

Turkish Online Journal of Educational Technology

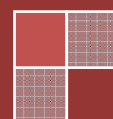
Special Issue for IETC, ITEC & INTE 2019
DECEMBER 2019

Volume 2

Prof. Dr. Aytekin İşman
Editor-in-Chief

Prof. Dr. Jerry WILLIS - ST John Fisher University in Rochester, USA
Prof. Dr. J. Ana Donaldson - AECT President
Editors

Assist.Prof.Dr. Fahme DABAJ - Eastern Mediterranean University, TRNC
Associate Editor





**THE
TURKISH ONLINE
JOURNAL
OF
EDUCATIONAL
TECHNOLOGY**

December 2019

Special Issue for IETC, ITEC & INTE 2019

VOLUME 2

Prof. Dr. Aytakin İşman
Editor-in-Chief

Editors

Prof. Dr. Jerry Willis
Prof. Dr. J. Ana Donaldson

Associate Editor

Assist. Prof. Dr. Fahme Dabaj

ISSN: 2146 - 7242

Indexed by

Education Resources Information Center - ERIC

Copyright © THE TURKISH ONLINE JOURNAL OF EDUCATIONAL TECHNOLOGY

All rights reserved. No part of TOJET's articles may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without permission in writing from the publisher.

Published in TURKEY

Contact Address:
Prof. Dr. Aytekin İŞMAN
TOJET, Editor in Chief
Sakarya-Turkey

Message from the Editor-in-Chief

Dear Colleagues,

We are very pleased to publish Special Issue Volume 2 for IETC, ITEC & INTE-2019 conferences. This issue covers the papers presented at International Educational Technology Conference, International Teacher Education Conference & International Conference on New Horizons in Education and International Trends and Issues in Communication & Media Conference. These papers are about different research scopes and approaches of new developments and innovation in educational technology, teacher education and distance education.

Call for Papers

TOJET invites you article contributions. Submitted articles should be about all aspects of educational technology. The articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to TOJET. Manuscripts must be submitted in English. TOJET is guided by its editors, guest editors and advisory boards. If you are interested in contributing to TOJET as an author, guest editor or reviewer, please send your CV to tojet.editor@gmail.com.

December 15, 2019

Prof. Dr. Aytekin ISMAN

Sakarya University

Editorial Board

Editors

Prof. Dr. Aytekin İşman - Sakarya University, Turkey
Prof. Dr. Jerry Willis - ST John Fisher University in Rochester, USA
Prof. Dr. J. Ana Donaldson - AECT President

Associate Editor

Assist.Prof.Dr. Fahne Dabaj - Eastern Mediterranean University, TRNC

Editorial Board

Prof.Dr. Abdullah Kuzu - Anadolu University, Turkey
Prof.Dr. Ahnet Eskicumalı - Sakarya University
Prof.Dr. Ahnet Zeki Saka - Karadeniz Technical University, Turkey
Prof.Dr. Akif Ergin - Başkent University, Turkey
Prof.Dr. Ali Al Mazari - Alfaisal University, Kingdon of Saudi Arabia
Prof.Dr. Ali Ekrem Özkul - Anadolu University, Turkey
Prof.Dr. Anil P. Gaikwad - Yashwantrao Chavan Maharashtra Open University, India
Prof.Dr. Antoinette J. Muntjewerff - University of Ansterdan
Prof.Dr. Arif Altun - Hacettepe University, Turkey
Prof.Dr. Arvind Singhal - University of Texas, USA
Prof.Dr. Asaf Varol - Fırat University, Turkey
Prof.Dr. Aytekin İşnan - Sakarya University, Turkey
Prof.Dr. Brent G. Wilson - University of Colorado at Denver, USA
Prof.Dr. Buket Akkoyunlu - Hacettepe University, Turkey
Prof.Dr. Carnencita L. Castolo - Polytechnic University of the Philippines, Philippines
Prof.Dr. Cengiz Hakan Aydın - Anadolu University, Turkey
Prof.Dr. Chang-Shing Lee - National University of Tainan, Taiwan
Prof.Dr. Charlotte N. (Lani) Gunawardena - University of New Mexico, USA
Prof.Dr. Chi - Jui Lien - National Taipei University of Education, Taiwan
Prof.Dr. Chih - Kai Chang - National University of Taiwan, Taiwan
Prof.Dr. Chin-Min Hsiung - National pingtung university, Taiwan
Prof.Dr. Colleen Sexton - Governor State University, USA
Prof.Dr. Denetrios G. Sanpson - University of Piraeus, Greece
Prof.Dr. Dinitier G. Velev - University of National and World Economy, Bulgaria
Prof.Dr. Don M. Flournoy - Ohio University, USA
Prof.Dr. Dongsik Kin - Hanyang University, South Korea
Prof.Dr. Eralp Altun - Ege University, Turkey
Prof.Dr. Feng-chiao Chung - National pingtung university, Taiwan
Prof.Dr. Ferhan Odabaşı - Anadolu University, Turkey
Prof.Dr. Finland Cheng - National pingtung university, Taiwan
Prof.Dr. Fong Soon Fook - Uniiversiti Sains Malaysia, Malaysia
Prof.Dr. Francine Shuchat Shaw - New York University, USA
Prof.Dr. Gianni Viardo Vercelli - University of Genova, Italy
Prof.Dr. Gwo - Dong Chen - National Central University Chung - Li, Taiwan
Prof.Dr. Hafize Keser - Ankara University, Turkey
Prof.Dr. Halil İbrahim Yalın - Gazi University, Turkey
Prof.Dr. Heli Ruokano - University of Lapland, Finland
Prof.Dr. Henry H.H. Chen - National pingtung university, Taiwan
Prof.Dr. Ing. Giovanni Adorni - University of Genova, Italy
Prof.Dr. J. Ana Donaldson - AECT President
Prof.Dr. J. Michael Spector - University of North Texas, USA
Prof.Dr. Jerry Willis - ST John Fisher University in Rochester, USA
Prof.Dr. Jie-Chi Yang - National central university, Taiwan
Prof.Dr. Kinshuk - Athabasca University, Canada
Prof.Dr. Kiyoshi Nakabayashi - Chiba Institute of Technology, Japan

Prof.Dr. Kuniko Aoki - The Open University of Japan, Japan
Prof.Dr. Kuo - En Chang - National Taiwan Normal University, Taiwan
Prof.Dr. Kuo - Hung Tseng - Meiho Institute of Technology, Taiwan
Prof.Dr. Kuo - Robert Lai - Yuan - Ze University, Taiwan
Prof.Dr. Liu Meifeng - Beijing Normal University, China
Prof.Dr. Marina Stock McIsaac - Arizona State University, USA
Prof.Dr. Mehmet Ali Dikermen - Middlesex University, UK
Prof.Dr. Mehmet Çağlar - Near East University, TRNC
Prof.Dr. Mehmet Gürol - Fırat University, Turkey
Prof.Dr. Mei-Mei Chang - National pingtung university, Taiwan
Prof.Dr. Melissa Hui-Mei Fan - National central university, Taiwan
Prof.Dr. Min Jou - National Taiwan Normal University, Taiwan
Prof.Dr. Ming - Puu Chen - National Taiwan Normal University, Taiwan
Prof.Dr. Murat Barkan - Yaşar University, Turkey
Prof.Dr. Mustafa Murat Inceoğlu - Ege University, Turkey
Prof.Dr. Mustafa Şahin Dündar - Sakarya University, Turkey
Prof.Dr. Nabi Bux Junani - International Islamic University, Pakistan
Prof.Dr. Nian - Shing Chen - National Sun Yat - Sen University, Taiwan
Prof.Dr. Paul Gibbs - Middlesex University, UK
Prof.Dr. Petek Aşkar - Hacettepe University, Turkey
Prof.Dr. Randane Younsi - Ecole polytechnique de Montreal, Canada
Prof.Dr. Rauf Yıldız - Çanakkale 19 Mart University, Turkey
Prof.Dr. Roger Hartley - University of Leeds, UK
Prof.Dr. Rozhan Hj. Mohanned Idrus - Universiti Sains Malaysia, Malaysia
Prof.Dr. Saedah Siraj - University of Malaya, Malaysia
Prof.Dr. Sello Mokoena - University of South Africa, South Africa
Prof.Dr. Servet Bayran - Yeditepe University, Turkey
Prof.Dr. Shan - Ju Lin - National Taiwan University, Taiwan
Prof.Dr. Sheng Quan Yu - Beijing Normal University, China
Prof.Dr. Shi-Jer Lou - National pingtung university, Taiwan
Prof.Dr. Shu - Sheng Liaw - China Medical University, Taiwan
Prof.Dr. Shu-Hsuan Chang - National Changhua University of Education, Taiwan
Prof.Dr. Stefan Aufenanger - University of Mainz, Germany
Prof.Dr. Stephen Harnon - Georgia State University, USA
Prof.Dr. Stephen J.H. Yang - National Central University, Taiwan
Prof.Dr. Sun Fuwan - China Open University, China
Prof.Dr. Sunny S.J. Lin - National Chiao Tung University, Taiwan
Prof.Dr. Teressa Franklin - Ohio University, USA
Prof.Dr. Toshio Okamoto - University of Electro - Communications, Japan
Prof.Dr. Toshiyuki Yanamoto - Japan
Prof.Dr. Tzu - Chien Liu - National Central University, Taiwan
Prof.Dr. Vaseudev D.Kulkarni - Hutatna Rajguru College, Rajguruunagar(Pune),(M.S.) INDIA
Prof.Dr. Xibin Han - Tsinghua University, China
Prof.Dr. Yau Hon Keung - City University of Hong Kong, Hong Kong
Prof.Dr. Yavuz Akpınar - Boğaziçi University, Turkey
Prof.Dr. Yen-Hsyang Chu - National central university, Taiwan
Prof.Dr. Yuan - Chen Liu - National Taipei University of Education, Taiwan
Prof.Dr. Yuan-Kuang Guu - National pingtung university, Taiwan
Prof.Dr. Young-Kyung Min - University of Washington, USA
Assoc.Prof.Dr. Adile Aşkın Kurt - Anadolu University, Turkey
Assoc.Prof.Dr. Aijaz Ahmed Gujjar - Sindh Madressatul Islam University, Pakistan
Assoc.Prof.Dr. Anita G. Welch - Ball State University, USA
Assoc.Prof.Dr. Aytaç Göğüş - Okan University, Turkey
Assoc.Prof.Dr. Chen - Chung Liu - National Central University, Taiwan

