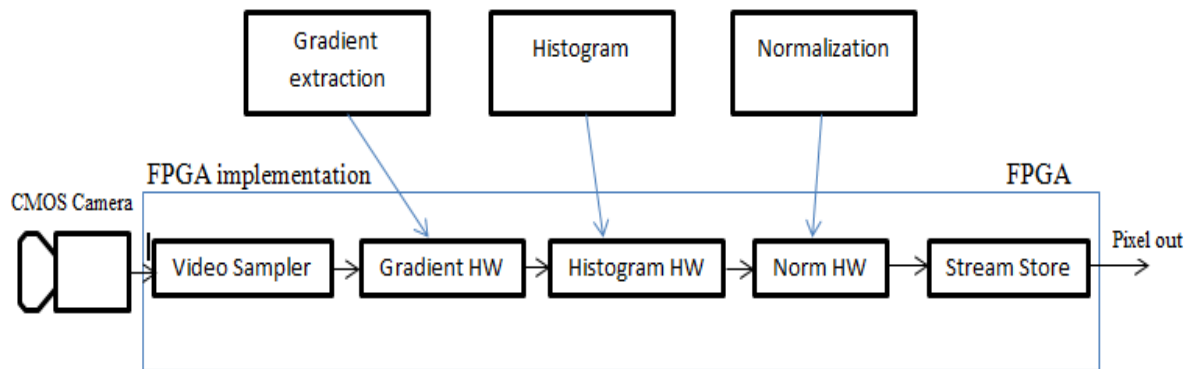


Figure.8: FPGA implementation of the HOG pipeline [2].

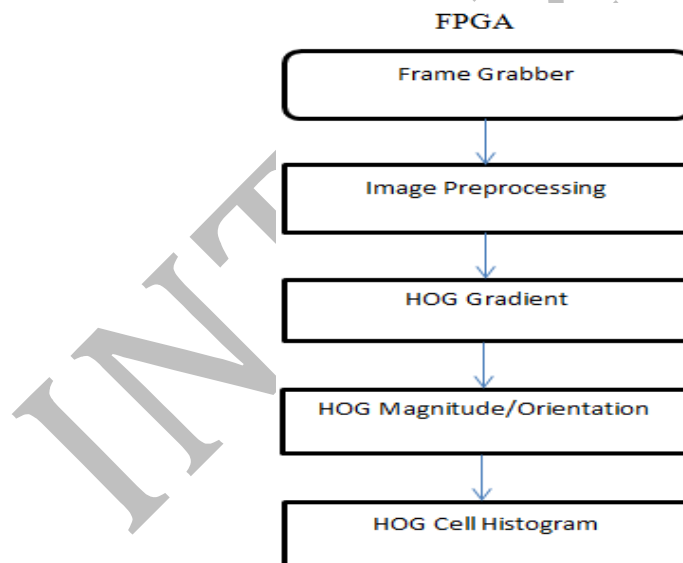


Figure.9: Block diagram FPGA realization of HOG



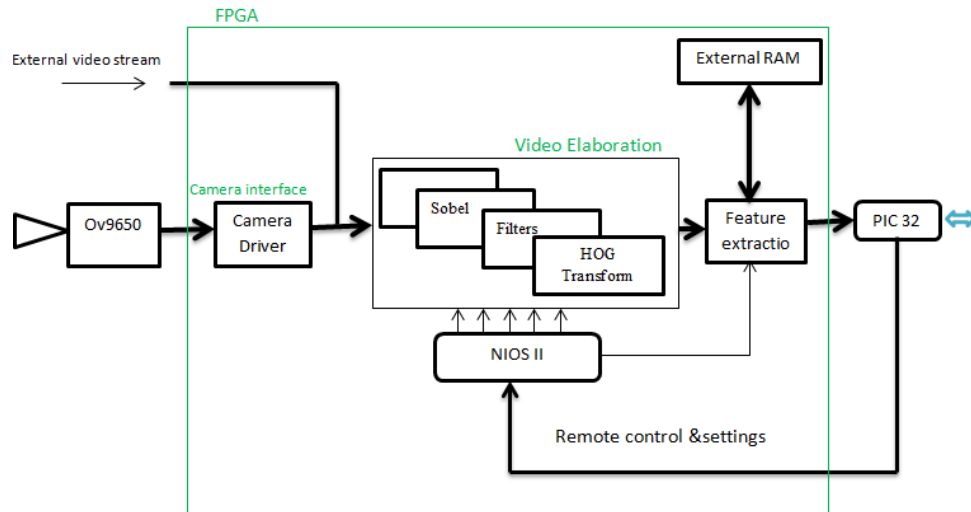


Figure.10: Each hardware block is implemented using the streaming paradigm: data are processed when appear in input [2].

Edges characterizing limits are therefore a problem of essential importance in image processing. Edges in images are fields with strong intensity contrasts – a leap in intensity from one pixel to the other. Edge discovering an image significantly cuts down the amount of data and filters out ineffective information, while preserving the important structural properties in an image. There are plenty of ways to perform edge detection. Nevertheless, the mass of different methods may be grouped into two categories, gradient and Laplacian. The gradient method discovers the edges by searching for the maximum and minimum in the first derivative of the image. The Laplacian method explores for zero crossings in the second derivative of the image to discover edges. An edge has the one-dimensional form of a ramp and calculating the derivative of the image can emphasize its location. Presume we have the upcoming signal, with an edge shown by the leap in intensity below: If we bring in the gradient of this signal (which, in one length, is just the first derivative with respect) we get the following:

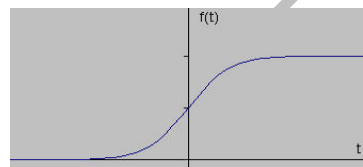


Figure.11

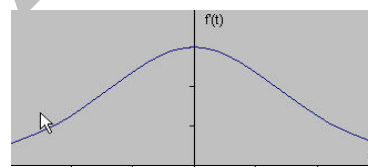


Figure.12

Obviously, the derivative demonstrates a maximum located at the centre of the edge in the original signal. This method of locating an edge is characteristic of the “gradient filter” family of edge detection filters and includes the Sobel method. A pixel location is confirmed an edge location if the value of the gradient exceeds some threshold. As mentioned before, edges will have higher pixel intensity values than those mediating it. So once a threshold is set, you can compare the gradient value to the threshold value and discover an edge whenever the threshold is exceeded. In addition, when the primary derivative is at a maximum, the second derivative is zero. Therefore, another alternative on discovering the location of an edge is to locate the zeros in the second derivative. This method is called as the Laplacian and the second derivative of the signal is shown below:

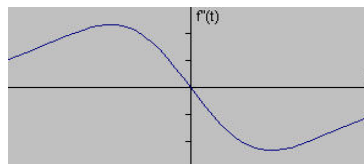


Figure.13

## Conclusion

According to the current years based on the HOG illustrators, that are so well-liked in literature tried to progress the object gratitude in the hardware way. The structure of HOG algorithm is appropriate for paralleling and also

is so appropriate for adaptation over embedded systems such the FPGA that is available to make parallel operation. Illustrator that is noted is even simple but it performed successfully and effectively from the aspect of hardware. This achievement is important because it is able to use in many examples. At this work, totally is proved 125 figures and as a result is gained %100 success. At this achievement is used Terasic DE2- DE0 Nano board that demands Altera Cyclone III FPGA. Finally, the structure of this work is thought to be used successfully in more difficult or complicated circumstances.

## Reference:

- [1]. Bauer, S., Brunsmann, U., FPGA Implementation of a HOG-based Pedestrian Recognition System, Stefan Schlotterbeck-Macht Faculty of Engineering Aschaffenburg University of Applied Sciences, Aschaffenburg, Germany.
- [2]. Bourrasset, C., Maggiani, L., Salvadori, C., Sérot, J., Pagano, P., Berry, F., FPGA implementations of Histograms of Oriented Gradients in FPGA, Institut Pascal- D.R.E.A.M - Aubière, France, TeCIP Institute - Scuola Superiore Sant'Anna - Pisa, CNIT – National Laboratory of Photonic Networks – Pisa.
- [3]. INRIA Person Dataset, 2014. <http://lear.inrialpes.fr/data/human>
- [4]. Kapre, N. (Chapter 6), Programming FPGA Applications in VHDL, Department of Computer Science, California Institute of Technology, USA.
- [5]. Kobayashi, T., Hidaka, A., Kurita, T., Selection of Histograms of Oriented Gradients Features for Pedestrian Detection: University of Tsukuba, Institute of Advanced Industrial Science and Technology (AIST), 305-5868, 305-8577 Japan.
- [6]. Lowe, D.G.: Distinctive Image Features from Scale-Invariant Keypoints. IJCV 60(2), 91–110 (2004)
- [7]. Mikolajczyk, K., Schmid, C.: A performance evaluation of local descriptors. In: Proc. of Computer Vision and Pattern Recognition (2003)
- [8]. N. Dalal. Finding People in Images and Videos. PhD thesis, Institut National Polytechnique de Grenoble, 2006.
- [9]. Peker, M., Altun, H., Karakaya, F., HOG Temelli Bir Yöntem ile Ölçek ve Yönden Bağımsız Gerçek Zamanlı Nesne Tanıma, Elektrik Elektronik Mühendisliği, Niğde Üniversitesi, Niğde
- [10]. Q. A. Zhu, M. C. Yeh, K. T. Cheng, and S. Avidan. Fast human detection using a cascade of histograms of oriented gradients. In Proc. of the IEEE International Conference on Computer Vision and Pattern Recognition (CVPR), pages II:1491-1498, 2006.
- [11]. Shashua A., Gdalyahu Y., and Hayon G., “Pedestrian detection for driving assistance systems, Single-frame classification and system level performance”, In Proceedings of IEEE Intelligent Vehicles Symposium, 2004.
- [12]. T. P. Cao and G. Deng. Real-time vision based stop sign detection system on FPGA. In Proc. of the International Conference on Digital Image Computing: Techniques and Applications (DICTA), pages 465-471, IEEE Computer Society, 2008.

# Implementation of the lifelong learning experiences management approach – Observations on the first experiences

Mehmet Emin Mutlu <sup>a,105</sup>, İlker Kayabaş<sup>b</sup>, Buket Kip Kayabaş<sup>c</sup>, Ayşe Peri Mutlu<sup>d</sup>

<sup>a,b,c,d</sup>Open Education Faculty, Anadolu University, Eskisehir, 26470, Turkey

---

## Abstract

In this study, applicability of a digital lifelog system developed for managing lifelong learning experiences has been investigated. System is designed and developed by the first author of this study and evaluated independently by the other three authors by using action research method. Because of the fact that, life logging applications produce log entries, which belong to every awake hour of the individual's daily life, they may contain private visual information, so direct observation of the application by the others may cause ethical problems. Three practitioner-researchers have implemented the system independently without being affected from one another for overcoming this limitation and they have supervised the implementation by themselves and have collected data relevant to the implementation through systematic self-observation during this period. Data gathered has thereafter been evaluated by being analyzed with a common analysis by all authors. It has been seen that the system of digital life logging used has caused the practitioners to acquire skills of planning, evaluation and controlling of lifelong learning experiences and it is a sufficient tools for implementing such skills.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* Life logging; lifelong learning; recording of learning experiences; management of learning experiences

---

## Introduction

The concept of “learning” can be handled with the help of concepts of “lifelong learning”, “life-wide learning” and “life-deep learning” in a such way that it will include all three dimensions of learning (Mutlu, 2013a). Lifelong learning is a process starting at birth and continuing uninterruptedly until death. Life-wide learning can be categorized as formal learning, non-formal learning and informal learning depending on where individual live its learning experiences (Clark, 2005). Life deep learning, which leads people what to believe, how to behave, how to judge himself/herself and others, embraces all the religious, spiritual, ethical an social values (Banks, et al., 2007).

Informal learning acquired by individuals leading themselves due to increased life and working time, rapid development of technology and complication of needed information and skills have started to gain more importance when compared with formal and non-formal learning provided by institutions. Informal learning can be categorized as "implicit (tacit) learning, "integrative learning", “reactive (incidental) learning” and "self-directed learning" as to the situations of pre-planning and consciousness in "expanded informal learning model" (Mutlu, 2013b).

“Learning experience” is defined as "physical, mental, emotional, spiritual, religious, social or virtual event or activity that we have participated or been exposed to by gaining, altering or strengthening new information, behavior, skill, value or preferences" by considering encyclopedic definitions of "learning" and "experience". Individual has a set of learning experience experienced in the past in any moment, learning experiences experienced at the moment and learning experiences potential to experience in the future. Approach of "management of learning experiences" sheltering the phases of planning learning experiences in the future, controlling current learning experiences and evaluating learning experiences in the past is a method developed based on recording, interpreting and signification lifelong learning experiences with a life logging system

---

\* Corresponding author. Tel.: +90-505-7330725.  
E-mail address: memutlu@anadolu.edu.tr

(Mutlu, 2013b). Approach of "management of learning experiences" has been initiated in 2013, February and developed within the scope of a scientific research project supported by Anadolu University and a set of tools has been designed for ensuring practical applicability of this method in the same project (Mutlu, 2014a).

Learning experiences management method consists of (a) capturing life experiences via a life logging system, (b) interpretation of experiences in the form of activities, episodes and stories, (c) creating a personal knowledge base by listing contexts accompanying experiences, (d) signification learning experiences distributed within life experiences, (e) the phases of planning, controlling and evaluating learning experiences and this method offers an integrative approach for managing lifelong learning experiences of individuals (Mutlu, 2014a).

Even if it is possible to implement approach of management of learning experiences corporately by using paper and pencil, this approach will not be preferred since it is practically tedious and time taking and unsustainable. Instead, a set of software has been developed for ensuring convenience for implementing this approach. Out of these, the first one is the system of life logging providing recording of life experiences as computer screenshot images and camera capture images within every thirty seconds (Mutlu, 2013c). Afterwards, an experience processing software has been developed (AllMyListsLE) for ensuring convenience in interpretation of images related to experiences (Mutlu, 2013d). Another study conducted for this purpose is the design of a personal knowledge base system based on life logging enabling determination of contexts created within life experiences records and creating a personal knowledge base from these contexts (Mutlu, 2013e). Additional features to AllMyListsLE software has been added for facilitating the procedures of signification and managing learning experiences that are final phases of the method (Mutlu, 2014a).

In this study, applicability of a digital life logging system developed for managing lifelong learning experiences has been investigated. As a result of the research, identifying problems and opportunities relating to implementation process has been intended.

## Method

In this study, an action research that is a qualitative method has been used. Action research used widely in social sciences as of second half of 20th century is defined as a research approach including data collection and analysis in regard to revelation of problems and understanding and solving a problem emerged available in respect with implementation process and conducted together with a researcher or directly by practitioner according to Yıldırım and Şimşek (Yıldırım & Şimşek, 2005:295).

The phases of "planning-acting-observing-reflecting" are implemented with guidelines for solution of problem handled in action research (McNiff, 2013). In most cases, due to the complex nature of the problem, research is conducted in cyclical manner of these phases and repetition by making a change in the plan in each cycle. In this way, effect of the action realized in each cycle is elaborately observed and evaluated. A practical guide to action research has been provided below in steps (McNiff et al., 2009).

- We review our current practice,
- identify an aspect we want to improve,
- imagine a way forward,
- try it out, and
- take stock of what happens.
- We modify our plan in the light of what we have found and continue with the 'action',
- evaluate the modified action,
- and so on until we are satisfied with that aspect of our work.

### *Nature of problem*

Learning experiences management approach has separate phases required to be learned, got accustomed and adopted independently. For this reason, implementation process is preferred to be progressive. Thus, action research has been designed in a way in which only one change is carried out in each phase and in a way of cycles where effects created by such change are observed and evaluated (Riel, 2010).

Although learning experiences management method and software to be used in implementation of this method have been elaborately designed, it is envisaged that individual usage differences may occur in practice. Since especially AllMyListsLE that is experience processing software has been designed in a form of tree based personal knowledge base tool, it has flexibility enabling different individual usage modes while applying the method (Mutlu, 2013d). It is expected that the action research method to be applied is to revealing such individual usage differences as well as implementation problems of cycles and to identify the best practices.

The problem handled within the scope of action research is a real life problem since it has potential of gaining/enhancing participants with managing skills of lifelong learning processes. It is expected that positive effects that implementation has caused participants to gain enable both researcher and practitioner-researchers to adopt learning experiences management approach and to sustain the said implementation during lifelong learning process outside of this research scope. The research in this sense is a problem of putting an information system developed in the meantime into implementation (Henfridsson and Lindgren, 2007).

#### *Participants and characteristics, included environment-context*

It is preferred that method and tools of practitioner in minimal number for revealing problems and opportunities relating to implementation process are implemented over themselves under the supervision of a researcher and to observe and evaluate themselves in detail and depth; for this purpose, it is assumed that availability of a researcher and three practitioner-researchers is sufficient. Approach of first researcher of this paper is "participating action research" (Reason and Bradbury, 2008), other three practitioner-researchers have implemented the approach of "self-study action research" under the supervision of first researcher.

Four researchers are currently working in Anadolu University, Open Education Faculty, Learning Technologies R&D Center. The activities offering design, development, presentation and support services of e-learning content intended for students studying as open education and distance education. While first researcher (Mehmet) is developing the tools used in implementation of method and the method of "learning experiences management", he has implemented it over himself for a period of 16 months. First practitioner-researcher (İlker) is using computer intensively as doctorate student and software developer. Second practitioner-researcher (Buket) is using computer at home and in the office as doctorate student and instructional designer. Third practitioner-researcher (Ayşe) is working in the same institution and is maintaining its master education with distance education method over internet. Practitioner-researchers have implemented the method and tools within the scope of action research for the first time.

#### *Action research process*

The phases recommended by Riel (2010) have been used for approach of cyclic action research used in this study: (a) Identify research question. (b) Report cycles of research; for each action cycle: (b1) describe of cycle action, (b2) identify the question of action cycle, (b3) describe what happened in action, (b4) collect evidence for evaluating action, (b5) evaluate results of action, (b6) reflection. (c) Final reflection.

Since implementations of life logging perform captures images regarding all times of individuals are awake, they incorporate visual data in specific nature and thus, feature of implementation to be directly observed by others may cause ethical problems. First researcher and other three practitioner-researchers have implemented learning experiences management approach independently without being affected from one another for overcoming this limitation. They have implemented by adding each phase related to approach in each cycle and they have supervised implementation by themselves and have gathered data pertaining to implementation through a systematic self-observation during this period. Data gathered as the end of cycle has been analyzed and evaluated. One more phase pertaining to approach in following cycle has been implemented and added and put into implementation in this way. Once all cycles of independent researchers end, data gathered and interim evaluations have been analyzed and evaluated with a common study by first researcher and other practitioner-researchers.

Participative action research process of first researcher: First researcher has carried out the following procedures within the scope of the research:

- Designing action research
- Planning action cycles and kick off up meetings
- For each cycle: (a) Creating explanation and question of action. (b) Creating relevant reading parts for introducing action (c) Preparing observation forms. (d) Preparing pre-tests and final tests. (e) Preparing evaluation forms. (f) Initiating action. (g) Observing practitioner-researchers for each phase for supervising research and evaluating the phase at the end of phase. (h) Trying the implementation over itself. (i) Evaluating the implementation. (j) Organizing an evaluation meeting with practitioner-researchers.
- Evaluating collectively evaluation results of practitioner-researchers

Self-study action research process of practitioner-researchers: Practitioner-researchers have carried out the following procedures within the scope of the research:

- Participating to kick off meeting: In this meeting, (a) research problem is introduced by first researcher, research question is stated; (b) action research method is introduced, tools to be used and process to be applied are introduced, (c) action cycles are introduced.
- To carried out the following procedures for each action cycle: (a) Explaining the action in a Word document prepared by first researcher and reading and understanding reading parts relating to action. (b) Understanding action cycle question. (c) Gathering data relating to existing situation and interpreting gathered data and conducting pre-test. (d) Recognizing alternative action plan and putting action into implementation. (e) Having training of approaches to be applied and software to be used. (f) Carrying out action each day for a period of one week. (g) Gathering data for supervising and evaluating implementation; observing itself and recording observation data with the help of observation form. (h) Conducting final test at the end of the phase. (i) Analyzing and evaluating observation data; completing evaluation form, comparing and interpreting test results with pre-test results. (j) Carrying out group evaluation to which other implementers and first researchers participate. (k) Reflecting phase results critically.
- Conducting collective evaluation for all phases and carrying out critical reflection.

First of all, research question has been identified according to the format recommended by Riel (2010) and afterwards, question of action research has been provided. Research question is an overall question stating integrity of the research. Each of action cycles in the following part is sub-questions asked for finding response to the question of this action research.

**Research question (Overall question):** Can I manage lifelong learning experiences by implementing learning experiences management method?

Firstly, action is explained for creating question of action research and then output to be obtained is explained. Accordingly, question of action research has been determined as follows (Riel, 2010):

**Question of Action Research:** If I record learning experiences via life logging system and implement the phases of learning experiences management approach, what will its effect on my management skills of learning experiences?

### *Cycles of action research*

Each of five fundamental phases of the method for investigating applicability of the method of "learning experiences management" has been handled as the action to be applied in cycle of an action research: (1) Recording life experiences (shortly "recording") (2) Interpreting life experiences (shortly "interpreting") (3) Creating context lists (shortly "listing contexts") (4) Signification learning experiences (shortly "signification") (5) Creating management lists of learning experiences (shortly "managing").

Each phase has been envisaged to be implemented for a period of one week together with previous phases. Accordingly, practitioners will experience uninterrupted keeping life log experience for a period of five weeks, experience of interpreting life experiences for a period of four weeks as of second week, experience of listing contexts for a period of three weeks as of third week, experience of signification learning experiences for a period of two weeks as of fourth week and experience of managing learning experiences in fifth week. In this way, practitioners will start from the simplest phases and gradually put more complicated phases into implementation and they will strive to observe the change created by each phase over them. Table 1 includes explanation, action question, action plan and final test pertaining to each action cycle.

Table 1. Details of action cycles

Explanation of Action Cycle	Action Question	Pre-Test	Action Plan	Final Test
<i>In first cycle</i> , researcher records life experiences by using life experience recorder software developed for capture screenshots and camera images. Revises life experience records recorded during the week.	"What is the effect of recording life experiences over remembering and realizing experiences?"	Researcher is requested to note down all events, actions and procedures fully by trying to remember realized in regard to one and two days before from implementation start.	Alternative action is identified as "recording experiences with life log recorder tools". Participants are provided with training for using software.	Researcher is requested to create the list of operations, actions or activities realized during last two days by making use of the images captured. Compares and evaluates remembering and realizing performances of life experiences in pre-test and Final Test processes.
<i>In second cycle</i> , researcher interprets life experiences recorded in previous week and	"Does interpreting life experiences enable me to	Researcher is requested to browse and define recorded	Alternative action is identified as "interpreting experiences in the form of	Researcher is requested to compare performance of identification

to be recorded in this week with the help of "experience processing" software.	remember the experiences for longer time"	images pertaining to one day.	activities, episodes and stories by using experience processing software. Participants have been provided with training for using relevant software.	procedure determined by itself in pre-test with interpretation process implemented in action cycle.
<i>In third cycle</i> , researcher creates the lists related to contexts accompanying life experiences recorded and interpreted.	"Does defining contexts such as persons, places, events etc. out of life experiences reveal implicit experiences?"	Researcher is requested to browse images pertaining to one day and to capture association experienced at that moment or in different times but having not realized.	Alternative action is identified as "creating personal knowledge base and semantic network by preparing context list" (associates with experiences, establishing associations among experiences with contexts). Participants are provided with software training for preparing context lists.	Researcher is requested to compare performance of capturing association procedure determined by itself in pre-test with creation of context list process implemented in action cycle.
<i>In fourth cycle</i> , researcher starts to acquire learning experiences from life experiences that it has been recording, interpreting and identifying context and to signification such experiences.	"Do learning experience signification action enable me to realize learning experiences experienced without planning or without being conscious as well as experiences with planning or being conscious"	Researcher is requested to browse the images pertaining to one day and to identify its learning experiences experienced.	Alternative actions is identified as "to identify experiences whether they are formal, non-formal, informal-implicit (tacit), integrative, reactive (incidental), self-directed-in systematic manner.	Researcher is requested to compare performance of explanation procedure determined by itself in pre-test with explanation process implemented in action cycle.
<i>In fifth cycle</i> , while researcher continues to record, interpret life experiences and identify its contexts and signification learning experiences, it starts to plan learning experiences in the future, to control current learning experiences and evaluate learning experiences in the past.	"Does preparing lists regarding future, present and past in relation to learning experiences enable me to manage learning experiences?"	Researcher is requested to implement an approach for managing their learning experiences.	Alternative action is identified as "Preparing lists regarding future, present and past in relation to learning experiences and to use such lists" Training of preparing and using management list in regard to planning, supervising and evaluating will be provided.	Researcher is requested to compare performance of learning experience management procedure determined by itself in pre-test with approach implemented in action cycle.

*Gathering data for supervising and evaluating implementation:* Researchers systematically record context information, observation notes, remarks, episodes and stories pertaining to implementation each day during implementation period in respect to each action cycle. For this purpose, observation forms are used. Within this period, practitioners record the responses given to the questions of what has changed together with action in this process, how has been reacted to this change, what is direct and indirect proof for what it is. In a similar process, first researcher systematically observes implementation of three practitioner-researchers as passive observer and takes down notes by using a similar form each day. Entire context relating to implementation is recorded. Quality of this process is of high importance in terms of ensuring criteria set out in Credibility of Researcher and Transferability recommended by Guba (1981) for validity of action researcher.

"Depict context you are included objectively.", "What are the procedures or actions you perform on that day within the scope of the research?", "Jot down observation notes, thoughts and comments regarding these?" and "What changed together with this action and how did you react against this change and what is direct and indirect proof regarding this?" in a way that shall contain the questions needed to be investigated emphasized in the phases recommended by Riel (2010) in observation form. Since the phases of action cycle are implemented for a period of one week, observation form above in each phase is completed separately for seven days. Once research is completed, total 35 observation forms are acquired for each practitioner. Practitioners perform the activities called "pre-test" on the first day of each phase and "final test" on seven days of the phase. Activities in pre-tests are in a way that are performed with an approach determined by an individual without method and tools recommended by the implementation in that phase for each phase and activities in final tests are performed with method and tools recommended by the same implementation. Observation forms are prepared as a Word document containing a separate observation form pertaining to within seven days of the phase for each action cycle. This document includes the information regarding research question for being a guide for the researcher, explanation of action cycle, question of action cycle, action plan, reading parts relating to action, introduction of

relevant software and user information, gathering data for supervising and evaluating implementation, data analysis and evaluation, collective evaluation and reflection processes.

*Data analysis and evaluation:* Researchers firstly evaluate action results in each action cycle by themselves. For this purpose, each researcher completes a self-evaluation form at the end of each phase. Researchers are requested to state their thoughts in the following issues in their self-evaluation process: Deficient points of the system applied, inadequacies, problems, surplus points, competencies, gains, possible effects, potential different usage possibilities, aspects open for development, hardware, software, practicability and technological comments relating to interface, individual and external factors affecting use of model or tool developed. Researcher may add the features not included here for making comment. A Final Test is also conducted at evaluation phase. Experiences of Pre-Test and Final Test are compared and comments are written in evaluation form. This procedure is completed on last day of the phase and observation and evaluation forms are communicated via first researcher.

Self-evaluation form for each phase is included the last part of Word document bearing guidance information together with observation forms within it and prepared separately for each phase. In this way, researchers are able to perform information acquisition relating to action cycle, saving observation data and evaluation performance procedures on the same document.

*Start of action cycle and evaluation meetings:* Researchers have observed themselves each day for gathering data during action cycles and have evaluated data obtained as a result of observations individually and then have come together with other researchers and have performed collective evaluations. Common evaluation meetings held at the end of each action cycle have been organized in a way of sharing self-evaluation results of each practitioner-researcher with other practitioner-researchers and first researcher. Unstructured user stories in collective evaluations are compiled and significance of experiences undergone for individuals, contribution to individuals and expectations of individuals from this method are determined. Interrogative techniques are utilized in this phase. Evaluation meetings have been recorded to video for analyzing them later time. Once evaluation meeting of first phase is completed, kick off meeting of action cycle of the following phase is organized.

*Reflection:* Reflection pertaining to action cycle according to Riel (2010) are looked into by turning back to action. "If you could repeat the process, what would you change and what happened as you expected and what were the surprises?" the questions above are asked. Predictions relating to future cycle are noted in this phase. Investigation techniques are made use of in this phase and first researcher compiles these views in the negotiation held with other researchers and writes them down after the meeting.

*Collective evaluation of all phases:* Collective evaluation in regard to all phases is organized following fifth evaluation cycle. In this way, the problems and opportunities experienced in use of learning experiences management method and related tools are made come together. In this phase, final state of the report is made with corrections and critics made by other three practitioner-researchers over result report written on the text by first researcher.

Quality of data collection, evaluation and reflection phases is of high importance in terms of ensuring the criteria of Dependability and Confirmability recommended by Guba (1981) for validity of action researches.

### *Privacy*

Record of screenshots and camera capture images has been made in desktop computers, laptop computers and tablets of participants during research process. In order for participants to avoid being unaware of images of other persons in the environment, participants have an announcement in visible size with the text of "*Screenshots and camera capture images saved in every 30 seconds within the scope of Scientific Research Project - 1301E014 in this Computer*" on their desks. Researchers have not shared the images recorded with other researchers and they have shared their views in that moment with only observation and evaluation forms in the evaluation meetings.

### *Reliability of research*

Generalizability and repeatability in quantitative sense contradict with nature of action research. The reason for this is that data collection is in question depending on features of a specific context. Reliability in action researches is established in a way that data is significant for those conducting research and consistency within itself and reading research report (Uzuner, 2005).



## Findings

Findings relating to implementation and usage obtained in the research are handled in two groups as findings related to each of five action findings.

### *Findings relating to implementation and usage*

It is envisaged that implementation starts on 2 April 2014 Wednesday and last for five weeks and is completed on 7 May 2014 Wednesday. All of action cycles in the implementation have been started in envisaged dates. However, planned start dates have not been adhered to due to work loads of practitioners in execution of evaluation meetings and delivery of observation and evaluation forms related to action cycles. First researcher has observed practitioner-researchers during five weeks and following four weeks during research process on a daily basis. Practitioner-researchers have been able to deliver observation and self-evaluation forms regarding actions cycles within first weeks of June. Collective evaluation of research was conducted on 4 June 2014 Wednesday. The situation of extension of 5 the research of 5 weeks to 9 weeks held on this date has been investigated and no effect disrupting nature of research has been seen apart from increase in implementation periods of action cycles. It has been concluded that the phases of increase in implementation periods have enabled more proper evaluation.

Since all researchers are assigned in the same department, no problem has been detected in observation of other researchers of first researcher each day upon organization of kick off meetings of action cycles. Implementation is not limited to working hours and specific location and but it can be performed in each environment where practitioners can use computer and in all hours where they are awake. As a result of this, kick off meetings relating to the first three phases have been organized in the workplace and kick off meeting relating to 4th phase has been organized in a hotel lobby commuted for participating to a conference and kick off meeting relating to 5th phase has been organized in an home environment.

Differences of researchers in their frequency of daily computer use and their usage purpose of computer affect observation and evaluation processes in research. It is envisaged that it will not be possible to establish homogeneity in terms of time and interest spent by the persons in research to be selected randomly in the research of this type to be performed with more participants.

It has been seen that images are saved from early hours of morning to late hours of evening since researchers use computers intensively in both workplaces and in other places rather than their workplaces. It has been observed that life logs are related with the work in day time and are related with education and social media in the evenings and at the weekends.

### *Summaries of observation and evaluation reports concerning the phases*

Individual observations and evaluations concerning implementation can be categorized into two groups as problems and opportunities. Evaluations of participants in the phases are briefly included in Table 2 and Table 3.

Table 2. Problems identified in action cycles

Phase	Participant	Problems
Recording	Ayşe	<ul style="list-style-type: none"><li>• The procedure of capturing image ends when computer turns into sleep mode.</li><li>• Windows messages locking screen ends the procedure of recording screen image.</li><li>• Computer cameras captures image with narrow angle.</li><li>• Screen image captured in displays with small resolution can be cropped.</li></ul>
	Buket	<ul style="list-style-type: none"><li>• I have experienced a period of adaptation since I have been using Windows for the first time.</li><li>• I do not take image from camera embedded to computer in Windows working over MAC Pro.</li><li>• I have had a feeling of being watched for a short period when screen images start to be recorded.</li></ul>
	İlker	<ul style="list-style-type: none"><li>• Recording current moment leads more controlled performance of movements of individuals. Naturalness gets lost.</li><li>• Recording other persons in the meetings causes the persons to be anxious.</li><li>• When sleep mode is activated, capturing image is stopped. When sleep mode is deactivated, capture image does not continue.</li><li>• Browsing and analyzing the images recorded each day take time.</li></ul>
	Mehmet	<ul style="list-style-type: none"><li>• When image is captured from external USB camera, if camera is removed, software does not detect this case and it continues recording last image.</li><li>• Windows Store applications installed from development environment stops working when developer license ends.</li><li>• While Windows 8 tablet is full charge, it can perform recording for maximum 3,5-4 hours.</li><li>• Overloading of recycling box can causes problem in OneDrive (SkyDrive) synchronization. Regular clean-up is needed.</li></ul>

Interpretation	Ayşe	<ul style="list-style-type: none"> <li>Files in the nature of "Online-Only" cannot be transferred from SkyDrive (OneDrive). File attribute should be made as "Available offline".</li> <li>Once entered activity is selected, to come forward of images relating to that activity gets better.</li> </ul>
	Buket	<ul style="list-style-type: none"> <li>I only run software in Windows 8 system installed in Mac Pro. Screen resolution of Mac Pro is sufficient for displaying all time slices on display screen.</li> <li>Connection between images and comments should be tighter. When an image is selected, inputs relating to this and images relating to this input when an input is selected should appear more properly.</li> <li>Options of displaying images should be increased.</li> </ul>
	İlker	<ul style="list-style-type: none"> <li>Commenting procedure is time taking.</li> </ul>
	Mehmet	<ul style="list-style-type: none"> <li>After a detail is processed in comment entry, data processed when another input is not clicked gets lost.</li> <li>Default image mode on the screen when images are listed should be "FullDayView". This will provide convenience.</li> <li>Browsing and commenting one week generally takes one hour. I have processed stories relating to 2014 year, episodes relating to January, February, March and April months and activities relating to the days between 1-5 April in a half day. For this purpose, I have created more than 50 records.</li> <li>While daily comments are processed, it is necessary to have a look at calendar tool of computer for determining which day of the week the day selected from node will be. What day of the week the selected day should be displayed within software.</li> </ul>
Listing Contexts	Ayşe	<ul style="list-style-type: none"> <li>If tree regarding context lists and images is displayed on the screen, it will be better.</li> <li>Relationship between experiences and contexts and contexts and experiences should be seen in a more useful manner.</li> </ul>
	Buket	<ul style="list-style-type: none"> <li>I have had a difficulty in creating behaviour and feeling lists.</li> <li>The system should be used for a longer period for developing context lists.</li> <li>Browsing experiences and obtaining contexts is fun but it is time taking.</li> </ul>
	İlker	<ul style="list-style-type: none"> <li>Each activity relating to the project for listing contexts of a project should be defined.</li> </ul>
	Mehmet	<ul style="list-style-type: none"> <li>Context data in abundant number cannot be obtained sufficiently within research period because of lacking of period. Context data related to previous periods should be processed and lists should be enriched.</li> </ul>
Signification	Ayşe	<ul style="list-style-type: none"> <li>Required time is not sufficient for improving the project when the numbers of the phases get higher.</li> <li>More time is required in each phase for internalizing the phases more.</li> </ul>
	Buket	<ul style="list-style-type: none"> <li>I think that browsing and detecting the images of implicit learning experiences is difficult.</li> </ul>
	İlker	<ul style="list-style-type: none"> <li>Detecting integrative learning experiences is difficult.</li> </ul>
	Mehmet	<ul style="list-style-type: none"> <li>Learning types are with their old names in experience processing software. I have made an update in software for enabling accurate selection of learning experiences of inputs from "Type" field.</li> </ul>
Management	Ayşe	<ul style="list-style-type: none"> <li>When the project proceeds, this becomes more significant for practitioners but it becomes difficult to explain this to others.</li> </ul>
	Buket	<ul style="list-style-type: none"> <li>I have had a difficulty in preparing the lists concerning past.</li> </ul>
	İlker	<ul style="list-style-type: none"> <li>How the persons having practice of planning activities can implement the recommended methods in this approach by avoiding repetition?</li> <li>How can mind mapping be added to this system?</li> </ul>
	Mehmet	<ul style="list-style-type: none"> <li>Images of planning, controlling and evaluation lists cannot be processed onto experience processing screen and this is an important issue.</li> </ul>

Table 3. Opportunities identified in action cycles

Phase	Participant	Opportunities
Recording	Ayşe	<ul style="list-style-type: none"> <li>As far as what we have remembered by utilizing from our memory, those remembered by looking at images are more than average and in what time slice they are realized are more accurately remembered.</li> <li>When images are browsing at the end of day, the procedures envisaged to be performed but forgotten to be performed are easily remembered.</li> <li>When it is needed to have a look at an important document examined in a computer within a day again in another location, images contained in cloud can be browsed and image of that document can be accessed.</li> <li>Recording of screen and camera image during a day can be accepted in a time and this is not noticed.</li> <li>When computer is left open at night or when there is no one at home, this can be used as a type of security system since it continues to capture image.</li> <li>When a procedure performed in a computer is needed to be performed in another time or computer, recorded images can be leading.</li> <li>Activities performed in a computer by browsing daily activities can be detected where they get intensive. (Work, communication, social media, education, shopping etc.)</li> <li>With whom computer is shared can be remembered from camera images.</li> <li>I realize a lot of message which I have ignored while listening to the lesson in a virtual class environment by recording and browsing learning activities that I have performed over Internet while continuing with distance master education.</li> <li>While image is recorded while using computer, experiences relating to other times or places cannot be recorded. This issue can be solved with a portable camera.</li> <li>Recording images as well as recording sound and video will be useful in terms of revising experiences undergone afterwards.</li> </ul>