Assoc.Prof.Dr. Cheng - Huang Yen - National Open University, Taiwan
Assoc.Prof.Dr. Ching - fan Chen - Tankang University, Taiwan
Assoc.Prof.Dr. Ching Hui Alice Chen - Ming Chuan University, Taiwan
Assoc.Prof.Dr. Chiung - sui Chang - Tankang University, Taiwan
Assoc.Prof.Dr. Danguole Rutkauskienė - Kauno Technology University, Lietvenia
Assoc.Prof.Dr. David Tawei Ku - Tankang University, Taiwan
Assoc.Prof.Dr. Eric Meng - National pingtung university, Taiwan
Assoc.Prof.Dr. Eric Zhi Feng Liu - National central university, Taiwan
Assoc.Prof.Dr. Erkan Tekinarslan - Bolu Abant İzzet Baysal University, Turkey
Assoc.Prof.Dr. Ezendu Ariwa - London Metropolitan University, U.K.
Assoc.Prof.Dr. Fahad N. AlFahad - King Saud University
Assoc.Prof.Dr. Fahriye Altınay - Near East University, TRNC
Assoc.Prof.Dr. Gurnan Kaur Sidhu - Universiti Teknologi MARA, Malaysia
Assoc.Prof.Dr. Hao - Chiang Lin - National University of Tainan, Taiwan
Assoc.Prof.Dr. Hasan Çalışkan - Anadolu University, Turkey
Assoc.Prof.Dr. Hasan KARAL - Karadeniz Technical University, Turkey
Assoc.Prof.Dr. Hsin - Chih Lin - National University of Tainan, Taiwan
Assoc.Prof.Dr. Huey - Ching Jih - National Hsinchu University of Education, Taiwan
Assoc.Prof.Dr. Huichen Zhao - School of Education, Henan University, China
Assoc.Prof.Dr. Hüseyin Yaratın - Eastern Mediterranean University, TRNC
Assoc.Prof.Dr. I - Wen Huang - National University of Tainan, Taiwan
Assoc.Prof.Dr. I Tsun Chiang - National Changhua University of Education, Taiwan
Assoc.Prof.Dr. Ian Sanders - University of the Witwatersrand, Johannesburg
Assoc.Prof.Dr. İsnail İpek - Fatih University, Turkey
Assoc.Prof.Dr. Işıl Kabakcı - Anadolu University, Turkey
Assoc.Prof.Dr. Jana Birova - Conenius University in Bratislava, Slovakia
Assoc.Prof.Dr. Jie - Chi Yang - National Central University, Taiwan
Assoc.Prof.Dr. John I-Tsun Chiang - National Changhua University of Education, Taiwan
Assoc.Prof.Dr. Ju - Ling Shih - National University of Taiwan, Taiwan
Assoc.Prof.Dr. Koong Lin - National University of Tainan, Taiwan
Assoc.Prof.Dr. Kuo - Chang Ting - Ming - HSIN University of Science and Technology, Taiwan
Assoc.Prof.Dr. Kuo - Liang Ou - National Hsinchu University of Education, Taiwan
Assoc.Prof.Dr. Larysa M. Mytsyk - Gogol State University, Ukraine
Assoc.Prof.Dr. Li - An Ho - Tankang University, Taiwan
Assoc.Prof.Dr. Li Yawan - China Open University, China
Assoc.Prof.Dr. Manoj Kumar Saxena - Central University of Himachal Pradesh, Dharanshala, Kangra, India
Assoc.Prof.Dr. Mike Joy - University of Warwick, UK
Assoc.Prof.Dr. Ming-Charn Jeng - National pingtung university, Taiwan
Assoc.Prof.Dr. Murat Ataizi - Anadolu University, Turkey
Assoc.Prof.Dr. Nergüz Serin - Cyprus International University, TRNC
Assoc.Prof.Dr. Norazah Mohd Suki - Universiti Malaysia Sabah, Malaysia
Assoc.Prof.Dr. Nornaliza Abd Rahin - Universiti Putra Malaysia, Malaysia
Assoc.Prof.Dr. Noushad Husain - Maulana Azad National Urdu University, Hyderabad
Assoc.Prof.Dr. Oğuz Serin - Cyprus International University, TRNC
Assoc.Prof.Dr. Ping - Kuen Chen - National Defense University, Taiwan
Assoc.Prof.Dr. Popat S. Tanbade - Prof. Rankrishna More College, India
Assoc.Prof.Dr. Prakash Khanale - Dnyanopasak College, INDIA
Assoc.Prof.Dr. Pranela Krish - Universiti Kebangsaan Malaysia, Malaysia
Assoc.Prof.Dr. Tzu - Hua Wang - National Hsinchu University of Education, Taiwan
Assoc.Prof.Dr. Vincent Ru-Chu Shih - National Pingtung University of Science and Technology, Taiwan
Assoc.Prof.Dr. Wu - Yui Hwang - National Central University, Taiwan
Assoc.Prof.Dr. Ya-Ling Wu - National pingtung university, Taiwan
Assoc.Prof.Dr. Yahya OMohamed Elhadj - AL Inan Muhammad Ibn Saud University, Saudi Arabia
Assoc.Prof.Dr. Yavuz Akbulut - Anadolu University
Assoc.Prof.Dr. Zehra Altınay - Near East University, TRNC
Assoc.Prof.Dr. Zhi - Feng Liu - National Central University, Taiwan
Assist.Prof.Dr. Aaron L. Davenport - Grand View College, USA
Assist.Prof.Dr. Alper Beyazıt - Yeditepe University, Turkey
Assist.Prof.Dr. Andreja Istenic Starcic - University of Primorska, Slovenija

Assist.Prof.Dr. Betül Özkan - University of Arizona, USA
Assist.Prof.Dr. Burçin Kısa Işık - Gaziantep University, Turkey
Assist.Prof.Dr. Chiu - Pin Lin - National Hsinchu University of Education, Taiwan
Assist.Prof.Dr. Chun - Ping Wu - Tankang University, Taiwan
Assist.Prof.Dr. Chun - Yi Shen - Tankang University, Taiwan
Assist.Prof.Dr. Chung-Yuan Hsu - National pingtung university, Taiwan
Assist.Prof.Dr. Dale Havill - Dhofar University, Sultanate of Onan
Assist.Prof.Dr. Devrin Akgündüz - İstanbul Aydın Üniversitesi, Turkey
Assist.Prof.Dr. Fernan Konuknan - College of Arts and Science, Sport Science Program, Qatar University
Assist.Prof.Dr. Filiz Varol - Fırat University, Turkey
Assist.Prof.Dr. Guan - Ze Liao - National Hsinchu University of Education, Taiwan
Assist.Prof.Dr. Hsiang chin - hsiao - Shih - Chien University, Taiwan
Assist.Prof.Dr. Huei - Tse Hou - National Taiwan University of Science and Technology, Taiwan
Assist.Prof.Dr. Hüseyin Ünlü - Aksaray University, Turkey
Assist.Prof.Dr. Jagannath. K Dange - Kuvenpu University, India
Assist.Prof.Dr. K. B. Praveena - University of Mysore, India
Assist.Prof.Dr. Kanvaria Vinod Kunar - University of Delhi, India
Assist.Prof.Dr. Lotfi Salhi - University of Gafsa, Tunisia
Assist.Prof.Dr. Marko Radovan - University of Ljubljana, Slovenia
Assist.Prof.Dr. Min-Hsien Lee - National central university, Taiwan
Assist.Prof.Dr. Mohannad Akran Mohannad Al-Zu'bi - Jordan Al Balqa Applied University, Jordan
Assist.Prof.Dr. Muhannet Denirbilek - Süleyman Demirel University, Turkey
Assist.Prof.Dr. Pamela Ewell - Central College of IOWA, USA
Assist.Prof.Dr. Pei-Hsuan Hsieh - National Cheng Kung University, Taiwan
Assist.Prof.Dr. Pey-Yan Liou - National central university, Taiwan
Assist.Prof.Dr. Phaik Kin, Cheah - Universiti Tunku Abdul Rahman, Kanpar, Perak
Assist.Prof.Dr. Ping - Yeh Tsai - Tankang University, Taiwan
Assist.Prof.Dr. S. Arulchelvan - Anna University, India
Assist.Prof.Dr. Seçil Kaya - Anadolu University, Turkey
Assist.Prof.Dr. Selma Koç Vonderwell - Cleveland State University, Cleveland
Assist.Prof.Dr. Sunil Kunar - National Institute of Technology, India
Assist.Prof.Dr. Tsung - Yen Chuang - National University of Taiwan, Taiwan
Assist.Prof.Dr. Vahid Motanedi - Tarbiat Moallan University, Iran
Assist.Prof.Dr. Wong Kung Teck - Sultan Idris Education University, Malaysia
Assist.Prof.Dr. Yalın Kılıç Türel - Fırat University, Turkey
Assist.Prof.Dr. Yasin Aslan - Sinop University, Turkey
Assist.Prof.Dr. Yu - Ju Lan - National Taipei University of Education, Taiwan
Assist.Prof.Dr. Zehra Alakoç Burna - Mersin University, Turkey
Assist.Prof.Dr. Zerrin Ayvaz Reis - İstanbul University, Turkey
Assist.Prof.Dr. Zülfü Genç - Fırat University, Turkey
Dr. Arnaud P. Prevot - Forest Ridge School of the Sacred Heart, USA
Dr. Balakrishnan Muniandy - Universiti Sains Malaysia, Malaysia
Dr. Brendan Tangney - Trinity College, Ireland
Dr. Chan Shiau Wei - Universiti Tun Hussein Onn Malaysia, Malaysia
Dr. Chen Haishan - China Open University, China
Dr. Chin Hai Leng - University of Malaya, Malaysia
Dr. Chin Yeh Wang - National Central University, Taiwan
Dr. Chun Hsiang Chen - National Central University, Taiwan
Dr. Chun Hung Lin - National central university, Taiwan
Dr. Esra Telli - Hacettepe University, Turkey
Dr. Farrah Dina Yusop - University of Malaya, Malaysia
Dr. Fatma Bayrak - Hacettepe University, Turkey
Dr. Gökhan Akçapınar - Hacettepe University, Turkey
Dr. Gökhan Dağhan - Hacettepe University, Turkey
Dr. H. İzzet İsmail - Universiti Sains Malaysia, Malaysia
Dr. H. Mohd Arif H. İsmail - National University of Malaysia, Malaysia
Dr. I-Hen Tsai - National University of Tainan, Taiwan
Dr. İsmail İpek - Bilkent University, Turkey
Dr. Jarkko Suhonen - University of Eastern Finland, Finland

Dr. Li Ying - China Open University, China
Dr. Norlidah Alias - University of Malaya, Malaysia
Dr. Pinar Nuhoglu - Hacettepe University, Turkey
Dr. Rosnaini Mahnud - Universiti Putra Malaysia, Malaysia
Dr. Sachin Sharna - Faridabad Institute of Technology, Faridabad
Dr. Seetharan Chittoor Jhansi - Pushpa Navnit Shah Centre for Lifelong Learning, India
Dr. Tan Shu Sin - University of Malaya, Malaysia
Dr. Tiong Goh - Victoria University of Wellington, New Zealand
Dr. Vikrant Mishra - Shivalik College of Education, India
Dr. Zahra Nainie - University of Malaya, Malaysia
Dr. Zari Sadat Seyyedrezaie - Islamic Azad University, Iran

Table Of Contents

A CASE STUDY ON THE PRIMARY SCHOOL CLASS TEACHERS' OPINIONS ON VALUES AND VALUES EDUCATION	1
<i>Müge TAÇMAN</i>	
A COMPARATIVE STUDY ON COMPUTER EDUCATION IN NORTH KOREA'S No.1 MIDDLE SCHOOL AND GENERAL MIDDLE SCHOOL IN KIM JONG-IL ERA	6
<i>Youyeon KIM</i>	
A PILOT STUDY ON THE COMPARISON BETWEEN BLENDED AND F2F LEARNING METHODS IN A SQL COURSE	17
<i>Mithat YAVUZARSLAN, Hakan OLGUN, Selim YAZICI</i>	
A STUDY ON THE INFLUENCE OF NEWS CREDIBILITY AND FALSE CONSENSUS EFFECT BY USER'S ALGORITHM-BASED DIGITAL NEWS SERVICE EXPERIENCE, PERCEIVED USEFULNESS, PERCEIVED RISKS AND PERCEIVED BIAS	26
<i>Mikyung KIM</i>	
ADMINISTRATIVE FACTORS AFFECTING BRANDING OF PRIVATE SCHOOLS IN UDON THANI PROVINCE	36
<i>Krit MUNGKALASAEN, Dawruwan THAWINKARN, Wallapha ARIRATANA</i>	
ASTRONOMICAL PROJECTS FOR HIGH SCHOOL STUDENTS	40
<i>Paola MAGNAGHI-DELFINO, Tullia NORANDO</i>	
“AUGMENTED PRACTICE-ROOM”: AN E-LEARNING TOOL FOR MUSIC STUDENTS	45
<i>Neva Klanjscek, Matthias Frank, Lisa David</i>	
CASE STUDY: BEING AN ARAB UNIVERSITY STUDENT IN THE CZECH REPUBLIC	51
<i>Tereza SVASKOVA, Michaela VONDRICHOVA</i>	
CO-DESIGNING OF A MOBILE EDUCATIONAL TOOL FOR INNOVATIVE TEACHING AND LEARNING AT THE COLLEGE OF BUSINESS EDUCATION, TANZANIA	56
<i>Godfrey Isaac MWANDOSYA, Calkin SUERO MONTERO, Esther- Rosinner MBISE</i>	
COMPARISON OF COMPUTER-AIDED INSTRUCTION AND INQUIRY-BASED TEACHING ON STUDENTS' ANXIETY TOWARDS SCIENCE	72
<i>Hasan KAYA, Ashı SAYLAN KIRMIZIGÜL</i>	
CONFIRMATORY FACTOR ANALYSIS AND RELIABILITY OF THE BARRIERS TO SEEKING PSYCHOLOGICAL HELP SCALE AMONG TURKISH ADULTS	78
<i>Nursel Topkaya, Ertuğrul Şahin</i>	

CYBERBULLYING AND NEW TECHNOLOGIES AN EDUCATIONAL PROJECT FOR EMOTIONAL ORIENTATION AND CYBERBULLYING PREVENTION	86
Alessio Catiglione, Giorgia Coppola, Gioacchino Lavanco	
DETERMINATION OF CRITERION WEIGHTS AFFECTING ENTREPRENEURSHIP LEVEL BY SWARA METHOD	90
Alper Kiraz, Hüseyin Eski	
DETERMINING THE WEIGHTS OF CRITERIA AFFECTING THE PERFORMANCE OF STUDENT CLUBS BY SWARA METHOD	98
Alper Kiraz, Hüseyin Eski	
DEVELOPMENT OF THE INSTRUCTIONAL ACTIVITIES FOR ENHANCING STUDENT TEACHERS' ABILITY IN DEVELOPING INSTRUCTIONAL INNOVATION FOCUSING ON LOCAL-RELATED CONTENT BY USING LESSON STUDY APPROACH	108
Arthitaya KHAOPRAAY	
DIGITAL LITERACY OF SCHOOL ADMINISTRATORS IN WORLD-CLASS STANDARD SCHOOLS: A CONFIRMATORY FACTOR ANALYSIS	114
Panita ARDWONG, Dawruwan THAWINKARN	
EFFECT OF BLENDED LEARNING APPROACH ON THE PERFORMANCE OF TECHNICAL COLLEGE STUDENTS IN WOODWORK, IN OYO STATE, NIGERIA	122
Badmus Ayodeji Muideen	
EFFECTS OF CONCEPT CARTOONS ON NIGERIAN PRIMARY FOUR PUPILS ACHIEVEMENT IN BASIC SCIENCE AND TECHNOLOGY	128
Bernadette Ebele Ozoji, Michael Emaikwu, Eyiaromi Adeleke, Peter Lemarck Tibin, Odigiri Matthew Adikpe, Olanrewaju Adebukola Oyebimpe, Dung Mohammed Dauda	
EFFECTS OF CONCEPT MAPPING ON TEST ANXIETY AND ACHIEVEMENT IN MATHEMATICS AMONG SECONDARY STUDENTS IN LAGOS ISLAND, NIGERIA	134
Anthony Akinyemi AYEObasan	
EUROPEAN EMERGENCY NUMBER ASSOCIATION AS A RESPONSE TO THE LACK OF EDUCATION FOR EUROPEANS	140
Barbara Kaczmarczyk, Karolina Lis	
EXPERIENCED CHEMISTRY TEACHERS' SCIENCE PROCESS SKILLS (SPSs) DEVELOPMENT AND THEIR USE OF SPSs IN ACTIVITY PLANS	149
Sevgi AYDIN-GÜNBATAR, Elif Selcan ÖZTAY, Ayşegül TARKIN-ÇELİKKIRAN, Betül EKİZ-KIRAN	
FAKE NEWS - PHENOMENON, RESULTS, EDUCATION	162
Barbara Kaczmarczyk, Izabela Nowicka, Piotr Szczepanski, Marlena Dabrowska	

<i>FOR A PHENOMENOLOGICAL TEACHING</i>	171
<i>Daniela DE LEO, Gabriella ARMENISE</i>	
<i>INTRODUCTION TO ALGORITHMIC BASED DATA MANAGEMENT IN SPREADSHEET ENVIRONMENT</i>	178
<i>Katalin SEBESTYÉN, Gábor CSAPÓ, Mária CSERNOCH</i>	
<i>INVESTIGATION OF HEALTHY LIFE PERCEPTION AFTER ANATOMY LABORATORIES IN MEDICAL FACULTY STUDENTS</i>	186
<i>Ismail SIVRI, Ayla TEKİN ORHA, Tuncay COLAK, Belgin BAMAC</i>	
<i>INVESTIGATION OF LIFE SATISFACTION OF UNIVERSITY STUDENTS ACCORDING TO VARIOUS VARIABLES</i>	191
<i>Murat GÖKALP, Temel TOPAL</i>	
<i>INVESTIGATION OF REASONS FOR NATIONAL SWIMMERS TO QUIT SPORTS IN EARLY STAGE OF THEIR LIVES</i>	205
<i>Mehmet YARGICI, Serap COLAK, Mehmet Deniz YENER, Enis COLAK, Murat SON, Ismail SIVRI</i>	
<i>LIFE-SAVING TECHNOLOGIES IN THE MOUNTAINS – THE ISSUE OF MODERN SOLUTIONS AND EDUCATION OF THE SOCIETY</i>	213
<i>Barbara Kaczmarczyk, Andrzej Demkowicz</i>	
<i>MATHEMATICAL MODELING OF PARABOLAS: EXAMPLES FROM ARCHITECTS</i>	219
<i>Tuba ADA, Aytaç KURTULUŞ</i>	
<i>MISSION AND VISION ANALYSIS IN THE DETERMINATION OF NEW TRENDS IN DISTANCE EDUCATION: EADTU AND AAOU EXAMPLE</i>	224
<i>Seçil KAYA GÜLEN</i>	
<i>NEW AND EMERGING STUDY RESOURCES AS ENRICHMENT AND REPLACEMENT OF TRADITIONAL SCHEME OF INTRODUCTORY MATHEMATICAL COURSES IN HIGER EDUCATION</i>	232
<i>Jana GLIVICKÁ</i>	
<i>ON THE RELATION BETWEEN ATTITUDES AND SCHOOL ACHIEVEMENT OF VOCATIONAL SCHOOL</i>	239
<i>Sinan AYDIN</i>	
<i>POLYNESIAN YOUTH LITERATURE AND BILINGUAL PHILOSOPHICAL DISCUSSIONS AT SCHOOL</i>	244
<i>Deprez Simon</i>	

<i>PREPARING ENGINEERING STUDENTS FOR THE EXPECTATIONS OF THE LABOUR MARKET</i>	254
Ildikó HOLIK	
<i>REPRESENTATION OF “SPIRIT” IN ADVERTISEMENTS: THE CASE OF ALPHA ROMEO GIULIETTA</i>	264
Süheyla AYVAZ, Tuba LİVBERBER, İlker ÇÖZELİ	
<i>SAUDI TEACHERS' PERCEPTIONS REGARDING ADOPTING DIGITAL GAMES IN TEACHING PRACTICE</i>	269
Dhaifallah Alsuhaymi, Ali Alzebedi	
<i>SCHOOL CLIMATE AS PREDICTOR OF TEACHERS' COMPETENCES TO RECOGNIZE THE EDUCATIONAL NEEDS OF ADOPTED CHILDREN IN ITALY</i>	277
Cinzia Novara, Giorgia Coppola, Alessio Castiglione, Michela Lenzi	
<i>SELF-EFFICACY OF PRE-SERVICE SCIENCE TEACHERS IN PHYSICS COURSE</i>	281
Supranee PITSAMAI, Thitiya BONGKOTPHET	
<i>SELF-REGULATED LEARNING AND REFLECTION: WEB-BASED ASSESSMENT PORTFOLIOS VS PAPER-BASED PORTFOLIOS</i>	287
Chi-Cheng Chang, Chun-Yu Lin	
<i>SOCIAL AND SCIENCE DEPARTMENTS STUDENTS' BELIEFS ABOUT MATHEMATICS</i>	291
Sinan AYDIN	
<i>SPREGO TOOLBOX: A WAY TO TEACH SPREADSHEETING MEANINGFULLY</i>	296
Ádám GULÁCSI, Nikolett DIENES, Maria CSERNOCH	
<i>SYMBOLIC VIOLENCE AND MEDIA</i>	304
Ahmet ESKİCUMALI, Mehmet ÖZER	
<i>THE ASSESSMENT OF E-BOOK LEARNING WITH ACCEPTANCE LEVEL AND INFLUENCE OF TERTIARY STUDY IN TERTIARY EDUCATION</i>	314
Hon Keung YAU, Mei Ling TSANG	
<i>THE EDUCATION FOR SECURITY: CULTURAL OR TECHNOLOGICAL PROBLEM?</i>	330
Teresa Grabińska	
<i>THE EFFECT OF BLOCK-BASED PROGRAMMING ON THE COMPUTATIONAL THINKING SKILLS OF MIDDLE SCHOOL STUDENTS</i>	335
Mustafa Serkan GÜNBATAR, Barış TURAN	
<i>THE IMPACT OF THE HUMAN FOUR DIMENSIONS ON STUDENTS' LIFE</i>	340
Belahmer Zakia	

<i>THE IMPACT OF THE PHENOMENON OF IMMIGRATION IN POLAND ON CHANGES IN EDUCATION FOR SECURITY</i>	345
Jacek Dworzecki, Izabela Nowicka	
<i>THE IMPACTS OF SOCIAL MEDIA ON CONSUMER BEHAVIOR: THE CASE OF COMMUNICATION FACULTY AT SAKARYA UNIVERSITY</i>	350
Aytekin İŞMAN, Hüseyin SERBES	
<i>THE INTEGRATION OF POE METHOD TO CHEMISTRY II COURSE LABORATORY APPLICATIONS IN SCIENCE TEACHER TRAINING PROGRAM</i>	363
Gülseda Eyceyurt Türk, Hatice Güngör Seyhan	
<i>THE STUDY OF MATHEMATICAL PROBLEM SOLVING FOR GRADE 6 STUDENTS USED LESSON STUDY AND OPEN APPROACH</i>	381
Metta MARWIANG, Kemmika SUWANNATHADA, Maneenapa SANGCHOMPU, Putcharee JUNPENG	
<i>THE THOUGHTS OF UNIVERSITY STUDENTS ABOUT PARTICIPATION OF THE EUROPEAN UNION AND THE BOLOGNA EDUCATION PROCESS</i>	389
Murat GÖKALP, Sabit MENTEŞE	
<i>THE TRAINING OF FUTURE LEADERS THE PARADIGM OF TRUST</i>	395
José M. Ortiz Ibarz, Beatriz Vila Ramos	
<i>VIRTUAL LEARNING: VOCATIONAL SCHOOL MATHEMATICS LECTURES</i>	400
Sinan AYDIN	
<i>VOCATIONAL SCHOOL STUDENTS' DIFFICULTIES WITH FRACTIONS</i>	404
Sinan AYDIN	

A CASE STUDY ON THE PRIMARY SCHOOL CLASS TEACHERS' OPINIONS ON VALUES AND VALUES EDUCATION

Müge TAÇMAN

National Educational Ministry, North Cyprus

m.tacman@yahoo.com

ABSTRACT

The aim of this study is to discover primary school teachers' opinions on the values that students should have and the process in which students can gain these values.

Research is conducted in survey method, and the sample is composed 10 primary classroom teachers. The data is gathered via qualitative method. Descriptive and content analysis were used in order to analyse the data. According to the findings of the research, all of the teachers have highlighted the significance of values education, indicating it is a process impacting on positive character development of the students and their integration to the society.

The teachers have emphasized that there are problems in the values education of the children starting from the family, owing to the changing living conditions and negativities, and due to that reason having cooperation with the families and also educating them too has critical significance.

Keywords: Values, Values Education, curriculum

INTRODUCTION

Values are the attitudes, behaviours, moral principles and beliefs, constructed by the people, with the objective of enabling continuation of societal existence and functioning.

Values are the source of social control system within the society and fosters interpersonal connections. Values are the determinant of regulating interpersonal relations, decision-making, selection and evaluation processes. Respect and love are the driving forces in a person realizing himself. Through this, values assign the role of regulator, instructor and motivator. Reviewing definitions of 'values', one can reach to this summary (Aydin and Gurler, 2014);

- Value is desired and desirable attitudes of people towards related events.
- Values, ideal behaviour patterns or our beliefs about aims of life, are measures which direct our behaviours.
- Value is the importance or supremacy given to an object, entity or activity from a societal and individualistic perspective.

Gaining values is the process of individuals' acquiring basic values which are beneficial for the society or for the individual; according to their psychological, social and mental developments. This process also includes gaining basic human values and developing individuals who are eco-friendly, by supporting love, responsibility, empathy and character education and protecting the societal system.

Schools have a vital role in individuals' gaining, developing and maintaining positive behaviour tendencies. Primarily, this necessitates teachers to understand, internalize the moral and values of education and also the ability to transmit to students. For learning and understanding values, there is a need for a special "educational language" lesson which is above all other lessons. So, teachers come first among the components which are going to supervise students' gaining these values. Teachers' active role in teaching values and its importance have been presented both based on research findings and in theoretical evaluations (Hökelekli, 2010).

Violent incidents, increasing crime rates, violation of rules and insensibility which took place in the past few years, has increased the importance of values education. Especially the psychological and physical violence events in schools, insensibility, violation of rules and discourtesy show that enough values are not gained by students. Besides, the density of content and more importance being given to academic lessons in conventional education programs highlight the absence of values education.

In Northern Cyprus's education system, regardless of not having a lesson directly for values education, values are tried to be taught through a tacit program. When the education program is examined, particularly the content of "life sciences, social studies ve social skills" lessons provide education of such values. Besides this, a school's atmosphere,

disciplinary understanding of teachers, and their expectations from students contribute to the values development of students as well. There are determinants which have important roles in teaching values to individuals' and also protecting them. One of these determinants is the teachers. Because, the people who are going to teach students the values through education are teachers. From this point, it is important that views of teachers about values and its education be stated and have recommendations identified towards their improvement.