	Buket	<ul style="list-style-type: none"> <li>When it is utilized from memory, details relating to a few days ago can be obscure. I start to make predictions instead of remembering clearly the procedures rather than daily routines. Even if more time is elapsed, I have remembered when and for what period I have done it with image record,.</li> <li>I have realized that I have spent a lot of time in shopping web sites in my first browsing. I need to make a time management.</li> <li>It is accustomed to recording period within three days and it is started not realize it.</li> <li>Browsing images of days gives opportunity of evaluating the day.</li> <li>When I make a daily plan and review them at the end of the day, I can see to what extent I adhere to the plan.</li> <li>Camera image capturing software has been updated in a way that will take image more than one camera and I have started to capture image by plugging external camera to my computer.</li> </ul>
	İlker	<ul style="list-style-type: none"> <li>I have gained a different perspective about myself by revising in detail all my activities up today for the first time.</li> <li>I can sense how much time I spend which job.</li> <li>Following completion of research, I am contemplating to continue recording my experiences.</li> <li>The procedure of recording image transforms into a routine procedure within a time.</li> <li>I have realized that I have spent more time than I have thought in social networks in browsing performed in the first days.</li> <li>Life logs contribute performing self-evaluation.</li> </ul>
	Mehmet	<ul style="list-style-type: none"> <li>When I watch a film on TV over HDMI cable by accessing Internet, archive of watched film is created since I continue capturing screen image.</li> <li>I can take regular records in the computer in my workplace. I should strive to use Windows 8 tablet for recording the moments I have spent in especially social media in the evenings and at the weekends. I have started to capture environment image with Windows 8 tablet in the moments when I do not spend time in my computer environment.</li> <li>I have purchased a telephone holder for recording image experimentally with Windows 8 smart phone while driving by my car and I have started to try it. After shooting inside of my car for a while, I have started to shoot outside from windscreen of my car.</li> <li>When I record with the camera in presentation environments, slides in curtains can be recorded completely and an archive can be created.</li> </ul>
Interpretation	Ayşe	<ul style="list-style-type: none"> <li>When images relating to experiences are interpreted, even if longer time is elapsed, it becomes easier to remember it.</li> <li>For example, visual evidence is created in my hand belonging to all courses I have joined in virtual class.</li> </ul>
	Buket	<ul style="list-style-type: none"> <li>While interpreting the images, I have had a chance to have a look at the woks I have done within a day.</li> </ul>
	İlker	<ul style="list-style-type: none"> <li>Interpretation becomes more active by using image recognition technologies.</li> </ul>
	Mehmet	<ul style="list-style-type: none"> <li>I can make more integrative interpretation in classifications in the form of stories “continuing from previous year”, “stories started in previous years and to be completed in this year”, “stories starting in this year/predicted to be started in this year and to continue in the next year”, “stories started in this year/predicted to be started in this year”, “stories to be completed in this year”, “stories predicted to start in the next years” and “stories completed in previous years”. In addition to this, defining some portion of life routines as continuous stories (stories with no starting and ending) facilitates the episode.</li> <li>I have taken notes of stories and episodes relating to past and future years by opening nodes not containing images regarding past years (2011,2012, 2013) and future years (2015,2016, 2017).</li> <li>Software which will enable accessing interpretation inputs and recording records at the same time will enable to take down notes simultaneously (as in meeting environments).</li> </ul>
Listing Contexts	Ayşe	<ul style="list-style-type: none"> <li>I have create a special information set for myself by determining contexts.</li> </ul>
	Buket	<ul style="list-style-type: none"> <li>Context lists seems like a reflection of our lives.</li> <li>Creating a context list and adding explanation is a fun.</li> </ul>
	İlker	<ul style="list-style-type: none"> <li>Listing contexts enables me to realize relationship between contexts accompanying experiences.</li> <li>Focusing on a context enables navigation between details.</li> </ul>
	Mehmet	<ul style="list-style-type: none"> <li>Starting from the closest contexts and accessing them accurately to remote ones will facilitate the process. It is possible to revise and deepen contexts on continuous basis.</li> <li>Obtaining contexts from experiences for longer times and adding experience information relating to these contexts enable to reveal implicit information of individual.</li> </ul>
Signification	Ayşe	<ul style="list-style-type: none"> <li>Trying to handle experiences as to their learning types enable to capture possibility of learning experiences without plan or realization.</li> </ul>
	Buket	<ul style="list-style-type: none"> <li>My awareness has increased in the issue of availability of other learning experiences as self-directed experiences within learning experiences within this phase and reactive (incidental) learning experiences as weighted terms.</li> </ul>
	İlker	<ul style="list-style-type: none"> <li>I have realized the learning processed that I was not aware with the activities I have made within the scope of this study. Lists I have created and notes I have taken, revisions I have made retroactively over these records and records I have made regularly will enable hidden data within a period to come together and to realization of new learning processes and reinforcement of learned information.</li> </ul>
	Mehmet	<ul style="list-style-type: none"> <li>Revising learning experiences enable to relate different experiences with one another and especially experiences of acquiring new information can be undergone with intuition in integrative learning.</li> </ul>
Management	Ayşe	<ul style="list-style-type: none"> <li>I can plan distance learning activities, revise and supervise and evaluate the images.</li> </ul>
	Buket	<ul style="list-style-type: none"> <li>Procedures of planning future, controlling of present and evaluation of past generally consist of processes embedded with one another.</li> </ul>

	<ul style="list-style-type: none"> <li>Preparing lists regarding future (to do), present (doing) and past (did) in relation to learning experiences have enabled me to manage learning experiences.</li> </ul>
İlker	<ul style="list-style-type: none"> <li>Supporting management process with mind map techniques will increase efficiency.</li> </ul>
Mehmet	<ul style="list-style-type: none"> <li>In the method developed, firstly activities, then episodes and then stories emerge. However, in practice, stories and episodes can be determined in detail in advance as annual and monthly planning tools. These information can be updated at the end of month and in following periods of the year. Yearly and monthly nodes relating to future years and months should be manually opened herein. Software permits this.</li> <li>An approach which will facilitate acquiring stories from episodes can be developed.</li> <li>In this phase, I have started to create lists such as stories of year, plan of year, episodes of month, plan of month and weeks of month. These lists enable planning future, controlling present day and evaluating past to appear on the same screen with story, episode and activity comments.</li> </ul>

### *Descriptive analysis of data*

When observation and evaluation reports pertaining to implementation performed for a period of nine weeks in the research are analyzed, the following findings have been accessed. Discussions in the meetings where individual observation and evaluation reports are evaluated within analysis period are mostly made use of.

- Even if system of life logging used has problems open for development, practitioners can easily get accustomed to passive daily record and can get adapted.
- Recording daily lives of individuals as computer screen and camera image is a thrilling experience and this raises awareness in regard to experiences of individuals in their daily lives.
- Since recording life experiences enable to return a desired moment and examine it, it reduces stress of remembering activities and events in individuals.
- Individuals discover new and different usage possibilities of recording procedure that they do not envisage before.
- Interpreting experiences enable individuals to get to know themselves better.
- Interpreting experiences direct individuals to contemplate over past and future experiences as current experiences.
- Listing contexts relating to experiences enable creating personal knowledge base and makes nodes of complex network and associations constituting life of individual more distinctive.
- Activities such as realizing learning experiences disperse to whole area of life experiences by trying to signification learning experiences, naming, distinguishing period and frequency of experiences and classifying the same can be performed in this way. This case reinforces dominance of individual over its learning process.
- Management process of experiences with the procedures of recording, interpreting, classifying and signification experiences has been performed implicitly to a great extent. "Management" phase that is final phase enables reporting of decisions given in this process.
- Individual's observing itself in a way that will cover a few years before and a few years after regarding the moment will enable individual to identify its personal road map properly.

### *Findings as to user's characteristics*

Although personal characteristics are not emphasized in this study, findings show that usage habits of users vary according to learning experiences emphasized (informal learning, formal learning and formal distance learning). This case triggers necessity of longer term individual action researches and focusing mostly on type of learning experience of practitioners.

## **Discussion, conclusion and recommendations**

### *Discussion*

Life logging researches become widespread as of the beginning of 2000's and approaches are developed in order for individuals to record their experiences and to examine them afterwards. Especially researches come to the fore for supporting individuals having memory problem (Hodges et al., 2011). Obtaining learning experiences from life experiences records in this study and managing these learning experiences are studies as an original issue.

It is seen that capturing life experiences as a result of findings obtained and analysis of findings is a thrilling experience and causes habit after a while. In addition to this, interpreting experiences helps individual to reveal the information possessed about itself. After this, when individual creates context lists related to experiences, it can clearly draw its own borders. When individual focuses on learning experiences during recording, interpreting and classifying process, it can explain its learning experiences and it can realize learning opportunities that it has missed as it has owned. In the same way, it realizes weak areas as strong areas via learning. In final phase, individual targets to manage learning experiences, to turn unplanned and/or unaware life learning experiences into opportunity and to obtain more value than these experiences. Other learning experiences undergone by individual will enable supporting self-directed learning experiences and this enhances effect of life experiences over development of individuals.

### *Conclusion*

Findings obtained in the study and method of "learning experiences management" as a result of analysis of findings and software developed for facilitating implementation of this method equip practitioners with foundations relating to planning, evaluation and controlling skills of formal, non-formal and informal lifelong learning experiences and it is seen that these skills are sufficient tools on starting level for implementing these skills.

### *Recommendations*

That individuals capture their life experiences and use skills of learning experiences management during their lives by making use of this will have influential effects over their personal developments. Having knowledge and skills required by the age, correct orientation of professional development, effectively creating and updating personal road map, realizing learning deficiencies and acting more consciously and in a planned way for remedying such deficiencies can be listed among them.

In this study, applicability of learning experiences management method has been focused on. Especially formal learning, non-formal learning and informal learning types have been independently emphasized for examining in detail effectiveness of developed method and tools and more comprehensive and longer term researches should be conducted. Moreover, it may be targeted to determine different usage modes of method with the studies based on observation of several users and to measure contributions made to individuals having different qualifications. More different sensors such as sound and video in addition to camera and screenshot image for capturing life experiences should be used and research and development studies are needed for observing effects of these. Development should be made in order for "experience processing" software used for management and processing of captured data to be more user friendly.

Modular nature of learning experiences management method enables this approach to be used for different purposes. For example, if health experiences are emphasized instead of learning experiences in fourth phase following the first three phases and planning, controlling and evaluating health experiences are conducted in fifth phase over this, approach of "lifelong health experiences management" can be obtained. This adaptation procedure method can be tried out for very different areas to be focused on in fourth phase.

### **Acknowledgements**

This study was supported by Anadolu University Scientific Research Projects Commission under the grant no: 1301E014.

### **References**

- Banks, J., Au, K., Ball, A., Bell, P., Gordon, E., Gutierrez, K., et al. (2007). *Learning in and out of school in diverse environments: Life-long, life-wide, life-deep*. The LIFE Center (The Learning in Informal and Formal Environments Center), Seattle, University of Washington, Stanford University, and SRI International, Retrieved from [http://life-slc.org/docs/Banks\\_etal-LIFE-Diversity-Report.pdf](http://life-slc.org/docs/Banks_etal-LIFE-Diversity-Report.pdf).
- Clark, T. (2005). Lifelong, life-wide or life sentence? *Australian Journal of Adult Learning*, 45(1), 47-62.
- Henfridsson, O., & Lindgren, R. (2007). Action research in new product development. In *Information Systems Action Research* (pp. 193-216). Springer US.
- Hodges, S., Berry, E., Wood, K. (2011). SenseCam: A Wearable Camera That Stimulates and Rehabilitates Autobiographical Memory, *Memory*, 19(7), 685-696.

- Hodges, S., Williams, L., Berry, E., Izadi, S., Srinivasan, J., Butler, A., ... , Wood, K. (2006). SenseCam: A Retrospective Memory Aid, In *UbiComp 2006: Ubiquitous Computing*, Springer Berlin Heidelberg, 177-193.
- Guba, E. G. (1981). Criteria for assessing the trustworthiness of naturalistic inquiries. *ECTJ*, 29(2), 75-91.
- McNiff, J. (2013). *Action research: Principles and practice*. Routledge.
- McNiff, J., & Whitehead, J. (2009). *You and your action research project*. Routledge.
- Mutlu, M.E. (2013a). Creating Three Dimension Learning Model and Learning Experiences, 22 *Ulusal Eğitim Bilimleri Kurultayı*, Eskişehir Osmangazi Üniversitesi, 5-7 September 2013. (In Turkish)
- Mutlu, M.E. (2013b). Genişletilmiş İnförmel Öğrenme Modeli ve Öğrenme Deneyimlerinin Yönetimi için Bir Yöntem, 22. *Ulusal Eğitim Bilimleri Kurultayı*, Eskişehir Osmangazi Üniversitesi, 5-7 September 2013. (In Turkish)
- Mutlu, M.E. (2013c). Öğrenme Deneyimlerinin Kaydedilmesi İçin Çoklu Cihaz Tabanlı Bir Yaşam Günlüğü Sisteminin Geliştirilmesi, *Eğitim ve Öğretim Araştırmaları Dergisi (JRET)*, Cilt 2, Sayı 4, Makale No:28, 256-269 pp., November 2013. (In Turkish)
- Mutlu, M.E. (2013d). Yaşam Deneyimlerinin Yönetimi İçin Bir Sistem Önerisi, 30. *Ulusal Bilişim Kurultayı*, 28-29 November 2013, Ankara. (In Turkish)
- Mutlu, M.E. (2013e). Yaşam Günlüğüne Dayalı Bir Kişisel Bilgi Tabanı Sistemi Tasarımı, *İnet-Tr 2013 – XVIII. Türkiye’de İnternet Konferansı*, İstanbul Üniversitesi, 9-11 December, 2013. (In Turkish)
- Mutlu, M.E. (2014a). Design and Development of a Digital Life Logging System for Management of Lifelong Learning Experiences, *Int-e 2014 International Conference on New Horizons in Education*, June 25-27, 2014, Paris. (Accepted)
- Reason, P. and Bradbury, H. (2008). Introduction, in P. Reason and H. Bradbury (eds) *The Sage Handbook of Action Research: Participative Inquiry and Practice*. Sage, CA, pp. 5–10.
- Riel, M. (2010). *Understanding Action Research*, Center For Collaborative Action Research, Pepperdine University (Last revision Sep, 2013). Retrieved from <http://cadres.pepperdine.edu/ccar/define.html>.
- Uzuner, Y. (2005). Özel Eğitimden Örneklerle Eylem Araştırmaları, *Ankara Üniversitesi Eğitim Bilimleri Fakültesi, Özel Eğitim Dergisi*, 2005, 6 (2), 1-12. (In Turkish)
- Yıldırım, A., Şimşek, H. (2003). *Sosyal bilimlerde araştırma yöntemleri*. Ankara:Seçkin (In Turkish)

# IMPLEMENTING ELT INNOVATIONS: ADOPTING INTEGRATED LANGUAGE SKILLS THROUGH ICT

\*Asst.Prof.Dr. Semin KAZAZOĞLU, Karadeniz Technical University, Department of Foreign Language Education, seminkazazoglu@ktu.edu.tr

\*\*Asst.Prof.Dr. Elif TOKDEMİR DEMİREL, Karadeniz Technical University, Department of English Language and Literature, elif@ktu.edu.tr

## Abstract

The purpose of this study is to examine Turkish EFL teachers' perceptions about the use of information and communication technology (ICT). The results of data analysis indicated that Turkish EFL teachers use ICT most frequently in teaching oral skills. Besides, it has been concluded that the most commonly used ICT resources were overhead projectors and computers. Some of the teachers in the study highlighted the need of pre-service training in the use of ICT both for teachers and students. In the study it is inferred that although EFL teachers held positive attitudes toward ICT the adoption of ICT in schools needs to be revised.

# Implementing a digital model for smart space design: practical and pedagogic issues

Do-Young Kim<sup>a</sup>, Yoon Choe<sup>b</sup>, Sung-Ah Kim<sup>a, b,\*</sup>

<sup>a</sup>*Sungkyunkwan University, Department of Architecture, "Suwon", Republic of Korea*

<sup>b</sup>*Sungkyunkwan University, Department of Convergence Engineering for Future City, "Suwon", Republic of Korea*

---

## Abstract

Traditionally, models have been used by designers to represent abstract design ideas or to analyze and evaluate the refined design solutions. The digital model, in particular, represents the logics, process, and intended result of the design in the form of digital information and media. Innovations in Internet of Things (IoT) and 3D printing technologies now enable the various levels of real-world spatial interactions that were possible only when the user becomes an avatar in a cyberspace. This level of model virtualizes the design and the building itself, becoming an organism of information and materials whether it is being digital analogue.

This phenomenon calls for the reorganization of the conceptual framework during the architectural design process where different kinds of models coexist and continuously evolve. Beyond the ad hoc communications between two modes of models, a symbiotic framework is proposed in this paper, where digital and analogue models interact in synergetic ways in the form of design versions and prototypes. This framework is especially appropriate for designing the smart space. It reflects the paradigm of form-finding and prototyping over the traditional counterpart of design process: form-making. The concept of Smart Analogue Model (SAM) is introduced as a main instrument to facilitate this process. The SAM refers to the prototyping of smart space by integrating ICT-embedded components like sensors and actuators. Through the co-evolving process, two models interact in various channels by utilizing techniques from parametric design, design-by-simulation, and physical computing. The impacts on the pedagogy of architectural design studios are discussed within the framework of the proposed symbiotic design process.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

**Keywords:** Smart space, Prototyping, Digital Model, Building Information Modeling (BIM), Design Process

---

## Background

Traditionally, designers have used models to externalize abstract design ideas or as a mean to analyze and evaluate the refined design solutions. Models are also used for more tangible communication between designers and clients or collaborating engineers, as in the case where the architect often uses the model to convince or share design problems and propose solutions. The digital model, in particular, represents the logics, process, and intended result of the design in the form of digital information and media. Therefore, the role of digital models may be simplified as a digital representation of physical buildings to be realized in the long run, or a digital representation of a mental image transforming incessantly in the designer's mind. That is, the digital model represents something. With the advances in computer technologies, digital models have evolved into essential tools, expanding the horizon of design languages (Kim 1997, Kim 2012). Experimental and complex geometries became universal vocabularies in architectural design thanks to the generative nature of parametric design models (Shelden 2002). That is, the digital model is able to generate the design or the building. Furthermore, VR technologies facilitate full sensory experiences from the design artifacts of a cyber space, by adding more interactive features to the digital model (Singh 2011, Volander 2014, Calado 2013). Fully fledgling technologies, in the field of Internet of Things (IoT) and 3D printing, now enable the various levels of interactions and experience with the space that were possible only in cyber space in the condition that an user limits him/herself as a virtual being (Say 2014). This level of digital model virtualizes the design and the building (Fig. 1).

---

\*Corresponding author. Tel: +82-31-290-7566; fax: +82-31-290-7570

E-mail address: sakim@skku.edu



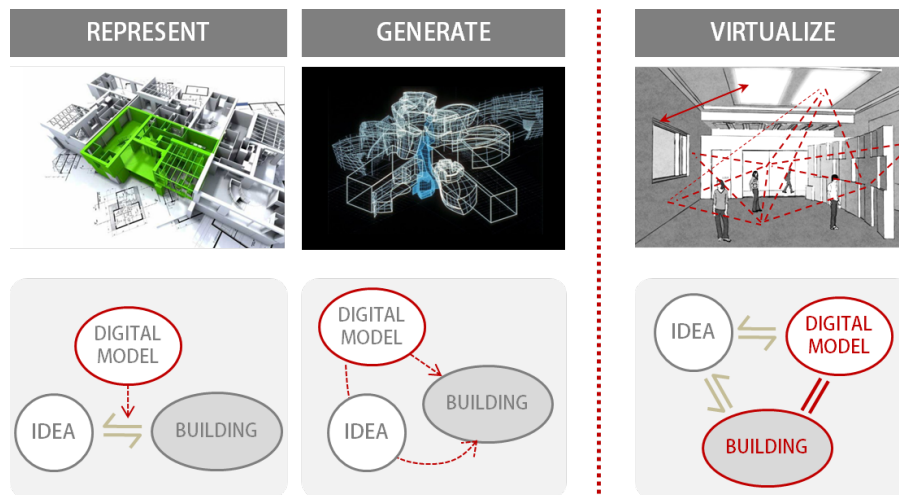


Fig. 1 Evolution of the Digital Model

Not being far different from traditional physical equivalents such as wood model, digital models like 3D geometric model have been extensively used for form-making process. This process involves iterative creating and modifying operations that require manual craft of the designer as a computer operator. Most of digital modeling works are still conducted at this level. This form-making process becomes faster than ever, due to the development of computation design methods such as generative parametric design and digital fabrication. These methodologies are also even better supported by the powerful simulation and optimization tools in combination with accelerating BIM (Building Information Modeling) technology (Oxman 2008). The paradigm of digital modeling is changing from form-making to form-finding as the designers can enjoy the selection of optimum design solutions from myriads of possible alternatives (Carpo 2013).

Analog models, on the other hand, even in the age of computational design, still possess superior merits over digital ones. The pedagogical value of analog models cannot be underestimated as they allow designers to understand the tectonic characteristics through the manipulation of three-dimensional objects (Sun 2013) and to learn the process of construction by physically handling design elements (Cochran 2001). One of the major limitations of the analog model is that it cannot be generated or modified as flexibly as digital models due to its material nature. Thus, analog models tend to be constructed only when the necessity exceeds the limitations of resources compared with the relative flexibility of digital model's unlimited generations and modifications. In other words, few analog models can be created while digital models virtually do not have limitations in terms of quantity in most of architectural design process.

The Smart Analog Model (SAM) can be implemented by the combination of up-to date ICT technology, 3D printing, Internet of Things (IoT) and Smart materials: The form, spatial configurations, and properties of the components can be changed in response to user's information and environment state: The SAM, provided with versatile interaction channels with the digital model, can overcome the limitations of traditional analog models. Furthermore, it augments the form-finding process of the digital model by adding authentic human interactions and real world simulation and optimization operations. The SAM is not modeled, but prototyped as in the case of manufacturing industries: the purpose is to verify the overall performance of the space being designed, not to evaluate only form and shape.

Prototyping with SAM can be of great help to designing a smart space, which should support user's task and respond to the change of environment in real-time. This process allows a kind of Pre-Occupancy Evaluation as the designer is able to estimate user's interactions with the space and the level of performance during the design stage. This nature is essential to the implementation of smart space, as the user feedback can be reflected into the modification of the model from the individual component level. Therefore, when prototyping of smart analog model is applied to educational curriculum, designers can be inspired to follow the architectural trends of future technologies and grasp the concept of flexible space adapting to user's task and environment. Thus, designers can not only generate alternatives rapidly, find optimum alternatives which are satisfied with design criteria, but also verify alternatives by the multidisciplinary approach (Fig.2).

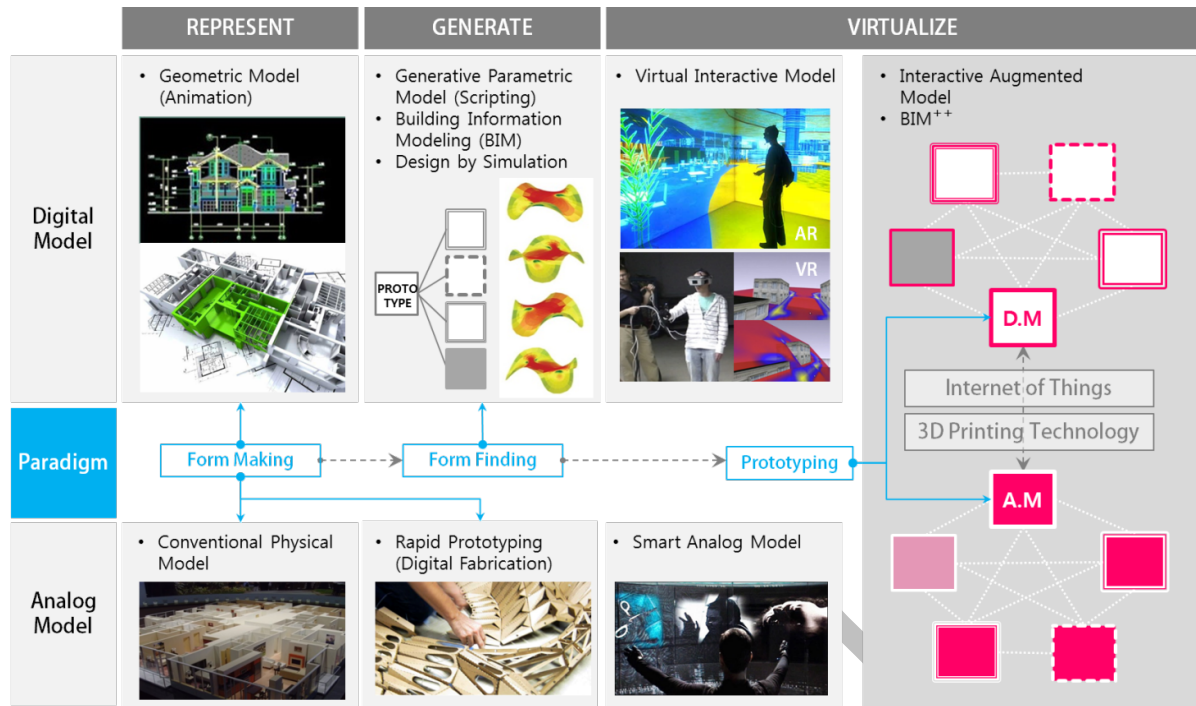


Fig.2 Roles of Digital and Analog Models

## Research Objectives

The smart space changes its form and function in response to the user's needs practically in real time. This kind of space is reconfigurable to create an optimum environment for user's task and emotional state. It can be accomplished by changing material properties or states of spatial elements when the space detects the state of the user and environment. Moreover, the smart space could behave intelligently such that it infers the user's needs or tasks by learning the patterns of user's needs. This inference is conducted on the accumulated data of interactions between the space and the user. That is, the smart space improves spatial intelligence by the learning and inference. From an design point of views, future smart space design can be enhanced by using stored interaction data even though currently implemented smart spaces cannot fully satisfy the user's need. Therefore, the smart space is differentiated from existing space in that it features flexible and evolutionary modes of response to user's need.

Compared with the conventional building space, the smart space is rather closer to a machine (system) that orchestrates components such as sensors, actuators and smart materials to perform a desired function. Therefore, an integrated engineering process is necessary beyond the form-oriented design. This design evolves in such a process through the cycle of reconfiguration of new technology-integrated components and overall performance evaluation. A prototyping methodology needs to be applied so that an iterative process of test and revision is conducted until the required level of performance is accomplished. Emerging technologies as IoT are to be integrated with architectural space in this way. Such a process leads to the generation of numerous design versions and alternatives that share similar spatial formal logic, yet featuring different configurations and interaction methods.

Generative parametric design is an outcome of recent advances in digital modeling where sophisticated and high-performance building forms can be generated by controlling the relationship between the geometry and design intention. This method not only allows designers to analyze and generate alternatives rapidly, but also helps realize experimental and evolving architectural design. Such a role of digital model is also significant in designing the smart space. However, a new kind of analog model interacting with the digital model is needed to support the prototyping process required for smart space design. In this paper, the notion of Smart Analog Model (SAM) is introduced. The SAM aims at better supporting the control of ICT-integrated design elements just in time and the rapid implementation of new prototypes. The SAM will play a crucial role for improving the overall performance of smart space as it is adaptive to design information built through the two-way interaction with its counterpart digital model. In the process of implementing and interacting with the SAM, designer can better grasp the construction method and the overall performance of smart space. Therefore, a symbiotic interaction

between SAM and DM will facilitate understanding the evolving process of the smart space design and enhancing its performance (Fig. 3).

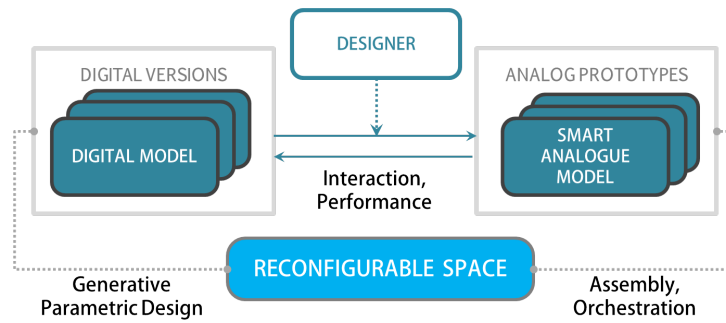


Fig. 3 Digital versions and analog prototypes in design of reconfigurable smart space

In this paper, smart space is defined (①) and two-way interactions between SAM and DM is proposed for implementing a smart space design (②). Then, prototyping of smart space is proposed in design process (③) (Fig. 4).

- ① The definition of smart space is dominated by technical elements enabling the re-configurability of the space. Re-configurability of smart space means a series of phase-changing process such as recognizing (user, environments), accumulating (data), analyzing (user's task), assessing (present environment condition) and operating smart building components. This process is achieved by the smart object, packaged product of multiple functions such as sensing, actuating and processing. Real-time interaction and evolutionary process of smart space is explained by comprising multi-level functions of smart objects.
- ② Two-way interaction model between SAM and DM is necessary for implementing a smart space. This interaction model helps designers plan and configure smart components in smart space design and to conduct direct performance simulations. In practical point of views, the role of BIM (Building Information Model) needs a special attention. Existing BIM does not support most of concepts introduced in this framework such as smart building components or smart objects. Thus, an extended version of the BIM, BIM++, is needed which accommodates more classes.
- ③ Prototyping with SAM and DM is explained and a specific case scenario is also proposed.

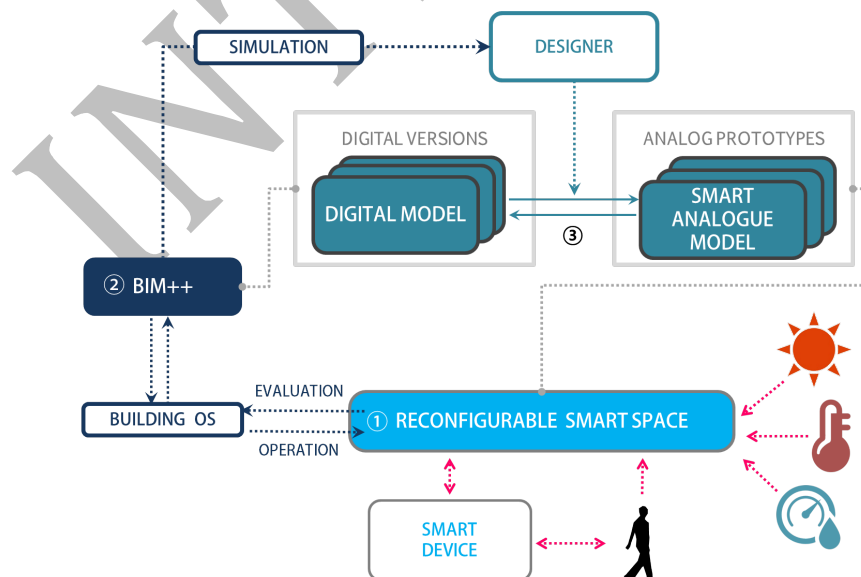


Fig.4 Research Objective

## Elements of Smart (Reconfigurable) space

A smart object exists as an embedded part of a building element or home appliance, enabling its smartness in the space. Thus, Smart Building Component (SBC) is a building element embedded with smart objects. Also, Smart Appliance (SA) is defined as a device embedded with smart objects. SBC and SA save sensing data, analyze the stored data and orchestrate smart objects by determined user's tasks. In the process of reconfiguring the space, functions of smart objects are inter-connected as follows (Fig. 5).

Functions of smart object are regulated into a series of sequential levels such as S-N-I-D-A (Lopez 2011): recognizing users and environments (Sensing): gathering sensing data from various distributed sensors by network (Networking): accumulating data (identity & storage data): estimating user's task using stored information (Decision-making): controlling components to change properties (Actuating). S is detecting information related with user's task and environment state. These include location sensors, mobile sensors and environment sensors: location sensors recognize occupant's position by temperature, infrared radiation, and etc.: environment sensors recognize environmental condition such as temperature, humidity, illumination, the intensity of the wind and etc.: mobile sensors recognize motions or gestures which are associated with human's physical state and psychological state. 'N', 'I' and 'D' are processing parts such as integrating, translating data and estimating user's task. It is critical for determining functions of elements in smart space. In particular, D is orchestration for functions of space elements to make proper environments to user's task. Even when errors of elements are found, decision-making module could find fungible object.

Smart Objects are different from general connected objects as the D module is able to operate physical elements adapted flexibly using accumulated data. Actuation is a holistic change by physical elements in reconfigurable smart space. The holistic change is classified four action types.

- ① Phase change: changes of smart object's properties and invisible molecule
- ② Motion change: changes of smart object's mechanical movement
- ③ Function change: changes of smart object's roles such as interface change in mobile device and media wall
- ④ Creation/demolition: changes of smart objects' existence based on 3D printing technologies

Function types need to be connected to D and A module to implement function-change of smart space. The D module options specific action type by analyzing user's task with stored data in Level 3. Then, the roles are assigned to each smart building components adapted to the determined action type.

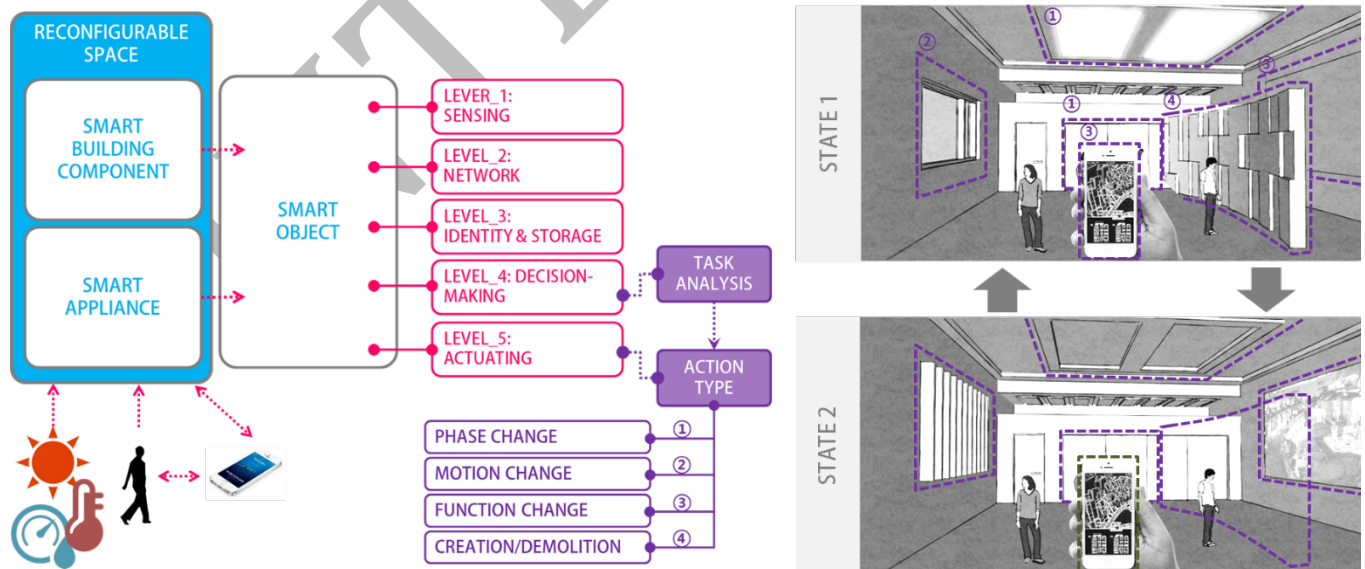


Fig.5 Function of Smart objects in a reconfigurable space

## Extended BIM (BIM++)

Smart space is a flexible system that changes its function or state in response to the user's needs. This function change is enabled by the collaboration of smart objects embedded in the building component or in the appliance inside the space. In addition to these smart objects, physical objects such as partition walls or tables can be created or demolished with the help of 3d printing technology. The space becomes highly reconfigurable in this way.

Process of "Reconfigurable space" is classified into 6 steps using multi-level functions of smart objects: ① sensing user and environmental factor: ② sensing interaction data such as user's behavior: ③ storing sensing data: ④ analyzing user's task and demanding performance of space: ⑤ assigning task's type to element's function: ⑥ operating distributed elements to approach required space function. In design process, SAM contributes sensing and actuating: sensing user's occupancy and surrounding environmental factor (①), sensing interaction between environment and user such as user's behavior patterns, emotional state (②), actuating physical assemblies (⑥). DM contributes processing: storing data detected by smart objects (③), analyzing data and interpreting user's task types (④) (Fig. 6).

Although existing Building Information Modeling (BIM implemented in IFC 2X4) already reflects such specific types of several sensors, actuators and network elements, in practical point of views, BIM needs to be extended so that it reflects recent technologies of smart objects to implement a smart space design. Then, agent model (red lined box in Fig. 6) is referred to facilitate the interaction between DM and SAM. The agent model embraces basic data for analyzing user's physical states and psychological states which influence on determining user's tasks. When agent model is added with BIM, designers can simulate building performance by reflecting user's behaviors so that they can explore more optimized alternative for user's tasks. Agent model contains user's motion, gestures which are associated with user's behavior patterns and psychological states.

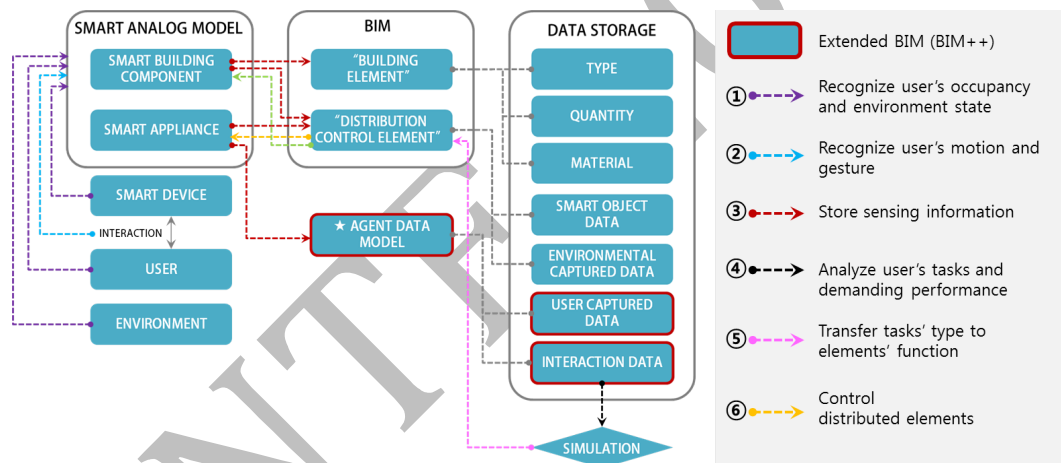


Fig. 6 Data Interoperable Process Based on Reconfigurable Space

Present smart object technologies have matured enough not only to perceive user's location, motion and environments but to catch user's thinking as in the application using Google glass<sup>TM</sup>. Classes in current BIM implementation were investigated in the framework of Jeng (2009)'s classification standards of smart objects in the first place. More action types available from recent advances in smart technologies have been added to this framework. This framework provides a repertoire of necessary classes to support the model (Fig. 7).