THE STUDY

The aim of this study is to unveil primary school teachers' views about the values, which students need to have, and the process of gaining these values. This study was conducted relying on "phenomenological method", which is one of the qualitative research methods. Qualitative research is defined as the analysis of relations, analysis of structures used in daily life and the exposing of concealed meanings in written and spoken language in order to understand human's social worlds. And, "phenomenological method" is conducted by focusing on the subjects which people are aware of but need more detailed researching; and it is done by the subject of research being identified within its conditions or the way it is (Snape and Spence, 2003; Yildirim and Simsek, 2005; Buyukozturk et al., 2009). The data is gathered through using researcher-designed, semi-structured qualitative interviewing of 20 teachers who works at primary schools. Descriptive and content analysis methods were used in analysing the data. According to analysis, initially the data was transcribed and coded, and then, themes and concepts were created from the coded data. Direct quotations and repeating views are provided according to the themes and concepts which appeared from the data that were written down; and the coded interview forms were examined many times.

FINDINGS

In the light of the gathered data, the findings are as presented below;

1. All the teachers who took place in the study (n=20, f 100%) have stated that respect came first among other values that students need to have. Alongside respect, 8 teachers (f40%) have stated empathy, 4 teachers (20%) have stated honesty, and 4 other teachers (f20%) have stated tolerance as important values. Especially;

One teacher stated their opinion saying: "Imagine a crossroads where there are no traffic lights, cars enter the crossroads from every direction. A world which lacks values and respect is just like this. Values regulate life. If there is respect, it will also bring other values with it."

And another teacher stated his opinion saying: "Respect comes first. Where there is lack of respect, there cannot be responsibility or system. Respect and being helpful are values which make a society a real society. Initially, these values are taught by the family."

2. All of the teachers' (n=20, f 100%) answer was "yes" to the question "Do you think it is important that values are taught?" and;

Stated opinions such as "In order for children to be accepted by the society, they need to have correct behaviour and correct values."

"It is important because the future of society are children. Education of values affects the future societal structure."

"Yes, it is more important than any other thing. It is even more important than academic lessons. There is a lack of education received from the family regarding this subject, and as schools we need to give this education."

"Yes, it is very important for character development, but family collaboration is also of importance. A positive character will develop if we teach values to individuals."

3. All teachers who took place in the study (n=20, f 100%) said that schools were important while stressing the importance of family collaboration when answering the question "What do you think about the role of schools in value education?"

“From the aspects of social interaction and environment, a school’s effects on children are huge. Of course, schools are very important. As families do not take care of their children a lot (as they are working all day), rules and correct behaviour need to be taught at schools starting from kindergarten.” “Children do not even know how to drink water and spill it everywhere. Families do not give the adequate education, and when children go to schools, we have to teach them these things they lack.”

“Families don’t show enough affection to their children. They see them as trouble. This lack of affection eradicates all the values. Fundamentally, families suffering from financial difficulties and migration owing to this are the main factors leading to this. If this was not the case, and they lived happily in their own country and culture, the absence of Values would not be experienced this much.”

When asked “What are the Values we teachers find hardest to pass on?”, most teachers say respect and empathy (N=14, f %70) and added:

“Parents don’t respect children enough. As a school this is one of the biggest problems we have. They have become indifferent and don’t listen to each other as they have not learned this. Such that, when they are called by their names, they don’t even look back. We have such a serious communication issue. At the bottom of this is lack of affection. Changing life conditions, having migrated brought about lack of affection and this impacted on everything” said another teacher.

“Children are in need to stand out and be approved. Because of this they try to stand out without showing respect to the others’ rights. At the bottom of this is the feeling of worthlessness and lack of affection.” As teachers expressed their views.

4. The views below are expressed in response to the questions: “which activities do you use while making them gain values in this program?” and “do you collaborate with any institution?”

“Example incidents, what would you feel if it were you, story completion etc. They can be made to gain values through plenty of examples and activities. Last year we did activities together with SOS Children’s Village. These, as far as I observed, helped them develop empathy.”

“As a teacher I try to be a model for them. I concentrate on positive behaviour which will help them discover their positive behaviour. I try to expose positive behaviour. Example event, I provide continuity by drama, suggestions.”

“Social studies involve teaching values, however, maths and Turkish programs and books are intensive. Because of this intensity I have to cut back on social studies. And because social skills lesson is once a week, it is not enough.”

“I use example events. Everyday something happens about a different event. The root of this is lack of communication and I want them to think about this through their own lives. How would it not come to their point? I ask.”

“The program involves values but this depends also on the teachers’ attitude. It is teacher who add this to academic lessons. I use example events. I use drama. Trips to do with this should be increased and student’s behaviour should be observed.”

“Social skills lesson should be done more intensively. But sometimes because of the intensity of the curriculum for academic lessons it is skipped. In the week for the elderly a visit to the nursing home, in collaboration with the municipality the water day, we donated food to the animals and women’s

shelter. We observed that these activities are effective in making children foster values like empathy. We use example events and “what would you do if it were you” kind activities a lot.”

5. For the question: “What are your suggestions on the effective improvement of the values education?” the comments from the teachers are as follows:

“Schools is not the single responsible and collaboration should be established with the families, perhaps to initially educate the families. We should give them values through seminars. Then we can reach the children.”

“We should place more importance to trips, observations and certain days and weeks. Like, while going on a trip, their behaviour should be observed from the moment they get on the bus. Do they stand in a queue? Do they stick to the rules?”

“School rules should be given to children and families written. Families should be given education. Positive behaviour should be rewarded, and negative behaviour should be punished, and no one should object to these punishments. Social services and psychologists should work effectively, and families should be given seminars.”

“For example, each month a value should be chosen and studied at a school. Students, holding these values most, should be picked in front of school and evaluated?”

“Curriculum should be organised. Number of reasons should be increased, and time should be spared for teaching values.”

“Activities and trips should be increased. This doesn’t happen by suggestions. We should increase children’s’ interaction with each other. We should gain these better in a system where students are active. We are all part of the nature and doing lessons in the nature will help us make them foster.”

“In this existing situation school completes the missing parts of the puzzle. In the existing system, the teacher tries to give a child only an academic lesson during a 4-hour lesson. Unless the number of lessons is increased and full-time education started, this won’t be achieved.”

CONCLUSION

Generally looking at the results of this study, teachers taking part are aware of the importance of having values fostered and think having respect and empathy fostered is the most important value needed. Teacher again stressed that school is very important, yet education starts at home and collaborating with families is very valuable in getting values fostered.

Teachers, who claim that the main reason why values are missing is because no values and affection by teachers is seen, state that school education program and teachers have their own responsibilities about this topic and said applications and active activities will be very effective. Besides, they said reducing the contents of academic lessons a little will also make the teaching of values more possible.

For the spreading of teaching values, primarily families and teachers should be provided with necessary education. Resources and activities will be increased and therefore enriched. Furthermore, activities could be done in an enjoyable and meaningful way. Support about this could be obtained from the print and digital media.

Teachers can be advised to develop themselves main value concepts fostered and make it possible for children to reflect these in their expressions.

REFERENCES

- Aydın, M.Z. and Gürlü, Ş.A. (2014). *Okulda Değerler Eğitimi*. (4. Baskı.) Ankara: Nobel Yayın.
- Hökelekli, H. (2010). Moders Eğitimde Yeni Bir Paradigma:Değerler Eğitimi. *Eğitime Bakış Dergisi*,6 (18) 4-10.

- Snape, D. Ve Spencer, L. (2003). *The Foundation of Qualitative Research, In Qualitative Research Practice*, Edited by J.Ritche and J.Lewis, 1-23, London: Sage Publishs.
- Yıldırım, A. ve Şimşek, H. (2005). *Sosyal Bilimlerde Nitel Araştırma Yöntemleri*. (5. Baskı.) Ankara: Seçkin Yayıncılık.
- Büyüköztürk, Ş., Kılıç, Ç. E., Akgün, E.Ö., Karadeniz, Ş.,Demirel, F. (2009). *Bilimsel Araştırma Yöntemleri*. Ankara: Pegem Akademik Yayınları.

A COMPARATIVE STUDY ON COMPUTER EDUCATION IN NORTH KOREA'S No.1 MIDDLE SCHOOL AND GENERAL MIDDLE SCHOOL IN KIM JONG-IL ERA

Youyeon KIM

Department of Education Ph.D. student, Seoul National University, Republic of Korea

youyeon@snu.ac.kr

ABSTRACT

The purpose of this study is to reveal the characteristics of North Korea's gifted education by comparing computer education in the No.1 and general middle schools. Computer education in North Korea has been centered around the No.1 middle schools, which are schools for the science and technology gifted education. In 2001, the Computer Gifted Education Institutes were established with intensive national supports. However, after North Korea shifted its education policy in 2009 toward strengthening general secondary education, education officials are seeking to improve the overall level of computer education. After the school system was reorganized in 2012, the subject of 'Computer' was revamped into 'Information Technology.' Comparing the computer textbooks of No.1 and general middle schools, we can see that the No.1 middle school textbooks contain more systematic and deepened contents.

INTRODUCTION

North Korean government began to implement science-technology-oriented policies in the 1980s as a way of tackling the economic downturn started in the late 1970s. They declared science and technology one of the three pillars of the socialist powerhouse, defining it as a “powerful driving force behind the construction of a strong and prosperous nation.” “Political-ideological power and military power have already risen to the position of a strong nation,” but since they have not yet reached the status of an economic powerhouse, it is essential to hold the science-technology-oriented policies that are the core of economic development.

In the field of education, the government also began to pay attention to nurturing science and technology talents. They judged that running the gifted education was controversial in light of the principle of equal socialist education until the end of the 1970s and conducted it on a limited basis in the fields of art and physical education. However, the government established and expanded the No.1 middle school, a science and technology gifted education institution, starting with Pyongyang No.1 Senior-middle School in 1984. 12 No.1 middle schools were founded for each province and city next year, and since 1999, the number has increased to 200 for each city, county, and district. As a result, No.1 middle schools accounted for about 4 percent of all middle schools in North Korea as of 2000. For all middle school students nationwide, the overall secondary education is graded by ranking the selection system in the order of 'general middle school → city, county and district No.1 middle school → province No.1 middle school → Pyongyang No.1 middle school'.

In the No.1 middle school, basic science education such as mathematics, physics, chemistry, and biology was not only given priority, but computer education was also emphasized. It was the information technology field that Kim Jong-il was particularly interested in among North Korea's science-technology-oriented policies. In 1984, when Pyongyang No.1 Senior-middle School was established, Kim Il-sung ordered his country to look at the development of information technology in each country and pay attention to the latest high-tech technologies during his trip to the eastern Europe, which is known to be a starting point for the information and science sector to gain attention in North Korea. Later, the Colleges of Electronic Computing were established in Pyongyang and Hamhung in 1985, and the 'Computer Center' was set up at Kim Il-sung University in 1986. The first three-year plan for science and technology development, which began in 1988, focused on the development of software and hardware industries and automation components by building computer networks around the Korea Computer Center (KCC), which was founded in 1990.

Computer education is a regular subject in secondary schools. The No.1 middle schools have been operating as a 6-year regular course since the late 1980s, while general middle schools have provided computer education from 4th grade for two hours per week since 1998. In February 1998, at the 'National Program Competition and Exhibition,' Kim Jong-il ordered to set up a training system for human resources in the information science field and to provide computer education from an early age to strengthen their computer software skills. In December 2000, the North Korean Ministry of Education announced plans to establish two or three computer science 'model schools' in each city. Considering that computer education was focused on gifted education institutions, it is assumed that the No.1 middle schools would have mainly chosen as 'model schools.'

The purpose of this study is to reveal the characteristics of North Korea's gifted education by comparing computer education in the No.1 and general middle schools in Kim Jong-il Era. Until now, studies on gifted education (Kim, 1990; Son, 2000; Kang, 2001; Park, 2006; Cho, 2004, 2007; Kim, 2014) and computer education (Nam, 2002; Song, 2005; Sung, 2006; Jin, 2006; Lee, 2014) in North Korea have been carried out, but no studies have been conducted to compare the computer education of North Korea's No.1 middle school and general middle school. This study not only reveals the actual condition of North Korean computer education by comparing the representative institutions, educational facilities, qualifications of teachers and educational contents and methods of North Korea's No.1 middle school and general middle school but also clarifies the differentiation of North Korean gifted education more clearly.

The way to investigate North Korea's education policy, where does not disclose specific statistics and cannot be visited directly, is very limited. When one tries to study North Korea, she/he mainly uses methods to analyze the official publications from North Korea or listen to the stories of North Korean refugees. In the study, the researcher seeks to use computer education-related articles among *Kyo-yuk Sinmun* from the 2000s to early 2010s and *Computer* (“컴퓨터”) textbooks for North Korea's No.1 and general middle schools between 2009 and 2011 as analysis materials. The *Kyo-yuk Sinmun* is North Korea's central newspaper specializing in the education field and is the most credible resource showing the education policy of North Korea - nevertheless, since the official publications of North Korea have a propaganda character, they need to be read between the lines. *Computer* textbooks were found as exclusive data from Korean Educational Development Institute. The No.1 middle schools in North Korea were expanded to 200 in 1999 and operated nationwide until the mid-2000s. In 2009, however, almost all schools except for some of the No.1 middle schools in the provinces and cities were switched back to general schools (Kim, 2014). Therefore, the No.1 middle school's *Computer* textbooks to be analyzed in this study can be seen as being used for a relatively small number of gifted students. Since the regime of Kim Jong-un has been established and the 12-year compulsory education reform had been announced at the Supreme People's Assembly in September 2012, Information Technology has replaced the computer subject. However, in South Korea, *Information Technology* textbooks have not been sufficiently available to compare those in No.1 and general middle schools.

REPRESENTATIVE INSTITUTIONS

Computer education in North Korea has been centered on gifted education institutions with limited resources concentrated. According to *Rodong Sinmun*, the “Computer Gifted Education Program” was enacted in December 2000. In January 2001, Kim Jong-il emphasized the early identification and development of computer gifted students in a dialogue with the chiefs of the Central Committee of the Workers' Party. He said that to raise computer program specialists in their late 20s would be already too late, so they should raise a lot of famous computer gifted students from the secondary education stage. Under this program, computer gifted classes were set up at Mangyongdae Children's Palace, Pyongyang Children's Palace, Geumseong No.1 & No.2 Senior-middle Schools, which form the Computer Gifted Education Institutes, and professional computer education was started to be conducted. Kim Jong-il also said computer gifted education should be developed as a “pyramid style” of selecting students from the previous school year and ordered nationwide math competitions or computer contests to select excellent students. Thus, about 100 students enter computer gifted classes in Geumseong No.1 & No.2 Senior-middle School each year, who are regarded as boasts of their hometown.

Kim Jong-il seemed to have a particular interest in the Computer Gifted Education Institutes. Despite the impoverished North Korean education system and difficulties in creating educational conditions in the aftermath of the March of Hardship, Kim Jong-il donated 1,300 latest computers from the electronic product development company under the Ministry of Electronics Industry to the computer gifted classes in February 2001 (Nam, 2002). According to the *Kyo-yuk Sinmun*, the workers and teachers who received the computers from Kim Jong-il were surprised to see the production year ‘2001’ engraved on the computer. The computers for students there are connected to the internal network, allowing them to exchange data with teacher's computers, and also connected to the national computer network system, so they can access the websites of institutions such as Naenara, Gwangmyeong, Science & Technology Information Agency, and KCC to read and print the materials they need. Kim Jong-il also sent gifts to Geumseong No.1 & No.2 Senior-middle Schools in May and July 2001, and in April 2002, he granted the latest educational facilities and school buses to the Computer Gifted Education Institutes. The articles on gifts from Kim Jong-il show in common that after receiving it, teachers and managers made resolutions pledging allegiance to him.

Since 1998, computer education has been started at general secondary schools as well. After the No.1 middle schools expanded to about 200 in cities, counties and districts across the country in 1999, the necessary support for computer education was first concentrated in the No.1 middle school. However, since 2006, the government

had gradually changed the policy of the No.1 middle school, and in 2009, most of the No.1 middle schools were turned to general middle schools. The policy was changed to deal with the side effects of the expansion of No.1 middle schools nationwide and to strengthen general secondary education (Kim, 2014).

Strengthening the general secondary education in 2009, Kim Jong-il visited the field of Seojung Middle School in Lakwon County in April and Muncheon Middle School in Muncheon City in August. Among them, Seojung Middle School put great emphasis on computer education. The newly built Seojung Middle School was expected to set a national example in general secondary education, including computer education where Kim Jong-il “dispatched military builders for beach village students.” Seojung Middle School is a historic school where 1,097 students graduated from 1979 to 2006. Kim Jong-il said that since they lacked experience on how to teach computer subject in the general secondary school, the case of Seojung Middle School can be a good example. At Seojung Middle School, there were two laboratories that have dozens of computers sent by the Workers’ Party of Korea. Kim Jong-il also mentioned about the teachers and the course of the school. Although the computer teacher graduated from Hamheung Computer Technology College, the gap between the local education level and the education level in Pyongyang is enormous, so he recommended to visit the Geumseong Academy or Geumseong No.1 Middle School to observe and take the necessary lessons.

Kim Jong-il seemed to try to solve the imbalance of computer education, which is different by the school level and region by emphasizing computer education in general middle school. Computer gifted education, which was conducted as a “pyramid style” in 2001, became universal in 2009 as computer education in general education. It was expected that the know-how would be handed down to the general middle school by learning the lessons of the Computer Gifted Education Institutes, which is already receiving the priority support of the Party and conducting state-of-the-art computer education.

EDUCATIONAL FACILITIES

The computer education facilities of the No.1 middle school were given priority over the general middle school. As mentioned above, in the case of Computer Gifted Education Institutes, 1,300 computers were donated by direct instruction of Kim Jong-il. According to *Chosun Sinbo* in 2003, Pyongyang No.1 Middle School had about 100 computers. However, even in the No.1 middle school, only a handful of schools were directly supported computer facilities by the Workers’ Party. Each school should create a material foundation for computer education with the “revolutionary spirit of self-reliance.” In 2002 *Kyo-yuk Sinmun* says at Taetan No.1 Middle School in Taetan County, the principal and other members demonstrated the power of the school itself and were ‘sufficiently’ equipped with computers and intuition materials in the computer education room with the help of supporters’ organizations. It also says that workers in Yeomju County sent 40 modern computers in 2001 as a result of their interest in supplying computers to schools in the county. They set an excellent example for the computer education room of the No.1 middle school, and other schools were also being organized to the level of the school. These articles in *Kyo-yuk Sinmun* are encouraging local organizations to provide educational facilities on behalf of the government. They show that after the march of hardship, the rationing system and public education system were weakened and that the residents made a living through private business.

The situation in general middle school was even worse. In 2001, the penetration rate of North Korean computers was one per 185 people. At the national level, however, the latest computers were preferentially distributed to higher institutions, so there might not be a single computer in a general middle school (Sung, 2006). In 2001, Kim Jong-il instructed the government to continuously supply the latest computers to the Computer Gifted Education Institutes, and to transfer the old computers to the Student Children’s Palaces in the provinces. It can be a glimpse of North Korea’s computer supply system. When computer acquisition was not feasible in general middle schools, according to *Kyo-yuk Sinmun*, education was carried out with an intuitive graphical board and a mock keyboard for training. Even if there is a computer, the power supply was not secure, and measures were taken to guarantee the power supply. It is assumed that the computer penetration rate has been improved since 2009 when it began to strengthen general secondary education.

QUALIFICATION OF TEACHERS

Qualified teachers selected based on their skills are assigned to the No.1 middle school computer education teacher. The Computer Gifted Education Institutes select excellent teachers in the scientific research sector and the education sector. Through the article of *Kyo-yuk Sinmun* that said the education sector was unfamiliar to the computer specialist vice-chief and the computer lecturer in Geumseong No.2 Senior-middle School, it can be guessed that even if they have no experience as a teacher, they were appointed as experts with computer knowledge. The quality of teachers is consistently emphasized in the articles on computer education. They insisted that teachers must keep in mind that “the qualities of teachers are the quality of computer education,”

and make every effort to raise their abilities and qualities to the world level. In other words, teachers should actively adopt advanced science and technology to make education content so that they can raise the modernization level of education. In order to improve the qualities of the teachers, schools offer practical lessons on how to handle computers and write programs, and teachers get help from other teachers who are relatively good at computers.

There are not many articles that show how the computer teachers of general middle schools are trained and deployed. An article on Pyongyang Yulgok Senior-middle School in 2002 said that the teacher in charge of computer science originally majored in math, but he worked hard to develop his expertise as he took on a computer subject that was unfamiliar and difficult. Teachers in general middle schools have also carried out quality enhancement projects to raise computer literacy. An article about a teacher at Pyongyang Bonghak Middle School in 2002 stated that she developed a student who was good at math by discovering excellent computer skills.

EDUCATIONAL CONTENTS AND METHODS

Kim Jong-il had a great interest in the Computer Gifted Education Institutes, so he even ordered specific subjects. The following to the [Table 1] re-quoted from Song (2005) shows the curriculum of the computer gifted classes at Geumseong No.1 & No.2 Middle Schools in 2003. Song said that they gave a lecture for 90 minutes to concentrate on computer education from the 5th grade. The ‘learning’ step to learn the basic principles of the program is for grades 1 to 2. The ‘studying’ step to improve the understanding of the various application programs and acquire the writing is for grades 3 to 4. The ‘theorization’ phase, which teaches the principles of computer science and qualifies the ability to develop programs, aims to ‘combine theory and practice’ for the 5th and 6th grade students.

Table 1: Curriculum of computer gifted classes in Geumseong No.1 & No.2 Middle Schools

Subject	Hour / 1 year	Phase	Total
Computer Circuits and Peripherals	80h	Learning	560h
C and C+ + Language Program Preparation	280h	Learning	
Windows Manipulation System	200h	Learning	
Computer Mathematics	120h	Studying	680h
Data Structures and Algorithms	200h	Studying	
Visual dBase and Access	180h	Studying	
How to write a Linux program	180h	Studying	
AI language lisp와 prolog	120h	Theorization	420h
Natural Language Processing and Artificial Intelligence	160h	Theorization	
Computer Communication and Network	140h	Theorization	
Total hours	1,660h		

Re-quoted from Song (2005)

Computer education was important not only in the Computer Gifted Education Institutes but also in every No.1 middle schools across the country. While the specific contents of the education will be covered later in the textbook analysis below, education to deal with the computer devices was carried out as a first step. Dealing with computer devices involves learning how to install and manage computers, how to start and stop computers, handling keyboards, monitors and printers, handling disks and other peripherals, and how to explain and combat

the causes of computer failure. Besides, the core of computer education for No.1 middle school students is to write algorithms and programs through mathematical considerations. In July 2003, Kim Jong-il instructed Hero Kang-gye Jangja-san No.1 Middle School on the spot, saying, “We should not only let students practice the keyboards, but we should teach them how to create programs.” The articles in *Kyo-yuk Sinmun* argue that the algorithm training should be strengthened to master the basics of programming.

The computer textbooks were written by the No.1 middle school teachers who taught computer subjects for a long time. According to *Kyo-yuk Sinmun*, the materials for Computer Gifted Education Institutes were written intensively for two months by computer education & science researchers and editors of the publisher. Kim Jong-il sent gifts in appreciation of their efforts. In a program development course at Geumseong No.1 Middle School, teachers wrote textbooks and reference books that could help nurture computer gifted children.

It is recommended that students review what they learned after class by thoroughly studying with extracurricular instruction. There are two ways in the computer tutoring system - group tutoring and individual tutoring. *Kyo-yuk Sinmun* stresses the need to put more emphasis on the individual instruction that presents the learning tasks according to the preparation level and characteristics of the students. In extracurricular tutoring, tutors should actively use games, songs, intelligent play programs, and physical education programs to help students develop computer literacy. They should also develop students’ application skills by carrying out practical tasks to write programs about what they have learned in the relevant subjects and the problems they encounter in the real world.

The contents of computer education in general middle school slightly differ from the level of the No.1 middle school. However, emphasizing computer handling and programming skills is the same. It is imperative for computer group tutoring to be operated in general middle school as well. According to the 2001 *Kyo-yuk Sinmun*, a teacher in charge of computer education at Pyongyang Dongheung Senior-middle School taught students in the 2nd and 3rd grades basic subjects such as math, physics and chemistry, and gradually grouped them into preliminary groups that teach them how to use computer keyboards and play computer intelligence game, and then the basic groups that focus on how to write programs. She also evaluated computer literacy according to the characteristics of the students, conducted individual instruction, and took students to observe the KCC, the 3-Revolution Exhibition Hall, and the National Program Exhibition.

Since 2000, the North Korean government has held the National Computer Program Contest in the education sector every Summer. The contest is divided into individual competitions and special competitions, which include 6th-grade students from general and No.1 middle schools, and students from vocational schools and universities. However, particularly good students can participate even in lower grades. The individual contest has a typing contest and a programming contest. *Kyo-yuk Sinmun* says the No.1 middle school contest additionally includes a “database management problem.” The articles on the contest every year shows that the No.1 middle school students are winning a high percentage.