- ① Sensing: Sensing categories are limited in devices which detect exterior environmental condition such as gas, frost, fire, heat, moisture, etc. Classes of 'Location sensor' need to be extended to reflect the possibilities of detecting user's location using not only tag, but also infrared radiation or sound. Classes of 'Mobile sensor' need to be classified in detail so that they can reflect the points of views for user's behavior, from motions to gestures.
- ② Identity & data storage: ID categories are confined in the level of distinction for object types. Classes need to be extended for dynamic data through analysis algorithm which helps to classify user's task.
- ③ Decision-making: Decision-making categories need to be extended for reflecting the method of determining user's task type. It is indispensable part to operate physical elements change.





alternatives among precedent prototypes (B), the designer creates a new prototype of reconfigurable space (C). A prototype of SAM has three elements as follows.

- ① Sensor (actuator): Embedded sensor and actuator exchange data with micro-controller.
- ② Micro-controller: Micro-controller connects sensor (actuator) to digital environment. It translates environmental information from sensors, reversely send signals to distributed elements for actuating.
- ③ Integrated development environment (IDE): Designers represent design logics such as operating physical elements, using digital languages.

Third, a prototype is assessed whether it responds environment state and user's task by using the interaction between SAM and DM (D).

- ④ Protocol: Protocol is a hierarchy of network which influences on the speed of data interoperability between IDE and BIM in real-time.
- ⑤ BIM++: data of user and environment is combined with BIM.
- ⑥ Simulation: Integrated data of user and environment is used for analyzing user's task in simulation tool.

Forth, designers modify parameters of digital model or design versions recursively to reflect user's evaluation (E). A prototype is complemented by modifying the logic of IDP module. This module is associated with classification method of user's task and actuations of smart object which follows user's task. This module is changed so that overall performance is improved.

Fifth, when the existing prototype is not fully satisfied with present user's task, the designer creates a new prototype (F).

Sixth, new prototypes and modified digital versions are reflected in design warehouse (G). Design warehouse is data storage system for designer to implement a smart space which responds unpredicted conditions by utilizing digital models.

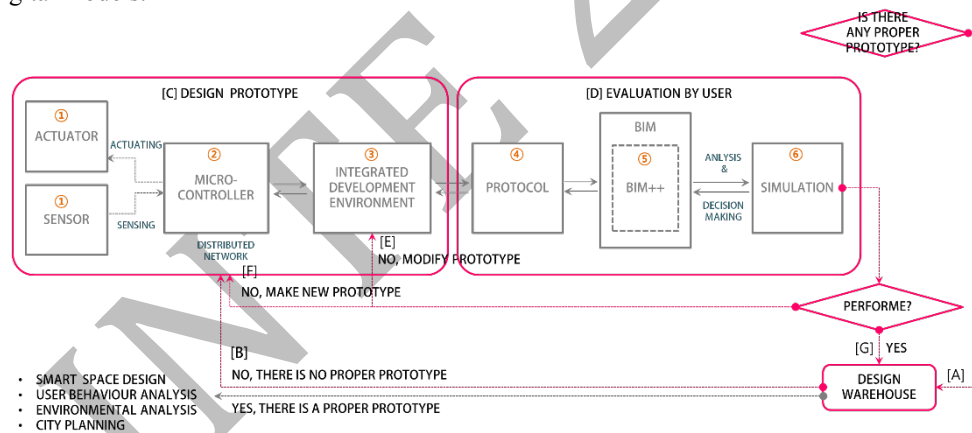


Fig. 9 Example of Framework: Prototyping with Smart Analog Model

## Conclusion

In this paper, a symbiotic model between Smart Analog Model and Digital Model was proposed. Digital Model (DM) is supports the generation of numerous and evolving design versions by applying generative parametric design and design-by-simulation methods. On the other hand, Smart Analog Model (SAM) supports prototyping by orchestrating smart building components to accomplish desired performance with the help of IoT and 3D printing technologies. This symbiotic model was for two-way interaction between SAM and DM. It allows designers to test for dynamic changes of design and complement design elements. As a smart space was defined for multi-levels of functions by controlling forms and functions of building components adapted to user's tasks, prototyping was necessary to implement a smart space design as optimum condition for user's task. Furthermore, a symbiotic model between SAM and DM was specified for implementing a smart space design. Using two-way interactions between SAM and DM allows designers to not only facilitate exploring design

versions and alternatives, but also enables pre-occupancy evaluation (POE) during the design process. And the interaction will help students understand building's response to users and environment.

In the future, design warehouse need to be developed for storing designed prototypes, searching feasible prototypes in similar conditions so that the quality of smart space design can be improved.

## Acknowledgement

This research was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education, Science and Technology (2013R1A1A2A10057503)

## References

- Calado A. V. S., Soares M. M., Campos F. and Correia W. (2013), Virtual Reality Applied to the Study of the Interaction between the User and the Built Space: A Literature Review, *Design, User Experience, and Usability 8014*, pp.345-351
- Carpo M. (2013), The ebb and flow of digital Innovation: from form making to form finding - and beyond, *Journal of Architectural Design* 83, Special Issue: The Innovation of Imperative: Architectures and Vitality, No. 1, pp. 56-61
- Cochran D., Zhao Z. and Ng Q. (2001), The role of physical simulation in the re-design of exiting manufacturing systems, Proceedings of International CIRP Design Seminar, Design in the New Economy
- International Alliance for Interoperability (2013), IFC 2×4, <http://www.buildingsmart-tech.org/ifc/IFC4/final/html/index.htm>
- Jeng T. (2009), Toward a ubiquitous smart space design framework, *Journal of Information Science and Engineering* 25, pp.675-686
- Kim S. A. (1997), On the Role of Modeling in the Education of Computer-Aided Architectural Design, *Journal of Architectural Institute of Korea* 13, No. 7, pp. 37-43
- Kim S. A. (2012), Digital Architecture and BIM, *Journal of Architectural Institute of Korea* 56, No. 11, pp. 15-18
- Lopez T. S., Ranasinghe D. C., Patkai B. and McFarlane D. (2011), Taxonomy, technology and applications of smart objects, *Information Systems Front*, pp. 281-300
- Say M. (2014), Ubiquitous computing riding the next wave, *Journal of ITNOW* 56, No. 1, pp.2-3
- Shelden D. R. (2002), Digital surface representation and the constructibility of Gehry's architecture, Massachusetts Institute of Technology
- Singh B., Pardyjak E. R., Norgren A., Willemssen P. (2011), Accelerating urban fast response Lagrangian dispersion simulations using inexpensive graphics processor parallelism, *Environmental Modelling & Software* 26, pp.739-750
- Sun L., Fukuda T., Tokuhara T. and Yabuki N. (2013), Differences in spatial understanding between physical and virtual models, *Frontier of Architectural Research* 3, pp. 28-35
- Volander M. (2014), Virtual reality for architectural acoustics, *Journal of Building Performance Simulation*, pp. 1-11
- Oxman R. (2008), Digital architecture as a challenge for design pedagogy: theory, knowledge, models and medium, *Design Studies*, Vol. 29, No. 2, pp. 99-120
- Oxman R. (2008), Performance-based Design: Current Practice and Research Issues, *International Journal of Architectural Computing*, Vol. 6, No. 1, pp. 1- 17
- Yi I. G., Kim S. A. (2012), Communication between Virtual and Physical Prototypes for Intelligent Facade Design, *Journal of Architectural Institute of Korea* 28, No. 11, pp 67-74



# Improve student success through their realities

Bani Saloua<sup>a</sup>

*<sup>a</sup>Higher Institute of Technological Studies of Nabeul, TUNISIA  
Salouabani2005@yahoo.fr*

---

## Abstract

In recent years, research in Higher Education showed that student achievement is particularly influenced by their motivation and their commitment to their studies. However, in recent years, teachers in higher institutes of technological studies in Tunisia observed among a number of students from 1th and 2nd year license economic sciences and management decreased their motivation and commitment to their studies. In 2008, with the adoption of License Master license PhD program in Tunisia, teaching modules have been integrated in the (personalized career plan, entrepreneurial culture) these curriculum modules were designed to better understand student reality. In the context of training, these modules provide a better understanding of the reality of the students and consequently improve their success. It is in this context that a study was conducted among students of 2nd year License Economics and Management enrolled at Higher Institute of Technological Studies of Nabeul (ISETN). To do this, a questionnaire and a guide of maintenance have been developed in order to examine the different components of the model of model of motivation, commitment and success proposed by Prigent et al (2009). - Model adapted from Pintrich, Schrauben (1992) and Eccles, Wigfield, Schiefele (1998). This two-pronged approach aimed to assess and better understand the perceptions of students in relation to the components of the model used, in addition to promoting their reflexivity. The results obtained in particular allow teachers to identify areas of intervention to improve the success of their students.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* Reality student, motivation and commitment, conditions for success, reflexivity

---

\* Corresponding author. Tel.: Tel.:+000000000000  
E-mail address: Salouabani2005@yahoo.fr

## Introduction

This communication is the result of a collective work by a team of teachers Department of Economic and Management Sciences in collaboration with the Director of Studies in the ISET of Nabeul. It aims to present the results of a completed fall 2013 with the main objective exploratory studies to develop a better understanding of the reality of the 2nd year students of economics and license management to identify areas for intervention improve their success. This interest in better understanding the student actually broadly follows the recommendations of the Ministry of Higher Education in Tunisia.

The first section of this article presents the context behind this research project and objectives inherent in the latter. The second sections briefly state the theoretical framework on which this study is based. The third section depicts the methodological elements that guided the collection of data from students referred. In the fourth and the fifth section, the main results are presented and discussed. The first courses of action that were identified under conditions of student success are finally revealed in conclusion.

## Background and objectives of the study

During the second year students take five courses: three disciplinary courses, technical, course data analysis and two language courses. The first four courses are compulsory and must be inculcated notions are fundamental to exercise the professions related to business administration.

Despite repeated and unequivocal about it with students' indications, we observe a decrease in recent years their academic performance in these courses. This concerns us, especially as the conditions of assessment remained essentially the same over time: a constant team teaching, course content unchanged, similar examinations, criteria identical correction.

Students also seem to us little incentive to invest in learning their future profession. They say find difficult assessments and claim lack of time to prepare the required work. Their absenteeism rate class is growing and we have the perception that they are more likely to check boxes (I finished it even though I did not understand much).

In this context, we decided to conduct a study to develop a better understanding of the reality of our students - that is to say, the relationship they have with their studies - in order to identify possible intervention to improve their success. At the same time, we wanted to find a way to make them think about their motivations, perceptions, attitudes and learning strategies.

## Theoretical framework

Before explaining briefly the theoretical framework used for this study, we consider it relevant to define the concept of success based on our thinking.

The acquisition and integration by the student or the student knowledge and skills in connection with a high-level training registering the personal project and at the same time contributing to the development of the artistic professional, scientific, cultural, civic and personal.

In recent years, research in Higher Education showed that student achievement is particularly influenced by their motivation and their commitment to their studies.

To make intelligible the dynamics underlying these two phenomena in the acquisition of knowledge in a university context, Prigent et al. (2009: p. 252) have shown in a model of motivation, commitment and success (Figure 1).

Motivation is presented as a dynamic state that has its origins in a series of internal and external determinants that drive the student to actively engage in the learning process. Prigent et al. (2009: p. 252-253) describe their model as follows: "The dynamics of the model assumes that all of these assumptions could have an impact on the level of commitment (cognitive engagement and behavioral engagement) and perseverance. In turn, commitment levels and high persistence significantly contribute to skills development and success. Finally, the loop effect, the student is constantly reviewing one or the other components of the model after every change that may affect the development of their skills and achievements. "

The components of this model form the framework of this study and associated indicators What Prigent et al. (2009) to each of them guided us in the development of our tools for data collection.

## Methodological elements

For the purposes of this study, two methods of data collection were selected, a questionnaire survey (quantitative methodology) followed by a group discussion (qualitative methodology).

### *Questionnaire survey*

As a first step, a questionnaire survey targeting 52 students in the 2nd year was conducted in early October 2013. This survey was designed to measure students' perceptions in relation to five themes: 1) curriculum, 2) factors influencing motivation to learn and commitment to studies, 3) faculty task, 4) learning strategies used and 5) skills and attitudes to business of a manager.

The questionnaire included 40 questions. The first 35 questions were formulated based on indicators identified by the authors of the model used and by Bédard and Viau (2001). The last five questions were used to collect socio-demographic data. The questionnaire was validated by the project team and has been the subject of a pre-test.

It was given to the students covered in class, after a course to ensure a good turnout. Students have previously been informed by the project manager of the objectives of the survey as well as ethical rules and participation laid down (voluntary and anonymous, confidential data processing). The participation rate was 88%, ie 46 respondents completed the questionnaire.

### *Discussion group*

In a second step, the students of the 2nd were invited to participate in a panel discussion that took place in early December 2013. This approach had two objectives: to have a better understanding of some of the results obtained through the questionnaire and encourage reflexivity students referred.

Group discussion, semi-structured type was made from a discussion guide included 15 questions. These were grouped into five themes: 1) presence in the classroom, 2) understanding of the requirements and guidance of teachers, 3) perception towards faculty task, 4) improving conditions of student success program and 5) reflexivity. This guide has been validated by the project team. Ten students agreed to take part in group discussion. Previously, the project manager briefed the objectives of the discussion as well as ethical and operating rules established. For this purpose, a consent agreement and confidentiality agreement was signed with the participants. The discussion lasted an hour and half and is subject to an audio recording.

## Results

This section presents the main results obtained in the course of the study. They were grouped into four themes.

### *Interest in curriculum and courses and perceived utility class attendance :*

The survey respondents were very likely to show their satisfaction with their curriculum. Indeed, 93% of them are satisfied with their choice of program and 78% expressed the view that the license provided useful course the reality of a business manager. However , respondents admitted that their level of interest in the subject of compulsory courses Grade 3 differed significantly from one course to another, the average ranging between 2.89 and 4.17 were obtained for each of the four courses on a scale of 5 , where 5 corresponded to a very high and 1 interest, not a high interest. In addition, nearly a quarter (22 %) of respondents indicated that they had occasionally or rarely in the classroom for their courses.

The focus group participants were invited to comment on what they believe motivated students to attend class for their courses.

They relied mainly on two factors. The first was the perceived benefit on the explanations given by the teacher during a class more students have the perception that the explanations provided in the class help to understand the material , the more he says motivated to present themselves to benefit. The second factor was the perceived added value regarding the dissemination of unique information (not otherwise available in class), as illustrated in the excerpt below:

"The teachers, who leave their examples available, say, on the Internet or [elsewhere], it is less likely to go over.

But as in the course [name of course], the examples he [the teacher] actually, they are on the board and they are not elsewhere. We tend to go in just to take those notes. "

To a lesser extent, some participants also mentioned that the fact that their presence in the classroom was important for a teacher motivated them to attend his classes.

#### *Expectations of student success and perception of their understanding of the material and working methods*

"Given a learning task , a student still has expectations for its success " ( Prégent et al. 2009 : p. 256 ) . In fact , 89% of survey respondents said they trust in general , in their ability to pass the baccalaureate and 91 % said they thought gain enough knowledge from one year to another program to complete the course .

However, respondents rated more favorably their ability to succeed each of the four mandatory that their understanding of the material in each of these courses. Indeed, respondents gave averages ranging from 3.80 to 4.09 on a scale of 5 (where 5 corresponded to very high and 1 low) when they assessed their ability to succeed in each of these courses while these averages were consistently lower (3.24 to 3.93 on the same scale of measurement) when they assessed their understanding of the material.

As expectations of student success based, inter alia, on the degree of control they believe exercise in their learning (Prégent et al., 2009), survey respondents were asked about their working methods. In a proportion of 43%, they said they had no opinion, disagree, or abstained from answering the question I consider employing effective methods of work to get my way.

On the occasion of the discussion group, so it was deemed appropriate to return to this last point with the participants and to check if they had made changes to their working methods in the session.

The participants mentioned that they prepared for the first time this session a sheet of notes (synthesis) which was authorized during certain examinations. According to many, the preparation of the score sheet has more incentive to revise all the material, compared to what they would do for a open book exam.

Nevertheless, several focus group participants agreed that, in general, their working methods could be improved.

#### *Goals of students and teaching staff evaluation practices*

A feature model of Prégent et al. (2009) is that it takes into account the social or professional aspirations of students through the future perspective of the goals pursued dimension component. This dimension " refers to mental representations is the student's future direction, including professional orientation " (p. 260).

For the survey respondents can put some light on the characteristics of mental representations they have of their future profession, they were asked to select the five skills or attitudes (Among the 15 proposed a list inspired Guide development of skills of a fire economics and management) that seemed most important to them.

The five skills and attitudes held by the largest number of respondents were:

- Judgment (74 % of respondents);
- Demonstrate a spirit of analysis and synthesis (65%);
- Demonstrate critical thinking (63%);
- Rigor and attention to detail (59%);
- Ability to work in a team (57%).

Although more than a majority of respondents believe that a good manager is a professional who is rigorous, more than a third (37%) said they were undecided or disagrees with the fact that a great teacher has stringent requirements about the knowledge and skills that focus on fundamental elements of the course. In addition, 54% of respondents said they were undecided or disagree with the fact that a great teacher is demanding in terms of learning.

Because jurisdiction is "one of the four core values of the profession», it was therefore considered essential to better understand the students' perception regarding evaluation practices of teachers. In this context, the focus group participants were asked to comment on what could justify certain practices and requirements.

From the outset, the participants agreed that being subjected to stringent encouraged them to devote more time to

their studies and deepen the course material. Some also added that the teacher evaluation practices were consistent with the requirements of the profession.

On the other side, several participants noted that the severity of some evaluation practices had the effect of increasing their stress levels and affect their balance studies - work - life.

### *Reflexivity*

According Derobertmeasure and Dehon (. 2009, p 30) , reflexivity refers to :

«The ability to think deliberately (Peters et al, 2005. De Cock, 2007, Dewey, 1933 cited by De Cock, 2007) on its own practices (Perrenoud, 2001) in order to solve problems (Hatton & Smith , 1995 ) , that is to say to improve its practical ( Tochon 1993). "

One objective of this study was to find a way to reflect the students referred to their motivations, perceptions, attitudes and learning strategies.

As part of the survey, respondents were invited to comment on the following statement: Overall, the result of this questionnaire made me think about my motivations, perceptions, learning strategies and attitude as a student or undergraduate student in mechanical engineering. In a proportion of 63 % of respondents said they agreed with this statement.

To explore the theme of reflexivity with the participants of the focus group, they were asked what they believe the best way to make us reflect on the points listed in the above statement. Several participants mentioned that while the fact of increasing the links between training and professional practice is a good way, because it would help them better understand the realities, issues and challenges of their profession.

### **Discussion**

The present study focused on two objectives. First, it aimed to develop a better understanding of the reality of students to identify courses of action to improve their success. Secondly, she wanted an opportunity to find a way to reflect these students about their motivations, perceptions, attitudes and learning strategies.

Based on the results, we can say that our first goal is achieved, since this study we, among others, allowed:

- Identify factors that could further motivate our students to attend class ;
- Learn that our students recognize that their working methods could be improved;
- Understand that if some students disagree with the rigor of certain practices
- Evaluative teacher, it could be because they have difficulty managing stress
- They cause and the resulting constraints.

We are also able to say that our second goal is achieved, since most of the majority of students interviewed in our survey expressed the view that the questionnaire developed for this purpose had been thinking about their motivations, perceptions, attitudes and learning strategies. Participants of the focus group we also mentioned that to increase the links between training and professional practice would be another avenue to consider promoting their reflexivity.

### **Conclusion**

Although we are still thinking about the follow-up to this study, we can identify some areas for action to improve the success of our students.

To promote their presence in the classroom, we will consider factors they identified in the planning and organization of our courses. To help them invest in their learning effectively, manage stress caused by our evaluation practices and reconcile studies - work - life, we will offer in the first half of 2014 PPP over more times volume. This course will in particular aim to develop skills to foster perseverance and success in school, as a good time management and stress and the use of effective methods of work. Finally, to promote the reflexivity of our students, we will evaluate future ways to increase the links between training and professional practice.

Figure 1:

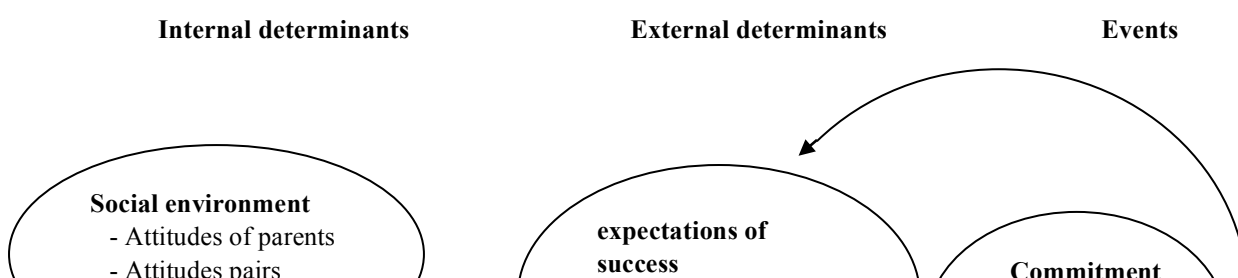


Figure 1. Model of motivation, commitment and success of Prigent, et al. (2009) - Adapted from Pintrich and Schrauben (1992) and Eccles, Wigfield and Schiefele (1998).

## References

- Driscoll, M. P. (2000). *Psychology of learning for instruction*. 2ème éd. Needham Heights, MA : Allyn & Bacon
- Dewey, J. (1933). *How we think : a statement of the relation of reflective thinking to the educative process*. Boston : Heath and co
- John R. McGarity Jr.<sup>1</sup>, David P. Butts<sup>2</sup> “ The relationship among teacher classroom management behavior, student engagement, and student achievement of middle and high school science students of varying aptitude”
- Jay R. Dee, Cheryl J. Daly, “Innovative Models for Organizing Faculty Development Programs: Pedagogical Reflexivity, Student Learning Empathy, and Faculty Agency ”
- Schön, D. (1983). *The Reflective Practitioner*. New York : Basic Books
- Wah Seng, T. (2001). Measuring practicum student teacher's reflectivity : the reflective pedagogical thinking scale. *Jurnal Pendidikan*,

# In other words: Counterdiscourses in the classroom

Nils Olov Fors\*

*Hankuk University of Foreign Studies, 89 Wangsan-ri, Seoul, 449-791, Republic of Korea*

---

## Abstract

Advocates of socially just pedagogy argue that the relationship between our classrooms and the communities we serve is crucial to quality education, and that we have a responsibility to develop socially responsive and responsible pedagogy that reflects the interests of all members of our communities (e.g. Deleuze & Guattari, 1987; Giroux, 2003). An important part of this task is to include historically underrepresented groups and to construct counterdiscourses aimed at resisting marginalizing forces in dominant mainstream discourses (e.g. Anzaldúa, 1987; Shin, 2006). This paper describes two courses designed to integrate “other” voices and perspectives in the classroom and to incorporate “other” knowledge in the existing curriculum. The paper outlines the framework for community-oriented teaching on which the courses were based, and presents strategies for including, and thus legitimizing, a greater variety of identities, perspectives, and knowledge in the classroom and the curriculum. The paper also discusses reactions to the courses from students, teachers, and members of the community, and considers implications for education research and teacher training.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

1. *Keywords:* Critical pedagogy; Second-language pedagogy; Social justice.

---

## Introduction

Pedagogy can be understood as a discursive process by which the world is put into words; in this process, social realities, messages, and voices are privileged or marginalized, amplified or silenced, included or omitted. As critical pedagogues have shown us, there is no neutral pedagogy—as teachers, we are involved in a political act (whether we are aware of it or not) that has consequences far beyond the classroom. By choosing what to teach and not to teach, we contribute to the community perception of what knowledge is of most worth and whose knowledge is most important. That means that we have a responsibility to consider how the representation of knowledge in our

\* Corresponding author. Tel.: +82-31-8020-5511

E-mail address: olafpep2008@gmail.com

classroom affects the social stratification of our community, and to examine the relationship between knowledge, power, and education.

In this paper, I discuss ways to increase critical awareness of the process of representation in classroom discourse and present strategies for including, and thus legitimizing, a greater variety of identities, perspectives, and knowledge in the classroom and the curriculum. Following a brief outline of the theoretical foundation of socially just pedagogy and counterdiscourses, I describe two courses designed to integrate “other” voices and perspectives in the classroom and to incorporate “other” knowledge in the existing curriculum, and I summarize student and teacher reactions to the courses.

## Socially just pedagogy

The basic premise of socially just pedagogy is that education is a process of social construction by which communities are structured and social identities formed. Advocates of critical pedagogy argue that the relationship between our classrooms and the communities we serve is crucial to quality education, and that we have a responsibility to develop socially responsive and responsible pedagogy that reflects the interests of all members of our communities (e.g. Deleuze & Guattari, 1987; Giroux, 2003). According to Freire (2002) and Giroux (2003) such pedagogy should recognize socioeconomic contexts and consequences, address and foster community resilience and social equality, and be transformative.

An important part of developing socially just pedagogy is to include historically underrepresented groups and to construct counterdiscourses aimed at resisting marginalizing forces in dominant mainstream discourses (e.g. Anzaldua, 1987; Shin, 2006). Critical pedagogy “aims to understand, reveal, and disrupt the mechanisms of oppression imposed by the established order, suturing the processes and aims of education to emancipatory goals” (Grande, 2007, p. 317). Socially just pedagogy is inclusive and reflects the interests of all members of the community; ultimately, socially just pedagogy aims to promote community values and practices in order to empower the community and its members and reduce inequality.

### **Discourses and counterdiscourses**

Pedagogy is discourse that constructs and valorizes the objects of its study and the concomitant social reality—teachers tell the world in words that reflect their values and beliefs. Discourse is the “fundamental medium for action [and] the medium through which versions of the world are constructed and made urgent or reworked as trivial and irrelevant” (Potter & Hepburn, 2008, p. 29). Since there are multiple and at times contending discourses, not all social realities get told in the same way, and some rarely get told at all. Dominant discourses (re)construct social structures and perpetuate a status quo that serves the interests of those discourse communities, often at the expense of less powerful members or discourse communities (e.g. Illich, 1971; Giroux, 2003).

The relationship between classroom discourse and the community creates a critical imperative to tell, and to tell differently. Advocates of critical pedagogy (e.g. Anzaldua, 1989; Illich, 1971; Shin, 2006) argue the need to construct counterdiscourses, i.e., other ways of telling that resist marginalization and oppression, and that integrate a broader range of perspectives and identities. Unlike dominant discourses, which tend to promote the interests of a single, often elite, minority, counterdiscourses are designed to perform discursive work that benefits all members of the community. Practically, this involves including historically underrepresented members of the community, constructing and valorizing community knowledges, and empowering members of the community through collaboration and discourse.

### **Counterdiscourses in the classroom (1): Including “othered” language**

The first course discussed in this paper was an undergraduate Linguistics course for students in a language education department. Traditionally, such courses focus on high-status discourse communities and the language use of the elites. External norms are adopted to construct language and language use; these norms are then used to examine and discuss language and language use in the community as well as in the classroom. The content, as well as the analytical and observational models, are derived from traditional academic and professional canons developed in high-status contexts.

In the course discussed here, the mainstream curriculum was expanded to include the language use of “other” discourse communities. This was done through readings and discussions that introduced the discourse communities and, to the extent possible, the language use of the members of the communities. The readings and discussions revealed not only what aspects of the discourse communities were made available through the mainstream discourses, but also what aspects or features were omitted or silenced. Most notably, the students quickly identified a near-total absence of positive information about the language use of less powerful communities (e.g. whereas it was easy to find information about the language use of privileged discourse communities, such as airline pilots, it was very difficult to find information about the language use of marginalized discourse communities, such as migrant workers).

Another strategy used in the course was to use “other” community resources to generate knowledge and develop analytical frameworks (this was done in part to examine how/if more inclusive discourses could be constructed as alternatives to the mainstream discourses). In order to identify and explore community language use, students conducted a “linguistic landscape” study of their community in collaboration with students from another country. The joint study documented a much broader range of language use than that allowed by the mainstream discourses, and the contrastive analysis of the two communities enabled the students to recognize transnational, functional language use that went beyond the traditional language models the students usually encounter in language and linguistics classrooms. In addition, students were asked to conduct informal interviews with their grandparents to document alternative perspectives on language and language use on the community. The informal interviews were then integrated with the students’ analysis and discussion of language and language use in the course.



After completing the course, the students expressed greater interest in the language use of different groups in their local communities. They realized that the language use of their community—including their own language use—could serve not only as a resource for learning about language and language use, but also as a necessary and useful component of their professional expertise and practice. The students recognized, however, that such language use was constructed as “other” language use and marginalized or even punished in many mainstream discourses and testing and evaluation, and would thus need to be reconstructed and introduced as valid, legitimate language use. The students also expressed a greater sense of pride in their own language use and the language use of the community, and commented that they appreciated the opportunity to treat the language use of their community as a resource rather than as a burden or problem.

The teachers reported having found more opportunities to discuss different aspects of language and a greater range of language functions in the community. Students and teachers both stated that the course increased their awareness of linguistic diversity in the community, and that the course revealed gaps in their knowledge and understanding of what language was used in the community and how it was used.

### **Counterdiscourses in the classroom (2): Centering practice**

The second course discussed in this paper was a course for graduate students in a TESOL/ELT program. The course was designed to shift the traditional focus on research developed and published in centers of power to research and discourses found in centers of practice; in other words, the course attempted to integrate research and practice of and by the community (a center of practice) into a curriculum based on research and practice developed in contexts privileged by the professional and academic discourse (centers of power). By doing so, the course also aimed to address the resulting uneasy relationship with the community, where the concept of service often gets reduced to teaching or helping, and where the discourses and practices of the classroom often are detached from other discourses in the community.

In the course, the graduate students participated in online collaboration projects with peers from other countries. The purpose of the projects was to reconstruct and revalorize indigenous knowledge and to reposition “other” knowledges and practices in relation to the curriculum (Johnson, 2006). The students began by discussing readings about the relationship between research in different contexts, and then developed discussion questions based on their own teaching context. Initially, the discussion questions were general, but as the project progressed the discussion became focused on issues specific to the respective contexts. Based on the discussion, the students designed small research projects aimed at gathering data or information to complement extant research. The discussions and the results of the small research projects were used to formulate tentative objectives for practice and further research. The students also drafted materials and texts to be used in the different contexts.

Many of the graduate students who took part in the courses expressed a need for a better understanding of how they could contribute to their own community and what role(s) they could assume in addition to the rather limited “researcher” or “teacher” roles constructed by the existing curriculum. The teachers also identified a need to integrate “other” knowledge in the curriculum, and to complement the curriculum with data and materials developed in the process of learning. Both the students and the teachers found that they had limited understanding of how classroom practices align with community practices

### **Conclusion**

The two courses described in this brief article suggest that it is both necessary and possible to introduce “other” voices in mainstream classrooms and to integrate “other” knowledge into a mainstream curriculum. By constructing and empowering alternative accounts and counterdiscourses in the classroom, students were able to shed light on the limitations and marginalizing forces of the mainstream curriculum; rather than causing the students to reject the mainstream curriculum, the construction of counterdiscourses led the students to assume greater responsibility for the implementation of the curriculum and to develop alternative outcomes consistent with the objectives and principles of the curriculum.

The course discussions and the reactions from the students also suggest that, despite the vast literature on education in general and language teaching in particular, there is a significant need for education research that takes its cue from the immediate community rather than from already privileged centers of power. The undergraduate students’ linguistic landscape study and the graduate students’ research projects produced data and evidence that was different from what is found in mainstream research, thus indicating a need for “other” research in the communities. Such research needs to be critical, meaning it should serve the community, and position research as community resource and the community as resource for research. Finally, the comments

from teachers and students suggest a need to equip future teachers with administrative and organizational skills that will enable them to act as community organizers and leaders. Such empowerment is necessary if teachers are to fulfill their dual roles as educators and researchers and develop and deliver socially just pedagogy.

## References

- Anzaldua, G. (1987). "How to Tame a Wild Tongue." *La Frontera/Borderlands*. San Francisco: Aunt Lute Books, 1987.
- Borg, S. (2003). Teacher cognition in language teaching: A review of research on what language teachers think, know, believe, and do. *Language Teaching*, 36, 81-109.
- Creese, A. (2002). The discursive construction of power in teacher partnerships: Language and subject specialists in mainstream schools. *TESOL Quarterly*, 36(4), 597-616.
- Dogancay-Aktuna, S. (2006). Expanding the socio-cultural knowledge base of TESOL teacher education. *Language, Culture, and Curriculum*, 19(3), 278-295.
- Freire, P. (1970/2002). *Pedagogy of the oppressed*. New York: Seabury Press.
- Grande, S. (2007). Red Lake Wobegone: Pedagogy, cecolonization, and the critical project. In P. McLaren & J.L. Kincheloe (Eds.), *Critical pedagogy: Where are we now?* (pp. 315-336). New York: Peter Lang.
- Illich, I. (1971). *Deschooling society*. New York: Harper & Row.
- Johnson, K. (2006). The sociocultural turn and its challenges for second language teacher education. *TESOL Quarterly*, 40(1), 235-257.
- Johnston, B., & Goettsch, K. (2000). In search of the knowledge base of language teaching: Explanations by experienced teachers. *Canadian Modern Language Review*, 56(3), 437-468.
- Kumaravadivelu, B. (2003a). A postmethod perspective on English language teaching. *World Englishes*, 22(4), 539-550.
- Pennycook, A. (1989). The concept of method, interested knowledge, and the politics of language teaching. *TESOL Quarterly*, 23(4), 589-618.
- Potter, J. & Hepburn, A. (2008). Discursive constructionism. In J.A. Holstein & J.F. Gubrium (eds.), *Handbook of constructionist research* (pp. 275-293). New York: Guilford Press.
- Ramanathan, V., & Morgan, B. (2007). TESOL and policy enactments: Perspectives from practice. *TESOL Quarterly*, 41(3), 447-463.
- Shannon, P. (1990). *The struggle to continue: Progressive reading instruction in the United States*. Portsmouth, NH: Heinemann.
- Shin, H. (2006). Rethinking TESOL from a SOL's perspective: Indigenous epistemology and decolonizing praxis in TESOL. *Critical Inquiry in Language Studies*, 3(2, 3), 147-167.

# In the shade of performance

Barbara Di Blasio <sup>a</sup> 106

<sup>a</sup>*Institute of Educational Sciences, University of Pécs, Ifjúság u. 6., Pécs H-7624, Hungary*

---

## Abstract

Interdisciplinarity is the interaction of disciplines, during which real transition takes place between disciplines, crossing the boundaries. The theoretical framework that evolves can be regarded as a theoretical web, behind which, in our case, the world of social theater can be discovered. With describing the interdisciplinarity of social theater several researchers and theories become the center of attention, who and which meet, interact and fall into oblivion at certain points. In social theater we approach the human being in a holistic way. We face a paradigm, which offers support to social groups, and individuals who are struck by the crisis of fragmentation. This holistic approach combines the individual features with being distinct from others. Performance is an opportunity not only for deep encounters with the crises of our existence, but also for breaking out of these crises. It is an intermediary method between groups and cultures, with specific methodology. In this essay we will explore the narrative approach to prison theater as a specific manifestation of social theater, behind which ontological questions and cultural phenomena lie.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* social theater; prison theatre; interdisciplinarity; dialogue; life story; interculturality; performance-based research

---

## What takes place in the shade of performance?

Our research is a participant research, which combines the relevant theories and results of humanities and social sciences, without striving for completeness. The focus of our encounters, from the point of view of social theory, is the examination of the phenomenon of how individuals define themselves in life-like situations, which are offered to the young people by the reality of social theater in our case. The decisions and self-definition in our roles in the social theater are influenced by a series of acts and different perceptions, just as much as in our real social roles. Our research contains involving juvenile offenders at the Pécs Institute for Regional Juvenile Prisoners. In our prison theater, which is a manifestation of social theater, we are working with concepts and in context similar to Augusto Boal's theater of the oppressed, to applied theater or to the theater for development with the critical approach that we only partly identify with Boal's original concept. In our case, with the individuals leading a criminal lifestyle, our goal cannot be the support of "the struggle against social injustice". We do not act against the "judgment of the unfair society" with the prison theater; rather we undertake the performance-based preparation for a conscious lifestyle, while entertaining and developing at the same time. Our goals include improving the situation awareness and self-knowledge of the juvenile delinquents. According to our preliminary assumption, being active at the prison theater is able to support the young people's reintegration into society and avoidance of their accidental recidivism by the fact that, with continually carrying out reflective work in their roles, their personal and social competences are improving. It is the creation of performances that takes place in the theater.

Social theater, as a method includes various practical activities, actions and series of animations. It is close to social sciences, ethnography and cultural anthropology. With the help of theatrical interpretation, the cultural actions that characterize cultures and subcultures are embodied in the performance (Alexander, 2004). In terms of research, the formation of the performance is also the nesting of cultural elements, the accumulation and systematization of data. The performance-based approach to the research is a qualitative methodology, in which the participation of the researcher is inevitable. In our case, performance is mostly a tool for interpretation, with the help of which the cultural elements and stories of the everyday life become more comprehensible for both the "actor" and the "audience". It enables experiencing life in different, unusual dimensions. During the

---

<sup>106</sup> Corresponding author. Tel.: +36-72-503-600,24684  
E-mail address: diblasio.barbara@pte.hu

performance the participants are performers of meaning-making and sharing, at the same time they accumulate experiences by and during social interactions, and, as one of the most important momentums, they can reach the state of complete involvement. The subject, form and effect of the performance can also be the subject of the investigation. Achieving an artistic effect is not always an objective, because the aim depends on the environment in which the performance is created. The most significant manifestation of the effect is raising the interest in the other person, which will ensure the success of social interactions. The performance offers the pleasure of social and individual discovery, the possibility of cultural cognition.