A COMPARISON OF COMPUTER TEXTBOOKS IN No.1 AND GENERAL MIDDLE SCHOOLS

Analyzing the textbooks is essential to understand how computer education has been implemented in North Korea, where Worker’s Party determines both the curriculum and the system and teaches all subjects as state-authored textbooks. The first computer textbooks for middle schools were completed in 2003. Subsequently, textbooks for grades 2 to 6 were revised in 2007 and revised again in 2009-2011. In September of 2012, the government announced the reorganization of its compulsory education system. In 2013, *Computer* subject was renamed as *Information Technology*. Currently, all textbooks for both No.1 and general middle schools are available is the 2009-2011 edition. The year of issue and the number of pages of two textbooks are shown in [Table 2].

Table 2: Year of issue and pages of *Computer* textbooks for No.1 and general middle school (2009-2011)

Grade	No.1 Middle School		General Middle School	
	Year of Issue	Pages	Year of Issue	Pages
1 st	2010	200	2009	100
2 nd	2010	380	2010	104
3 rd	2010	188	2011(2 nd edition)	104
4 th	2010	336	2011(2 nd edition)	93
5 th	2010	88	2009	207
6 th	2010	96	2010	96

While the No.1 middle school textbooks were issued simultaneously in 2010, the first publication of general middle school textbooks lasted from 2009 to 2011. The third edition of textbooks for 3rd and 4th graders in general middle school is currently available, and the year of the first edition is not provided. Interestingly, the pages of No.1 middle school textbooks for 1st to 4th grades are two to three times the pages of general middle school textbooks. In the 5th grade, the amount of textbooks in general middle school textbooks is more than that of the No.1 middle school students, while the 6th grade textbooks have the same amount. This situation can be interpreted as the intention to detect computer gifted students in the early stage by carrying out advanced computer education in No.1 middle school from their young age. Below is to compare the characteristics of contents, difficulty level, and learning periods of general and No.1 middle school computer textbooks.

COMPOSITION AND DIFFICULTY LEVEL OF CONTENTS

Comparing the *Computer* textbooks of No.1 and general middle schools shows that the main contents of the textbooks are similar, but the No.1 middle school textbooks are dealing with more advanced contents. For example, the contents of the 1st and 2nd grade textbooks are as follows. In [Table 3] below, the contents only in the No.1 middle school textbook are underlined, and the same themes with a different title that appears in the No.1 and general middle school textbooks are expressed in italics.

Table 3: A Comparison of Contents of 1st and 2nd Grade *Computer* textbooks for No.1 and general middle school

Grade	No.1 Middle School	General Middle School
1 st	<p>Preface</p> <p>Ch1. What is a Computer?</p> <p>1) What Computers Do</p> <p>2) How Computers Work</p> <p><u>3) The Development Process of Computer Practice</u></p> <p>Ch2. Drawing</p> <p>1) Drawing a Yut Board</p> <p>2) Drawing Yut Markers and Sticks</p> <p><u>Practice</u></p> <p><i>Ch3. Basics of Document Editing</i></p> <p><i>1) Document Editing Program 《Geul》</i></p> <p><i>2) Concepts about Typefaces</i></p> <p><i>3) Input of Formulas</i></p> <p><i>4) Typing in English</i></p> <p><i>5) Creating a Simple Document</i></p> <p><i>Practice</i></p> <p>Ch4. Making a Poster</p> <p>1) Making Birthday Cards</p> <p>2) Poster 《Composition of the Computer》</p> <p><u>Practice</u></p> <p><u>Comprehensive Questions</u></p> <p>Ch5. Data Management in 《Red Star》</p> <p><i>1) Concepts of Files and Registers</i></p> <p>2) Finding the Contents of Computer</p> <p><i>3) Dealing with Registers</i></p> <p>4) Data Management from Various External Memories</p>	<p>Preface</p> <p>Ch1. What is a Computer?</p> <p>1) What Computers Do</p> <p>2) How Computers Work</p> <p>Ch2. Drawing</p> <p>1) Drawing a Yut Board</p> <p>2) Drawing Yut Markers and Sticks</p> <p><i>Ch3. Entering Documents</i></p> <p><i>1) 《For one and only country》</i></p> <p><i>2) The ABC Song</i></p> <p><i>3) Formula Input Method</i></p> <p>Ch4. Making a Poster</p> <p>1) Birthday Cards</p> <p>2) Proud of Division</p> <p>Ch5. Data Management in 《Red Star》</p> <p><i>1) Concepts of Files and Folders</i></p> <p>2) Finding the Contents of Computer</p> <p><i>3) Creating and Erasing File Folders</i></p> <p>4) Data Management from External Memories</p>

2 nd	<p>Preface</p> <p>Ch1. Configuration of 《Red Star》</p> <p>1) Configuration of the Screen, Mouse, and Sound</p> <p>2) <i>Installing New Programs and Devices</i></p> <p>3) Various Configuration</p> <p>4) <u>Computer Network</u></p> <p>5) <u>Section Management of Hard Disk</u></p> <p>Ch2. <i>Grade Card</i></p> <p>1) <i>Making a Grade Card</i></p> <p>2) <i>Getting a total score and rating</i></p> <p>3) <i>Formatting of data</i></p> <p>Ch3. <u>Our Class Database</u></p> <p>1) <u>The Concept of Database and Basic Operation</u></p> <p>2) <u>Building a Database</u></p> <p>Ch4. <i>2D Imaging</i></p> <p>1) <i>Foundation of Image Editing</i></p> <p>2) <i>Basic Tool Window and Image Window</i></p> <p>3) <i>Layer and Filter</i></p> <p>4) <i>Image Processing</i></p> <p>Ch5. <u>Making a Simple Moving Picture</u></p> <p>1) <u>Moving Picture Program</u></p> <p>2) <u>Imaging</u></p> <p>3) <u>Models in Flash</u></p> <p>4) <u>Making a Moving Picture</u></p>	<p>Preface</p> <p>Ch1. Configuration of 《Red Star》</p> <p>1) Configuration of the Screen, Mouse, and Sound</p> <p>2) <i>Installing New Programs</i></p> <p>3) Various Configuration</p> <p>Ch2. <i>Table Calculation</i></p> <p>1) <i>Making a Grade Card</i></p> <p>2) <i>Making a Competition Chart</i></p> <p>3) <i>Simplified Data Management</i></p> <p>Ch3. <i>2D Imaging</i></p> <p>1) <i>Basic Concept of Image Editing</i></p> <p>2) <i>Making a Cone</i></p> <p>3) <i>Making 3D Letters</i></p> <p>4) <i>Image Synthesis</i></p>
-----------------	---	--

The contents and order of the 1st grade textbooks for the No.1 and general middle school are similar. However, in the No.1 middle school textbook, Chapter 1 to Chapter 4, add "Practice" or "Comprehensive Questions." While there are practice sessions in the general middle school textbook, the No.1 middle school textbook requires more challenging training. At the end of each section, there is a "Training Question," which requires more careful review as much content as there is to be learned in the No.1 middle school textbook. In Chapter 3, which teaches how to use "Geul," a program developed by North Korea in the form of Microsoft Word, the No.1 middle school textbook provides a more detailed explanation of 'menu.' In the general middle school textbook, only the composition of the program is examined, but the No.1 middle school textbook explains the function of each menu, how to archive and open the document before practicing. Chapter 5 teaches how to manage data in the "Red Star," a computer operating system (OS) made by North Korea. Here, the "Registers" of the No.1

middle school textbook and the “File Folder” of the general middle school textbook are the same.

The 2nd grade textbook has 380 pages of the No.1 middle school textbook, more than three times the textbook of general middle school. Many contents do not appear in general middle school textbooks. Chapter 1, Section 2, “Installing New Programs and Devices,” provides a way to install an integrated office processing program “We” and Windows environmental support program “Man-neung” 2.0, and a video processing program “Phantom” that appears only in the textbook for No.1 middle school, followed by the installation of an electronic document editor Acrobat and a printing press. In Chapter 1, Section 4 describes the concept and setting method of ‘Computer Network,’ which means ‘bundle of connected computers.’ In Chapter 3, the concept and operation method of ‘Database’ appears, which appears in the 3rd grade textbooks in the general middle school textbook. Chapter 2 explains how to use ‘table’ developed by North Korea in the form of Microsoft Excel. Compared to the general middle school textbook, the No.1 middle school textbook explains in more detail the hidden functions of ‘sheets’ or ‘columns’ and how to save files. Moreover, in Chapter 2, “Making a Competition Chart” and “Simplified Data Management,” the No.1 middle school textbook covers the content in more detail, including functions, for 3rd graders. While “2D Imaging” also simply explains the image editing program “Fantasy” in the general middle school textbook and goes straight into practice, such as creating a cone, making 3D letters and synthesizing images, the No.1 middle school encourages them to practice one by one, explaining the composition of the “Fantasy” program and how to use various functions. Finally, Chapter 5, “Making a Simple Moving Pictures,” teaches high-end technology to make flash using the Micromedia Flash MX program, which is not covered until the 6th grade in the general middle school.

LEARNING PERIODS BY AREA

As discussed above, the *Computer* textbooks for the No.1 and general middle schools differ not only in the composition and difficulty of the learning contents, but also in the learning periods of some area. [Table 4] below summarizes the different learning periods of specific contents.

Table 4: Different learning periods for some areas of No.1 and general middle school

Contents	No.1 Middle School	General Middle School
Concepts about 《Geul》 Typefaces	1 st	3 rd
Computer Network	2 nd	3 rd
Building a Database	2 nd	3 rd
Making a Simple Moving Picture	2 nd	6 th
Making a Competition Chart	3 rd	2 nd
Simplified Data Management	3 rd	2 nd
Creating a Homepage	4 th	6 th
Making a 3D Image	4 th	5 th
Creating Multimedia Works	4 th	6 th
Programming Basics	5 th	4 th

Most of the areas are taught faster in No.1 middle schools than in general middle schools. Since the No.1 middle school is a place where students with superior intelligence are selected and nurtured as a science and technology gifted student in North Korea, they will have a faster understanding and better desire to learn than general middle school students. However, some contents are taught later than general middle schools. As we have seen above, “Making a Competition Chart” and “Simplified Data Management” allows general middle school students to learn earlier than No.1 middle school students. Comparing the contents of the textbooks for the 3rd grade of No.1 middle school to the contents of the 2nd grade of general middle school, the textbook for No.1 middle school contains the contents that are not in the general middle school, such as the format of the diagram component or

how to add and delete data in the chart and simple statistical processing.

Programming, which takes an important place in North Korea's computer education, is also taught in the 4th grade at general middle schools and in the 5th grade at No.1 middle schools. All describe algorithms that initially write down the handling of problems that the computer needs to solve in order. This part is also more detailed and kindly described in the 5th grade textbook of No.1 middle school. Then they teach the programming language. In the No.1 middle school, students learn the C language, and the general middle school students learn Gambas. C language is a programming language for system technology designed and developed by D.R. Ritchie and others at Bell Labs in 1971. It is a convenient programming language because it has few technical constraints that are often seen in high-level languages.

CONCLUSIONS

Computer education in North Korea was carried out to contribute to economic development by achieving the automation of industry as an extension of its science-technology-oriented policy. In the early days, however, the computer penetration rate was not high enough to be universalized nationwide, so computer education was developed centering on the No.1 middle school, a science and technology gifted education institute. The Computer Gifted Education Institutes, which set up computer gifted classes in 2001, was the cradle of such a “pyramid” computer gifted education and was continuously supplied with the latest computers amid Kim Jong-il's particular interest. On the other hand, in general middle schools, about one computer in one school was shared by teachers and students, and instead provided education with intuitive boards and mock keyboards. After a few years, when the gap between No.1 and general middle schools became widened and the general secondary education weakened, North Korea switched all No.1 schools to general schools in 2009 except for some of the schools in provinces and cities. As if to symbolize his policy of strengthening general secondary education, Kim Jong-il visited Seojung Middle School in ‘beach village’ and asked to become a model nationwide in general secondary education, including computer education. Since then, computer education in general middle schools has been emphasized, and in 2012, the subject was upgraded from *Computer* to *Information Technology*.

This study analyzed the articles of *Kyo-yuk Sinmun* and compared the computer textbooks of No.1 and general middle schools to highlight the differentiation of North Korean gifted education more specifically. The No.1 middle school computer textbook contains more systematic and more in-depth contents, even in the same subjects as general middle school textbooks. There are also areas where the No.1 and general middle schools have different learning periods. Overall, the No.1 middle school students learn the problematic units first. The programming method emphasized in computer education differs from the language used in No.1 and general middle schools. Gambas, which is used in general middle schools, is a language developed for first-time learners, so it seems to be taught in Gambas instead of the C language used in No.1 middle schools. Even after the school system was reorganized in 2012, the language of Gambas is being taught in *Information Technology*.