Our performance-based research has not been concluded yet; therefore, we do not undertake to formulate final findings within the framework of this study. However, our observations suggest that the work at the theater has a significant effect on the social and cognitive development of the juvenile delinquents. As a result of the work that has been going on for several months, the group experience and carrying out tasks that require close cooperation has brought about massive transformation in mostly the behavior and the mutual relationships of the young people. Our group cannot be considered as culturally and linguistically homogenous, but we have found such a common life-story node that, when performed, will bring a set of social and individual conflicts close to the audience and receivers. This topic is the gipsy wedding and the abduction of the bride, in the procession of these mainly musical ways of expression dominate combined with episodes from life stories. The specific dramaturgy requires attunement and an authentic mode of performance, since there are no other additional tools in the prison theater. The script is based on the youngsters' own texts, and in the acting certain levels of self-exploration are manifested. Our primary sources, on which the dramaturgy is built, are gipsy folk music, folk dance and folk songs. The different levels of the knowledge of this cultural heritage is what enables the theater group to function, namely, the members of the prison theater are always changing as a result of serving their prison sentences and being released. The context of the performance is what provided relative stability to our meetings. The topic organizes the event.

The location is not ordinary either, because in the prison a different, sometimes irrational reality works, which is closed away from the world. The prison, with its expected and realized rigid system of rules, makes an impact on the personality of the convict, altering it. Observing the rules is an important and irrevocable foundation in the world of the institution. Some of these rules force the inmate into real or quasi self-surrender. The paternalistic institutional surroundings do not offer anything in return for the surrendered or oppressed parts of identity. The juvenile convict is left alone on the way designated for change. There are no alternatives of choice and no suitable companions. Most of them do not possess patterns for how to manage in the outside world without crime and causing damage. Nothing discourages the insatiable desires and the aggression inherent in them.

That way, theater and performance become methods, in which the theater gives space to more formal, while the performance gives space for freer methods of expression. It is not necessary to separate the two concepts if their modalities are familiar to us. The theatrical acting becomes crucial for the individual in the prison; it has a socializing function. It is of great importance that the procedures of the theater are motivational and provide space for self-expression. It offers its free space and theatrical liberty in contrast to the confinement in a physical and many times symbolical sense, thus favoring the workings of the fantasy. However, this work cannot be explosive, cannot yield to the aggressive fabrications, gradation is essential. There is a great emphasis on expressing emotions and on adaptation. Performance, which is rather a series of collective actions, does not support excessive individualism, individual dominance and introverted behavior. The conscious acts related to the roles help in distancing the unpleasant emotions originating in prison-life, in discovering new, even unknown forms of life, compassion and cooperation come to the front during interactions. In case of juveniles, playing and role-playing has a great function in decreasing auto aggressive manifestations and vapours due to confinement. The convicts, mainly via their body, express themselves by forms of movement, dance, behind which complex mental processes take place. These internal experiences help the youngsters to deal with societal stigmatization or with the survival of the prison life, even if only temporarily. Theatrical actions may bring relief. The meaningful scenes could not come into existence without mental processes, which contribute to the apperception of imprisonment, to relieving the anxieties caused by confinement and timelessness. The negative effects of the outer world urge counter-actions. Expressivity and reflexivity support the reformulation of the individual's interpretations of reality, the change. The permanency and tightness of physical space can be re-evaluated with the involvement into the scene of the performance and opening the space. Involvement is marked by those moments that are connected to the convicts' awareness and experiences of their bodies. When the conventional manifestations are taken over by individually formed movement, these will be more bravely followed by the reinterpretations of the scripts of the texts (Meldolesi, 1994). That way the scenes of the performance come to existence, which are the here and now manifestations of the convicts. At/with the prison theater we face such human events and phenomena that deserve recognition. Theater, with its indirect effects, brings out the stories of the individuals from the dark. Darkness can have the following meanings: forgotten story, events that so far have

not been realized, unreflective stories, hidden or changed episodes, etc. Within the limited space of the prison there are limitless quantities, atmospheres and ranges of stories that are the prisoners' own. Working with these stories is beneficial from several respects.

The prison theater builds upon the expressive power of the individual, be it of mental or physical origin. Besides the expression of the thoughts and inner emotional contents, the building blocks of the theater are the physical gestures and movements towards the other person. The theater calls forth the individual creativity of the closed, isolated individual, which is often not even known to the person concerned. The convicts prone to deeply underestimate their own cognitive abilities, and this is reinforced by their experiences at school. But the success of the performance depends on the abilities of the individuals or the development of these abilities. The development designates the road to success, and moving along this road is a shift towards self-knowledge and self-esteem. The catharsis brought about firstly by recognizing the abilities, secondly by the artistic achievements. The performative acts are many times not created for performance; they remain the expression of the inner group experience, exclusively for the participants.

To complete the picture, however, in addition to the positives we should mention the negatives. Getting back to normality only for the time of the theatrical activity poses great difficulty to both the leader and the convicts. The shift of perspective is not easy; initially it puts tension on the individual or on the group. The prison's system of impact and system of rules work against recollection, dialogue, culture, and what is more, mother tongue. As opposed to this, the theater becomes what it is by mobilizing these elements. Another is "empowerment", the problem of enabling. The abilities and impulsive exhibitions are inevitably effaced, because the fundamental of the relatively conflict-free existence is that the individual should be transparent, should not make a stir among the others. The best strategy seems to be that the individual emphasizes the lack of abilities instead of their existing abilities. Contrarily, the theater demands adequate impulsivity and immediate reflective reactions from the actor. The theater desires to "empower" the person, to authorize them to adequately confront the challenges in the civil life and to become socially recognized as capable to act, to be able to make appropriate decisions about their own lifestyle. This transition is remarkably difficult. The problem-free change can be the result of a long learning process.

Active theatrical work invisibly steals into the hidden realms of our personalities, it has makes impact on us through indirect channels. The masks of the people that they have inherited from their ancestors or have developed during their lives hide the real self of the person, and most of the time they even deprive them of recognition, revelation and the ability to converse into the authentic existence, which is emphasized by existentialists and philosophers. Social theater does not give physical props into the hands of the actor and does not build scenery around the drama, but is offers a subjective range of opportunities, perhaps an insight behind the masks. The basis of experiencing drama is offered by the variety of life. The naturally perceptible masks and disguises originate from the human nature of the actors, the atmosphere of the audience creates the scenery. The bodies of the actors form the theatrical props. The movements, the vision and state of the body, the sound and light effects collectively become the props. In this theater hat is meant by achievement is the degree of transformation, or just the promise of it. Social theater, prison theater is about the person, it sends a message to people and gets into contact with the outside world through the personal abilities. It operates in the special world of human communities. In this peculiar world strange questions arise in connection with the theater. The needs are defined by the youngsters' necessities and susceptibility.

Social theater is particularly the world of marginalized masses; its emergence is not in the least the product of the twentieth century. As a result of the enlightenment, the desacralization of the world, the transformation of the culture and the primitive democratization of societies begun. These complex societal movements inescapably helped the emergence of the social theater in Europe. The fact that the early prison theater turned to the isolated masses even centuries ago can be originated from the concepts of the enlightenment. Studies of theater historians shed a light on the fact that Denis Diderot operated a prison theater in his time. Later, of different motivation, with artistic and entertaining pursuits (against indifference), Fyodor Mikhailovich Dostoyevsky also set up his theater in the camp while he was in exile. In the world of the theater, the beginning of the twentieth century is the time of turning, when besides the traditional theatrical exhibitions the recognition of theatricality appeared, as a fundamental value of the theater of the future. This is the time of theatrical utopias, high-impact theories of theater. The pioneer age is followed by more ages, on different basis.

While the great theatrical revolution of the 1950's-60's, which was ideologically highly influenced by politics, advocated the emancipation of the oppressed masses, the theater of the 1990's tries to ease the cultural deprivation and the consequences of social segregation caused by poverty, by giving tools into the hands of those in need. Social theater, as a democratic institution, as an advocate of interculturality, speaking to the hidden

members of society, is building a bridge between social groups torn apart from each other. It offers relief to the tensions and constraints emerging between groups and individuals. Today social theater or community theater is a performative practice which has a role in the construction of human relationships, it is the source of creativity, and offers a wide range of tools that help the individuals in communication and gaining experience. One of its main functions is to trigger change and to change. It mobilizes individuals and communities to face their needs and to conquer the frustrations that typically derive from feeling unwell. It offers such situations to the participants in which it stimulates cultural conflicts, but at the same time it also compels to mutual tolerance towards each other.

### **Meetings at the prison theatre**

During our work at the prison theater, university students and juvenile delinquents work together on a weekly basis. These occasions are the meetings of the convicts, the students and the researcher, during which we collaborate in preparing for assembling and performing a performance. We interpret and live teamwork and the developing process of the performance as real intercultural encounters. Taking place in the performance and the numerous activities connected to it develops interpersonal and social competences, while it widens the range of concepts of the young convicts, it also helps in their communication and in forming their opinion. It sets them on a road where they show greater understanding towards other people, they view themselves and the others in context with the things around them, and they live through the deeper meanings of the encounters, while they put together the mosaic of their lives.

The following parts of the essay deal with the theoretical net that can be regarded as the scientific background to our work. We will highlight those theories that have an effect on the design of our scientific activities. We believe that the young people's choice of values is characterized by several societal impacts and, among others, the accelerated perception of time. We have little influence on these impacts, but looking behind the problems concerning young people, we are looking for the frameworks for the usability of the community social theater. Location, the needs of the participants and the interest of the researcher can be detected in the selection of the basic elements of the theoretical net.

### **Meeting our own story**

In social performance there is a possibility to re-order the stories of the individual, therefore, to create the coherence for life, to shape personal identity. Story-creation is a way of structuring our experiences in time. Our story is created by time, because our life, about which our story is, is inseparable from time. Narrativity and temporality are closely connected to each other (Ricoeur, 1980). Temporality is the structure of our existence, for which language gives a possibility of expression in narrativity. With the words of Bruner (Bruner, 1987), there is no other possibility for us to write down and to preserve the time lived by us but the narrative. Polster (Polster, 1987) expresses the relationship between the story and the person: "When an old man dies, it is like the burning of a library." According to Peter Berger (Berger, 1963) sociologist "we have as many lives as many points of view we watch our stories from".

We have plenty of stories, which we can organize into topics, but the widest must be the group of fiction (Randall, 1997). One part of our stories remains forever untold. Over the years, we color the stories several times told, we diversify them. We pick form our stories according to the situation, the audience, and the culture. The versions of our life stories are in connection with each other and they mix. We can find intrapersonal and interpersonal, what is more, institutional stories among our narratives. One part of the institutional stories is organized around the family. Family itself is a collection of stories. Moore (Moore, 1992) has an interesting approach: when we talk about the family, we talk about characters and topics, which together shape our identity. The family, which seems to be so concrete, is always an imagined reality. McGuire's idea (McGuire, 1990) is that: „Those who don't know our narratives, are not a part of the same world we are in." Our institutional stories can also mix, they are embedded in each other, like this: the story of the family with the city's, the city's story with the country's or nation's and finally the totality of the stories make up the story of the world (Hall, 1982).

According to anthropologists and sociologists there is a complicated system of relationships between culture and the people who live in it. McAdams quotes the thoughts of Ruth Benedict, according to which „the persons are the microcosm of the culture in which they live, and culture itself is the person in the widest sense..." (McAdams, 2006). Psychology-conscious anthropologists emphasize today, that culture is not the unity of random groups, but in the given culture groups exhibit particular coherence and organization. Their stories contain common elements; they mutually share the stories with each other. The culture of the predecessors is

inherited to the group by the stories. On this basis, therefore, such social factors (games) may come from analyzing life stories that may play a significant role in who a person claims to be and how they act.

Getting to know the stories of the young people we find that they are living in a culturally and linguistically diffuse world, their familial relationships are disordered, and the prison environment further undermines this. These factors collectively make young people's identification and their change of lifestyle difficult and complicated. However, the diffuse cultural impacts also affect university students, they are not negligible in the case of their personality development. In the performance the not usual, dialogic interpretation of own stories creates the coherence of the life story.

### **The social sources of identity, the development of self-esteem**

Among the effects of social theater on the person we must mention the essential thoughts of G.H. Mead (Mead, 1973), mostly concentrating on his relationship to the newer theories of self-esteem.

According to Mead, persons have such a part of their identity, besides their reactive self, their subconsciously reacting part of identity, that is of sociological origin and it represents the general other. The general other represents the norms of society and affects the self as a result of interiorization. The general other is not equal to the significant other person. The general other is a model built with the help of the lived experienced. The structure of the model is what, according to Mead, enables empathy and that a person can play different roles, that they can place themselves in other roles, and they can view themselves in this respect.

Susan Harter (Harter, 1999) agrees with the opinion of Mead. One of Harter's most significant researches carried out in connection with young people is the one dealing with the development of children's and youngsters' self-esteem (Johnson, 2004). The novelty of his finding is that it shows that our self-esteem is increased by those successes that we personally consider important. This is of great importance for us in the performance.

According to the modern socio-cognitive perspective, the process aimed at the self's psychological surviving is called self-regulation. An important part of self-regulation is self-esteem; its essence is that the individual thinks different things about themselves. The individuals see themselves as object, to which they attribute value. Self-esteem is an elusive concept, but it can be observed in our everyday actions and decisions. The development of self-esteem shows a strong connection with the parenting style of the parents, the palpable impacts of which become apparent in adolescence. Self-esteem is the basis of a lifestyle that is socially beneficial and effective. Self-regulation and self-esteem is of great importance especially in relation to violence and aggression. It is a known fact that violence is taking up more serious forms and the perpetrators are getting younger. Researches dealing with abuse and self-esteem have shown that abuse is always a part of a greater social drama. This greater social drama has projections on an individual's life stories, from which details taken out, reinterpreted, reflected on for example in performance, may have a socializing function on the development of personality from point of view of self-esteem and self-regulation. The performance, besides the idealized self-image, gives space to a more realistic self-image, and may build the confidence in the self, which is the basis of self-esteem. Ultimately, as a guiding principle of our existence, our goal is to increase our existential self-esteem. It is highly important for our existential self-esteem that we take responsibility, that we have substantial choices (decisions) based on our judgment, that we are able to stay alone, that we can understand our own feelings and motivations. It is likely in the case of convicted young people that the development of these processes got stuck at the early stage of personality development.

We supplement our qualitative research with tests as well, for a more complete understanding. We have come across a few relevant quantitative data. On the Kopp Dysfunctional Attitudes Scale the juvenile convicts' need for outside approval and their demand for performance are strikingly high. On the Oláh Psychological Immune System Questionnaire the feelings of coherence and growth show remarkably low rates compared to the standard. Therefore, the data confirm the above discussed, namely that it is required to give the convicts such a space where their self-esteem can be created by the development of their competences, and at the same time, by telling and performing their life-stories they can create the coherence of their personal life.

Erving Goffman's research shows that our usual everyday interactions are much less spontaneous than we would think so. The person creates an image of themselves via their communal social interactions, and they strive to maintain this image. Self-images are on the one hand individualistic, on the other hand collective. Every communal social group develops its own self-image collectively also, to which the members have to adjust. The given community guards the maintenance of this image jealously. Observing the interactional rites stabilizes the connection and the self-image. "One's (self-made) image is sacred thing, and the expressive order required to

sustain it is therefore a ritual one.” (Goffman, 1961) Rite is in the service of the sacred. The image, the self-image appears as an important part of the personal identity, which is cultivated-strengthened or weakened-destroyed by the communicative, ritualized interaction.

Another significant part of the work of Goffman is also closely connected to our work. Goffman wrote about the cultural “ceremonies” of the prison, as being group therapy, open house, prison theater, education, sports within the walls, religious events. The ceremonies undertake the implied liberating task during which the guards and the prisoners can get rid of the “prison masks” they usually wear. These masks are necessary for the prisoners and their guards to live together. During these occasions the prisoners are given freedom to a certain extent; freedom in the workings of fantasy, in the resistance, in showing illusory independence against the prison’s repressive effects. The permission of the (symbolic) distance between the guard and the convict is not unintentional, for during this time the management of the prison can strengthen its power by decreasing the possibilities of conspiracy and mutiny, exercising the control functions in the background (e.g.: cell search). That way the cultural events of the prison are not only the locations forgetting relief from the personality distorting pressure, but also the latent server of the institution’s control functions.

## Conclusion

In the new theater overcoming the actor’s inner and outer boundaries, the deeply lived theatrical performance are conceived as central questions, because the ontological questions behind the theatrical experiences originating from the physical body are effaced, 107 while the mind and the body are inseparable. The theatricality of the body is manifested the most successfully when the actor, the creator arrives to the border of inauthentic existence. The inner maturation processes cannot take to a positive direction without so-called ontological grounding. The human world is a network, where the experience of our existence is related to the transcendental world inside and around us. The exercises of the experience of the physical body are simultaneously the exercises of ontological recognition. The body image, the body awareness, the body scheme, the human consciousness and self-reflection, creativity, the abilities and self-esteem collectively create the human reality.

The uniqueness of our narrative work in the prison can be observed in the ontological part, in which the emphasis is on the dialogues. We build upon the tradition that says that the theater itself is our existence. It is the theatricality where the thought comes from that the human being always plays roles and connects to the cultural traditions via rituals, and the social acts are expressed in theatricality. For us the theater is in the focus of investigation not from an aesthetic, but from an existential philosophical and anthropological perspective. We view it as a possible way of getting to know human nature and culture, as a possibility for communication and development.

The young people in the prison confined to criminality from the most disadvantaged social groups. The lifestyles of their dysfunctional families mediate wrong value judgment to the young people, in which mimetic imitation plays an important role. Marginalized groups are necessarily removed from the system of rules of the society into the peculiarly interpreted, incorrectly formed environment that is not usually characteristic of the communities of civil society. The person liberated from the rules of society, gone astray in the diffuse flow of information lives in severe deficiency state. The traditional cultural heritage, the rules, the abilities, the lack of recognition undermines the young people’s social orientation, their successful adjustment to the adult world. The edge offers a limited horizon for the individual, in which meeting with the differences has a the highly frustrating effect, and these frustrations, as a result of improper socialization, influence the young people towards a deviant direction, and these young become victims of their own destiny, they drift easily into the sultry world of prison.

Social theater based on the life story is a meeting possibility supporting interpersonality and intersubjectivity. There always remains an unsolved problem in society, namely, how to implement the cooperation of people amidst weakening traditional myths and rituals, in order for the cultural survival of generations. However, in the dialogues of social theater, in addition to the traditional ones, it is possible to revive new myths and develop new rituals that adjust to the needs of today’s people today.

It seems that a way of our existence is really the theatrical acting and the related forms of human expression. The performance-based research contributes to this to a large extent, because it studies the people and the subject

---

<sup>107</sup> Franco Basaglia from Trieste is one of the few people who dealt with phenomenological and existential questions in connection with social theatre. Franco Basaglia (1924-1980) was an Italian psychiatrist and neurologist. His peculiar theatrical initiative dates back to 1972-73. He took theatrical plays close to the mental patients of the psychiatry who were locked up for years. He played an important political role in representing the groups “fated to silence”.



in a complex system of relationships, and immediately analyzes the situation. The resulting performance is a cultural snapshot, to which the traditions found in it, embraced by the global social impacts give a particular mood. Using the idea of Maximilian Voloshin, the illustrious figure of Russian theater theory, for him theater is a dream without images: insight into the dark.

However, the identity-shaping function of social theater seems to be better appreciated, at the time when, with the impact of mass culture and the media, the mixing of cultures has an unstoppable effect on the life and the choice of values of the everyday person. Social theater lends space for the orientation in the surrounding and sometimes engulfing chaotic world, where a critique of the status quo can be formulated in general or partial. The theater socializes with its specific set of tools, the dialogues, while playing a role in shaping the individual who takes responsibility for their decisions. In this transformation the individual moves toward being authentic, in which the mother tongue, gestures, body conscious behavior and the social experience plays an important role. The life story-based events of the performance vivify the forgotten cultural and community traditions.

As a utopian desire, the ultimate aim is to awaken the consciousness of the individual and the masses, which is rooted in Paulo Freire's critical pedagogy.

In our study we have presented some segments of the effects and benefits of prison theater, putting the emphasis mainly on the opportunities of performance-based research and philosophical fundamentals. We do not regard prison theater as psychoanalytic preventive method, because it is not its main purpose. But what do we consider it? This is surrounded by uncertainty, because its internal mechanisms are poorly explored and understood.

### Acknowledgements

This research was supported by the European Union and the State of Hungary, co-financed by the European Social Fund in the framework of TÁMOP-4.2.4.A/2-11/1-2012-0001 'National Excellence Program'.

### References

- Alexander, B. K. (2004). *Performance ethnography and inciting of culture*. The Sage Handbook of Qualitative Research (Denzin, N. K. & Lincoln, Y. S. (Eds.). (3rd ed.). CA: Thousand Oaks, Sage Publications.
- Meldolesi, C. (1994). Immaginazione contro Emarginazione. *Teatro e Storia* 9. 1, 64-66.
- Ricoeur, P., (1980). Narrative time. In W. J. T. Mitchell (Ed.), *On narrative* (pp.165-166). Chicago: University of Chicago Press.
- Bruner, J. (1987). Life as narrative. *Social Research* 54. 1, 12.
- Polster, E. (1987). *Every person's life is worth a novel*. New York: Norton, 96.
- Berger, P. L. (1963). *Invitation to sociology: A humanistic perspective*. New York: Anchor. 57.
- Randall, W. L. (1997). *The Stories We Are: An Essay on Self-Creation*. Toronto: University of Toronto Press. 185.
- Moore, T. (1992). *Care of the soul: A guide for cultivating depth and sacredness in everyday life*. New York: HarperCollins. 26.
- McGuire, M. (1990). The rhetoric of narrative: A hermeneutic critical theory. In B. K. Britton, & A. D. Pellegrini, (Eds.), *Narrative thought and narrative language* (pp. 219-236). New Jersey: Lawrence Erlbaum.
- Hall, D. J. (1982). Who tells the world's story? *Interpretation* 36. 1, 47-53.
- McAdams, P. D. (2006). The role of narrative in personality psychology today. *Narrative Inquiry* 16. 1, 15.
- Mead, G. H. (1934). *Mind, Self, and Society*. Chicago: University of Chicago Press.
- Harter, S. (1999). *The Construction of the Self: A Developmental Perspective*. New York: The Guilford Press.
- Johnson, M. (2004). Approaching the salutogenesis of sense of coherence: the role of 'active' self-esteem and coping. *British Journal of Health Psychology*, 9, 419-432.
- Goffman, E. (1961). *Asylums: Essays on the Social Situation of Mental Patients and Other Inmates*. New York: Anchor Books.

# Inclusive learning environment at the University of West Bohemia, Czech Republic

Pavla Hrabackova<sup>\*</sup>, Jana Hruskova

University of West Bohemia, Univerzitní 8, 306 14 Plzeň, Czech Republic

---

## Abstract

In this presentation we will discuss several pedagogical and technological items related to university level teaching for students with special educational needs. Special needs education means the special education arrangements which are in place for people with disabilities. Counselling for persons with special needs is a special type of professional service designed to provide information, advice and recommendations in order to find a solution to problems related to personal or study issues. Its major task is to increase the proportion of successful graduates and prevent study failures and drop-outs. The aim is to support students' motivation and to help them address the problems they face.

In a first part, we will discuss the different types of limitations that applicants and students with special educational needs might have. In the second part, we will give an overview of the possible study and technical support. All the activities described in our presentation were developed and extended from the programme "Investments in Education Development", which is financed by the European Social Fund and the budget of the Czech Republic (project CZ.1.07/2.2.00/29.0016 "Equal opportunities for all - tertiary education for persons with special needs").

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

**Keywords:** inclusive learning; accessibility of tertiary education; university counselling; special needs; digital resources; hybrid books; effective teaching strategies; blindness and low vision; deafness and hardness of hearing; mobility health; chronic health; psychological disorder; learning disabilities; inclusive non-discriminatory environment;

---

## Introduction

The University of West Bohemia (UWB) was established by the Act of the Czech National Council No. 314/1991 Coll. in 1991 through the merger of the Institute of Technology and the Faculty of Education. At the time of its foundation the University had five faculties – the Faculty of Applied Sciences, the Faculty of Economics, the Faculty of Electrical Engineering, the Faculty of Education and the Faculty of Mechanical Engineering and about 4,200 students. The original five faculties were joined by the Faculty of Law in 1993, the Faculty of Philosophy and Arts (former Faculty of Humanities) in 1999 and the Faculty of Health Care Studies in 2008. At present the University has eight faculties with more than 60 departments and three institutes of higher education. Today nearly 15,000 students can choose from a wide range of Bachelor, Master and PhD study programmes. The broad structure provides students with the widest range of study possibilities with the options of full-time or combined study.

UWB has a significant position in the field of higher education both among the universities in the Czech Republic and in Europe as a whole.

The Information and Counselling Centre was established in 2006. The aim of the centre is to help its clients (applicants and students) understand particular issues and make informed decisions in order to address their problems or overcome various setbacks and difficulties they face in their personal, study and career life. The concept of *education for all* has remained at the centre of attention of the university management and departments.

### *1. Counselling activities in the Czech Republic*

Counselling is a specific activity by means of which counsellors help their clients (Act No. 111/1998, Higher Education Act). Counsellors are specialists in particular fields – lawyers, economists, social workers, psychologists, etc. Types of counselling institutions:

- a single counselling unit (poradna) – small unit providing services in one or at the most two specialisations; there is no further break-down,
- a counselling centre (poradenské centrum) – composed of more than one single unit (model used at UWB).

Counselling services in the Czech Republic are provided by:

- schools,
- educational-psychological counselling centres.

The system of tertiary education in the Czech Republic consists of:

- 26 public universities,
- 2 state universities,
- 44 private universities,
- 166 higher professional institutions.

## *.2. Counselling activities for university applicants and students with special educational needs*

Study-related counselling for applicants and students with special educational needs is focused on the provision of information, advice, recommendations and solutions concerning problems related to the optimal choice of an educational path leading to an appropriate profession.

Counselling is focused on:

- providing information about study programmes (presentations, open days, etc.),
- understanding their own interests, capacities and aptitudes,
- organisation of preparatory courses for entry examinations,
- help in adapting to a university style during the first couple of months.

The Information and Counselling Centre acts as the point of entry for individuals who have **documented learning disabilities and physical or psychological special needs**.

Counselling services are offered to students declaring:

- blindness and low vision (students with visual impairment),
- deafness and hardness of hearing (students with hearing impairment),
- mobility or chronic health (students with mobility impairment),
- psychological disorders,
- learning disability.

### **Support for students with special needs**

The special needs services coordinators work to provide a reasonable study environment to students with special needs and to ensure that university programmes and activities are accessible to individuals with disabilities.

#### *.1. Support to students with visual impairment:*

- study support
  - providing study materials in electronic form (digital documents, hybrid documents),
  - accessing electronic libraries,
  - providing ongoing monitoring of access to university buildings,
  - face-to-face counselling,
  - individual study programmes, incl. arrangements of place and methods of examination.
- technical support
  - accessing a special study room equipped with all necessary equipment for visual impairment,
  - providing special computer programs,
  - providing special equipment – scanners, Braille display, Braille printer, etc.

#### *.2. Support to students with hearing impairment:*

- study support
  - providing sign language interpreting,
  - providing note-taking services,
  - face-to-face counselling,
  - providing corrections,
  - individual study programme, incl. arrangements of place and methods of examination.
- technical support
  - accessing special study room equipped with all necessary equipment.

*.3. Support to students with mobility impairment:*

- study support
  - providing study materials in electronic form (digital documents, hybrid documents),
  - providing note-taking services,
  - providing ongoing monitoring of access to university buildings,
  - face-to-face counselling,
  - individual study programme, incl. arrangements of place and methods of examination.
- technical support
  - accessing special study room equipped with positioning tables,
  - providing special equipment – scanners, keyboards, mouse pads, etc.

*.4. Support to students with psychological disorders:*

- study support
  - providing ongoing monitoring of access to university buildings,
  - face-to-face counselling,
  - individual study programme, incl. arrangements of place and methods of examination.

*.5. Support to students with learning disability:*

- study support
  - providing study materials in electronic form (digital documents, hybrid documents),
  - providing note-taking services,
  - providing testing (assessment battery for students with dyslexia),
  - face-to-face counselling,
  - individual study programme, incl. arrangements of place and methods of examination.

Table 1. Number of students

	2014	2013	2012
students with visual impairment	1	5	4
students with hearing impairment	2	2	2
students with mobility impairment	10	7	7
students with psychological disorders	9	8	4
students with learning disability	58	38	35

## Conclusion

The main goal of counselling activities offered by UWB is to create an inclusive non-discriminatory environment. The activities are designed to help applicants and students with special educational needs to fulfil basic human rights, incl. the right to education. The aim is to achieve a place that is accessible, comfortable and safe for everybody.

## References

Higher Education Act, Act No. 11/1998

# Individual potential of doctoral students: Structure of research competences and self- assessment

Eridiana Olehnovica<sup>a</sup>, Ingrida Bolgzda<sup>a</sup>, Mārīte Kravale-  
Pauliņa<sup>a</sup>,<sup>108</sup>

<sup>a</sup>*Daugavpils University, Parades 1-415, Daugavpils, LV5400, Latvia*

---

## Abstract

Doctoral students, being researchers to be, play a significant role in the sustainable development of society. At present doctoral students are expected to achieve a certain result, and in order to attain it, adequate research competencies are needed. This article can be considered as the analysis of one stage of a pilot study, in which the structure of doctoral students' research competencies are set, and the development tendencies can be acquired in the context of qualification and research competence theories. With the existing range of competency theories, the authors emphasize an approach, where competences are oriented at a definite aim- to obtain the degree of doctor of sciences, being the most acceptable for research competence analysis. In the pilot study doctoral students at Daugavpils University (Latvia) and candidates for a scientific degree (N-64) were questioned, who completed a self—assessment of research activity competencies. Three competency groups were identified: informative, communicative and instrumental. In order to assess the effect of support of the ESF (European Structural Funds) Project “Support to the implementation of Daugavpils University doctoral studies” in the improvement of research competences, the competence groups identified were analyzed like are/are not in the context of the ESF Project. Conclusions depict the strong and weak sides of doctoral students' research potential, as well as the most significant research activity competences of the researcher to be.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* research potential; doctoral students; competencies; competence structure

---

## Introduction

Between the concepts of education and competences exist cross-correlations because the public development, to a great extent, depends on the ability of the education system to provide adequate competences. One of the main priorities mentioned in the strategy approved by the European Commission “EU 2020” – is the provision of sustained development on a value-creation basis by means of the knowledge, including in education, research, innovation and creativity (Kravale-Paulina, Iliško, & Oļehnoviča, 2013). One of the conditions of the development mentioned in the final higher education stage is that doctoral studies are interrelated in a single research environment. Thus, the research potential of doctoral students and quality become of strategic importance. Research potential as a set of abilities involves a correlation of several objective and subjective factors.

Therefore research competences are considered as a characterizer and driving force of doctoral students' research potential. In the field of education the research themes more commonly deal with the aspects of doctoral students' career and relationship to the academic and professional environment, but are less connected with doctoral students' research competences, which are of importance in every context (Oļehnoviča, Kravale-Pauliņa, & Bolgzda, 2013; Bolgzda & Olehnovica, 2012). The aim of this study is to determine tendencies in the development of doctoral students' research competences, which would further allow to predict and plan preventive events so that strategies of knowledgeable society would take action and not just become declarative.

One cannot find a single view on the content, structure and classification of doctoral students' competences in the relevant scientific literature. It is therefore essential to set the limitations of the pilot study conducted here: (1) analyzing the doctoral students' research competences by taking into account the formal requirements –

---

\* Corresponding author. Tel.: +371 29739686; fax: 371 654 22890.

E-mail address: marite.kravale@du.lv

qualification criteria of the doctor of sciences, which are determined by the education standards and qualification framework; (2) the study emphasizes those competences from the authors point of view, promote the implementation of these criteria; (3) a scientist's individual competences are developed in a interrelationship with the social and cultural environment, with different support systems. In this study, ESF financial support is evaluated as one of the external support factors. Several activity programmes have been carried out in Latvia since 2009 within the framework of the European Social Fund, such as, "Human resources and employment" 1.1 priorities "Higher education and science" 1.1.2.1.2. subactivity "Support to the implementation of doctoral study programmes". Its aim is to increase the number of the type of specialists in all educational thematic groups, which have acquired the higher qualification ( a PhD degree) and are able to plan, to create and introduce the high tech products in production, as well as products and services of high value , promoting the development of national economy on the innovation basis; (4) doctoral students' research activity, to a great extent, is self-organized. The ability to carry out an adequate self-assessment is one of the essential competences; therefore the level of competence development in the study was determined by the respondents themselves.

### **Normative framework of research competence structure**

The fundamental context of competences is made of the qualification indicators to be acquired, each education process is subordinated to them. What qualification is expected from doctoral students or future researchers, which in the profession classifier are mentioned as "scientists"? In Europe the scientist's and research work framework are determined by the definition from "Frascati Manual" 2002, where all professionals with an academic degree or higher education diploma are called scientists, and who deal with fundamental or applied sciences, as well as experimental research to get new knowledge, products, processes, methods and systems. On the other hand, research work is understood as creative work which is done systematically to increase the scope of knowledge and promote the application of this knowledge into new and improved products (goods and services) (Bolgazda & Olehnovica, 2011). The fundamental context of competences mentioned is the expected outcome, which states what competences are necessary in order to achieve them. Considering the variety of competence theories, one should take the standard of the respective area as the basis. In Europe the future researchers' qualification should correspond to the 8th level of European Classifications Framework (EQF), which was approved also by Bologna process of Bergen conference in May, 2005. But, according to the European Higher Education Area (EHEA) criteria, the qualification of the doctor of sciences is awarded if the candidate possesses (1) systemic understanding of the subject and application of corresponding research methods (2) abilities to perceive, to change, to integrate into practice theoretical knowledge (3) original thoughts, one's own contribution which exceeds the previous level of the development (4) innovative publications at the international or national level (5) critical analysis, ability to evaluate, synthesize complicated ideas (6) skills to communicate with colleagues, scientists and the public in general (7) to promote the unity between the academic and professional environment.

The fundamental competences included into the international education documents are interpreted and supplemented in national qualification systems and future researchers' association documents. Latvian Young Researchers Association (LJZA), on the basis of the guidelines of the European Council for Doctoral Candidates and Junior Researchers (EURODOC), offers their own vision on competences, classifying them into seven directions: research work skills; understanding of the research environment; personal efficiency and work in groups; communication skills; career management; ethics and social understanding, and extra competences – management skills, pedagogical skills and writing skills. The EURODOC approach pays special attention to doctoral students' career development and their ability to integrate into the working environment. It is worth mentioning that the normative framework determines only the achievable outcome, not the research work competence structure. In order to understand the content of the competence structure and its components, one must analyze the most essential competence theories.

### **Theoretical framework of competence structure**

Taking into account that doctoral students' research is target-oriented (to acquire a PhD qualification), and this aim has certain criteria which are determined by respective standards, in the current study the definition "competence" is described as interrelationships of aims and criteria or as a cross-section of qualification. It allows the researcher to evaluate and predict the level of competence improvement (Spencer, 1993).

The context of the idea "competence" has changed from a single-dimensional understanding, when competences were attributed only to a narrow professional activity to an open and dynamic multidimensional system. Competence models are getting more and more complicated. Erpenbeck (2003) defines the competence

model as a system, in which the necessary competences are defined and which is supplemented by historically determined conditions, national cultural traditions and specificities. Scott (2006) considers the notion “*competence*” as a dual nature of a man’s abilities: skills to use and to perfect the acquired ones.

In scientific literature, competences by their contextual similarities, using different approaches, are classified into larger groups. The most characteristic principles of choosing competence structures are summarized (see Table 1).

Table 1 Principles of choice of competence structures

Principles of choice of competence structures	Authors
Compilation of various systems	Weinert, 2001; Straka, 2002
Approach to the process	Cheetham, 1996; Chivers, 1996
Personality actualization	Hodkinson, 1995; Issitt, 1995
Career or professional context	Hsing-fen Leea, Miozsoa, & Laredob, 2010
Historically determined national tradition	Delamare Le Deist & Winterton, 2005
General and specific principle	Project TUNING, 2000

One can also observe other examples in the competence theories, such as skills to work productively; professionally significant personality features; mental maturation; competence to do planning and make decisions; socially communicative competences (ability to work cooperatively, communicatively, empathy); management of knowledge; initiatives; ability to change; ability to offer a social benefit effect.

By summarizing and generalizing the variety of competence theory content and approaches in the classification, we can identify two competence categories: professionalism and personality; by the way, each of these categories can be viewed from the level of comprehension or activity (see Table 2).

Table 2 Generalization of competence theories and classifications, constructed by authors.

Levels of usability	Professional competences	Personality competences
Comprehension	Cognitive competences	Meta competences
Activity	Functional competences	Social competences

The empirical competence analysis of this study is based on approaches, which are target-oriented and interpreted in the context of the acquired (PhD) qualification criteria. These examples from the theories discussed in scientific theories are encountered in F. E. Weinert’s (2001) competence system, where he points to such competences as: (1) specific cognitive abilities and skills (2) objective (compliance with standards) and subjective self-concept (3) activity competences (4) social competences. Like another prototype for the chosen competence analysis, the European Education Structure Project TUNING competence classification (instrumental, interpersonal, systemic competences) is used. Separate components of the before mentioned competence classification are adapted and contextually widened in correspondence with the study objectives: interpersonal competences are called the communicative competences and systemic competences are called informative competences.

It is worth mentioning that in this study the greatest attention is paid to specific research competences, and lesser to those, which refer to the personality traits. Although the personality traits cannot be separated from the rest of competences, to analyse them correctly however, a different methodology is needed – the qualitative competence, which in this research stage was not used.

## Methodology of the study

In 2013 a study was carried out at Daugavpils University, surveying doctoral students and candidates for scientific degrees of various study programmes and various study years (N=64). Of them 11 were men and 59 were women. 11 of the respondents belonged to the study programme “Economics”, 5 to the doctoral study programme “Psychology”, 39 to the doctoral study programme “Pedagogy”, 8 to the doctoral study programme “Biology” and 6 to other study programmes.