Although North Korea's information technology has its limitations because it restricts Internet access, computer education will continue to develop as a means to cultivate “National Science and Technology Talents” (Kim, 2017). This paper analyzed *Computer* textbooks published between 2009 and 2011 to compare gifted and general education, but on *Information Technology* subject, which was revised after the implementation of the 12-year compulsory education in 2012, continued research will be needed.

REFERENCES

- Cho, Jeong-ah. (2004). The Educational Policy of North Korea in the Era of Kim, Jung-il. *Asian journal of education*, 5(2), 1-20.
- Cho, Jeong-ah. (2007). Utilitarianism in education and uneven development of education in North Korea in 2000s. *Korean Journal of Sociology of Education*, 17(4), 109-131.
- Cho, Jeong-ah, Lee, Kyo-Duk, Jung, Chae Kwan & Kang, Hyoje. (2015). *Education Policy, Education Curriculum, and Textbooks in the Kim Jong-un Era*. Seoul: KINU.
- Jin, Sung-hee. (2006). A Comparative Study on ICT Literacy Education Between South and North Korea. *Unification Strategy*, 6(2), 299-331.
- Kang, Kyung-Seok. (2001). A Study on the Gifted Education. *Journal of Gifted/Talented Education*, 11(3), 221-244.
- Kim, Dong Kyu. (1990). *Pedagogy of North Korea*. Seoul: Moonpasa.
- Kim, Ji-soo. (2017). Kim Jung Un Regime's Education Policy Seen through the 7th Workers' Party Convention in North Korea. *Korean Journal of Reunification Education*, 14(2), 1-21.
- Kim, You-yeon. (2014). A Study on the First Middle School Policy of DPRK. Master's Dissertation, Ewha Womans University.
- Lee, Yong-Bae. (2014). Analysis on Computer Education in Elementary Schools in North Korea and South

- Korea with Further Prospect. *Journal of the Korea Convergence Society*, 5(4), 49-60.
- Nam, Sung Wook. (2002). *Strategies for Development of IT Industry in North Korea and Construction of a Strong Country*. Seoul: Hanul Academy.
- Park, Min Su. (2006). A Study on Gifted Education in North Korea. Master's Dissertation, Seoul National University of Education.
- Son, Ji-Lim. (2000). Kim Jong Il's Military-Oriented Politics and the Educational System of the Elite. *North Korean Studies*, 205-224.
- Song, Kyung Jun. (2005). IT Education in North Korea. Master's Dissertation, Chonbuk National University.
- Sung, Eun-mo. (2006). A Study on Discourse for Cooperative Exchange of ICT in Education between the South and North Korea. *Unification Strategy*, 6(2), 261-298.

A PILOT STUDY ON THE COMPARISON BETWEEN BLENDED AND F2F LEARNING METHODS IN A SQL COURSE

Mithat YAVUZARSLAN

Computer Education and Instructional Technologies, Yeditepe University, Turkey

mithat.yavuzarslan@yeditepe.edu.tr

Hakan OLGUN

Informatics, Istanbul University, Turkey

hakan.olgun@ogr.istanbul.edu.tr

Selim YAZICI

Business Administration, Istanbul University, Turkey

selim@istanbul.edu.tr

ABSTRACT

One of the main outcomes of the current period is to decrease in the cost and energy of accessing the information due to rapid growing of internet and Information Technologies. Therefore, transferring online courses to users via e-learning platforms has become more and more preferred in recent years. This paper aims to investigate the effect of an online course designed in Google Course Builder to teach introductory level SQL (Structured Query Language) on students' knowledge and skills on use of SQL. 61 undergraduate students from a private university in Turkey who were enrolled in "Basic Computer Applications" course participated in this research. To establish an experimental research design, the students were randomly separated into experimental and control groups. Blended learning method was applied to the experimental group whose participants enrolled in the online course (SQL Course) and face-to-face (F2F) method was applied to the control group with the same learning content. While SQL Mid-Test was only conducted to observe the change of experimental group, SQL Final Test was applied to both groups. Since the sample size of the experimental group is under 30 and a normal distribution was not found, Mann-Whitney U Test was performed to compare the means of experimental and control groups. To compare the means of SQL Mid-Test and SQL-Final Test, Wilcoxon Signed-Rank Test was performed. After two weeks of experiment, it was found that there is a significant difference between two groups in favor of participants taught with F2F method. It was also revealed that slightly but significant improvement were found on the academic performance of the experimental group. On one hand, the comparison between two groups demonstrated the constraints for learning a scripting language in a short time, however on the other hand results also showed the positive effect of blended learning environment to students' learning performance towards using introductory level SQL. All findings of the study were discussed in the light of relevant literature.

Key Words: e-learning, blended learning, F2F learning, SQL

INTRODUCTION

In recent years, the advances in information and communication technologies are continuing to change the mentality of education in terms of both academic and institutional. To investigate the relationships and differences between e-learning and traditional methods has always been a significant task for enhancing the quality of education. This study is designed as a pilot study to compare blended and face-to-face (F2F) learning methods and the findings of the experiment were discussed in the light of relevant literature.

E-Learning and Blended Learning Methods

E-learning has emerged with the rapid advance of information technologies and electronic systems in the last 20 years. The widest definition of e-learning is "the use of Internet technologies to deliver a broad array of solutions that enhance knowledge and performance" (Rosenberg, 2001, p.11). Pollard and Hillage (2001) stated that e-learning concept refers to the processes such as providing information via information and communication technologies to enhance learning performance, preparing interactive learning materials to develop personal skills, and creating a multi-dimensional relationship between learner and instructor (monitoring the learning process, feedbacks, peer learning) by transforming the two previous steps into a broader level.

When compared to F2F learning, a number of advantages makes e-learning more preferable. Schweizer (2004) indicated that institutions give priority to e-learning because of the quality of information in e-learning environment, productivity of new technologies in terms of their costs, spreading culture of e-learning and internet based technologies, increase of online courses, reduction of business cycles, and increasing competition in business

market. Ally (2004) also emphasized that online learning platforms are transcending the boundaries of time and space, facilitating to access contemporary learning materials, and providing to communicate directly with the instructor. Additionally, directing students to valid and qualified knowledge in online learning platforms is more effective and easier than in F2F learning environment.

Today, most of the e-learning platforms are in asynchronous model. While asynchronous e-learning model refers to the e-learning environments which are accessible by users anytime and anywhere, synchronous e-learning model requires students to be gathered in e-learning environment at the same time (Rosenberg, 2001). Beyond these models, a model called “blended learning” which combines synchronous and asynchronous models to support learning environments with the benefits of both F2F education and e-learning is also being preferred. Driscoll (2002) defined blended learning as the combination of instructional technologies and web-based technology with a F2F learning environment guided by instructor. Since blended learning model is facilitating the development of open communication, criticism and discussion skills which are seen as significant personal features in higher education, it can usually cause more effective learning experiences in comparison with the other e-learning models (Garrison & Kanuka, 2004).

NIIT (National Institute of Instructional Technologies) proposed a classification for blended learning concerning institutions and organizations (as cited in Valiathan, 2002):

Skill-Driven Model: It is used to learn skills via web-based courses and online learning platforms covering e-mail groups, discussion forums, face-to-face interviews and self-learning methods.

Attitude-Driven Model: It is used to develop behaviors based on peer learning via online meetings and group work.

Competency-Driven Model: It is used to gain implicit knowledge via observing an expert including mentorship and learning management system (LMS) support.

Despite the lucid difference between the blended learning and other online learning models, there is no exact standard for determining the ratio of internet based technologies to traditional methods within an instructional design. In other words, blended learning refers to a process which is designed considering the contextual needs of instruction, learners’ level of development, scope of the subject area, and resources of educational institutions. Thus, it is impossible to come across two identical blended learning designs (Garrison & Kanuka, 2004).

Related Work

Literature review revealed that there are many research made to investigate the role of blended or e-learning in the development of learners’ academic performance. In a research conducted by Zhang, Zhao and Zhou (2004), the effects of e-learning environment and traditional classroom on academic achievement concerning database normalization and search engines subjects were examined. 103 undergraduate students were participated in the study and separated into experimental and control groups which refer to e-learning and traditional classroom environments. The students in traditional classroom were taught by the verbal lecture method and they were able to ask questions to instructor in anytime they want. On the other hand, the students in experimental group were enrolled in an interactive e-learning course. Findings of the study were exposed that test scores of students enrolled in e-learning environment were significantly higher than the scores of students in traditional classroom.

A similar study conducted by Zhang, Zhou and Briggs (2006) investigated the effect of an online course platform including interactive videos about internet search engines on learning outcomes of students. Participants of the study were 138 undergraduate students who divided into four groups. Three of these groups were all accessed in e-learning environments categorized as and with no video, with interactive video, and with non-interactive video. Students in the fourth group were trained with traditional methods in a physical classroom. According to the results, the group enrolled in an e-learning environment with interactive videos performed significantly higher academic achievement than the students in other groups.

In the study conducted by Chen and Jones (2007), blended learning and traditional classroom settings were compared to examine students’ learning performance and perception towards learning. The participants of the experimental group hold four F2F meetings in an academic term and enrolled online meetings in rest of the term. At the end of the study, it was revealed that participants in traditional classroom were more satisfied and identified learning content more lucid when compared to the participants in blended learning environment. On the other

hand, participants in blended learning environment were internalized the value of concepts within the course and their analytic skills were improved more than the students in traditional classroom.

Al-Qahtani and Higgins (2013) carried out a study with the participation of 148 undergraduate students to explore the effect of blended, traditional and e-learning environments on students' academic performance. The findings showed that a significant difference was found between three groups in favor of the students in blended learning environment. In accordance with these findings, authors emphasized that blended learning has more potential to enhance academic success than traditional and e-learning environments because it combines traditional and online methods of instruction.

In the study conducted by Wilkowski, Deutsch and Russel (2014), researchers designed a Massive Open Online Course (MOOC) by using Google's Course Builder for teaching the use of Google Earth tool. At the beginning, participants were asked to share their past experiences and to select learning goals to specify their expectations from the course. These data is used to remind participants their goals during the learning process. Participants' self-reports show the achievement of learning goals were compared at the end of the study. The results showed that participants who completed the course activities were achieved more learning goals than the participants who did not completed all of the activities. Moreover, the participants who completed the course despite of their low-skills were achieved more success than the participants just watched videos and read texts within the course. These results show the importance of activities and feedbacks towards learning achievement in any e-learning platform. Kay and McKlin (2014) also designed a course with Google Course Builder to improve robot programming skills of K-12 teachers. In the study in which 1100 teachers participated, pretest-posttest design were performed and it was revealed that their knowledge, skills and self-confidence were all significantly higher than their initial level.

A research made by Thai, Wever and Valcke (2017) investigated the effect of not just blended and traditional learning environments but also e-learning and flipped classroom environments on students' academic performance. In this study, intrinsic motivation, self-efficacy and perceived flexibility variables of 90 undergraduate students were examined besides their academic performance. Findings of the study revealed that the learning performance of the students in flipped classroom were significantly higher than the students in blended, traditional and e-learning environments. There was also a significant difference between the learning performance of blended learning and e-learning groups in favor of the students in blended learning environment. However, no significant differences were found between the students in blended and traditional learning environments in terms of their learning performance.

As can be seen from the literature, the studies focused on the comparison between blended and F2F learning were conducted with the large amount of sample and long periods of experiment. However, this pilot study was carried on with a small amount of sample and short period of experiment. This study aims to investigate the effect of a blended learning environment on undergraduate students' knowledge and skills towards using introductory level Structured Query Language (SQL).

MATERIAL AND METHODS

Participants of the Study

The participants of this study consists of 61 undergraduate students who enrolled Basic Computer Applications Course during 2017 fall semester at a private university in Turkey. In Table 1, number and percentiles of participants by the program they study is presented.

Table 1. Numbers and Percentiles of Participants by Programs

Program	N	Percentile (%)
Nutrition and Dietetics	22	36%
Guidance and Psychological Counseling	11	18%
Elementary Mathematics Teaching	8	13%
Sociology	8	13%
Psychology	5	8%
Genetics and Bioengineering	2	3%
English Language Teaching	2	3%
Computer Engineering	1	2%
Biomedical Engineering	1	2%
Turkish Language and Literature Teaching	1	2%
Total:	61	100%

It can be seen from Table 1 that the sample of this study has a broad-spectrum and majority of them are from the programs related with social sciences.

Design of the Study

This study is designed as a pilot study. The experimental method was used and the students were randomly separated into experimental and control groups by using MS Excel's randomize function. In Table 2 and Table 3, numbers and percentiles of experimental and control groups by program they study were listed.