The first part of the questionnaire included the most essential competences that are necessary to the doctoral students and candidates for scientific degrees in order to conduct their research successfully. The competences chosen depict the research potential’s cognitive, functional and behavioural dimensions and answer the questions - what? how? In what way? Respondents did their self-assessment of informative, communicative and instrumental competence development level of 38 research activities according to a 5 point score. Each score in



the scale determines the competence development level in percentage: 1 point – 0%, 2 points – 25%, 3 points – 50%, 4 points – 75%, 5 points – 100%. The self-assessment was done in two groups: group A – present competence development level and group B – the necessary competence development level for research activity. Such an approach allows the researcher to find out what competences are identified by the respondents as important in their research and to what extent they have improved. In the second part the respondents' competence to choose and to use the most useful methodology for achieving their research aims was identified. Respondents were asked to mark the nearest research approach for them in the scale – qualitative or quantitative from (-) 3 till 3. In the measurement scale from 0 till (-)3 corresponded to the research approach I or the qualitative research methodology, but from 0 till 3 research approach II or quantitative research methodology; (0) – hard to answer. For the measurement they were offered 13 statements, which marked the differences between the qualitative and quantitative methodology. The results give the answer to the question: what methodological approach in the research is chosen more commonly by the doctoral students? It also give an indication as to whether the adequate instruments are chosen to be used in their research methodology. The conclusions point to the doctoral students' potential to undertake an integrative research, which can be considered to provide the most perspective in the future.

Daugavpils University doctoral students have at their disposal the funding from the ESF project “*Support to implementation of Daugavpils University doctoral studies*”, the aim of which is to render support to the creation of innovative research, thus opening wider possibilities to improve the research competences. In order to determine the practical effectiveness of the project, the competence development level in the study position was chosen: participation in the project/ no participation in the project.

From the study data processing a semantic differentiation scale, factor analysis and cluster analysis was used, which allowed the researcher to group and mutually compare two independent selections (participation in the project/ no participation, doctoral student/candidate for scientific degree) and to determine the competence development level for each of these groups.

The type of research competence classification was determined by: conclusions of theoretical analysis of competences (Weinert, 2001; TUNING) and the research aim to assess competences, which for the doctoral students are needed to achieve the research aims. The authors of this study chose to classify the competences into three groups: (1) informative competences (F1), which are important for determining the research structure, content and strategy; (2) communicative competences (F2) states the ability to cooperate and get included into the research environment in the local and global context; (3) instrumental competences (F3) as the determinant of the order research data would be correspondingly processed and interpreted.

## Analysis of research results

Using the factor analysis the competences were grouped into three groups, demonstrating a different significance level. Factor weight intervals: F1 from .402 till .757; F2 from .413 till .686 and F3 from .404 till .682.

Comparing the competence development level between the three, before-mentioned research competence groups of the doctoral students and candidates for scientific degree (see Table 4), it is clear that the candidates of scientific degrees show a higher informative and instrumental competence level than the doctoral students, while the communicative competence group develop slightly more evenly. It is quite logical that the competences improve in the study process due to experience. In the aspect of the project one can notice a positive influence on the competence level both for the doctoral students, and candidates for a scientific degree. Candidates for a scientific degree, participating in the project, were seen to have a significantly higher level of all competence groups.

Table 4. Factor analysis of competence groups between different values: participation in the project/ no participation, doctoral student/candidate for a scientific degree

	Doctoral student		Candidate for scientific degree	
	Is ESF project grant-holder	Is not ESF project grant-holder	Is ESF project grant-holder	Is not ESF Project grant-holder
F1 – informative competences	-0.16	-1.22	0.50	0.35
F2 – communicative competences	0.23	-0.49	0.43	-0.37

The possible reasons for this could be several: the best were selected for the project, financial support gives greater possibilities to achieve the doctoral student's aim – to create an innovative study and to acquire a PhD qualification, perfecting such competences as mobility, presentation skills, and ability to integrate into the international environment. It is seen in the differences of perfection of communicative competences between the respondents who receive support to the project, and those for whom it is not available. Conditions of the project motivate and mobilize both respondent groups, but especially candidates for scientific degree. It might prove the effect of synergism principle, when personal growth, experience and external support are summed up.

The evaluation of respondents' competences is summarized in three cluster groups – NF1 group – low (result – 39.1%), NF2 – moderate (result – 32.8%) and NF3 high (result – 28.1%) competence development level. In the highest cluster group all competence groups are developing comparatively evenly. As a result this respondent group is considered to be best prepared for research work. In the moderate evaluation group, the answers of the respondents included, one can see a wide amplitude range between the informative and instrumental competence group development levels, which proves an insufficient ability to process the acquired data in order to continue to do a correct interpretation (see Table 5). It is important to mention, that part of respondents demonstrate the lowest measurement of informative competences, but these are the competences which play a significant role in the development of the doctoral student's research.

Table 5. Cluster analysis of competence groups

	1st cluster group (low evaluation)	2nd cluster group (moderate evaluation)	3rd cluster group (high evaluation)
NF1 – informative competences	-0.886	0.36	0.811
NF2 – communicative competences	-0.238	-0.185	0.547
NF3 – instrumental competences	0.205	-0.73	0.567

We have to conclude that uneven development of informative and instrumental competence groups include a risk factor – insufficient research capacity in some of the respondents. One can see such a common tendency – the higher is the research competence measurement, the more effective is scientific communication. Evidently, in order to successfully cooperate in the scientific environment, it is important to know sufficiently well the scientific subject a person is interested in itself.

In the second part of the questionnaire the respondents, the scale from (-)3 till 3 determined the closest qualitative or quantitative approach to research methodology for them. In the scale from 0 till (-)3 research approach I or qualitative research approach methodology was depicted., but from 0 till 3 – research approach II or quantitative research methodology. Consequently, the acquired data provide the information on the respondents' competences to choose and apply the most suitable methodology for achieving the research aims.

In general, the respondents' answers on methodological approaches are divided as follows: qualitative research methodology is chosen by 46.2% respondents, but the quantitative one – 53.8%.

However, when comparing the mean measurement of statements between all respondents, one can notice a contradiction – many respondents consider their promotion work as a qualitative study, while wishing to process the research data by quantitative methods. As a result, it is not clear whether the research will be based on empirical data or on a researcher' own individual experience.

Using the t-test method, the scale readings were compared between two selections “doctoral students” and “candidates for scientific degree”. The first ones were more positioned in the qualitative research, while the second ones – in quantitative. Evidently, the candidates for scientific degree deal more with the necessity to process the acquired data, to measure and visualize them. Although the candidates for scientific degree and the project participants, in general, understand the basic notions of the quantitative research, in the statement, however, whether the indicators of the phenomenon under study and its parameters are measurable, the scale reading (-1.4) is markedly on the side of qualitative research. The quantitative methodological approach, which is markedly more expressed in the candidates for scientific degree, is, however, based on measurability principle. The measurement observed can be interpreted as incoherence between the chosen approach and how to realize it. Limitations of the conducted study (the survey method) do not allow performing a correct, more in-depth interpretation of causes.

Doctoral students, on the contrary, position themselves in the middle between the qualitative and quantitative approach. A comparatively balanced view between the qualitative and quantitative methodological approach cannot be estimated unequivocally. It does not yet show the ability use both research approaches, but it could

mean lack of confidence or uncertainty in one's choice of research method as well. Using the cluster analysis, the acquired measurements were grouped into three cluster groups of different level of awareness of the research position: 1st group – low, 2nd group – moderate 3rd group – high awareness. The data of the cluster analysis show that 75% quantitative and 25% qualitative position supporters demonstrate a more convincing research approach (high awareness) and adequate understanding of methodology, however, sufficiently many respondents, or 58.33% of qualitative and 41.67% of quantitative approach researchers have an unclear understanding on their methodological approach. Thus, we can conclude, that respondents with a marked quantitative approach in their research are better prepared for conducting research work rather than qualitative researchers.

In this study we see different choices between the doctoral students and candidates for scientific degree, the latter more often, and more successfully use the quantitative approaches, while the doctoral students use the qualitative methodological approach. Perhaps at the beginning of research the doctoral students are concentrating more on qualitative study of the problem and only then think how to ground it with quantitative methods. In this contradiction between the methodological approach and its corresponding way of implementation, we can observe the lack of research competence. In scientific discussions on the usability and validity of quantitative and qualitative methodology, such a basic criterion for choice is there to set the aim of the study, as a result, a poor understanding of the research methodology causes the ground for the discussion on the clarity of the study aim and corresponding research competences. The lack of research purposefulness is a risk factor in research.

## Conclusions of study and discussion

The emphasis in the competence analysis of doctoral students' research activities was put on specific competences, a characteristic of research activities. The study data depict the dynamics in the improvement of doctoral students' research competences. Study results show the weak and strong sides of doctoral students' and candidates for scientific degree research competences.

With the growth of research experience, the rate of informative competences increases in the total competence structure, for instance, the ability to analyze the object of study from different points of views, the ability to link the acquired study results with practice. In candidates for scientific degree the informative competences are more fully developed than in doctoral students, but they are more essentially aware of insufficient development of instrumental competences. In general, in the structure of doctoral students' research the most poorly developed are the instrumental competences, which can potentially cause problem situations, for instance, if a candidate for scientific degree is not competent to choose the research strategy and its corresponding methodology, the research can lose its scientific validity. Insufficiently developed instrumental competences are considered a significant risk factor in doctoral students' research work.

ESF financial support of the improvement of doctoral students' research is very significant, yet, in the long-term one should think about the parallel state-funded support systems. Conclusions of the study indicate to the fact that the attempts to implement the research methodology like a separate study course in a certain period of time have not been sufficiently efficient. Updating of research methodology issues within the whole study process would help harmonize the levels of instrumental and informative competence performance. For the perfection of communicative competences, in its turn, it would need the study environment which would address the diversity of cooperation and mobility.

The aim of the study has been to assess the research competences as an instrument for achieving the result, and yet, it is hard to answer the question whether it characterizes the research potential of doctoral students and candidates for scientific degree to a full extent, as well as its adequacy to knowledgeable society and sustainability targets. The answers to these questions would be found by conducting qualitative content analysis of theses – doctoral students' research outcome. Thus, the first stage of the study has marked the next directions of study – the necessity for a deeper analysis of the causal relationship of incompletely developed research competences, which would, perhaps, deal with the continuity of different education stages, as well as interrelationship of the level of competence improvement with research result. The sustainability context, in turn, does not allow it/the researcher to ignore the environmental aspects (needs, values, economic and social conditions, etc.), which interact with the processes of research competences.

## References

- Bolgzda, I., & Olehnovica, E. (2012). Structure of doctoral student's research competences in sustainability context. *World Academy of Science, Engineering and Technology (WASET)*, 66, 438–441.

- Bolgzda, I., & Olehnovica, E. (2012). Self-assessment of doctoral students' competences for creation of innovations in research, 5th international scientific conference *Rural Environment. Education. Personality*. Jelgava, Latvia.
- Bolgzda, I., Olehnovica, E. (2011). The relation between the doctoral students' research freedom and institutional responsibility in Latvia: The definition of innovation in research. *EUA-CDE-news*, 13, 54-62.
- Cheetham, G., & Chivers, G. (1998). The reflective (and competent) practitioner: A model of professional competence which seeks to harmonise the reflective practitioner and competence-based approaches. *Journal of European Industrial Training*, 22(7), 267–276.
- Commissions of the European Communities (2009). *EU 2020 Strategy*. Retrieved November 11, 2010, from <http://ec.europa.eu/eu2020/pdf/eu2020.pdf>
- Erpenbeck, J., & Lutz, R. (2003). *Handbuch Kompetenzmessung*. Stuttgart: Schaffer-Poeschel Verlag.
- Hodkinson, P., & Issitt, M. (1995). *The challenge of competence*. London: Cassell Education.
- Leaa, H., Miozsoa, M., & Laredob, P. (2010). Career patterns and competences of PhDs in science and engineering in the knowledge economy: The case of graduates from a UK research-based university. *Research Policy*, 39, 869–881.
- Le Deist, F. O. D., & Winterton, J. (2005). What is competence? *Human Resource Development International*, 8(1), 27–46.
- OECD, Organisation for Economic Co-operation and Development (2002). *Frascati manual, proposed standard practise for surveys on research and experimental development*, § 206. Retrieved December 28, 2010, from [http://data.csb.gov.lv/DATABASE/zin/lkgad%E7jie%20statistikas%20dati/Zin%E2tne/ZI01.htm#\\_Defin%C4ijas](http://data.csb.gov.lv/DATABASE/zin/lkgad%E7jie%20statistikas%20dati/Zin%E2tne/ZI01.htm#_Defin%C4ijas)
- Kravale-Paulina, M., Iliško, D., & Oļehnoviča, E. (2013). Values orientation approach to the educational process: The temporal dimension. *Procedia Social and Behavioral Sciences*, 3, 3285–3290.
- Oļehnoviča, E., Kravale-Pauliņa, M., & Bolgzda, I. (2013). Doctoral students' competences of using online resources for research purposes in network society. *Procedia Social and Behavioral Sciences*, 1, pp. 896–900.
- Scott, P. (2006). The global context of doctoral education. *Bologna handbook*, 3-5.
- Straka, G. A. (2005). *Measurement and evaluation of competence*. Retrieved January 15, 2011, from [www.cedefop.europa.eu/EN/Files/BgR1\\_Straka.pdf](http://www.cedefop.europa.eu/EN/Files/BgR1_Straka.pdf)
- TUNING, Retrieved December 16, 2010, from <http://www.tuning.unideusto.org/tuningeu/index.php?option=content&task=view&id=173>[In Russian]
- Weinert, F. E. (2001). Concept of competence: A conceptual clarification. In D. S. Rychen, & L. H. Salganik (Eds.), *Defining and selecting key competencies* (pp. 45–65). Seattle, WA: Hogrefe & Huber.

# Influence of education on unemployment rate and incomes of residents

Ilga Lavrinovicha<sup>\*a</sup>, Olga Lavrinenko<sup>b</sup>, Janis Teivans-Treinovskis<sup>c</sup>

<sup>a</sup>Daugavpils University, Faculty of Social Sciences, Daugavpils, Latvia

<sup>b</sup>Daugavpils University, Faculty of Social Sciences, Daugavpils, Latvia

<sup>c</sup>Daugavpils University, Faculty of Social Sciences, Daugavpils, Latvia

---

## Abstract

The importance of education in the modern world is increasing as the most serious factor in the formation of a new quality of economy and society in common. It's role is constantly growing along with the growing influence of human capital. The article examines the impact of education on the unemployment rate and the amount of income of residents of Latvia in the period from 2002 to 2013. Differences in the amount of income and in the existence of job, which are determined by the level of education, are analyzed by the authors from the position of human capital as well as from the level of social and institutional relations. Methods of frequency, correlation and regression analysis are used in the research.

© 2014 The Authors. Published by Elsevier Ltd.  
peer-review under responsibility of the Sakarya University.  
*Keywords:* education; income; the unemployment rate

---

## Introduction

Today the new economy is coming as a replacement to the industrial economy - the knowledge economy, in which the leading role performs creative, intellectual work, but a simple working force has acquired properties of human capital. Moreover, if the knowledge is considered to be a source of collecting of human capital, the education - its main method. Given the new requirements, a modern strategic doctrine of progress of developed countries is based on the concept of human capital and the knowledge economy: competitiveness of the country today is determined not only by the presence of rich natural resources, but primarily by the human factor, by the ability to create and develop high technologies, to provide fundamentally new technological level of production, to adapt to the rapidly changing information environment, to be competitive in the labour market and, as a result, to have higher incomes.

The purpose of the article - to establish the degree of influence of education on unemployment and the amount of incomes of population of Latvia from 2000 to 2013. Informational base of the research are surveys of the University of Latvia, conducted within the project "Reports about national economic development of Latvia" for 2002, 2005, 2007, 2009, 2013.

To achieve the objectives of the research authors use frequency, correlation and regression analysis.

## Methodology

The influence of education on household income is explained by the theory of human capital, by the filter theory and it has a probabilistic nature, evolving under the influence of random factors.

"One of the forms of capital is education, it is called by human capital because this form becomes part of the human, but it is considered to be a capital due to the fact, that it is a source of future satisfaction or future earnings, or both together" (Schulz, 1960). In general, the share of educational differences makes about 25% of total inequality in earnings (Mincer, 1975). In general, the share of educational differences makes about 25% of total inequality in earnings.

Using the base of supply and demand curves of investment in human capital, G.Bekker (Becker, 1975). has formulated a universal model of distribution of personal income. The model proposed by G.Bekker explains income inequality not only on labor (in fact - of human capital), but also on the property. Return on investments in human is averagely higher than from investments in physical capital. But in the case of human capital, it

decreases with increasing the volume of investment, whereas in the case of other assets (real estate, securities, etc.) it slightly reduces or has no changes.

Other researchers (Spens, 1974, Arrow, 1973) treat education as a means of selection, a filter, that sorts students. Basic provisions of the filter theory can be formulated as follows (Ильина, 2009): education does not increase abilities, people initially have different abilities; education is costly, including moral costs; the costs of education and abilities are inversely related; costs for selection of employees and defining their real productivity are quite high for employers.

Since it is assumed, that the more gifted people achieve averagely higher levels of education, therefore, in the process of learning it is organized by the sorting of students according to their level of abilities. Another researcher - J. Psacharopoulos (Psacharopoulos, 1973) - believes, that if certificates of education has been used as a filter, then persons with a complete education would have higher rates of return, than those with incomplete education, but in reality, these differences are very minor. If the filter theory is correct, then the impact of education on earnings should decrease with age, because usually entrepreneurs learn in practice the ability of workers and as a result wages may differ in accordance with real performance of employees, and not be random, evaluating only level of education.

But this prediction is not confirmed: the gap in earnings among people with different education, but with similar abilities, isn't declining, but, on the contrary, increasing with the duration of their work experience. Using the filter theory it is possible to conclude, that the costs of finding capable workers among those with low qualification are so large, that they exceed the difference in pay of more or less trained working force. That's why firms do not organize their own services for checking abilities, but use as a substitute the information about education of employees.

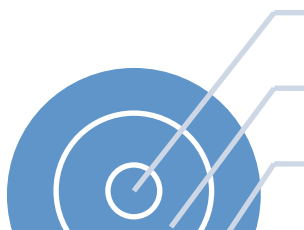
K.Jenks believes, that the process of determination of earnings is probabilistic in nature and develops under the influence of random factors. This view is reflected in his book (Дженкс, 1997), where the statistical data shows, that the correlation between education and earnings is found only for the common group values and in the analysis of individual data this relationship virtually disappears. He has concluded, that earnings depend mainly on purely random factors - "luck", "luck" person.

Institutional model focuses on the analysis of the structure of the working force. Level of employment, unemployment, wages are explained by the features of specific market segments. Main factors of the segmentation are: educational and occupational differences, gender differences (Dex, 1988), ethnic and religious differences, as well as age differences.

Job Competition Theory (Thurow, Lester, 1968) suggests, that choosing candidate for the job, the employer gives preference to those, whom he less likely to spend money on; in this case, the employer chooses the most experienced and educated candidate, no matter what skill level is actually required for the job, and pays the salary, corresponding to the complexity of the work, but not taking into account the real level of qualification of hired employee; as a result in the labor market can be created a disparity between the level of employment of high and low-skilled workers, as any employer, even for low-level jobs will select the most qualified candidates, and skilled workers in a situation of unemployment will accept jobs actually require less than their real qualifications.

"For example, if the system receives more college graduates than it needs, as it actually happened, these new workers are forced to choose jobs, that were considered the best, the highly paid for high school graduates. The observed distribution of wages for college graduates expands (becomes more uneven), and the observed level of qualification in the field, where usually used to work school graduates, increases - because from now graduate from college works at the position, where earlier used to work school graduate. As soon as high school graduates are displaced from their top jobs - down in the distribution of jobs - their average salary is reducing" - writes Lester C. Thurow.

The Dual theory of labor market (Piore, 1969; Doeringer, 1967; Bluestone 1970,; Harrison, 1972). P.Doeringer and M.Piore introduced the concept of a dual labor market, highlighting its "primary" and "secondary" segments and describing them as follows: "Jobs in the primary market have at least several of the following characteristics: high wages, good working conditions, stable employment, the possibility for promotion, observance of justice and due process in the establishment of labor regulations. Jobs in the secondary market tend to bring low wages and other related benefits, poor working conditions, high staff turnover, poor chances of promotion, and very often - willful and changeable attitude of the authorities. The observed differences between employed in the two sectors are largely parallel to the differences between jobs: for the employed in the secondary sector, compared with the ones in the primary sector, the increased turnover, frequent tardiness and absenteeism, administration and petty thefts are common" (Doeringer, Piore, 1971)



1

2

3

Fig. 1. J. Atkinson (Atkinson, 1984), presented one of the basic models of “flexible firm”.

Note: 1 - the core, 2 - the first and second peripheral groups, 3 - external periphery.

The core concentrates on the permanent workers, employed full-time and full week. Inside it occurs only functional adaptation: dismissals and discrimination aren't concern to these groups. According to J. Atkinson, core is focusing on primary labor market groups.

The second (middle) circle is divided into two segments, one of which has the first peripheral group, which also has a permanent workers, fully employed workers, but, unlike those got in the core, subjected to the numeral adaptation. Because of negative market fluctuations they could be fired and then recruited again. They probably present a secondary labor market group. In the other segment of the second round, we can see a second peripheral group, that includes other relatively badly equipped groups, manely working on short-term contracts, employed part-time work, studying because of state's finansial help - apprentices, trainees, sharing jobs with someone else (job sharing).

In the third round - the external periphery. It is formed by a group of workers, most of whom are not listed in the list of employees of the firm and usually they are employed as an external additional working force. These include: working under subcontract; temporary workers, hired through employment agencies; independent workers; outsourced (outsourcing).

Thus, most of the theories, examined by the authors: theory of human capital, job competition theory, dual theory of labor market put forward theoretical assumptions about dependence of status in the labor market and incomes of population by level of education.

### 3. Results

Latvia is a small European country with a population of about 2 million people. According to Eurostat, on May 15th 2014 in Latvia the proportion of pupils in primary and lower secondary education (ISCED 1-2) - as % of total population at regional level, between 2002 and 2012 has decreased from 12,4% to 8,3%, the proportion of pupils in 3<sup>rd</sup> level of education (ISCED level 3) has increased from 17,9% to 18,7% in the general population, the proportion of pupils in 4th level of education (ISCED level 4) has decreased from 1,3% to 0,6% in the general population, the proportion of pupils in 5<sup>th</sup>- 6<sup>th</sup> level of education (ISCED level 5-6) has increased from 19,7% to 22,7% in the general population. At the same time, the number of unemployed with higher education has increased, while the number of unemployed with less than secondary education – has decreased (see Table 1).

Table 1. Unemployed in Latvia by level of education (in thousands)

Education level	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Higher education	12,1	10,8	11,8	11,4	10,2	9,7	12,0	22,9	31,5	21,5	20,6	19,8
Professional education or professional secondary education	49,8	44,7	46,2	39,2	23,6	21,5	30,0	66,1	72,2	57,7	55,8	39,2
General secondary education	39,6	39,6	40,9	32,4	19,6	18,7	24,0	61,0	63,3	53,8	50,6	37,0
Primary education or less than primary education	34,8	31,6	29,4	25,5	24,6	17,7	22,5	42,8	38,7	33,6	28,0	24,3

At the same time, the employment increases amongst those with higher education, and decreases amongst those with less than higher education (see Table 2):

Table 2. Employed in Latvia by level of education (in thousands)

Education level	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Higher education	206,9	194,9	218,3	224,3	238,4	251,2	282,3	268,1	264,2	280,4	299,7	314,6
Professional education or professional secondary education	378,6	393,4	373,5	367,5	384,3	377,5	372,3	323,3	304,5	303,8	297,8	296,7
General secondary education	231,0	238,6	243,7	249,2	263,7	277,8	269,4	221,8	202,7	195,7	200,8	209,6
Primary education or less than primary education	139,0	135,2	128,3	131,3	144,0	148,9	130,8	95,0	79,0	81,4	77,2	72,6

Perhaps, the above data can be explained by the decrease of the proportion of population in the total population, as well as an increase of labor migration of population with secondary education and lower level of education. Population with higher education is more competitive in the labor market, so there is some

displacement of workers with lower level of education, at the same time, the share of the population with higher education in the total population is growing.

To prove the hypothesis defined by the authors it is convenient to use initial monitoring data for 2002, 2005, 2007, 2009, 2013, conducted by the University of Latvia in the framework of the "Reports about national economic development of Latvia". Surveys were conducted by a multi-stage stratified sampling, social-demographic characteristics in groups of respondents after evaluation of samples are close to those of the total population (total difference is less than 3%). The maximum error of each sample is 3% ( $\Delta p = 0.03$ ), the accuracy rate is 95% ( $t_{\alpha} = 1,96$ ).

Table 3. Results of the crosstabulation of questions about status on the labor market and level of education (%)

<b>2002</b>	<b>Employed</b>	<b>Unemployed</b>
Education is below secondary	13,2%	33,6%
Secondary education	55,6%	52,2%
Higher education	31,2%	14,2%
	100%	100%
<b>2005</b>		
Education is below secondary	10,1%	29,5%
Secondary education	54,6%	54,6%
Higher education	35,3%	15,9%
	100%	100%
<b>2007</b>		
Education is below secondary	10,4%	32%
Secondary education	57,9%	54,2%
Higher education	31,7%	13,8%
	100%	100%
<b>2009</b>		
Education is below secondary	12%	36,1%
Secondary education	62,9%	53,1%
Higher education	25,1%	10,8%
	100%	100%
<b>2013</b>		
Education is below secondary	12,4%	24,6%
Secondary education	48,9%	50,6%
Higher education	38,7%	24,8%
	100%	100%

The authors have established a dependence between status in the labor market and level of education of the citizens of Latvia in 2002, 2005, 2007, 2009, 2013: at the data samples of 2002 Chi-Square=76,96, df=2, Asymp.sig 2-sided=0,000, at the data samples of 2005 Chi-Square=81,58, df=2, Asymp.sig 2-sided=0,000, at the data samples of 2007 Chi-Square=87,84, df=2, Asymp.sig 2-sided=0,000, at the data samples of 2009 Chi-Square=100, df=2, Asymp.sig 2-sided=0,000, at the data samples of 2013 Chi-Square=35,03, df=2, Asymp.sig 2-sided=0,000.

Calculating the Spearman rank correlation coefficient for the data above, the authors determined, that data of 2002 has  $r=-0,275$  (Sig. (2-tailed)=0,000), data of 2005 has  $r=-0,270$  (Sig. (2-tailed)=0,000), data of 2007 has  $r=-0,287$  (Sig. (2-tailed)=0,000), data of 2009 has  $r=-0,297$  (Sig. (2-tailed)=0,000), data of 2013 has  $r=-0,188$  (Sig. (2-tailed)=0,000), i.e. there is a weak linear relationship between level of education of population of Latvia and their status in the labor market.

Thus, the hypothesis about the impact of education on the status in the labor market is confirmed.

Next, the authors examined income in Latvian lats on one member of the household after tax deductions, excluding inflation. Changes in average income of residents of Latvia for 2002, 2005, 2007, 2009, 2013 are summarized in Table 4:

Table 4. Household income for 1 person per month in Latvia after tax deductions (in Latvian lats)



	2002	2005	2007	2008	2009	2011	2013
The average income	74	106	151	213	202	166	219
Median	60	82	120	175	164	150	200
Consumption basket of minimum subsistence for 1 person average in 1 year	88,76	105,48	132,89	160,32	168,17	166,43	252,84
The average income in percentage (%) from consumption basket of minimum subsistence	83	100	114	133	120	100	87
The proportion of families with incomes lower than consumption basket of minimum subsistence, %	76	65	56	47	54	62	74

The tendency of increasing average arithmetic and median incomes of population has been established, as well as some reduction in average income in the crisis years. In 2013 the level of income has increased, so the reduction of income in 2009 - 2011 can be considered as a temporary fluctuation.

There is also the tendency to reduce the proportion of families living below the fixed level of subsistence in Latvia in the period from 2002 to 2009. Since 2009 the number of such families began to grow. The same trend continues in 2013 as well. A possible reason of such dynamics could be an increase of consumption basket per one household member.

Using the univariate regression analysis the authors have established the following linear relationship:

Table 5. Linear regression equations (dependent variable - incomes of population in Latvian lats, independent variable - 3 levels of education  
(below secondary education, secondary education, higher education))

2002	Income=26,75*education+2,99 (sig.=0,000)	(sig.=0,001)
2005	Income=31,65*education+39,18 (sig.=0,000)	(sig.=0,000)
2007	Income=33,99*education+80,49 (sig.=0,000)	(sig.=0,000)
2009	Income=59,88*education+84,93 (sig.=0,000)	(sig.=0,000)
2013	Income=70,16*education+66,98 (sig.=0,000)	(sig.=0,000)

Thus, in 2002, with an increase in education at one stage, the income increases on average by 26 Latvian lats and 75 centimes, in 2005 - the income increases on average by 31 Latvian lats and 65 centimes, in 2007 - the income increases on average by 33 Latvian lats and 99 centimes, in 2009 - the income increases on average by 59 Latvian lats and 88 centimes, in 2013 - the income increases on average by 70 Latvian lats and 16 centimes. The authors conclude, that the influence of education on incomes of population has increased stably from 2002 to 2013.

Hypothesis about the influence of education on the status in the labor market and on incomes is confirmed empirically.

## Conclusions

Theory of human capital, job competition theory, dual theory of labor market put forward theoretical assumptions about dependence of status in the labor market and incomes of population by level of education.

The connection between education and status in the labor market is confirmed empirically: the significance of the chi-square criteria does not exceed 0.05, a weak linear relationship between the above variables at a significance level of 0.01 is established, i.e. the higher the education level, the more predominant employment status in the labor market of Latvia's population between 2002 and 2013.

The connection between education and incomes of population is confirmed empirically: coefficients of univariate linear regression, where the dependent variable are incomes of population and the independent variable - level of education, commonly are significant at the level of 0.01, the influence of education in the research period increases - increasing the level of education on one stage, the average incomes of population increases from 26 Latvian lats per one household member in 2002 to 70 Latvian lats per one household member in 2013.

## References

Arrow, Kenneth. Higher education as a filter: *Journal of Public Economic*, 1973, vol 2, N3.

Atkinson J. *Manpower Strategies for Flexible Organisations // Personnel Management*, August 1984. P. 29-31

Atkinson J. *Flexibility, Uncertainty and Manpower Management*. Brighton, Institute of Manpower Studies, 1985

Becker G. Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education. 2nd ed. New York: National Bureau of Economic Research, 1975.

Bluestone, Barry. „The Tripartite Economy: Labor Market and the Working Poor,” *Poverty and Human Resources Abstracts*, July/August 1970, 5(4), pp. 15-35.

Dex S. Gender and the Labour Market / Oolite D. (ed.) *Employment in Britain*. Oxford. Basil Blackwell, 1988. P. 282, 293.

Doeringer, Peter B. „Determinants of the Structure of Industrial Type Internal Labor Markets,” *Ind. Lab. Relat. Rev.*, Jan 1967, 20(2), pp. 206-20.

Doeringer, Peter B. and Piore Michael J. *Internal Labor Markets and manpower analysis*. Lexington, Mass.: Heath, 1971.

Doeringer P., Piore M. *Labor Markets and Manpower Analysis*. Lexington, Heath Lexington Books, 1971. P. 165-166

Ginsberg, Madison: Industrial Relation Research Association, University of Wisconsin, 1969, pp. 101-32.

Harrison, Bennet. *Education, training, and the urban ghetto*. Baltimore: Johns Hopkins University Press, 1972.

Harrison, Bennet. „Education and Underemployment in the Urban Ghetto,” *Amer. Econ. Rev.*, Dec. 1972, 62(5), pp. 796-812.

Harrison, Bennet. „Ghetto Economic Development, A Survey,” *J.Econ.Lit.*, March 1974, 12 (1), pp.1-37.

Jenkins R. Discrimination and Equal Opportunity in Employment: Ethnicity and « Race » in the United Kingdom / Gallie JI Op. cit. P. 313-314

Lester C. Thurow. *The Future of Capitalism. How Today's Economic Forces Shape Tomorrow's World*. Penguin books, 1997

Lucas, Robert E.B. «Working Condition Wage-Bates and Human Capital: A Hedonic Study”. Ph.D. dissertation, Massachusetts Institute of Technology, 1972.

Mincer, Jacob. *Schooling, experience and earnings*. N.Y. 1975

Piore, Michael J. „On-the-Job Training in the Dual Labor Market,” in *Public-private manpower policies*. Edited by Arnold R. Weber, Frank Casseli, and Woodrow L. Piore, Michael J. „Job and Training,” in *The state and the poor*. Edited by S.H.Beer and R.E.Barringer. Cambridge, Mass.: Winthrop Press, 1970, pp. 53-83.

Piore, Michael J. „The Role of Immigration in Industrial Growth: A Case Study of the Origins and Character of Puerto Rican Migration to Boston,” Cambridge, Mass.: Massachusetts Institute of Technology, mimeographed, 1973.

Piore, Michael J. „Primary and Secondary Labor Market: A Critique of the Dual Approach: Comment,” *Bookings Pap.Econ.Act.*, 1974, (3), pp. 684-88.

Piore, Michael J. „Notes for a Theory of labor Market Stratification. Edited by R.Edwards et al. Lexington, Mass.: Heath, 1975, pp. 125-150.

Psacharopoulos, George. *Returns to education: an international comparison*. Amsterdam, 1973

Schultz T. Capital Formation in Education // *Journal of Political Economy*. 1960, p. 13.

Spence, A. Market signaling. *Informational Transfer in Hiring and Related Screening Processes*. Cambridge, 1974.

Thurow, Lester C. „The determinants of the Occupational Distribution of Negroes” in *The education and training of racial minorities: Proceeding of a conference*. Madison: Center for a Studies in Vocational Education, University of Wisconsin, 1968.

Thurow, Lester C. *Poverty and discrimination*. Washington, D.C.: Brookings Institution, 1969.

Thurow, Lester C. „Education and Economic Inequality”, *The Public Interest*, Summer 1972, (28), pp.66-81.

Thurow, Lester C. *Generating inequality*. New York: Basic Books, 1975.

Thurow, Lester C. and Lucas, Robert E.B. *The American distribution of income: A structural problem*. Joint Economic Committee Print. 92d Congress, 2d session, 1972.

Ильина Е.Г. Развитие человеческих ресурсов с точки зрения человеческого капитала и теории образовательных сигналов. Вестник Дагестанского Научного Центра. 2009. N356 с. 78

К. Дженкс "Неравенство: переоценка влияния семьи и образования в Америке", - М.: Наука, 1997. с.56. 37

Лестер К. Туроу. Будущее капитализма. <http://modernproblems.org.ru/capital/89-thurow.html#content>



„Atbalsts Daugavpils Universitātes doktora studiju īstenošanai, 2. kārtā”  
Vienošāns Nr. 2012/0004/1DP/L.1.2.1.2/11/1P/A/VIAA/011

# Influence of implementing inquiry-based instruction on science learning motivation and interest: a perspective of comparison

Pi-Hsia Wang<sup>a</sup>, Pai-Lu Wu<sup>b\*</sup>, Ker-Wei Yu<sup>c</sup>, Yi-Xian Lin<sup>d</sup>

*\*Corresponding Author: Pai-Lu Wu, e-mail: pailu@csu.edu.tw*

*<sup>a</sup>Associate Professor, Center for Teacher Education, Cheng-Shiu University, Taiwan*

*<sup>b</sup>Professor, Center for Teacher Education, Cheng-Shiu University, Taiwan*

*<sup>c</sup>Professor, Department of Marine Engineering, National Kaohsiung Marine University, Taiwan*

*<sup>d</sup>Principal, National Tung-Kang Maritime and Fishery Vocational High School, Taiwan*

---

## Abstract

The purpose of this study was to explore the influence of implementing inquiry-based instruction on science-learning motivation and interest. The participants included students from three high schools located north, west, and south of Taiwan.

The results showed that after participating in the implementation of inquiry-based instruction, science learning motivation and interest were both increased. Among them, School A achieved the best learning effect. Significant variation was observed in terms of self-efficacy and performance goals with regard to learning motivation; considerable differences in learning interests were also seen with respect to attitude towards science, learning atmosphere, learning difficulties, and learning commitment.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* Inquiry-based, Science Learning Motivation, Science Learning Interest

---

## Introduction

Teaching science as inquiry is an important pedagogical approach frequently discussed among science teachers (Whitworth, Maeng & Bell, 2013). The learning activities of science exploration benefit students by establishing critical thinking skills and constructing individual knowledge structures (Schneider, Krajcik, Marx, & Soloway, 2002). By allowing the students to develop problem-solving strategies, the students develop the initiative to pursue, discover, and evaluate answers, a “transferable capability”, with far-reaching consequences for future learning endeavors.

“Inquiry” implies an active learning process that allows students to answer research questions using data analysis and information exchange (Bell, Smetana & Binns, 2005). Inquiry-based instruction is, therefore, student-oriented. However, the instructor may direct students at key times during the learning process, as required for optimal exchange, e.g., beginners may need more instruction initially to exercise their inquiries more effectively (Zangori, Forbes & Biggers, 2012).

Numerous studies have investigated inquiry-based instruction, revealing a positive effect on teaching and learning (e.g., Avery & Meyer, 2012; Marshall & Horton, 2011; Powell-Moman & Brown-Schild, 2011; Walker, McGill, et al., 2008). Other studies have emphasized that the professional growth of teachers plays a significant role (Powell-Moman & Brown-Schild, 2011; Singer, Lotter, et al., 2011).

Pea (2012) showed that the school environment, categorized into human and sociocultural factors, influenced the implementation of inquiry-based instruction. The human environment includes motivated students, student initiative and motivation, peer support and cooperative learning environments, support from school mentors (e.g., the superintendent, principal, and teachers), and the involvement of colleges. The sociocultural environment includes reduced class sizes, manageable teaching load/courses, a reduced amount of content to teach, extended class time, increased planning time, team planning time with other teachers, tutoring and after-school support for students, policies that support science teaching, state and national guidelines, special programs and PD to address diversity, and community involvement. Thus, various factors influence the effectiveness of inquiry-based instruction, and the school must consider all of these to develop and implement inquiry-based instruction.

The National Science Council (2014) of the Republic of China proposed the High School Program in 2006 to help middle-level schools use newly developed technology to design a curriculum that adopts inquiry-based instruction. The purpose of the program is to encourage self-motivated problem-solving capabilities in the students, to inspire curiosity and motivation with regards to science, as well as to establish a teaching model that facilitates exploration initiative and an appreciation for thinking in students.

It is considered an honor for a researcher to be selected to take part in the High School Program at the maritime vocational high school in Southern Taiwan, for the implementation of inquiry-based instruction. The teaching assignment is usually for a period of 2 years, after which, the instructor promotes experimental instruction at two other extension schools (one in the north and the other in the west) over the course of the third year of teaching.

The three schools included in this study have various school environmental contexts. To understand the difference between learning motivation and interest, a relevant comparison has to be made; thus, this was one of the motives of this study. An additional motivation of this study was to better understand how the different school environments influence inquiry-based instruction, in particular, the learning motivation and interest of the students.

## Research Design and Implementation

### Research Design

The research design for this study, in the form of a pretest and post-test experiment intended for a single group, is detailed in Fig. 1.

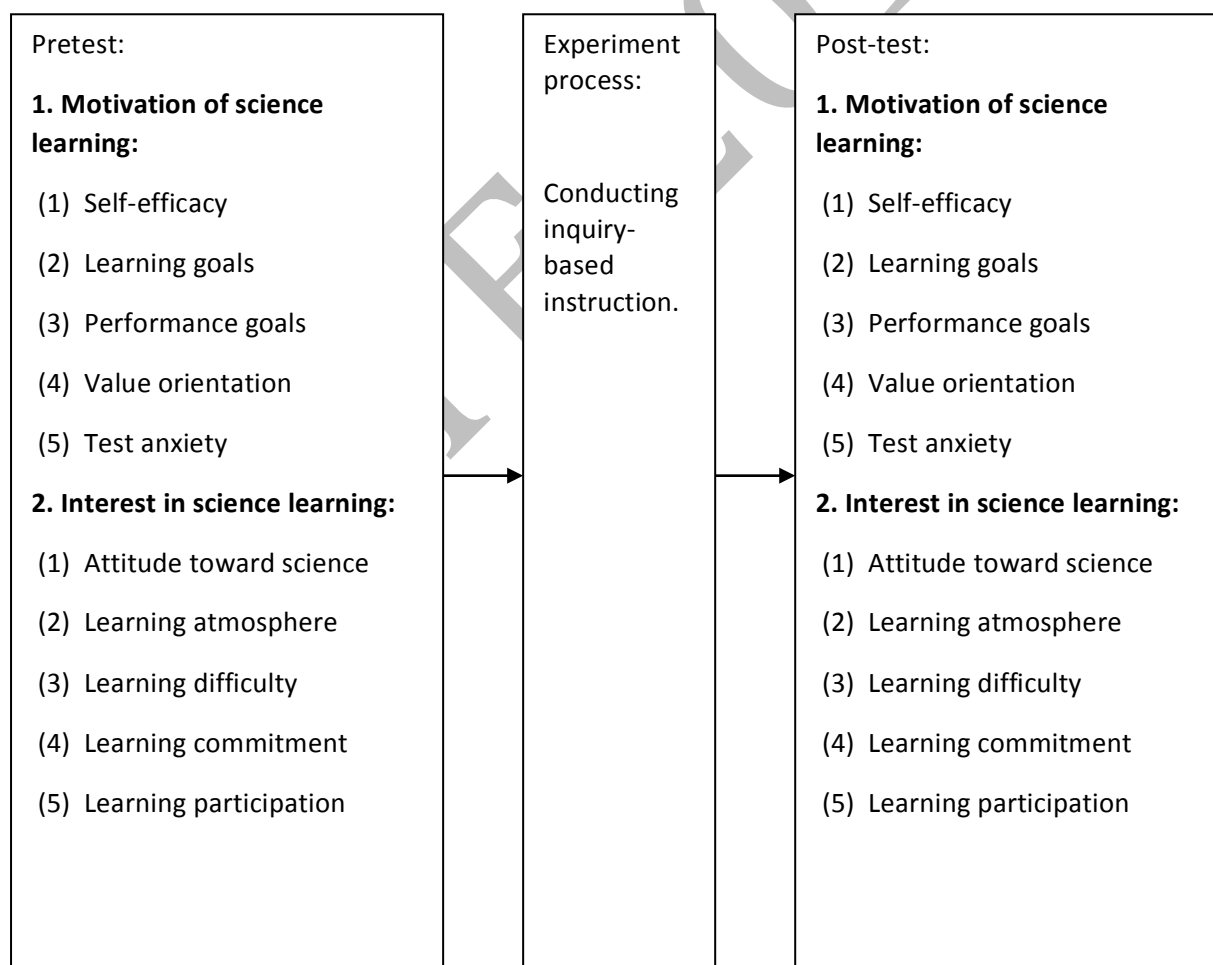


Fig. 1. Research design of the study.

### *Participants*

The teachers from the three schools participating in the study were all from the Department of Turbines. Because School A is a seed school, the teachers here must possess professional knowledge and are required to design the curriculum, as well as to share their teaching experiences with other teachers. After attending the inquiry-based instruction seminars, the teachers from Schools B and C asked for more teachers to participate in this inquiry-based instruction.

Eight teachers from School A formed a professional group that met three times monthly. At the group meetings held during the first year, one teacher would deliver a keynote speech, which was followed by two group activities lasting for a period of two hours. The effectiveness of the group meetings and the learning process involved were evaluated based on a self-made check index completed by the researcher, videotapes of the group during activities, a feedback list, a review of learning reports from the teachers, in-depth interviews, and observation. The professional learning group from School A continued its activities in the second year. Schools B and C established professional learning groups in the third year, lasting for 6 months, while carrying out inquiry-based instruction in the classroom.

In total, 10 teachers participated in the study: two from School A (average age: 35 years), three from School B (average age: 33.3 years), and five from School C (average age: 39.8 years). All teachers in the study conducted inquiry-based instruction. School A had 80 students from two classes participate, School B was represented by 40 students from one class, and School C had 120 students from three classes participate. Purposive sampling was used for all students from the three schools listed above.

### *Description of Instruction*

Eight teachers from School A were responsible for the research and development of lesson plans, teaching materials, and teaching aids during the first year. Two of the eight teachers from School A led the inquiry-based instruction in the second year; these teachers were in charge of promoting this instruction in Schools B and C in the third year. Three teachers from School B and five teachers from School C performed the inquiry-based instruction. In total, 10 teachers from the three schools implemented this experiment via 10 curriculums that focused on internship and project production. Students integrated and generalized the knowledge from the curriculum by observing, questioning, experimenting, defining the problem, questioning again and rethinking, verifying, explaining, and obtaining feedback.

### *Research instruments: questionnaire on motivation for and interest in science learning*

The questionnaire used in this study to determine motivation for and interest in science learning was modified from the "Learning Motivation Scale for Elementary School Nature and Life Technology Courses" and the "Questionnaire on Learning Interest for Elementary School Science Courses" edited by Wu (2007), known for its excellent validity and effectiveness. The modified questionnaire adopted a five-point Likert scale; the higher the score, the higher the students' motivation and interest. For motivation for science learning, the questionnaire took into account self-efficacy, learning goals, performance goals, value orientation, and test anxiety. With regard to interest in science learning, the questionnaire included questions related to attitude towards science, learning atmosphere, learning difficulty, learning commitment, and learning participation.

### *School environmental context*

The purpose of this study was to evaluate the effectiveness of the High School Program assigned by the National Science Council, emphasizing inquiry-based instruction for training students how to find, explore, and solve problems. School A, the experimental school, was responsible for integrating science into the vocational high schools; this responsibility included integration of emerging technologies with the International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers (STCW) and the application of green energy technologies to establish environmentally friendly protocols.

In setting up its curriculum example, School A focused on a maritime curriculum to elevate the professional growth of teachers and enhance the learning experience for students. After 2 years of hard work, outstanding results were achieved. Sixteen projects were produced and awarded the Best Actuating Unit Prize of 2012 Student's Contest of Handmade Ship Models. The students participated in SSH (Super Science High School) in Japan and achieved outstanding performance.

Schools B and C, extension vocational campuses of School A, are located north and west of Taiwan, respectively. School B is in the city and School C near the ocean. Both schools are maritime vocational high schools with an extended history. The teachers at School B and School C were very passionate about teaching and dedicated to creating enhanced learning experiences for their students.

### Data analysis

The data collected for this study were analyzed using SPSS software. The statistical analysis included descriptive statistics, calculations of the mean (*M*) and standard deviation (*SD*), and the Student's *t*-test.

## Research Results

### Motivation for science learning

Table 1 shows the pretest and post-test Likert scores for the three vocational schools (Schools A, B, and C) regarding the motivation of the student to learn science. For School A, the self-efficacy, learning goals, performance goals, and value orientation pretest scores were 3.68, 4.03, 3.29, and 4.27, respectively; the corresponding post-test scores for School A were 4.17, 4.25, 3.76, and 4.33, respectively. Note that the post-test scores for these four categories were higher than the pretest scores. In contrast, the pretest score for test anxiety (a negative layer category) was 3.41, compared with the post-test score of 3.33. Thus, test anxiety decreased after conducting inquiry-based instruction.

For School B, the self-efficacy, learning goals, performance goals, and value orientation pretest scores were 3.20, 3.42, 3.11, and 3.58, respectively, with post-test scores of 3.44, 3.60, 3.36, and 3.71, respectively. Similar to School A, the post-test scores were higher than the pretest scores across the four areas tested. In this case, the pretest and post-test scores for test anxiety were 2.87 and 2.78, respectively, again showing a decrease in test anxiety levels following inquiry-based science instruction.

School C revealed self-efficacy, learning goals, performance goals, and value orientation pretest scores of 3.70, 3.78, 3.29, and 2.70, respectively, with post-test scores of 3.79, 3.82, 3.43, and 3.14, respectively. Similar to Schools A and B, the post-test scores were higher than the pretest scores. The pretest and post-test scores for test anxiety were 2.63 and 2.61, indicating a slight reduction in test anxiety.

To better understand the significance of various layers of science learning motivation with inquiry-based instruction, the Student's *t*-test was performed between sampling pairs after students completed the "Power Operation" course in the science curriculum (Table 1). Note that  $p < 0.05$  indicated significance.

For School A, a significant difference was noted between students' pretest and post-test scores for self-efficacy and performance goals ( $t = -3.72, p < 0.01$  and  $t = -2.98, p < 0.01$ , respectively). However, this was not the case for learning goals and value orientation ( $t = -1.39, p > 0.05$  and  $t = -0.51, p > 0.05$ , respectively) or for the anxiety scores ( $t = -0.50, p > 0.05$ ).

Similar to School A, a significant difference was noted between students' pretest and post-test scores for self-efficacy and performance goals ( $t = -2.57, p < 0.05$  and  $t = -2.22, p < 0.05$ , respectively); however, learning goals and value orientation categories indicated no significant difference ( $t = -1.85, p > 0.05$  and  $t = -1.48, p > 0.05$ , respectively). Likewise, students' pretest and post-test scores for "test anxiety" indicated no significant difference ( $t = -0.93, p > 0.05$ ).

For School C, similar to Schools A and B, a significant difference was indicated between students' pretest and post-test scores for value orientation ( $t = -3.51, p < 0.01$ ) but not for self-efficacy ( $t = -0.46, p > 0.05$ ), learning goals ( $t = -0.26, p > 0.05$ ), or performance goals ( $t = -0.64, p > 0.05$ ). Likewise, students' pretest and post-test scores for "test anxiety" revealed no significance ( $t = -0.13, p > 0.05$ ).

Table 1. Student's *t*-test analysis of the significant difference between students' pretest and post-test scores on Vocational Students' Motivation for Science Learning.

Motivation for science learning	Schools	Pretest		Post-test		<i>t</i> -value
		M	SD	M	SD	
Self-efficacy	A	3.68	0.58	4.17	0.54	-3.72**
	B	3.20	0.47	3.44	0.50	-2.57*
	C	3.70	0.65	3.79	0.58	-0.46
Learning goals	A	4.03	0.56	4.25	0.56	-1.39

Performance goals	B	3.42	0.50	3.60	0.52	-1.85
	C	3.78	0.53	3.82	0.50	-0.26
	A	3.29	0.33	3.76	0.67	-2.98**
	B	3.11	0.61	3.36	0.39	-2.22*
	C	3.29	0.711	3.43	0.68	-0.64
	A	4.27	0.49	4.33	0.54	-0.51
	B	3.58	0.51	3.71	0.59	-1.48
	C	2.70	0.48	3.14	0.36	-3.51**
	A	3.41	0.47	3.33	0.57	0.50
Value orientation	B	2.87	0.57	2.78	0.59	0.93
	C	2.63	0.79	2.61	0.69	0.13
Test anxiety						

*N* is the number; *M* is the mean; *SD* is the standard deviation.

*N* for School A = 20; *N* for School B = 30; *N* for School C = 18.

\*  $p < 0.05$ ; \*\*  $p < 0.01$ .

### Interest in science learning

Table 2 the significant difference between pretest and post-test scores among the three vocational schools, with regards to students' interest in learning science. For School A, the pretest scores for "attitude towards science", "learning atmosphere", "learning commitment", and "learning participation" were 2.69, 3.20, 3.34, and 3.59, respectively; the corresponding post-test scores were 3.89, 4.05, 3.94, and 3.76, respectively. Similar to the results for motivation for science learning, the post-test scores were higher than the pretest scores across the four categories listed. The pretest and post-test scores for "learning difficulty" (a negative dimension) were 3.22 and 2.28, revealing a decrease in perceived "learning difficulty" after inquiry-based instruction.

Similar to School A, School B's pretest and post-test scores for "attitude towards science", "learning atmosphere", "learning commitment", and "learning participation" were 3.22, 3.38, 3.21, and 3.19, respectively and 3.48, 3.43, 3.27, and 3.34, respectively, indicating higher post-test scores in these areas. A slight decrease was observed between pretest and post-test scores for "learning difficulty", 3.10 compared with 3.09, respectively, indicating a slight improvement after conducting inquiry-based instruction.

For School C, the pretest and post-test scores for "attitude towards science", "learning atmosphere", "learning commitment", and "learning participation" were 3.13, 3.34, 3.33, and 3.20, respectively, and 3.39, 3.46, 3.34, and 3.24, respectively. The post-test scores were higher than the pretest scores for all four categories, similar to the results obtained for Schools A and B. The pretest score for "learning difficulty" was 3.22 and the post-test score was 3.14, indicating a decrease in perceived "learning difficulty" after receiving inquiry-based instruction.

The Student's *t*-test was performed between sample pairs of the five science-learning interest categories to determine whether or not a significant difference existed after students attended a "Power Operation" course. The test results are shown in Table 2.

For School A, significant differences between students' pretest and post-test scores were found for attitude towards science ( $t = -6.39$ ,  $p < 0.001$ ), learning atmosphere ( $t = -6.36$ ,  $p < 0.001$ ), learning commitment ( $t = -4.51$ ,  $p < 0.001$ ), and learning difficulty ( $t = 5.68$ ,  $p < 0.001$ ). However, a significant difference was not observed between students' pretest and post-test scores for learning participation ( $t = -0.49$ ,  $p > 0.05$ ).

The results of School B differed from those of School A. In this case, a significant difference between students' pretest and post-test scores was evident for attitude towards science ( $t = -2.60$ ,  $p < 0.05$ ); however, such was not seen in the other categories: learning atmosphere ( $t = -0.56$ ,  $p > 0.05$ ), learning difficulty ( $t = 0.25$ ,  $p > 0.05$ ), learning commitment ( $t = -0.77$ ,  $p > 0.05$ ), and learning participation ( $t = -0.49$ ,  $p > 0.05$ ).

For School C, significant differences could not be established between the students' pretest and posttest scores in any of the five categories: attitude towards science ( $t = -1.51$ ,  $p > 0.05$ ), learning atmosphere ( $t = -0.70$ ,  $p > 0.05$ ), learning difficulty ( $t = 0.40$ ,  $p > 0.05$ ), learning commitment ( $t = -0.00$ ,  $p > 0.05$ ), and learning participation ( $t = -0.17$ ,  $p > 0.05$ ).

Table 2. Student's *t*-test analysis of the significant difference between students' pretest and post-test scores on Vocational Students'

### Interest in Science Learning.

Interest in science learning	Schools	Pretest		Post-test		<i>t value</i>
		M	SD	M	SD	
Attitude towards science	A	2.69	0.434	3.89	0.55	-6.39***
	B	3.22	0.54	3.48	0.58	-2.60*
	C	3.13	0.52	3.39	0.55	-1.51
Learning atmosphere	A	3.20	0.260	4.05	0.67	-6.36***
	B	3.38	0.46	3.43	0.45	-0.56
	C	3.34	0.78	3.46	0.62	-0.70
Learning difficulty	A	3.22	0.282	2.28	0.62	5.68***
	B	3.10	0.41	3.09	0.38	0.25
	C	3.22	0.69	3.14	0.77	0.40
Learning commitment	A	3.34	0.284	3.94	0.63	-4.51***
	B	3.21	0.34	3.27	0.42	-0.77
	C	3.33	0.46	3.34	0.94	0.00
Learning participation	A	3.59	1.27	3.76	0.58	-0.49
	B	3.19	0.46	3.34	0.45	-1.47
	C	3.20	0.52	3.24	0.76	-0.17

*N* is the number; *M* is the mean; *SD* is the standard deviation.

*N* for School A = 20; *N* for School B = 30; *N* for School C = 18.

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .

## 4. Discussion

The purpose of this research was to examine the impact of inquiry-based instruction on science learning motivation and interest. The participants included students from three maritime vocational high schools located north, west, and south of Taiwan. The similarities and differences among the three schools are outlined below.

### 4.1 Similarities

Inquiry-based instruction had a positive influence on students' learning motivation for all three schools. The average grades of the students increased. Significant variation was revealed between pretest and post-test scores for self-efficacy and performance goals for Schools A and B, and value orientation for School C.

A positive influence was evident between inquiry-based instruction and students' learning interest for all three schools. Again, the average grades rose. Significant variations were indicated in the comparison of pretest and post-test scores for attitude towards science, learning atmosphere, learning difficulty, and learning commitment for School A. For School B, significant variation was evident between pretest and post-test scores for attitude towards science.

### 4.2 Differences

After implementing inquiry-based instruction, the effect on learning motivation was the same for Schools A and B; however, it had a varied impact on students at School C. Significant variations were observed in self-efficacy and performance goals in the pre-test and post-test scores for Schools A and B; however, this was not the case for School C. At School C, significant variation was indicated for value orientation.

Inquiry-based instruction seemed to have the greatest positive effect on the learning interest of the students at School A, followed by Schools B and C. Significant variations were revealed between the pre-test and post-test scores for attitude towards science, learning atmosphere, learning difficulty, and learning commitment at School A, and for attitude towards science at School B. No significant variations were found among the five categories



for the learning interest of the students at School C. Consequently, School A had the best performance, followed by Schools B and C.

Our results indicated that inquiry-based instruction had a positive influence on students' learning motivation and interest. The study results are similar to those of Avery & Meyer (2012), Marshall & Horton (2011), Powell-Moman & Brown-Schild (2011), and Walker, McGill, Buikema & Stevens (2008). Additionally, the results from this study showed that inquiry-based instruction had various impacts on students' learning motivation and interest at different schools, and they verified the significance of the school environment context with regard to the implementation effect provided by Pea (2012). In this study, different environments profoundly influenced the effects of inquiry-based instruction in these three schools. For example, School A was an experimental school, where teachers were responsible for the success or failure of the High School Program. The 1-year operation of the professional learning group gave teachers the opportunity to fully understand this instruction; they achieved the best effect with program implementation. In contrast, School B, a city school, was an extension program of the experimental school (School A). At School B, only one class carried out the inquiry-based instruction; this instruction was applied in three curriculums within one semester, explaining the effect that was achieved. School C, located near the ocean, was also an extension of the experimental school. For School C, only one curriculum included inquiry-based instruction in three classes within one semester; consequently, the desired effect could not be achieved.

### Acknowledgements

The authors would like to thank the National Science Council of Taiwan, R.O.C., for financially supporting this research under contract no. NSC 102-3113-S-022-001-GJ.

### References

- Avery, L. M. & Meyer, D. Z. (2012). Teaching Science as Science Is Practiced Opportunities and Limits for Enhancing Preservice Elementary Teachers Self-Efficacy for Science and Science Teaching. *School Science and Mathematics*, 112(7), 395-409.
- Bell, R. L., Smetana, L. & Binns, I. (2005). Simplifying inquiry instruction: Assessing the inquiry level of classroom activities. *The Science Teacher*, 72(7), 30-33.
- Marshall, J. C. & Horton, R. M. (2011). The relationship of teacher-facilitated, inquiry-based instruction to student higher-order thinking. *School Science and Mathematics*, 111(3), 93-101.
- National Science Council, Taiwan. (2014). Retrieved March 10, 2014, from <http://w1.ceels.org/highscope/web/modules/tinyd0/>
- Pea, C. H. (2012). Inquiry-based Instruction: Does School Environmental Context Matter? *Science Educator*, 21(1), 37-43.
- Powell-Moman, A. D. & Brown-Schild, V. B. (2011). The Influence of a Two-Year Professional Development Institute on Teacher Self-Efficacy and Use of Inquiry-Based Instruction. *Science Educator*, 20(2), 47-53.
- Schneider, R. M., Krajcik, J. Marx, R. W. & Soloway E. (2002). Performance of students in project-based science classrooms on a national measure of science achievement. *Journal of Research in Science Teaching*, 39(5), 410-422.
- Singer, J., Lotter, C., Feller, R. and Gates, H. (2011). Exploring a Model of Situated Professional Development Impact on Classroom Practice. *Journal of Science Teacher Education*, 22, 203-227.
- Walker, C. L., McGill, M. T., Buikema, A. L. and Stevens A. M. (2008). Implementing Inquiry-Based Learning in Teaching Serial Dilutions. *Journal of College Science Teaching*, 37(6), 56-61.
- Whitworth, B. A., Maeng, J. L. and Bell, R. L. (2013). Differentiating inquiry. *Science Scope*, 37(2), 10-17.
- Wu Shih-Hsun (2007). *A study of the Han nationality students and the aboriginal students on their learning motives and learning interests in the science course*. Thesis, Graduate Institute of Mathematics and Science Education, National Pingtung University of Education, PingTung, Taiwan.
- Zangori, L., Forbes, C. & Biggers, M. (2012). This is inquiry ... right? Strategies for effectively adapting elementary science lessons. *Science and Children*, 50(1), 48-53.

# Innovation approaches for better self-assertion of the University of Zilina, Faculty of Special Engineering graduates in accordance with actual labour market needs

Mária Hudáková<sup>a</sup>, Mária Lusková<sup>b</sup>109

<sup>a</sup>University of Zilina, Faculty of special Engineering, Univerzitná 8215/1, 010 26 Zilina, Slovakia

<sup>b</sup>University of Zilina, Faculty of special Engineering, Univerzitná 8215/1, 010 26 Zilina, Slovakia

---

## Abstract

One of the basic criterions of the university education quality evaluation is also successful self-assertion of its graduates in specific field at the labour market. This positive information is important also for students of secondary schools who decide where to continue in their study. Neither the Faculty of Special Engineering (FSE) of the University of Zilina disposes with good evaluation. But the Faculty continually tries to improve the results of this criterion. The Faculty participates in many projects that help to improve this evaluation, e.g. it participates in the project Innovation and internationalization of education – tools of quality enhancement of the Zilina University in the European Education Area. The aim of this paper is point out – propose how to increase self-assertion of the graduates in specific field at the labour market through innovation of study programme and changes in approaches of university teachers to actual trends in economic environment. The paper is dealing with analysis of the needs and requirements of the labour market in Slovakia, evaluation of the FSE graduates self-assertion at the labour market in Slovakia. We would like to point out to the importance of the project tasks fulfilment and underline not only the innovation of the FSE study programme for better self-assertion of its students in practice but also the change of the university teachers approach. Without positive thinking for change, willingness and innovation of educational process elements it will not be functional.

© 2014 The Authors. Published by Elsevier Ltd.  
Peer-review under responsibility of the Sakarya University.

*Keywords:* innovation; study programme; graduates; self-assertion; labour market.

---

## Introduction

Prosperity of the university can be evaluated not only from the view of applicants' number but also from the view of graduates' assertion at the labour market. It is expected that information concerning the graduates' assertion at the labour market will play more and more important role in selection of the university by the secondary school graduates. Greater interest in university brings more students and more money. For the actual and also future university prosperity is very important to know assertion of the students at the practice and adapt the study programmes to the labour market needs.

The Faculty of Special Engineering of the University of Zilina in Slovakia (FSE) educates learned specialists in study programme Crisis Management that is oriented especially on public administration and self-administration. The basis of our paper is to point out that if the FSE wants to obtain better evaluation in the graduates' assertion in specific field it is needed to develop another new study programme Risk management oriented on business sphere.

The reason of this new study programme creation is also increasing perception of the need to manage risks in the world also from the side of non-financial organizations representatives that is not limited only on the insurance of supposed risk sources. Managers have to be prepared for important decision makings to ensure prosperity, financial stability and competitiveness in conditions of uncertainty and risk. The list of potential risk sources is continually extending and especially un-prepared organizations are in danger. To know the risks is the way how to avoid stress that comes with risk appearing just in the most inconvenient time.

---

\* Corresponding author. Tel.: +421 41 513 6766; fax: +421 41 513 6620.  
E-mail address: maria.luskova@fsi.uniza.sk

The important world investors say that they do not have aversion towards risk but have aversion towards surprise and therefore they ask greater transparency of enterprises to risk management. They are convinced that reliable risks management ensures less negative surprises, greater financial stability and provides opportunity for profits.

## Actual state of things

### *.1. Unemployment of the university graduates in the Slovak Republic*

Looking for self – assertion at the labour market is for many university graduates in Slovakia long-distance race. This fact confirm also data from the EU Statistical office (Eurostat) which say that one third of young university graduates, in age up to 25 years, in Slovakia has no work. [11]

Concerning the interest for study at a university in Slovakia, for the first time in year 2013 the number of applicants was lower than planned number of accepted university students for the study. As results from the Fig. 1 that compares number of applicants with number of people born in 1994 (primary age of the applicant) it is more than probable that this trend will not change in the next years and the drop of interest to study at the universities will continue and the supposed minimum will be achieved in years 2020 - 2022. Actual level could be approached around the year 2030. [2] This indicates that the universities will have to struggle for the student especially through proved quality what can be observed also at present.

The Slovak university students are aware that to find their first working position they need several months. E.g. Slovak graduates of economic fields reserved for finding their first job 4,6 months. Their European colleagues are greater pessimists and reckon with 5,5 months to find a work. This results from the survey Graduate Barometer 2013. [11]

In interest to improve their position at the labour market young people in Slovakia find their job already during their study. The diploma from the university is for them certain plus and competitive advantage. Achieving the maximum education and increasing educational level is not only the interest of individuals but also educational policies of all European economies.

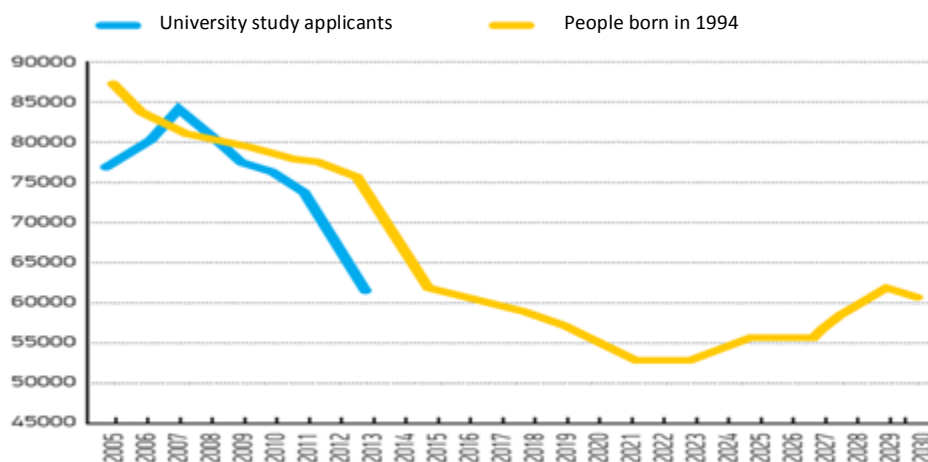


Fig. 1. Comparison of number of applicants for university study with number of people born in 1994 [2]

### *.2. Analysis of needs and requirements of the labour market in Slovakia*

The actual situation in Slovakia is characterized by turbulent and dynamic environment of the society life. According to professional crisis managers' this turbulency is caused by three forces – technologies, globalization and so called crisis syndrome of the 21<sup>st</sup> century. As a result of these motions the external business environment impacts have many times so unexpected occurrence and course that they cause critical or crisis consequences for the enterprises. [1]

Such situation influences management processes disturbed with traditional or new threats and various unexpected crises (e.g. financial, economic crisis). The managers are more and more forced to deal with risk management.

We can say that also in Slovakia the risk management trend is increasing. The reason is recent financial crisis that taught the Slovak managers not to underestimate the importance of external risk factors and their effect on enterprise, to assess the risk and response adequately. Based on the more studies, incorrect management of cash flow and insufficient financial risks management, i.e. missing early warning from the financial manager are the main reasons of enterprise failure during crisis in Slovakia [6]. We can say that the human factor is often the cause of serious problems, not only the workers but also especially managers. This fact confirms also research of the Institute for Crisis Management that says that incorrect management results in more than half enterprise crises, about 29 % are caused by workers and only 19% are caused by external forces.

Based on these trends it is needed to enforce the change in management. New conditions require new approaches. The basis is to accept legitimate requirements for changing managers competences. According to Antušák (2009) it is needed to complete general literacy of managers with crisis literacy element, Fig.2. The universal advice how to avoid the crises does not exist. There are several methods, tools and recommendations for elimination of impacts of actual structural changes and overcoming the crises. Their acceptance depends on each country, each organization. [5]

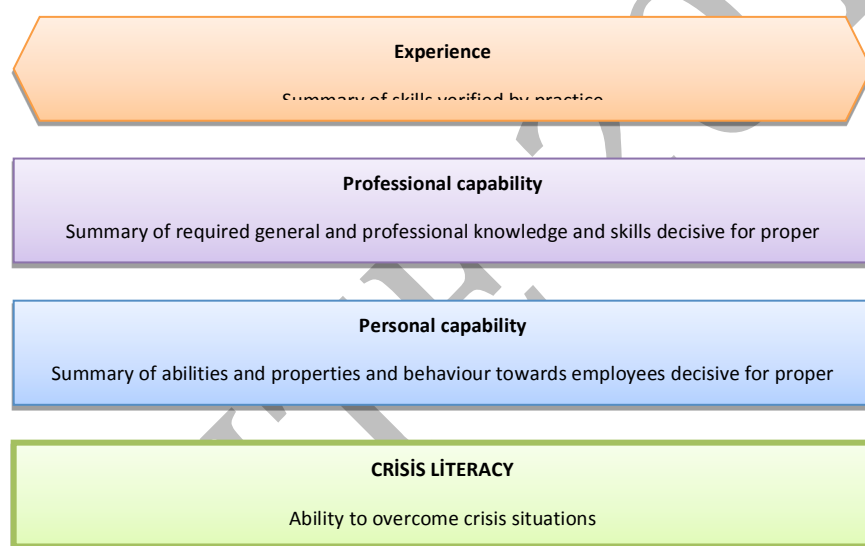


Fig. 2. Competence levels of manager of the 21<sup>st</sup> century [1]

## Actual situation in assertion of the FSE graduates at labour market

### .3. Evaluation of the FSE in Slovakia

FSE is the faculty of technological and managerial orientation. The basic task of the FSE is to provide university education and carry out research activities within accredited study programmes Security Management, Crisis Management, Rescue Services, Security and Critical Infrastructure Protection in bachelor, engineering and doctorate study. Faculty provides also continuing education in above mentioned accredited study programmes. Bachelor, engineering and doctorate study programmes are realized in full-time and external forms of study [12].

Graduates of the FSE study programme Crisis Management are theoretically prepared for the professional life in the governmental sphere as well as in the private sector. The main sphere of the competence within the public sector is connected to the roles and tasks of risk and emergency management in governmental institutions, municipalities, and in the environmental institutions. Graduates have accurate knowledge on risk solution

methods; they can provide risk analysis in various environments. They can deal with risk assessment and crisis elimination on management positions in public sphere or in (non) - industrial sector.

Evaluation of the Slovak universities and faculties, based on publicly available and verifiable data about education and research, realizes academic rating and ranking agency (ARRA). FSE is included in the group – other social sciences that involves social sciences faculties focused on public administration, international relations, political - economic science, mass - media communication and other related fields. In year 2012 FSE rating (53%) within this group was 3<sup>rd</sup> position. The evaluation criteria were as follows [2]:

- Education 74%
- Study attractivity 54%
- Science and research publications 13%
- Doctorate study 52%
- Obtained grants 73%

In comparison with evaluation in 2011, FSE moved from 6<sup>th</sup> to 3<sup>rd</sup> position especially thanks to increasing obtained foreign research grants.

#### *Actual situation in assertion of the FSE graduates*

According to the Academic ranking and rating agency [2] only 1, 42% of the FSE graduates (calculated as share of unemployed graduates towards all graduates for years 2010-2012) are unemployed. According to official information of the Ministry of Education, Science, Research and Sport of the Slovak Republic the employment rate of the FSE graduates for years 2011 and 2012 are 96, 2%. The total number of graduates in these years was 502. [14]

In year 2013 FSE realized own survey to find out the graduates assertion. From this survey results that 57% of graduates found their first work within 3 months, 23% within 6 months, 12% within 12 months, 6% found their first work during study. The greatest deal of the FSE graduates assertion is in the field of security and protection 36%. In public administration, self-administration is working 13%, in education 6% and 81% found their work in business (Fig.3).

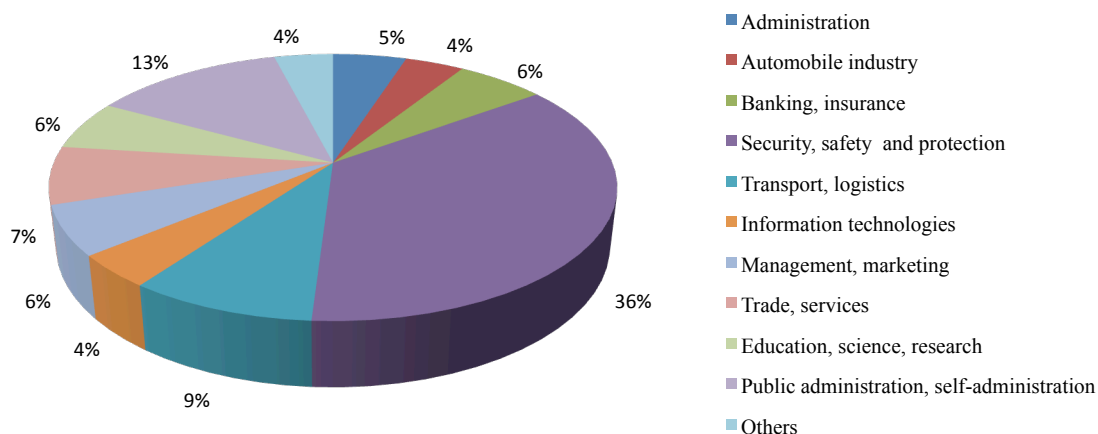


Fig. 3. FSE graduates assertion in specific fields [14]

In year 2011 Department of Crisis Management realized own survey. One of the aims was to find out the assertion of the graduates of study programme Crisis Management. From the total number of respondents 62% indicated that they are working in the field differing from their study (Fig.4). [10]

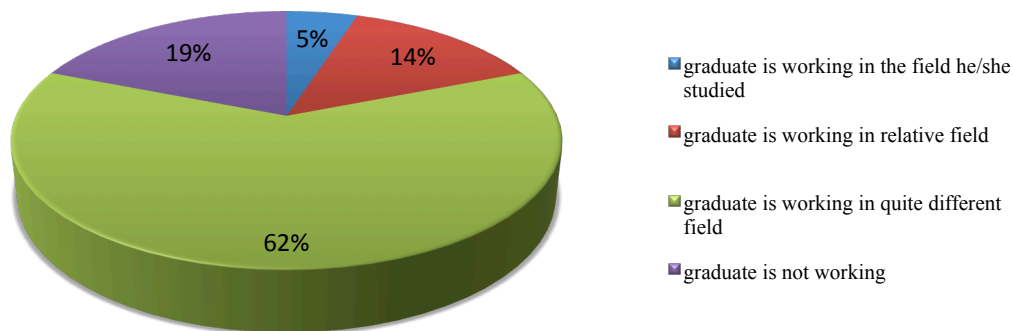


Fig. 4. Crisis Management department graduates assertion

From the survey results that only small number of graduates is employed in crisis management and it is evident that they do not use knowledge specifically oriented on crisis management but rather knowledge from general subjects. Majority of them (79 %) thinks that education should be more oriented on practice.

#### Approaches to better assertion of the FSE graduates at the labour market

The actual situation at the labour market in Slovakia should reflect in education or creation of new study programmes. For the FSE is necessary to prepare such study programme that would attract the students and allowed them to find better assertion in practice. Very important role should play internal factors of educational system, i.e. real quality of education, development of scientific - research activity, pedagogical abilities of teachers, their ability to gain the students and develop their creativity and self - activity, development of contacts with foreign schools, companies and other institutions, etc. Also the considerations about the content of the subjects, methods and tools of education are very important. This is connected with increasing demands for teachers, their ability to absorb latest knowledge as well as practical experience and effectively use them in educational process. [9]

#### 4. FSE approach to creation of new study programme

The basic condition for further FSE development is creating new study programme and improve the system of crisis management especially in private sector. FSE has started a lot of activities; it participates in various projects, e.g. Flexible and attractive study at the University of Zilina for the needs of labour market and knowledge society. The aim of this project was preparation of new bachelor study programme Risk Management and preparation of accreditation documents of study programme *Civil Protection* in English language.

The another project the FSE participates in is the project Innovation and Internalization of Higher Education – Tools of Quality Improvement at the University of Zilina in the European Higher Education. The aim of the activity 1.3 Creation and innovation of study programmes with emphasis on the needs of labour market and knowledge society (02/2013 – 06/2015) is to support the quality of education at the University of Zilina through innovative forms, attractive study materials and rationalization of study programmes.

The partial aims include:

- Design of new study programmes and accreditation documents of study programmes of the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> degree of higher education at the selected faculties of the University of Zilina.
- Analysis and comparison of existing study programmes with offer of the European universities.
- Creation of modern content of study programmes in accordance with the labour market needs and knowledge society.
- Improving graduates assertion at the labour market in accordance with their qualification.

Within the activities of this project the Crisis management department is working also on elaboration of accreditation documents for new study programme Risk Management

Within preparation of new study programme Risk Management the FSE management should:

- Support scientific-research activities in the field of risk management.

- Contact and cooperate with other EU universities of similar orientation in research and education.
- Develop cooperation with institutions and enterprises dealing with risk and crisis management in business environment.
- Ensure methodical and content preparation of new subjects.
- Support qualification growth of own teachers in risk management.
- Ensure publishing of literature in the field of risk and crisis management.
- Support courses, trainings and other forms of continuing education in the field of enterprise risk and crisis management.

The basis of new study programme Risk Management is to teach the students that risk management is rational systematic approach to work with risk and uncertainty (risk integration into key managerial decisions) with use of tools and methods of risk management. It is a part of management of the subject and is oriented on ensuring security or stability of managed system, analysis of risks and possible threats and looking for possible corrective measures to minimize negative effects and their growth to crisis. The aim of the effective risk management is not only to prevent business failures but to ensure proper management connected with measure of risk acceptability.

#### *.5. Approach of university teachers to own potential development*

The most valuable assets of organizations of this century are employees disposing of needed knowledge. The main competitive advantages are innovations, learning and ability of continual change. Just this competitive advantages comes from human potential not only of the FSE but from the whole University of Zilina. The teacher is essential element having impact on the quality of education. Practical encompassment of effective education is basic condition to ensure that the precisely selected content of the subjects is transformed to the system of graduates knowledge, abilities, capabilities and attitudes through effective forms and methods [9]. High teachers' professionalism, responsibility, credibility and team approach belong to the most important attributes.

Each teacher should have own self-development [7]:

- to have ability of career growth and self - development – reflect, diagnose, evaluate own pedagogical activity, to plan own growth and education, to have general cultural and social view, to know trends of society development and education, to be methodologically equipped for teacher's research,
- to identify with professional role and faculty/university – to identify with role of teacher, to know the aims of university development/FSE, to represent the profession, to communicate effectively with social partners.

For development of the university teachers' potential the University of Zilina undertakes to form environment supporting creativity and knowledge development, i.e. enables the teachers to educate, supports their initiative to increase their qualification and develop their abilities. Development of teachers' potential (capabilities, knowledge, skills, competences, etc.) contributes to building skillful and efficient human potential of the university. This systematic development permanently increases the value and prestige of the FSE and the whole University of Zilina [3].

Faculty and university have to provide various mechanisms that help teachers to increase their interest to develop their professional and personable potential. Within the university Blašková [4] recommends the approaches of teachers' potential development as follows:

- Coaching and mentoring are very suitable methods of complex potential development. These methods should be realized by seniors and colleagues gradually higher from the same department or other departments of the same faculty.
- Purposeful support of stays at foreign universities that the University of Zilina has good working relations with.

The content can be development not only scientific but also pedagogical cooperation with contributions for students and other colleagues. This form also helps to achieve the aims of departments, faculties and university.

- Selection and development of accurate people, their coordination to be able to cooperate and systematically develop their knowledge. One way of organizations development and obtaining competitive advantage at the market is to employ and support such people who are able to work, use and develop their knowledge potential [15].

## Conclusion

The results of the FSE work related to creation and realization of new study programme that should help the graduates to find better assertion at the labour market will depend especially on the teachers. It depends on each person if all his/her potential and knowledge wealth will develop, enhance and effective use for the benefit of students, colleagues, department, faculty and university. Educational and scientific - research activities together with moral profile of university teacher reflect in personality of university students. University teacher is main impulse of successful realization of educational process and starting up the progressive development of student personality. University teacher has to be carrier of properties and qualities that we want to develop in the university students.

## Acknowledgements

Publication of this paper was supported by the European Union within the project No. 26110230079 Innovation and internationalization of education – tools of quality enhancement of the Zilina University in the European Education Area.

## References

- [1] Antušák, E. (2009). *Crisis management. Threats, crises, opportunities*. Praha: Wolters Kluwer, 2009. 396s.
- [2] ARRA. (2013). *Evaluation of the faculties of universities*. [cit. 29. 04. 2014]. Available: [http://www.arra.sk/sites/arra.sk/files/file/Hodnotenie%202013/ARRA\\_Sprava\\_2013.pdf](http://www.arra.sk/sites/arra.sk/files/file/Hodnotenie%202013/ARRA_Sprava_2013.pdf)
- [3] Blašková, M. (2013) *Development of potential (capability) of university teachers - Development of Quality Culture at the University of Zilina on the Base of the European Standards for Higher Education, Operational program: Education*. Zilina: University of Zilina in Zilina
- [4] Blašková, M. (2010). Creative proactive-concluding theory of motivating, *Business: Theory and Practice*, 11 (1), pp. 39-48, DOI: 10.3846/btp.2010.05
- [5] Buganová, K. (2013). Risk management and Crisis management in the enterprise, In: *Methods and processes of enhancing crisis management education and preparation of inhabitants for solving crisis situations* : proceedings from international conference , Uherské Hradiště CR : Faculty of logistics and crisis management , Tomas Bata University in Zlín, p. 87-93.
- [6] CFO, (2013). *Risk management: The most important risks for the European Companies*. [cit. 25.02.2014]. Available: <http://www.cfo.sk/articles/risk-manazment-najvacsie-rizika-ktorym-celia-europske-firmy#.UjbZIMZM-Qo>
- [7] Kasáčová, B. & Kosová, B. 2006. *Competences and capabilities of teacher – European trends and Slovak approach*. Prešov: methodical-pedagogical centre in Prešov. 164 p.
- [8] Krištofik, P. (2010). *Lessons from crisis development*. [cit. 06.01.2010] Available: <http://www.financnymanazment.sk/2010-1/6-2010/Poucenia-z-krizoveho-vyvoja/>
- [9] Mika, V. T (2014). A competency approach and some pedagogical problems of education in the study programme Crisis Management. In: *Methods and processes of enhancing crisis management education and preparation of inhabitants for solving crisis situations* : proceedings from international conference, Uherské Hradiště CR : Faculty of logistics and crisis management , Tomas Bata University in Zlín, p. 264-274.
- [10] Moricová, V. (2012). Education of crisis managers focused on developing their personal qualities. In: *Security management and society* - proceedings from international conference. Brno ČR: Univerzita obrany. pp. 344-351.
- [11] Ram. (2014). Looking for employment is for graduates very hard work. [cit. 22. 04. 2014]. Available: <http://www.europskenoviny.sk/20/05/2014/hladanie-prace-je-pre-absolventov-riadna-fuska-tretina-mladych-slovakov-je-nezamestnanych/>
- [12] FSE ZU, 2014. *Annual report about faculty activities in 2013*, Žilina: Faculty of Special Engineering, University of Zilina
- [13] Sventeková, E. (2013). *Evaluation of educational activities at FSE in academic year 2012/2013*. Žilina: Žilina: Faculty of Special Engineering, University of Zilina
- [14] Sventeková, E. & Loveček T. (2012) Project-based teaching, practice in the academic environment. In: *Latest advances in educational technologies : proceedings of the 11th WSEAS international conference on education and educational technology*. Singapore City, Singapore : WSEAS Press, pp. 77-81.
- [15] Vetráková, M. a kol. (2006). *Human resources in the organization*. Banská Bystrica: Ekonomická fakulta UMB. 232 s.



# Innovation in ethical education by means of teachers' action research

Miroslav Valica, Terezia Rohn110

Miroslav Valica, Faculty of education, Matej Bel University, Ružová 13, Banská Bystrica, 974 11, Slovakia  
Terezia Rohn, Faculty of education, Matej Bel University, Ružová 13, Banská Bystrica, 974 11, Slovakia

---

## Abstract

In our study we examine the possibilities for using action research by teachers in planning innovative content and methodological changes in ethical education. We propose a model for the creation of an action research project that would enable teachers to effectively plan innovations in their own classes, by means of educational experiment.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* ethical education; action research; educational experiment; innovation.

---

## Introduction

Ethics teachers think routinely about their teaching and its influence on the cognitive, personal and socio-moral development of pupils. They adapt their teaching to their pupils' individual peculiarities, educational needs and interests, create favourable conditions for learning, and continually monitor the progress and results of teaching. Based on these factors they draw conclusions, reflect the educational context of the school and flexibly adapt their educational approaches to new conditions and requirements in education. They are *reflexive teachers who, in the process of choosing content, teaching strategies and methods, take into account the objectives of ethical education and the need for a structured curriculum, learning activities and tasks, motivation for pupils to learn and the creation of conditions for pupils' effective social learning, mode of interaction and communication in a class.*

The teacher of ethics should create his own **didactic concept** for educational situations based on knowledge of educational theory and its application to educational situations in ethics classes. Its practical application in school practice should be **validated by action research** based on specific educational phenomena and his idea of "how it should work".

## Action research in ethical education

Action research originated as a response to the inadequate influence of traditional research on change in practice and as a means of accelerating the necessary changes in practice (Hendl, J., 2008). Those who are affected by these changes actively participate in the creation of them. The research process is a process of learning and change. *It is of a liberating nature as it solves the problems of practice in order to improve it.*

Innovation in ethical education is linked to the permanent and systematic didactic reflection of a teacher, by way of action research in particular. It means the improvement of his educational activity by more precise, systematic feedback in relation to educational theory and the creation of a personalized teaching concept. Because according to our empirical findings ethics teachers seldom use action research in practice, we would like to point out its potential for the improvement and innovation of teaching and development of their professionalism.

In the Educational dictionary (Prucha J., Walterová E., Mareš J., 2003), action research is characterized as a type of educational research whose purpose *is to influence and improve a certain part of the educational practice directly*, and it addresses the current needs of educational institutions. It employs intervention strategies, and makes recommendations, which it also tries to implement. It continuously monitors the effects of changes.

---

\* Corresponding author. Tel.: +421 917 103 180  
E-mail address: miroslav.valica@umb.sk

Action research is usually short-term and implemented in a smaller research sample (e.g. one school class), and is focused on exploring and solving partial problems, which are not usually dealt with by traditional professional research. The results are applicable immediately, but their usefulness is limited to the studied group (Prucha J., 1995).

Turek (1996, p. 15) says that "action research is the practical research of teachers in the classroom or the kind of educational research carried out by teachers, which *responds to current problems in teaching (educational experimentation)*." He further states that action research is focused directly on improvement, enhancement, and positive influence on the teaching practice, while its results are immediately used in teaching practice. It is an integral part of the teaching process. According to this author, action research meets the following functions:

- Function of *practical research*, since its role is to study specific school situations and their positive changes, aimed at an improvement in the quality of education,
- Function of *methodological tool*, as it is aimed mainly at obtaining systematic knowledge and experience about the teaching processes and pupils' learning, and at seeking strategies, methods and procedures for the enhancement of teaching,
- *Incentive and regulatory* functions leading a teacher to self-reflection about his own work with the goal of improving his quality and professionalism.

The action research process can be of a cyclical and reflective nature, which determines the order of individual steps and phases. The cyclical nature of the examination process means that the major steps are repeated in a similar sequence, and reflectivity means that an essential part of each cycle is an evaluation of the process and results of examination.

The basis for the action research process is the teacher's own actions which result from reflection on a particular situation and lead toward a solution. The situation represents the action that the teacher examines and his actions should also lead to improvement of the examined situation.

On the basis of analysis of various approaches, we consider the *following procedure – cycle* to be appropriate for the planning and implementation of action research in ethical education focused on innovation of teaching (according to Turek I., 1996):

1. **Reflection**– the teacher thinks about the teaching process, wants to improve it, on the basis of his own experience finds out that some element of the educational process is not as efficient as it could and should be and that it would be possible to implement it better. It is usually *a part of the curriculum, teaching method, organization of teaching, method of examination and evaluation of pupils, pupil's attitude to teaching, subject popularity among pupils* and so on. On the basis of such analysis, he chooses the **research issue** he wants to deal with.
2. **Action research project**– the teacher should obtain detailed information about the selected issue, whether by more detailed study of literature or by consultation with colleagues. The outcome of the project should be an idea of *how the innovated teaching will be carried out* and how he will proceed in *gathering results of the proposed innovation*. He should determine a specific **objective (or objectives)** or alternatively research questions, and should determine the **research methods** to be used for the gathering of action research results. As far as possible several methods of data collection should be used to increase the objectivity, credibility and reliability of the research. In the action research plan, *the place of action research, the research sample, materials needed for action research, schedule of action research, and usage of action research results* should be determined.
3. **Action** – teacher implements the proposed plan in practice – he does an action research. **He continuously monitors the innovation's impact on the progress and results of the teaching process**. It is important to do the research honestly, impartially, responsibly, consistently and not to distort the results. Even the negative results can be a contribution to science, sometimes even more so than the positive results.
4. **Reflection**– the teacher evaluates the results, draws conclusions, **suggests recommendations for problem- solving in teaching practice**. If the results of action research are not convincing, the teacher can specify or extend the issue and repeat the action research. If the results are positive, the innovation will begun to be used in practice and will become a standard, integral part of the teaching process. The teacher suggests further innovation and the whole cycle is repeated.

It is assumed that the ethics teacher can create, implement and evaluate the contribution of action research, i.e. to develop and implement an action research project. He is able to:

- Identify **problems in ethics classes** that he needs to eliminate for better quality of teaching and to find new solutions,
- Create a certain concept of studying the didactical problem in ethics classes, i.e. to set **goals, or research questions** for which he is seeking relevant answers,
- Choose appropriate **methods of research** in order to solve the didactic problem in ethics classes,

- Carry out **educational experiment in the form of action research** in education usually focused on innovation of content, educational strategies and methods, organizational forms in selected thematic units.
- **Analyse and interpret** new experience obtained by employing innovative contents, methods and forms of teaching and **draw conclusions** for his own educational activities, and present the results to the teaching community.

## Planning action research in ethics classes (General framework)

### 1. Reflection

Action research represents *a controlled and systematic reflection of a teacher focused on the improvement of his educational activities by feedback*. The educational reflection of an ethics teacher on his own teaching process by means of educational experiment enables him to examine the innovation of a new curriculum or a new teaching method or methods in the process of teaching, based on identification of the **research problem**, where the class's learning results are evaluated (the change in their competence) before and after the experimental application of a new curriculum, methods of active learning, and so on. Research is carried out under real teaching conditions in order to increase efficiency and improve teaching conditions. Action research leads to the suggestions or discoveries and justification of educational content and methods, approaches, educational activities used by a teacher in his teaching.

### 2. Action research project in ethics classes by educational experiment

#### Research problem

Of what benefit is content/methodological innovation to my teaching of ethical education in the thematic unit selected; themes for the development of cognitive, personal, social and moral competence of pupils making use of my own didactic model for ethical education?

Note: The personal, social and moral competence of pupils developed in ethical education is defined in the National Educational Programme. Ethical education for ISCED 1-3, as the Framework Standards – content (cognitive), socio-affective and conative, for different levels of education, years and thematic units that form the framework for the school educational programme (curriculum, thematic plans and projects for ethics classes); by the specification of standards to learning objectives and content/curriculum that teacher takes into account (pupils' learning needs, conditions of school, class).

#### Main objective of research:

To identify the advantage of content/methodological innovation to my ethical education in the development of pupils' cognitive, personal, social and moral competence in the selected thematic unit, topic, based on the use of my own didactic model of ethical education.

#### Specific objectives:

1. To determine the level of cognitive, personal, social and moral competence of pupils/class characteristics in my ethics classes at the beginning of the chosen thematic unit, topic, on the basis of using my own didactic model of ethical education.
2. To determine the change in the level of cognitive, personal, social and moral competence of pupils/class characteristics in my ethical education at the end of the chosen thematic unit, topic, on the basis of using my own didactic model of ethical education.

#### Research questions:

1. What is the level of cognitive, personal, social and moral competence of pupils/class characteristics in my ethics classes at the beginning of the chosen thematic unit, topic, based on employment of my own didactic model of ethical education?
2. To what extent will the level of cognitive, personal, social and moral competence of pupils/class characteristics change in my ethics classes at the end of the chosen thematic unit, topic, on the basis of employing my own didactic model of ethical education?

#### Place of action research: school

#### Action research sample: class, chosen pupils, a pupil

**Methods of action research:** methods for the collecting and processing of research data, analysis and interpretation of research data, findings or justification of their choice

#### Material resources needed for action research: description of materials

### 3. Action-Tasks (including the time for completing the tasks):

1. To create projects for ethical education focused on innovations in teaching by employing content/methodological innovation in a selected thematic unit, topic.
2. To carry out assessment of pupil's competences/class characteristics at the beginning of the chosen thematic unit, topics in ethical education by relevant research and diagnostic methods (observation, sociometry, questionnaires, scales, interview, educational case studies, pupil's portfolio, etc.) according to the target and content orientation in teaching projects innovations.
3. To implement ethical education in selected thematic unit/topic according to the ethical education projects.
4. To make an ethical education analysis after each lesson (pedagogical diary, structured self-evaluation scale of a teacher, etc.).
5. To carry out assessment of pupil's competences/class characteristics at the end of the chosen thematic unit, topics in ethical education by employment of content/methodological innovation in the selected thematic unit, topic.

#### 4. Reflection

##### *Method of usage of the action research results*

Elaboration of an action research report or case study, which the ethics teacher presents to colleagues or publishes in a pedagogical periodical. The core of the research report will consist of: a theoretical framework for research, a research project for action research, projects for ethical education, the presentation and interpretation of results, conclusions and recommendations for teaching practice.

#### Conclusion

Knowledge and usage of action research increases the ethics teacher's professionalism, and his self-confidence, because it permits a merging of educational experience with the study of literature and research that is focused on solving his teaching problems. The ethics teacher becomes an innovator – a researcher in his own teaching, which also improves his professional status. He can justify and explain with greater validity, modify, successfully implement and introduce innovations into the teaching of ethical education.

This work was supported by the Agency for Research and Development under contract no. APPV-0690-10.

#### References

- BERTRAND, Z. (1998). *Soudobé teorie vzdělávání*. Praha: Portál.
- HENDL, J. (2008). *Kvalitativní výzkum. Základní metody a aplikace*. Praha: Portál.
- JANÍK, T. (2004). Akční výzkum jako cesta ke skvalitňování pedagogické praxe. In: MAŇÁK, J. – ŠVEC, V. *Cesty pedagogického výzkumu*. Brno: Paido, pp. 51-68.
- KOMPOLT, P. – TIMKOVÁ, B. (2010). *Pedagogická diagnostika a akční výzkum*. Bratislava: Univerzita Komenského.
- PRUCHA, J. (1995). *Pedagogický výzkum. Uvedení do teorie a praxe*. Praha: Karolinum.
- PRUCHA, J. – WALTEROVÁ, E. – MAREŠ, J. (2003). *Pedagogický slovník*. 4. vyd. Praha: Portál.
- TUREK, I. (1996). *Učitel a pedagogický výzkum*. Bratislava: Metodické centrum.

#### Instructions to Authors for Word template

##### 1. Locking of Copyright:

The copyright line is locked in the Procedia templates. The author may not edit the same and making it editable only PSMS. If there are any copyright changes required, you are requested to contact Journal Manager through Guest Editors. For editable the below mentioned steps must be followed:

##### Steps:

- Click on copyright statement
- Click on **Properties in Developer** tab
- Remove the checks from **Content control cannot be deleted** and **Contents cannot be edited** under **Locking** and then Press **ok**

##### 2. Docm format:

We have added macros in the Word templates for the below mentioned features. And since macros are not supported in doc and docx format we created the templates of all Procedia titles in .docm format.

- Removal of all highlights
- Accept track change
- Locking of Rules

If .docm format needs to convert in docx format then the following steps must be performed:

**Steps:**

- Press **Alt F11**
- Click on **Project (JID\_Template)**
- Enter "thomson" in Project Password
- Click on Microsoft Word Objects
- Click on **ThisDocument** under **Microsoft Word Objects**
- Delete all macros under **General**
- After deletion close the **Code** and **Project (JID\_Template)** windows
- From **File** menu click on save as type **.docx** option

### **3. Comments added in the margin in Word master templates:**

There are instances where author raising queries on what to do with key information lines such as “volume, page numbers”, “Conference title per issue” and “Copyright entity, year, copyright company Elsevier Ltd./B.V./Inc. and Organizer Name” in the copyright statement and for these concerns the comments have been inserted in the Word template to guide Author/JM about the information to be inserted by them in these fields.

**Comments removal from Print:** In Word 2007 and 2010 the comments present in a document get printed by default. If the authors do not want to get the comments appearing in print, the authors must remove the comments from the Word template before printing by changing the Print markup setting of word using the following steps:

**Steps:**

- Click the **File** tab
- Click **Print**
- Under **Settings**, click the arrow next to **Print All Pages**
- Click **Print Markup** to clear the check mark

**Instructions to Authors pages to be excluded from Print:**

- Click the **File** tab
- Click **Print**
- Under **Setting**, Type page numbers and/or page ranges separated by commas counting from the start of the document or the section. For example, type 1, 3, 1-5

### **4. PDF creation from Word master template:**

While creating PDF from Word template the below given steps should be followed to avoid difference in trim size and margins and to avoid decrease in resolution and size of the figure images of the Word template and the PDF created.

**Steps in Word 2007 and 2010:**

- Click the **File** tab
- Click **Print**
- Under **Printer** tab, select **Adobe PDF**
- Click **Printer Properties** link
- Under **Adobe PDF Settings** tab, click on **Edit** button
- Click on **Images** folder under **Standard**
- Make **Downsample** and **Compression** fields under **Color Images** and **Grayscale Images** "Off". And in **Monochrome Images** field make only Downsample "Off"

- Then click on **OK** and given name of the setting in **File name** tab and click on **save**
- Then again Under **Adobe PDF Settings** tab, click on **Edit** button
- Then click on **Color** folder
- Choose **Leave Color Unchanged** option under **Color Management Policies** tab then click on **OK**
- Lastly click on **OK** in **Adobe PDF Settings** tab
- Click **Save As**
- Under **Save as type**, click the arrow next to **PDF (\*.pdf)**
- Click **Save**

In Word 2003 the PDF can be created by using “Convert to Adobe PDF” symbol in tool bar or the required paper size can be adjusted in the Adobe PDF settings given in the Properties tab on the Print option. Please follow the above steps to avoid decrease in resolution and size of the figure images.

#### 5. Reference styles used in Procedia master templates:

Title	Reference style
AASPRO	2 Harvard
AASRI Procedia	3 Vancouver Numbered
APCBEE Procedia	3 Vancouver Numbered
EGYPRO	3 Vancouver Numbered
FINE	2 Harvard
IERI Procedia	3 Vancouver Numbered
MATPR	1a Numbered without article titles
MSPRO	2 Harvard
PHPRO	2 Harvard
PIUTAM	3a Embellished Vancouver
Procedia CIRP	3 Vancouver Numbered
PROCHE	3a Embellished Vancouver
PROCS	3a Embellished Vancouver
PROENG	1 Numbered
PROENV	3a Embellished Vancouver
PROEPS	3a Embellished Vancouver
PROFOO	3a Embellished Vancouver
PROMFG	1a Numbered without article titles
PROTCY	3 Vancouver Numbered
PROVAC	3a Embellished Vancouver
SBSPRO	5 APA
SEPRO	3a Embellished Vancouver
AQPRO	2 Harvard
UMKPRO	5 APA

# **Innovation of educational content and study materials with respect to knowledge society needs and labour market at the University of Zilina, Faculty of Special Engineering**

**Katarína Bugarová<sup>a</sup>, Mária Lusková<sup>b</sup>111112**

<sup>a</sup>*Faculty of Special Engineering, University of Žilina, 1. Mája 32, 01026 Žilina, Slovak Republic*

<sup>b</sup>*Faculty of Special Engineering, University of Žilina, 1. Mája 32, 01026 Žilina, Slovak Republic*

---

## **Abstract**

At present the quality of educational process is subject to continual incorporating new pedagogical approaches and techniques that are interconnected with results of scientific-research activity and the latest knowledge from practice. Design of new and innovation of existing study programmes in connection with preparation for complex accreditation follows establishment of new subjects prospectiveness of which depends also on trends in economic environment and business activities what underlies graduates self-assertion at the labour market. The very importance role plays also preparation of superior study materials. The paper is dealing with results achieved within innovation of educational content and study materials with respect to knowledge society needs and labour market at the University of Zilina and presents contributions resulting from these activities. It presents also the results of the survey carried out among the university graduates oriented on their satisfaction with skills and knowledge obtained during their study and their applying in practice.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* words: innovation; education; study materials; study programme; research

---

## **Introduction**

The important aim of the University of Zilina for years 2014 - 2020 in the field of education is innovation and specification of study programmes offer and also creation of appropriate structure of students' number in bachelor, engineering/master and doctorate study programmes. The university proceeds from assumption that the tendency to project oriented education will be supported and e-learning use especially in the 2nd and 3rd study degree. The offer of study in respective study programmes has to reflect the demand and self-assertion in practice refer to national qualification framework and national system of professions. Engineering/master study programmes will be selective for applicants who will meet the most challenging demands for this type of study. Similar demanding selection will be applied for doctorate study programmes, development of which will be in accordance with university orientation in scientific-research field [4].

## **Innovation of educational content with respect to knowledge society needs and labour market at the University of Zilina, Faculty of Special Engineering, Crisis Management Department**

Department of Crisis Management provides education in study programme Crisis Management and also ensures certain courses for other study programmes at the University of Zilina, Faculty of Special Engineering (FSE). Its educational and scientific-research activities are oriented on crisis management and risk management in all fields of the social life.

The number of students studying at the FSE in academic year 2011/2012 was 1151 students, in academic year 2012/2013 it was 1123 students. The average inter-year decline of the applicants for study at FSE is 4,5 %. The study groups of full-time study have stabilized numbers (from 22 to 28 students) in the long term. The free capacities are in study groups of the 1st and 2nd degree in external form of study. Decreasing interest to study in

---

\* Corresponding author. Tel. +421 041 513 6766

E-mail address: maria.luskova@fsi.uniza.sk

paid form study has persisting character. The question is how will be the development of situation in number of applicants after application of changes according to actually valid novelised act about universities in prepared accreditation documentation (extension of standard length of study, increasing number of lessons of contact education, etc.).

Although in year 2013 the number of students accepted for full-time study at bachelor degree was 85 students, only 60 students started their studying really. The situation was less favourable in external study form when from 12 accepted students only 10 students of bachelor degree started their studying really. In second degree 51 students of full-time study were accepted and 50 students started their studying really. In external study form 26 students were accepted and only 10 students started their studying really. In doctorate study all accepted students started their studying really, concretely 3 students in full-time study and 4 students in external form. The total number of students accepted for study programme Crisis Management was 181 students but only 137 students started their studying really. At the end of year 2013, 320 students were studying in study programme Crisis Management, from them 237 in full-time study (79,53 %) and 61 in external form (20,47 %). In comparison with year 2012 the number was minus 22 students, the decline was indicated especially in external form of study. At present 56,38 % of students are studying in bachelor degree and the rest in engineering degree.

The Faculty of Special Engineering does not plan to increase the number of students enormously in the future, the emphasis will be placed especially on quality of education and preparedness of graduates for practice.

Within the preparation for complex accreditation the Faculty of Special Engineering also re-evaluate and update the content of education and subjects within all four accredited study programmes. The aim is to adapt to the more and more demanding requirements put on the education of crisis managers, security managers and also managers in the field of rescue services and critical infrastructure protection as well as possible.

The study programme should be arranged thus the student would be able to obtain corresponding required competences and capabilities during the study already and will be of course developed after certain time of practice. Innovations should be also a part of realizing the pedagogical process.

The content structure of study programme should be subject to principles that would ensure its relative and potential success. The basic principles include [5]:

- **progressiveness** – study programme is arranged on the basis of actual and latest knowledge from the scientific research and requirements from practice and endeavours for their projection to the future to catch also supposed future development tendencies,
- **differentiation** – effort for elaboration of visible and effective difference as a source of competitive advantage, obtaining the respect and prestige,
- **compatibility** – accordance of basic content line with study programmes of prominent universities is source of credibility and assurance before excessive experimenting,
- **universality** - support of synthesizing aspect of managerial work and unforeseeable carrier perspective of student,
- **flexibility** – to assign sufficient extent for optional courses that should support progressivity and perspective of study programme,
- **chaining (as a part of flexibility)** - to meet the needs of practice and students interests the new study programmes are arranged on the basis of original study programmes,
- **stability** – to keep adequate period for realization of study programme without changes of its basic properties to allow it to ripen to target quality and so to avoid to ill-considered and early change.

The graduates of the FSE should be able to apply the methods of crisis events solution, to identify, analyse and assess risks in various environments and to manage preventive activities and adequate response to crisis events in public administration, manufacturing and non-manufacturing organizations and to eliminate their negative impacts on people, properties and environment. The Fig. 1 indicates the results of the survey realized among the FSE graduates where the students answered the question: “How are you evaluating the skills and knowledge obtained during your study at the FSE?” 35% of respondents are satisfied with the level of obtained skills and knowledge, 47% are more satisfied and 8% are very unsatisfied [1], [6].



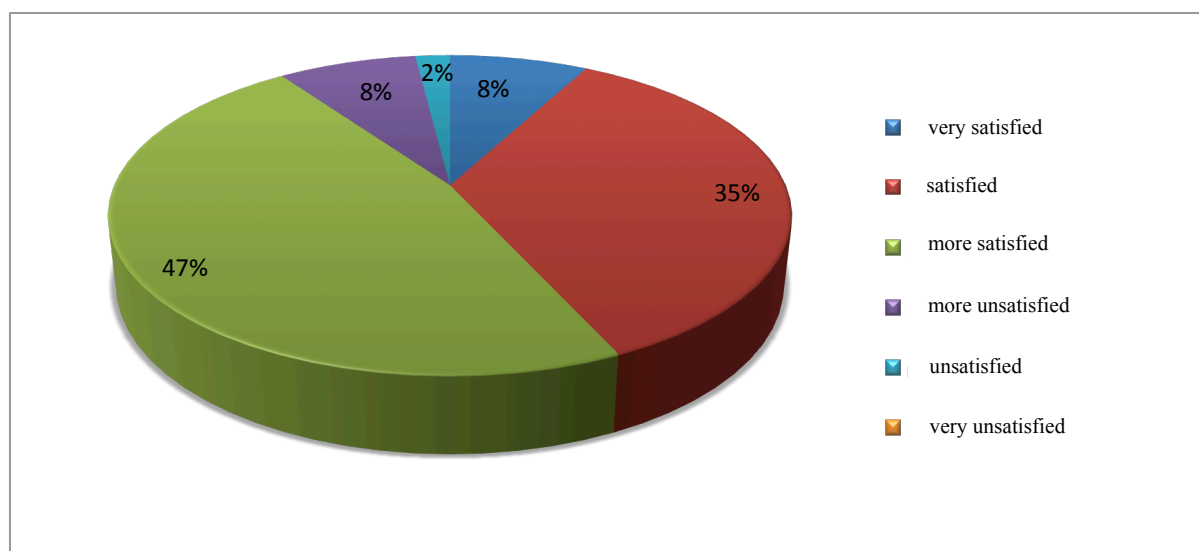


Fig. 1. Results of students' satisfaction evaluation with skills and knowledge

From the view of application of knowledge obtained during university study within their actual profession, 48% of respondents declared use of 41- 60% obtained knowledge (Fig. 2). If we consider that FSE educates the graduates for public administration sector as well as for business environment, this ratio is adequate.

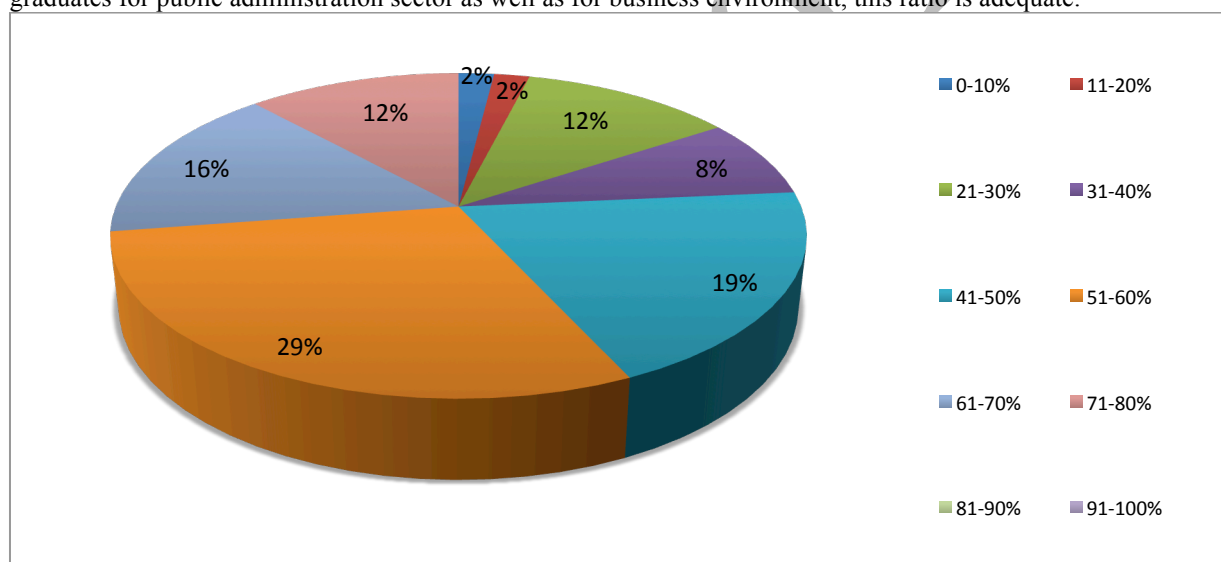


Fig. 2. Results of evaluation of applying knowledge in practice obtained during study

Department of Crisis Management presents results of the scientific research activities in the form of publication activities also at scientific conferences. In cooperation with Department of Security Management of the FSE each year organize international scientific conference "Solutions of Crisis Situations in Specific Environment" under the auspices of the University of Zilina rector and Ministry of Economy of the SR and Ministry of Interior of the SR.

In 2013 the FSE organized and ensured these scientific events:

- 18<sup>th</sup> International scientific conference "Solutions of Crisis Situations in Specific Environment", Zilina, Slovak Republic.
- 10<sup>th</sup> International scientific conference of young researchers and PhD. students "YOUNG SCIENCE 2013 – Science and Crisis Situations", Ostrava, Czech Republic.
- 2<sup>nd</sup> International scientific conference "Advances in Fire & Safety Engineering", Zilina, Slovak Republic.
- Professional seminar "Fire Safety of Constructions", Zilina, Slovak Republic.

- “Day of Working Opportunities”, Zilina, Slovak Republic.

In 2013 the FSE co-organized these scientific events:

- 10<sup>th</sup> International scientific conference of young researchers “TRANSCOM 2013”.
- Conference „Security and Crisis Management at Regional Level“, Faculty of Logistics and Crisis Management, Tomas Bata University in Zlín, Czech Republic.
- International scientific conference „Information Technologies, Economics and Law: state and development“, Červnivtsi, Ukrajina.
- The results of the scientific research activities are presented by the FSE staff at scientific conferences organized by the FSE and scientific events of other subjects at home and in abroad as well as by publishing in scientific and professional magazines and publishing books.

On the basis of actual results in scientific research activities, projects from home and foreign grant schemes, projects from structural funds, project of University Scientific Park and Research Centre of the Zilina University, centres of excellence and competence centres, centres of applied research one of the preferred research orientations at the University of Zilina is also Security (building complex security of society, crisis management and protection of persons, property, information and natural environment, increasing the level of critical infrastructure security, secure and ecological transport road and transport).

### **Innovation of study materials with respect to knowledge society needs and labour market at the University of Zilina, Faculty of Special Engineering, Crisis management Department**

During preparation of project, oriented on innovation and internalization of education – tools of quality improvement at the University of Zilina in the European Higher Education Area, one of the aims was also proposal of conception of attractive study materials creation and elaboration of methodology for producing multimedia study materials as repeatedly usable objects, stored in digital library that will be used for creating study resources for on-line education. Introduction of new methods into study programmes (virtual laboratories) will be a part of conception. The activity includes also pilot verification of preparation and creation of new attractive study materials based on the uniform university system supporting their quality assurance and possibility of use by other departments of the University of Zilina. For the purpose to achieve this objective, the faculties and departments of different orientation are selected so that the specifics could be identified and conditions for various needs of study programmes could be afforded. Within this activity new study programmes will be established and accreditation documentation of new study programmes for the 1st, 2nd and 3rd degree of higher education at selected faculties of the University of Zilina. Primarily the analysis and comparison of existing study programmes with offer of the European universities will be elaborated. Modern content of study programmes in accordance with labour market needs and knowledge society will be proposed to improve the assertion of university graduates at the labour market in accordance with obtained qualification [7].

Several subjects in the field of risk management, e.g. Management, Managerial methods and techniques, Business risks, Quality management, etc. were innovated at the Department of Crisis Management of the FSE in last time. Created educational materials relating to risk management include e-learning and university textbooks, e.g. Management – introduction to organization management in conditions of risk and crisis situations, Methods and techniques in the process of risk management, Risk management in enterprise (scripts Risk management in enterprise – practicum were also issued), Quality and risk management.



Fig.3. Selected publication outputs of the Department of Crisis Management for innovated subjects in last time

Financing necessary for outputs are obtained except national projects also from the European Union. Since the FSE ensures also education of foreign students in English language the study materials are created also in English. In dependence of financing the issues of book publications they are available in the University library of the Zilina University or they can be bought in the shop of the Zilina University publisher (EDIS). Students can find these study materials based on the above mentioned outputs in the form of e-learning for specific subject. These study materials are used by students not only during their study but also during elaboration of semester, bachelor, engineering, doctorate and other thesis. The publication outputs stored in the university library are available not only for the students but also for wide public.

Totally four textbooks and one script were issued at the Department of Crisis Management in 2012:

- Risk assessment of industrial processes (EL).
- Logistics and transport in crisis situations (EL).
- Risk management in enterprise.
- Economic theories.
- and script Risk management in enterprise – practicum.

In year 2013 four textbooks, scripts and professional book publication were issued:

- Crisis management in public administration.
- Management of social risks.
- Quality and risk management.
- Methods and techniques in the process of risk management.
- Planning and forecasting.
- Electronic scripts: Crisis management.
- Professional book publication Economics of crisis management.

In connection with solution of the project *Innovation and Internalization of Higher Education – Tools of Quality Improvement at the University of Zilina in the European Higher Education Area*, it is planned to elaborate new materials for education of other subjects. Specifically they include these university textbooks with year of issue 2014-2015:

- Psychology (for crisis managers and risk managers).
- Crisis Management.
- Protection of society – Fire protection.
- Management – introduction to crisis management.
- Information systems and application software as the decision making support tools in crisis management.

Based on the requirements of the public some special subjects were transformed to courses oriented on risk and crisis management from the view of process, methods, tools as well as human factor in crisis situations solution and risk management. Within the continuing education Department of Crisis Management provides module course "Effective crisis manager" oriented on education and training of the more and more actual crisis management problems and intended for wide public. The teachers and researchers also participate in activities within Children University that is very popular. The Children University enables to approach the potential students and arouse an interest in risk and crisis management in private and public sector [3].

Elaboration of the content of new engineering study programme "Risk Management" includes not only creation but also innovation of more study subjects. Based on the experience in the field of innovation of contents and study materials of specialized subjects successfully realized in last years these contributions were specified:

**Contributions resulting from innovation of contents and study materials of specialized subjects for the social practice:**

- Increasing the quality of educational process of selected subject.
- Increasing the students' motivation through new forms of education.

- Providing actual information for students based on the latest trends from practice and scientific-research work.
- Increasing the quality of pedagogical and scientific-research work of teachers and researchers of the FSE.
- Ensuring preparation, creation and issue of study materials (e.g. university textbook, scripts, e-books) and information-technological support of educational process through modern information technologies (e.g. e-learning).

**Contributions resulting from innovation of contents and study materials of specialized subjects for the economic practice:**

- Elaboration of new content of study plan for selected subject as well as new study materials is precondition for increasing know-how about the need and possibilities of risk management in various specific spheres of business environment not only for the students of the FSE but also for broad professional public what can have great impact on achieving positive economic results for organizations of private and public sector in present time of persisting effects of economic crisis.

**Contributions resulting from innovation of contents and study materials of specialized subjects for the business practice:**

- Widening the opportunities for self-assertion of the FSE graduates at the labour market.
- Dissemination of new knowledge in the field of risk management through the graduates in enterprise practice with aim to increase the success within planning, management and realization of selected managerial activities.
- New opportunity for the professionals from practice to obtain new information from the risk management through the study materials that will be available also for the wide professional public what can be precondition for successful realization of their business activities and increasing competitiveness of the organizations of private and public sector.

**Conclusion**

Publication activities at the FSE are connected especially with specific research and educational projects what is the condition of their quality. There is also support of internationalization of education through arranging the contacts and cooperation with international organizations and involving foreign experts in innovation of subjects' content. The scientific-research activity of the Department of Crisis Management is oriented on development of theory and practice of crisis management and risks management. It is focused especially on the issues of aims, activities content of crisis manager, crisis planning system, communication in crisis situations, sociological and social-psychological scope of crisis situations solution.

The basic aim is to increase the effectiveness of crisis managers' preparation at the FSE. Staff of this department is also dealing with complex risk assessment in social, technical, technological and natural environment, new methods and risk analysis processes, their rationalization for conditions of specific human activities, complex risk assessment and proposals of preventive measures of managerial and technological character. The basic aims include also enhancing the crisis planning system and its information system. The research work is oriented also on increasing the processes effectiveness of the emergency events and crisis situations in natural, social and business environment as well as their organizational, material and technical ensuring. In the last time the emphasis is put also on assessment of critical infrastructure functionality and its protection in crisis situations, solution of economic impact of catastrophes and proposal of optimization measures in this field.

## Acknowledgements

Publication of this paper was supported by the European Union within the project No. 26110230079 Innovation and internationalization of education – tools of quality enhancement of the Zilina University in the European Education Area.

## References

- [1] Annual Report the faculty of Special Engineering 2013. (2014). (on line, 20.04.2014) [http://www.fsi.uniza.sk/legislat/leg7\\_ine\\_dokumenty/vyrocná\\_správa\\_fsi-2013.pdf](http://www.fsi.uniza.sk/legislat/leg7_ine_dokumenty/vyrocná_správa_fsi-2013.pdf)
- [2] Buganová, K., Lusková, M. (2013). Creation and Innovation of Study Programmes with Emphasis on the Needs of Labour Market and Knowledge Society. In: INTE 2013 [elektronický zdroj] : international conference on new horizons in education : June, 25-27,2013, Rome / Italy : proceedings book. - ISSN 2146-7358. - [S.l.: s.n.], 2013. – Online <http://www.int-e.net/publications/inte2013v1.pdf>
- [3] Hudáková, M. (2012). Actual trends in education of managers in the world and in Slovakia. In: Acta Scientifica Academiae Ostroviensis. ISSN 1506-2864. Z. 1 (2012), s. 193-200.
- [4] Long-term intention of the University of Zilina in Zilina 2014 - 2020 (2014) (on line, 20.04.2014) In: [https://www.uniza.sk/document/DZ\\_2014\\_2020\\_7\\_1\\_2014.pdf](https://www.uniza.sk/document/DZ_2014_2020_7_1_2014.pdf)
- [5] Slávik, Š. (2007). Determinants of curricular development in the fields of study Management, and Economics and Business Management (in Slovak: Determinanty tvorby študijných programov v študijných odboroch Manažment a Ekonomika a manažment podniku). Available at <http://semafor.euke.sk/zbornik2007/pdf/slavik2.pdf>
- [6] Sventeková, E. – Loveček, T. (2012). Project-based teaching, practice in the academic environment In: Latest advances in educational technologies: proceedings of the 11th WSEAS international conference on education and educational technology (EDU '12) : Singapore City, Singapore, May 11-13, 2012. - ISSN 2227-4618. - [S.l.]: WSEAS Press, 2012. - ISBN 978-1-61804-093-0. - S. 77-81.
- [7] Švarcová, R. (2013). Project: Innovation and internationalization of education – tools of quality enhancement of the Zilina University in the European Education Area. 2013-2015, Code ITMS of project: 26110230079

# Innovations in ethical education: dilemmas in theory and practice

Petra Fridrichova<sup>113</sup>

*Matej Bel University in Banská Bystrica, Cesta na amfiteater 1, 974 11 Banská Bystrica, Slovakia*

---

## Abstract

Ethical education in Slovakia is based on project of education to prosocial behaviour which was created by R. R. Olivar from Spain. Its starting point is the development of sociability through a specific educational program, parenting style, and through specific methods. The study aims to identify opportunities of innovation in ethical education. The starting point is analyses of actually theoretical concepts of innovation in ethical education (innovation model of ethical education teaching, competence profile of ethical education teacher, content innovation of ethical education). Analysis is confronted with educational practice and view teachers the current state of ethical education and its perspectives.

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

**Keywords:** Innovation of ethical education; content innovation of ethical education; competence profile of ethical education teacher; theoretical concepts of ethical education innovation

---

## The current situation in the conception of ethical education in Slovakia

Ethical education in Slovakia proceeds from an educational project of pro-sociability created by R.R. Olivar. Its basis is the development of pro-sociability by means of a specific educational programme, educational style and specific methods. Ethical education is composed of ten foundational themes (open communication, human dignity, positive self-evaluation and positive evaluation of others, expression of emotions, empathy, assertiveness, real and figurative role models, creativity and initiative, helping – giving – sharing – pro-social behaviour, comprehensive pro-sociability) and six application themes (ethics – looking for the roots of pro-social behaviour, my family; ethics and economic values; ethics and religions; marital and parental education; environmental protection). The foundational themes represent a kind of overview of the personality and social skills acquired by a person who is able to:

- Live according to moral principles and ethics,
- Reach some level of self-reflection, self-development and self-management,
- Create and maintain healthy and positive interpersonal relations,
- Create and maintain a healthy, stimulating and non-threatening life environment.

The application themes represent a super-structural concept. The main idea of this concept is a confirmation of the morals and ethics in complex life-related themes. Progressively pupils are asked to explore the essence of pro-social behaviour not only in ethical but also in religious concepts, the link between ethics and economics, family life, sexual activity, and parenthood, as well as man's impact on his living environment or recognition of one's own abilities to contribute to sustainable development. It might seem that mastering the application themes is determined by an adequate knowledge of the foundational themes, but the State Educational Programme of the Slovak Republic Appendix Ethical Education (2011) does not support such a conclusion. An example of this is the topic *my family* or *Environmental protection*: they already appear at primary school level.

In the introduction to our paper we focused on a brief description of ethical education in Slovakia as characterized by the concept authors – R. R. Olivar and L. Lencz (1992). Ethical education has been accompanied by several problems and discussions since its formation. One of the recurring questions is the interchanging of ethical and religious education. A political decision, on the basis of which pupils may choose either ethical or religious education, led to the creation of two areas in Slovakia, (Eastern Slovakia, Kysuce and the Orava regions), where ethical education is not taught at all. Another question (of equal importance to ethical education practice) is an uncompleted and non-evaluated experiment that could have pointed out which methods and strategies are appropriate for a particular age group or a particular topic. Although ethical education's problems originated in the period when the subject was implemented, they are still relevant. We think that it is

---

\* Corresponding author. Tel.: +421 918 617 215

E-mail address: [petra.fridrichova@umb.sk](mailto:petra.fridrichova@umb.sk)

necessary to innovate and update the objectives and content of ethical education in relation to the social situation. This is the reason we decided to examine current perspectives on theoretical concepts of innovations in ethical education and to compare them with the possibilities of teachers themselves applying them to educational practice.

### **Theoretical concepts of innovations in ethical education in Slovakia**

There was some research in 2006-2010 in the Faculty of Education, at Matej Bel University, which focused on a comparative analysis of ethical education in the international context. It was the basis for identification of conceptual tendencies in ethical education or equivalent subjects in Europe. It was precisely this innovative direction of moral, personal and social education concepts that formed the basis for the ethical education innovation in Slovakia that extends to several areas:

- Content innovation,
- Innovative teaching model,
- Competency profile of an ethics teacher (Note: this model is not analyzed in our paper).

The content innovation of ethical education stemmed from the need to update the subject in relation to social change. The basis for the adjustments was the identification of key values to which the current concept of ethical education leads (more in Valica-Fridrichová, 2011). In primary education (ISCED 1) the aim of ethical education is a realization of the importance of friendship for self-development, for the creation and maintenance of good interpersonal (friendly) relationships, and for the understanding of moral principles. In lower secondary education (ISCED 2) the aim of ethical education is the development of responsibility. Initially, (in correspondence with the great diversity in age among pupils in lower secondary education), responsibility for oneself and one's own actions develops, in terms of the creation and maintenance of good friendly relationships, later it is understood in terms of social responsibility. In higher secondary education (ISCED 3), the core "value" of ethical education is morality, which should be interwoven with all components of life be it personal, social, as a partner or professional. Defining the key values of ethical education in individual classes is considered to be the main precondition for innovation of content for this subject as they indicate the goal of ethical education at the various educational stages (ISCED 1 – ISCED 3).

Another level of content innovation was to identify current social topics that so far are not included in the ethical education curriculum. The reason for their absence is first and foremost the period of time when the national curriculum of this subject was formed (for ISCED 2 and 3 it was in the 1990s of the 20th century, for ISCED 1 at the beginning of the new millennium) when many contemporary topics were not considered to be priorities of moral education at that time. More than twenty years later, however, topics that were not emphasized in the past (sustainable lifestyle, the technology boom and the related media pressure, ecological and environmental threats, religious tolerance, global terrorism, etc.) became crucially important to contemporary society.

We have not expanded the content of ethical education, but have tried to point out how is it possible to enrich the foundational and application themes with some current problems: media education, eco-ethics and global development education.

The topic, which seemed to be necessary at all levels of education, is media education. E. Balážová (2012) speaks in more detail about its aspects in relation to extending ethical education. The impetus for connecting media and ethical education became the prevention of cyber bullying, education in values in the virtual world, the ability to critically evaluate media content and consequently to choose appropriate programmes for self-development without putting in jeopardy one's own moral values. Another current topic for secondary education was to elaborate on the issues of eco-ethics. The reason for its integration was education in sustainable lifestyles. The content of primary education was influenced the most. Within this framework we connected individual (apparently isolated) topics through reflection on friendship. It is quite difficult for pupils of early school age to understand the philosophy and nature of topics such as empathy, assertiveness, human dignity, open communication, or pro-sociality. They are able to process concepts which are closer to their way of thinking, for example explaining these topics in terms of friendship, behaviour towards peers and older people by whom they are surrounded. We presumed that an increased emphasis on the principle of concrete examples in abstract topics would enable teachers to plan ethics classes in such a way that pupils would naturally learn the social skills they are either losing or not developing to a full extent because of an increased use of the internet and virtual communication. Another level of content innovation for primary education was the integration of selected topics of global developing education in ethical education. The objective of integrating these topics is to accelerate a tolerance of diversity among younger pupils (also by means of cognition of rights and obligations), to strengthen their willingness to help those in need and to become more sensitive to socio-wide problems.

The content innovation of ethical education does not interfere with the range of these subject topics. At its base is simply support of those areas that seem to be vital for contemporary moral education, on the basis of the acceptance of the current content and objectives of ethical education

The innovative model of ethical education was detailed in three main areas: pupils' pedagogical diagnostics, didactics and methodology of ethical education and action research. Inclusion of pedagogical diagnostics and action research in the model of ethical education teaching was supported by the presupposition that it is important to know their current state (pedagogical diagnostics) to plan personal and socio-moral development of pupils, and by proposing, carrying out and evaluating content and methodological innovative interventions (action research) we can change this state. The teaching model was revised primarily in the didactical and methodological sections. The basis of the change was the planning of ethical education based on a pro-active teaching model. Therefore, we focused on the creation of objectives and educational requirements in cognitive and affective (attitudinal) areas and subsequently on the creation of tasks focused on pupils' learning in the context of the established goals. The specific area of the ethical education teaching model was an elaboration of a number of methods and techniques of drama classes, methodology of games, methods of solving moral dilemmas, as well as discussion methods in relation to cognition of their roles in the process of ethical education in its individual phases (cognitive and emotional sensitization, reflection of values, class training, transfer to everyday conditions). A separate task of the methodological innovation of ethical education was to strengthen the utilization of literary, musical and visual arts for the development of the pupils' moral consciousness by their application in foundational and application themes (more in Šimonová, 2012; Lucinkiewiczová, 2012; Felix, 2012, 2013). The last of the innovative interventions was the elaboration of evaluation methodology in ethics classes, which is closely connected with pedagogical diagnostics and an operationalized choice of objectives geared towards the pupil.

### **Innovation of ethical education from the teachers' point of view**

The basis for the later verification of theoretical concepts of ethical education innovations in pedagogical practice was the education of teachers in two areas: expert competences and psycho-didactical and research competences. The goal of the first programme, focused on the development of expert competences, was to strengthen knowledge about media education, literary, musical and visual arts for all teachers (ISCED 1 – ISCED 3), about religions, economics, ethics, as well as eco-ethics for teachers in secondary education (ISCED 2 and 3); assertiveness and empathy as parts of friendship, and about the global development of teachers' education in primary education (ISCED 1). On the basis of education carried out, teachers prepared opportunities for ethical education content innovations according to a topic chosen for the particular year. We compared the innovation opportunities proceeding from teachers' real experience with theoretical suggestions for content expansion in particular topics. In general, we can state that while in the theoretical concepts authors suggested the content expansion almost in all thematic units of ethical education specified in the National Educational Programme for Ethical Education (2011), teachers' innovations were more differentiated and we can divide them to three groups.

The first group consists of teaching innovations similar to theoretical suggestions and dealt with all topics of ethical education. Such suggestions were connected with the integration of media, global developing education or with the application of arts. We assume that these topics were new for teachers and so they were unable to identify with any of the current thematical units. This gave them an opportunity to experiment with new dimensions in traditional topics of ethical education.

The second group was composed of innovations by teachers, which focused only on the foundational themes of ethical education. They were related mainly to the primary educational process of ethical education: empathy, assertiveness, communication, and positive evaluation of others. Teachers rarely found links between different areas suggested for innovation and application themes, or thematical units of ethical education. Another problem arose because teachers did not find a common denominator in empathy, friendship, positive evaluation or communication: namely friendship, which would have interwoven all of the themes and developed this aspect of ethics in primary education.

The third group of teachers are those who focused on the content innovation of application themes. Innovation, or to be more precise, extension of the basic curriculum, was limited to the elaboration of the application theme (for example, ethics and economic values, ethics – looking for the roots of pro-social behaviour, ethics and religions, etc.) in its elementary connotations. We presume that the main problem of this teachers' group, which was trained mainly at methodology and pedagogy centres (almost 90 % of the teachers involved), is the fact that they do not know anything about application themes. Before participating in our training, these teachers had a significant lack of knowledge about the individual application themes, so the elaboration of their themes was innovative from their own point of view (they worked out on a theoretical level a topic previously unknown to



them in order to create conditions for pupils' active learning in these areas).

Content innovation was the first step in the innovation process of ethical education. However, we were striving also to innovate education in terms of pro-active learning through the development of teachers' didactic competences. Many indicators of the efficiency of this model are not yet processed because at the present time teachers are completing its verification.

Provisional results indicated several problematic spheres of educational innovation:

- Teachers whose content innovation was only on the level of a deeper elaboration of already known and frequently taught themes (empathy, assertiveness, communication, positive evaluation): in educational planning they did not respect the strategy of ethical education and their lessons had a transmissive rather than pro-active model. Teachers were not pointing out the value of friendship manifested by such social skills as empathy, assertiveness, open communication, etc. Lessons took the form of practice or training in these social skills. In this group of teachers the applicability of the theoretical model was not proved in educational practice.
- Teachers whose content innovation was interwoven with the whole curriculum of ethical education: the educational projects created were focused on development of critical thinking through self-discovery and self-cognition through learning. Teachers alternated different educational methods, applied ethical education strategy and implemented value reflection. The only deficiency in these educational projects was the absence of evaluation criteria. The applicability of the theoretical model of ethical education was proved.
- Teachers who used art as a mean of achieving the objectives in their educational practice: the main deficiency of these groups was an inadequate differentiation between the means and goals of the education process. They perceived the reading of fairy tales, the deciphering of an illustration or work of art as an objective of the educational process, not as a means of moral education. Those who began to perceive the difference created lessons based on art and headed towards the fulfilment of the subject objectives through various additional tasks, using various educational methods (for example positive evaluation of others, open communication, tolerance, etc.). Such lessons met pro-active learning principles and also allowed the teacher to develop pupils' positive attitudes. On the other hand, teachers who put the objectives of art first had problems with their lessons planning, a fact which became apparent in the structure of individual lessons. Teachers primarily achieved the goals of literature, music or art, but the objective of ethical education kept a low profile. On the basis of this experience we can state that the methodology innovation of ethical education through art as a means of moral education is risky because teachers are sidetracked to develop aesthetic, not ethical feeling.

#### 4. Conclusions or ethical education perspective

We can sum up that the theoretical concepts of ethical education innovations have some strong, as well as weak points. However, the basis for innovation in any context is a well-prepared teacher who has expert, didactic and personal competences making presuppositions for:

- Bringing up to date and improving ethical education content according to social change;
- The educational process developing pupils' ability to reflect on their own behaviour and adjust it in terms of ethics;
- Teacher's self-development.

Ethical education is not a subject that would provide a general manual on how to make the world better or more moral. The concept of it, valid not only as it relates to this subject but also to other value-oriented subjects, helps pupils to see the world in a more complex way, reflect upon their actions and find various alternatives of how to respond in everyday situations.

*This work was supported by the Slovak Research and Development Agency under contract No. SRDA-0690-10.*

#### References

- Valica, M. – Fridrichová, P. Et al. (2011). *Modely výučby etickej výchovy a kompetenčného profilu učiteľa etickej výchovy*. Banská Bystrica : Faculty of Education, Matej Bel University.
- State Educational Programme of the Slovak Republic Appendix Ethical Education (2011). Bratislava : National institution of education.
- Lencz, L. (1992). *Pedagogika etickej výchovy*. Bratislava : Methodology and Pedagogy Centrum.
- Olivar, R. R.. (1992). *Etická výchova*. Bratislava : Orbis Pictus Istropolitana.
- Balážová, E. (2012). *Mediálna výchova v etickej výchove*. Banská Bystrica : Faculty of Education, Matej Bel University.

# Innovative educational activities using a model to improve cultural competency among graduate students

Kathleen Bauer<sup>a,114</sup>, Yeon Bai<sup>b</sup>

<sup>a</sup>Department of Health and Nutrition Sciences, Montclair State University, Montclair, New Jersey, 07043, United States

<sup>b</sup>Department of Health and Nutrition Sciences, Montclair State University, Montclair, New Jersey 07043, United States

---

## Abstract

In the United States, there are inequalities in all aspects of healthcare. The Campinha-Bacote Model of Cultural Competence in the Delivery of Health Care Services was used to design, implement, and evaluate a nutrition counseling graduate class focusing on improving cultural competency. Each assignment and activity addressed one or more constructs of the model. Examples included participation in a simulation to stimulate self-awareness, assessing cultural competence of a health organization to improve knowledge, using respondent driven interview questions to develop skills, and conducting a nutrition assessment of an individual across cultures. Students significantly improved ( $P < 0.001$ ) each aspect of the cultural competency model after completion of the course. The total competence score improved from “culturally aware” (score of 68.7 at pre-) to “culturally competent” (score of 78.7 at post-).

© 2014 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the Sakarya University.

*Keywords:* cultural competency; nutrition counseling; health education; multi-cultural education

---

## Introduction

In the United States, health care disparities plague health professionals. Inequalities exist in regard to access to healthcare, delivery of quality healthcare as well as health outcomes. Substantial health inequalities exist based on age, gender, race, ethnicity, education, income, disability, residence, and sexual orientation. In order to address this concern, professional organizations, institutions of higher education, and accrediting agencies involved in health care have focused on individual and organizational cultural competency as one line of attack. The Office of Minority Health (2014) defines cultural and linguistic competence as “a set of congruent behaviors, attitudes, and policies that come together in a system, agency, or among professionals that enables effective work in cross-cultural situations.”

Substantial population shifts also intensify the need for health care professionals to acquire culturally respective health care practices. According to the US Census Bureau (2014), beginning in the 1970s the United States has been moving toward a cultural plurality, where no single ethnic group is a majority. By 2050, non-Hispanic whites will become less than 50 percent of the total population of the United States. This population shift creates a myriad of health care challenges since each racial and ethnic group has unique linguistic patterns, cultural traits, and health profiles. In order to prepare future nutrition care professionals to work effectively with diverse populations groups, the Campinha-Bacote Model of Cultural Competence in the Delivery of Health Care Services was used to design, implement, and evaluate a nutrition counseling graduate class focusing on improving cultural competency.

## Research Design

### 2.1 Purpose of the Study

The premise of this pre- and post- comparison study was that an interactive course exposing students to theoretical and practical knowledge about cultural competence would be useful in improving culturally sensitive skills. The objective was to determine the effects of the course on the five constructs of the Campinha-Bacote Model as well as perceived cultural competence.

---

\* Corresponding author. Tel.: 973-655-7155.

E-mail address: bauerk@mail.montclair.edu

## *2.2 Conceptual Model and Educational Design*

The Campinha-Bacote Model of Cultural Competence in the Delivery of Health Care Services (2014) looks at cultural competence as a process in which the healthcare professional continually strives to work effectively within the cultural context of a client (family, individual or community). “It is a process of becoming culturally competent, not being culturally competent.” Five interdependent constructs of this model include cultural awareness, cultural knowledge, cultural skill, cultural encounter, and cultural desire. Cultural competence is influenced by working on any of these areas and strengthens the impact of the others on the journey towards cultural competence. Research of this model indicates that cultural encounters plays a pivotal role in the process having the greatest influence on the other four constructs. The following describes the constructs of this model and the specific learning experiences focusing on each construct used in the graduate classes. Although learning modules addressed one specific construct, one could make the case that individual learning activities likely addressed several constructs. An overview of constructs and learning experiences can be found in Table 1.

Cultural awareness is defined as “the deliberate self-examination and in-depth exploration of our personal biases, stereotypes, prejudices and assumptions that we hold about individuals who are different from us” (Campinha-Bacote, 2007). The goal of lessons and activities focusing on this construct was to develop an awareness of the cultural beliefs and values that influence conscious and unconscious thoughts and understand that these attributes create a bias of acceptable behavior. For one learning experience, students prepared and discussed collages illustrating cultural factors influencing their perceptions of the world. In order to challenge assumptions, students participated in Barnga, a simple card game simulation in which players needed to negotiate cultural clashes based on different perceptions and rules (Thiagarajan, 2006).

Cultural knowledge involves seeking and obtaining a sound educational foundation of diverse cultural groups regarding cultural values, health-related beliefs and practices and disease incidence and prevalence. As can be seen in Table 1 a variety of assignments and activities addressed this construct. In particular, the learning activities focused on cultural terms, cultural competency models, ethnopharmacology (scientific study of medicinal practices of cultural groups), cultural values, health disparities, organizational cultural competence, and in depth investigation of selected cultural groups focusing on ethnicity, disabilities, and lifespan issues.

Cultural skill is the ability to use appropriate cross-cultural communication skills to collect relevant cultural data and health histories and provide an appropriate and sensitive nutrition intervention. Students learned skills through, videos, readings, lectures, in class technique practices, and working with volunteer clients to practice cross-cultural interview techniques.

Cultural encounters with individuals from diverse cultural backgrounds encourage practitioners to appreciate alternative interpretations of reality and possibly question pre-existing beliefs about a specific cultural group. Encounters create opportunities to develop attitudes congruent with cultural competency, such as appreciation and respect. Throughout the course students participated in a variety of cross cultural encounters through readings, videos, presentations, cross-cultural interviews, and individual field trips. One component of the course was an eight-week book club. Students read *The Spirit Catches You and You Fall Down – A Hmong Child, Her American Doctors and the Collision of Two Culture* by Anne Fadiman and winner of the 1997 National Book Critics Circle Award for nonfiction. Students read assigned chapters, journaled answers to assigned questions, and participated in class discussions regarding their readings.

Cultural desire is the motivation of healthcare professionals to engage in the process of becoming culturally competent. By valuing diversity practitioners are more likely to provide appropriate and compassionate service and meet the needs of their clients. During the course the importance of valuing the process desire was discussed. No activity was identified that could adequately address this construct.

### 2.3 Sample

Thirty-four students enrolled in two separate graduate classes participated in the spring of 2010 and 2011. All students were working on obtaining a Master of Science degree in Nutrition and Food Science with a concentration in nutrition education. Combined data indicated that 27 participants were 20-29 years old, 2 were 30-39 years old, and 5 were 40 to 49 years old. Racial data indicated that 28 were Caucasian, 5 were African American, and 1 was Asian. There were 3 male and 31 female participants.

Table 1: Education Experiences Based on Constructs of the Campinha-Bacote Model of Cultural Competence of Cultural Competence in the Delivery of Health Care Services for Students Enrolled in a Graduate Nutrition Counseling Course (n=34)

Construct*	Education Experiences
Awareness	<ul style="list-style-type: none"> <li>• Development and presentation of cultural collage of self</li> <li>• Barnaga Simulation of cross cultural communication</li> </ul>
Knowledge	<ul style="list-style-type: none"> <li>• Terminology and definition matching activity</li> <li>• Cultural competency models and cross cultural counseling algorithm lecture</li> <li>• Reading and writing quiz questions of two articles on ethno pharmacology</li> <li>• Cultural values contrast activity</li> <li>• Using the internet to assess and compare health disparities in various states</li> <li>• Investigation of a culture and detailed written report</li> <li>• Investigation and written report of one segment of the lifespan</li> <li>• Cultural competence assessment of a health organization, such as a health clinic</li> </ul>
Skill	<ul style="list-style-type: none"> <li>• Various training videos focusing on working with an interpreter and obese individuals and communicating with hearing impaired, people with disabilities, and selected religious and ethnic groups</li> <li>• In class practice using relationship building counseling responses</li> <li>• In class experience using respondent-driven interview questions</li> <li>• Conducting a guided interview across cultures using respondent driven interview questions with a volunteer client</li> <li>• Interview and report of a counsellor who works with an identifies segment of the lifespan</li> </ul>
Encounter	<ul style="list-style-type: none"> <li>• Various videos including a disability dance video, A Class Divided, Disability Awareness, Unnatural Causes, and Weight Bias in Health Care</li> <li>• Book club: Reading, journaling, and discussing The Spirit Catches You and You Fall Down</li> <li>• Various encounters with a specified cultural group including an in person interview and a field trip to cultural neighbourhood or event</li> <li>• In class presentation on investigation of a culture</li> <li>• Lifespan poster session</li> <li>• Interview and nutritional assessment of an individual representing one segment of the lifespan</li> </ul>

\*Cultural desire was not part of this table since there were no specific educational experiences addressing this construct.

### 2.4 Methods

IRB approval was granted from Montclair State University. All students were voluntary participants, and were notified of the experimental evaluation of the course. Participants signed informed consents. All data collection was done by research assistants and all evaluation forms were coded. Coded evaluation forms were made available to the instructor at the end of the course after students received their grades.

Table 2. Evaluation of Cultural Competency Constructs of the Campinha-Bacote Model of Cultural Competence in the Delivery of Health Care Services of Students Enrolled in a Graduate Nutrition Counseling Course (n=34)

Construct	Pre-	Post-	F	p
Total	68.7 (6.9)	78.7 (6.1)	64.6	P<0.001
Awareness	14.2 (1.7)	15.9 (1.8)	22.13	P<0.001
Knowledge	11.6 (2.1)	15.1 (1.7)	67.2	P<0.001
Skill	12.9 (1.9)	15.9 (1.6)	89.2	P<0.001
Encounter	13.1 (1.7)	14.3 (1.5)	15.1	P<0.001
Desire	16.8 (2.1)	17.4 (1.8)	3.05	P=0.09

## Evaluation

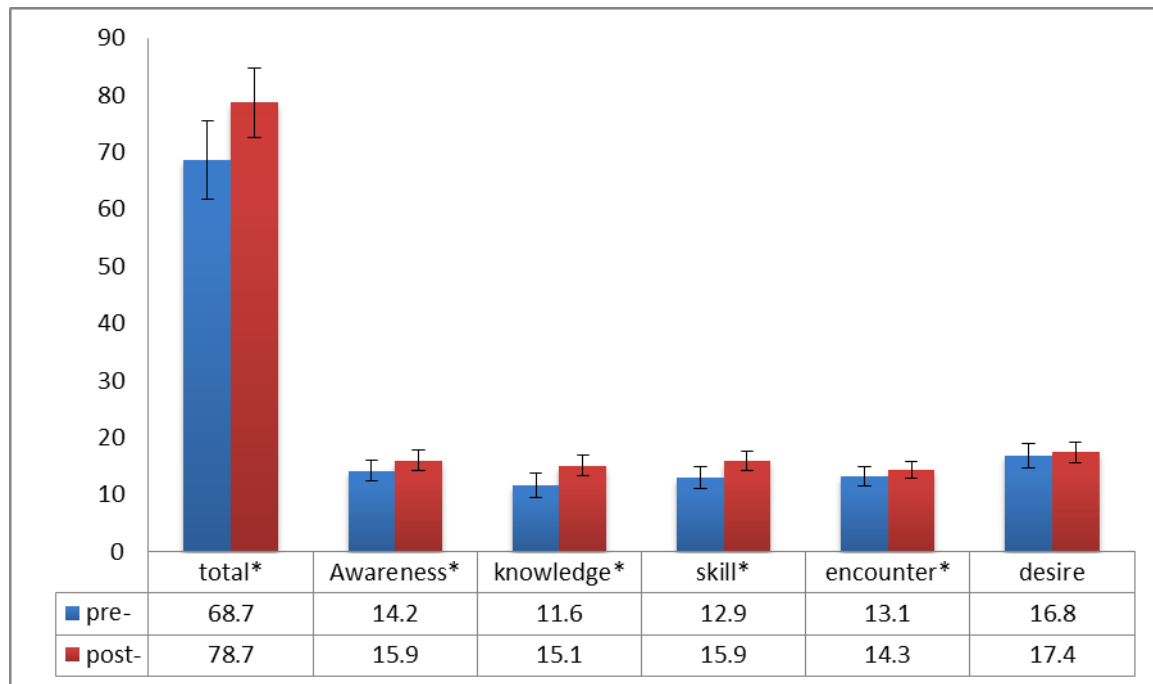
A pre and posttest using the Inventory for Assessing the Process of Cultural Competence among Healthcare Professionals – Revised (IAPCC-R), 2002, was used to measure overall cultural competency as well as the five constructs of the Campinha-Bacote Model. The IAPCC-R is a pencil/paper self-assessment tool and has a Likert-type scale with 25 items. Response options ranged from 1 (strongly disagree) to 4 (strongly agree). The total scale ranges from 25 to 100. A score of 25 to 50 indicates cultural incompetence, a score of 51 to 74 reflects cultural awareness, and a score of 75 to 90 specifies cultural competence, and a score of 91 to 100 designates cultural proficiency. This tool has been used extensively within the United States and has been tested for reliability and validity for health care professionals. Reliability studies conducted in 12 states have yielded an average reliability coefficient Cronbach alpha of .82 (Campinha-Bacote, 2007).

A repeated measure ANOVA was used to analyze the results. In addition students were queried for their impressions of the effectiveness of the course on their overall cultural competency. Also journal entries regarding reading assignments and open –ended questions on the final evaluation provided qualitative evaluation data. Thirty-four students enrolled in two separate graduate classes participated in the spring of 2010 and 2011.

## Results

### 4.1 Quantitative

Evaluation of cultural competency constructs of the Campinha-Bacote Model improved significantly after completion of the course. See Table 2. The total competence score improved from “culturally aware” (score of 68.7 at pre-) to “culturally competent” (score of 78.7 at post-). The scores for each construct of the model also improved after completion of the course. In addition, students perceived that a course providing multiple interactive activities addressing constructs of this model was very useful. See Table 2 and Figure 1.



\* indicates significant difference at  $p < 0.01$

“desire” was not significantly difference ,  $p = 0.09$

Figure 1 Evaluation of Cultural Competency Constructs of the Campinha-Bacote Model of Cultural Competence in the Delivery of Health Care Services of Students Enrolled in a Graduate Nutrition Counseling Course

#### 4.2 Qualitative

Journals were submitted directly to the instructor and designed to allow reflection of readings and course content. Students used them to examine their own beliefs and biases. This qualitative feedback allowed the instructor to observe trends or changes in student opinions and reactions. The following are some excerpts from journal entries:

- I was fascinated by what I have read so far about the Hmong and their culture. Living in only one section of the world, I have fallen victim to general prejudices that occur when we are introduced to something completely foreign to what we are accustomed to.
- This reading has reminded me that not everyone I counsel is going to believe me when I tell them that changing their dietary habits may help them get better.
- I did not cringe or squirm (as I thought I might) when I read about the pig’s throat being slit because I began to understand the practice as something very special and sacred to the Hmong. I ask myself, “Who am I to judge the beliefs and practices of other people?”

#### 5. Conclusion

A number of government organizations emphasize the need to prepare health practitioners to work effectively with diverse population groups. As stated in the Health and Human Services *Action Plan to Reduce Racial and Ethnic Disparities: A Nation Free of Disparities in Health and Health Care* (2011): “The ability of the healthcare workforce to address disparities will depend on its future cultural competence and diversity.” In addition the principal standard of the *National Standards for Culturally and Linguistically Appropriate Services in Health and Health Care* (2013) states: “Provide effective, equitable, understandable, and respectful quality care and services that are responsive to diverse cultural health beliefs and practices, preferred languages, health literacy, and other communication needs”.

Clearly educational institutions have the ability to be a conduit for helping to meet these goals. The findings of this evaluation of two graduate nutrition counseling classes indicated that learning modules focusing on

experiential learning activities and designed to address constructs of the Campinha-Bacote Model can help develop levels of cultural competence. These findings were in accord with empirical findings from studies of cultural competence workshops (McDougle, Ukockis, Adamshick, 2010), undergraduate and graduate courses focusing on cultural competence (Brathwaite, 2012), and immersion in a different culture (Wright & Lundy, 2014).

## References

- Brathwaite, A.E.C. (2005). Evaluation of a cultural competence course. *Journal of Transcultural Nursing* . 16, 361-369.
- Campinha-Bacote, J. The Process of Cultural Competence in the Delivery of Healthcare Services. <http://www.transculturalcare.net/>. Accessed May 23, 2014.
- Campinha-Bacote, J. (2007). *The Process of Cultural Competence in the Delivery of Healthcare Services The Journey Continues* (5th ed.). Cincinnati, OH: Transcultural C.A.R.E. Associates.
- HHS Office of Minority Health. (2013). *Enhanced National Standards for Culturally and Linguistically Appropriate Services in Health and Health Care*. [https://www.thinkculturalhealth.hhs.gov/Content/clas.asp#clas\\_standards](https://www.thinkculturalhealth.hhs.gov/Content/clas.asp#clas_standards). Accessed May 27, 2014.
- U.S. Department of Health and Human Services. (2011). *HHS Action Plan to Reduce Racial and Ethnic Disparities: A Nation Free of Disparities in Health and Health Care*. Washington, D.C.: U.S. Department of Health and Human Services.
- McDougle L, Ukockis G, Adamshick L. (2010). Evaluation of a new cultural competency training program: CARE Columbus. *Journal of the National Medical Association*. 102, 756-60.
- Thiagarajan, S. (2006). *Barnga 25th Anniversary Edition: A Simulation Game on Cultural Clashes* (3<sup>rd</sup> ed.). Boston, MA: Intercultural Press.
- US Department of Health and Human Services, Office of Minority Health.
- <http://www.minorityhealth.hhs.gov/templates/browse.aspx?lvl=2&lvlID=11#sthash.77OgvoYS.dpuf>. Accessed May 22, 2014.
- US Census Bureau. Available at: <http://www.census.gov>. Accessed April 14, 2014.
- Wright, L. & Lundy, M. (2014). Perspectives of cultural competency from an international service learning project. *Academy of Nutrition and Dietetics*, <http://download.journals.elsevierhealth.com/pdfs/journals/2212-2672/PIIS2212267214002305.pdf>. Accessed May 23, 2014.