Table 2. Numbers and Percentiles of Experimental Group by Programs

Program	N	Percentile (%)
Sociology	7	32%
Elementary Mathematics Teaching	6	27%
Psychology	3	14%
Guidance and Psychological Counseling	2	9%
Nutrition and Dietetics	2	9%
English Language Teaching	1	5%
Genetics and Bioengineering	1	5%
Total:	N _E = 22	100%

Table 2 shows that while Sociology students have the highest population in experimental group, students from English Language Teaching and Genetics and Bioengineering programs have the lowest population.

Table 3. Numbers and Percentiles of Control Group by Programs

Program	N	Percentile (%)
Nutrition and Dietetics	20	51%
Guidance and Psychological Counseling	9	23%
Psychology	2	5%
Elementary Mathematics Teaching	2	5%
Computer Engineering	1	3%
Turkish Language and Literature Teaching	1	3%
Sociology	1	3%
English Language Teaching	1	3%
Biomedical Engineering	1	3%
Genetics and Bioengineering	1	3%
Total:	N _C =39	100%

In Table 3, it can be seen that students from Nutrition and Dietetics represent the vast majority of control group.

Design of the SQL Course

In recent years, world-wide known universities started to transfer some of the course contents into the web and this trend led Massive Open Online Courses (MOOC) to gain a wide currency (Yuan & Powell, 2013; Waldrop, 2014).

Google Course Builders' features towards instructional design, open and free accessibility, possibility to publish and manage more than one course at the same time makes this platform useful and preferable for instructors, educational technologists and learning designers (Marciel, Michelinakis, Fanou & Muñoz-Merino, 2013). Additionally, in some studies, it was revealed that this tool is able to enhance learners' academic performance (Kay & Mcklin, 2014; Wilkowski, Deutsch & Russel, 2014)

In this pilot study, an introductory level SQL Course is designed by using Google Course Builder's infrastructure. At the beginning of the research, learning content was created for both of the groups and separated into three levels. First level of the course covered the database concept, principles of database design, types of databases, database management systems, and an introduction to SQL. In the second and third level of the course, students learn and practice how to write SQL statements from simple to complex.

In the home page of SQL Course, participants were asked to watch an introductory video that explains how to use the platform and how to answer questions within the experiment. After watching the video, students started to read and interact with the learning materials on the SQL Course platform.

At the end of each section in SQL Course, students were asked to write appropriate SQL statement by using "W3 SQL Tryit Editor" which is an online database editor based on SQL.

Table 4. Research Design

Group	Method	Duration	Mid-Test	Final Test
Experimental (n=22)	Blended Learning	2 Weeks	Yes	Yes
Control (n=39)	F2F Learning	2 Weeks	No	Yes

Students in the experimental group enrolled SQL Course which was designed in Google Course Builder and integrated with the learning content via this online platform during the experiment. Blended learning method was applied to experimental group by allocating the last 20 minutes of each lesson for verbal lecturing and discussion. Students were also able to ask questions in class sessions verbally and out of class sessions via discussion forums. The blended learning model used in this pilot study refers to "skill-driven model" according to categorization of NIIT. SQL Course platform was accessible for 2 weeks and participants were free to access the course content and

materials during the experiment process. At the end of first week, experimental group was tested with a mid-test covers the subjects of first level of the course.

The learning content of the three levels were instructed to the control group by verbal lecturing method and PowerPoint slides were used to show how to write SQL Statements. Since both groups were in the computer lab during the experiment, students in the control group were also directed to make practice using “W3 SQL Tryit Editor”.

Instruments

SQL Mid-Test, which consists of 10 multiple-choice questions, was applied to the students from experimental group at the end of the first week. The responses were collected using Google Forms.

SQL Final Test, which measures the knowledge and skills of participants towards database concepts and using SQL was applied to the experimental and control group at the end of the experiment. It consists of 7 multiple-choice questions about the topics of first level and 13 open-ended questions about using SQL on a sample database. Responses of this test were also collected using Google Forms and the responses given to the open-ended questions were evaluated by the second researcher of this study.

Data Analysis

Since the sample size of the experimental group is under 30 and a normal distribution was not found, Mann-Whitney U Test was performed to compare the means of experimental and control groups. To compare the means of SQL Mid-Test and SQL-Final Test, Wilcoxon Signed-Rank Test was performed. While Mann-Whitney U Test is used to compare two independent samples with small size and non-normal distribution, Wilcoxon Signed-Rank Test is used to compare two related samples when the assumption of normality have not met (Kenny, 1987). SPSS (Statistical Package for Social Sciences) v24 software was used to analyze the data.

RESULTS

The means and standard deviations of SQL Final Test scores for experimental and control groups are presented in Table 5.

Table 5. Means and Standard Deviations of SQL Final Test Scores

Group	n	\bar{X}	s	Minimum	Maximum
Experimental	22	43.07	26.23	10.0	92.5
Control	39	63.27	20.34	22.5	100.0
TOTAL	61	55.98	24.46	10.0	100.0

As shown in Table 4, the mean of the control group's final scores (\bar{X} =63.27, s=20.34) is higher than the mean of the experimental group's final scores (\bar{X} =43.07, s=26.23). To explore the difference between the mean scores of two groups, Mann-Whitney U test was performed and the results of this test were presented in Table 6.

Table 6. Results of Mann-Whitney U Test

Group	n	Md	Mean Rank	Sum of Ranks	Mann-Whitney U	z	p
Experimental	22	30.0	22.5	495.0	242.0	-2.813	.005*
Control	39	62.5	35.8	1396.0			

*p<.05

It can be seen from Table 6 that a statistically significant difference was found between the mean scores of control (Md=62.5, n=39) and experimental groups (Md=30.0, n=22) in favor of the control group (U=242.0, z=-2.813, p>.05, r=.36). It can be concluded that students in F2F learning environment performed significantly higher than the students in blended learning environment.

To analyze the SQL Mid-Test and SQL Final Test scores of the experimental group, Wilcoxon Signed-Rank Test was performed and results were presented in Table 7.

Table 7. Means and Standard Deviations of SQL Mid-Test and SQL Final Test Scores of Experimental Group

	n	\bar{X}	s	Minimum	Maximum
SQL Mid-Test	22	29.55	23.19	0	90.0
SQL Final Test	22	43.07	26.23	10.0	92.5

In Table 7, it can be seen that mean of experimental group's SQL Final Test scores (\bar{X} =43.07, s=23.19) are higher than the mean of their SQL Mid-Test scores (\bar{X} = 29.55, s=23.19). On the other hand, it was seen that both scores are below the expected mean.

Table 8. Results of Wilcoxon Signed-Rank Test

SQL Mid-Test /SQL Final Test	n	Mean Rank	Sum of Ranks	Z	p
Negative Ranks	6	10.58	63.50	2.047*	.041**
Positive Ranks	16	11.84	189.50		

*Based on Negative Ranks

**p<.05

According to the results shown in Table 8, there was a statistically significant difference between the mean scores of SQL Mid-Test and mean scores of SQL Final Test of the experimental group (z=2.407, p<.05). It can be stated that blended learning method provided a slight but significant improve on learning performance of the students.

DISCUSSION

In this pilot study, the effect of a blended learning environment on undergraduate students' knowledge and skills towards use of SQL was investigated. Students were divided into experimental and control groups to compare the blended and F2F learning environments. While the mean SQL Final Test scores of both groups were compared, the difference between the mean SQL Mid-Test scores and the mean SQL Final Test scores of experimental group was also examined.

First result of the study revealed that the students in F2F learning environment performed significantly higher in SQL Final Test than the students in blended learning environment. Although there can be found some early studies in e-learning research which discovered significant difference in favor of traditional learning methods or no significant difference between two settings (e.g. Johnson, Aragon & Shaik, 2000; Ponzurick, France & Logar et al., 2000), these results are not in line with the findings of the studies conducted in last years (Zhang et al., 2004; Zhang et al., 2006; Melton, Graf & Chopak-Foss, 2009; Al-Qahtani & Haggins, 2013; Thai et al., 2017). It can be asserted that since the participants except engineering students are from the departments where generally traditional learning methods are used, they may have had the lack of adaptation to a blended learning environment. Furthermore, there are some constraints for learning a programming language in a short time. Hadjerrouit (2007) emphasized that learning a programming language is related with developing a skill rather than gaining a set of knowledge and even an academic term will not be enough to make unexperienced students to reach the expected level. Despite the fact that the difficulties when learning a programming language can be reduced using online tools, the time of the training should be described and organized well to allow learners to develop such skills. In a study conducted by Gülseçen and others (2013), undergraduate students' programming skills were examined in F2F and online learning environments and compared with pretest-posttest design. They found that while the scores of the students in F2F learning environment were higher in the first week, the students in online learning platform performed better but not significantly higher at the end of second week. Thus, the difference between the learning performances found in our pilot study can be explained by the short experiment time which did not allow participants to acquire knowledge of SQL effectively.

According to another finding of this study, it was revealed that there was a slight but significant increase in mean test scores of students in blended learning environment from first to second week. In other words, students in blended learning environment performed slightly but significantly better in SQL Final test than they did in SQL Mid-Test. These results show the positive effect of blended learning environment to students' learning performance towards using introductory level SQL. When these results considered, students may have just started to become more adapted not only to write SQL statements but also to use of SQL Course platform during the two weeks of experiment. In a series of experiment, a problem-solving based environment, SQL-Tutor, which provides students to write SQL queries with the help of feedbacks has been evaluated concerning several variables (Mitrovic & Ohlsson, 2016). In one of these researches conducted with 68 undergraduate students, it was stated that four weeks of experiment was a restriction of the study even the experimental group solved the problems in a shorter

time than the control group (Mathews & Mitrovic, 2007). Another study made by Gálvez, Guzmán and Conejo (2009) implemented a blended learning setting included a problem solving environment called OOPS (Object Oriented Programming System) and found any significant differences between test scores of experimental and control group. However, an improvement can be seen in the scores of all students involved in blended learning or online environments in both studies. These results suggest that although the time of the experiment can make difficult to observe or conclude the effect of blended learning environments on students' learning performance, an overall progress can be seen. Thus, it can be said that the findings of this study is similar with the study conducted by Gálvez and others (2009).

It is known that learning a programming language is a challenging process. Students can face with difficulties in understanding the concepts of programming or developing strong skills when they learn programming in F2F environments (Lahtinen, Ala-Mutka & Järvinen, 2006). In computing education, developing rich learning environments is important to address students' different learning styles and various sources of motivations (Jenkins, 2002). Therefore, use of blended learning design to teach programming has several advantages in terms of its pedagogical opportunities. It allows users for accessing the exercises, course materials, examples and their solutions any time so that they become able to develop a deep comprehension towards the notions of programming. Blended learning environments are also useful for computing education since they may include activities for operating programming tasks which direct students to improve their skills by repeating difficult tasks. Additionally, students faced with difficulties when trying to solve a task can use both discussion forums and F2F meetings for seeking help (Hadjerrouit, 2008). Considering the emerging technologies and services in e-learning industry, all of these advantages are highlighting the functionality of blended learning design in computing education.

In conclusion, it is expected that the results of this pilot study, which was conducted in a short time with a small sample size will shed light on further studies likely to investigate the effect of blended learning method on students' learning performance. It is also considered that there might be found higher and more significant differences in the further studies likely to be conducted in a longer time and with a larger sample size. Further studies should also consider the reflection of students towards the online course and their experiences within training.

REFERENCES

- Al-Qahtani, A. A., & Higgins, S. E. (2013). Effects of traditional, blended and e-learning on students' achievement in higher education. *Journal of computer assisted learning*, 29(3), 220-234.
- Ally, M. (2004). *Foundations of educational theory for online learning*. Theory and practice of online learning, 2, 15-44.
- Chen, C. C., & Jones, K. T. (2007). Blended learning vs. traditional classroom settings: Assessing effectiveness and student perceptions in an MBA accounting course. *Journal of educators online*, 4(1), n1.
- Driscoll, M. (2002). Blended learning: Let's get beyond the hype. *E-learning*, 1(4), 1-4.
- Gálvez, J., Guzmán, E., & Conejo, R. (2009). A blended E-learning experience in a course of object oriented programming fundamentals. *Knowledge-Based Systems*, 22(4), 279-286.
- Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. *The internet and higher education*, 7(2), 95-105.
- Gülseçen, S., Reis, A., Z., Erol, S., Ç., Karataş, K., E., Gezer, M., Şimsek, İ., Asaadi, Y., Derelioğlu, Y., Yıldırım, K., Gürsul, F., Mutlu, D., Şişman, B. & Özen, Z. Comparison of On-line and F2F Education Methods in Teaching Computer Programming. *World Journal on Educational Technology*. 5(2), 291-300.
- Hadjerrouit, S. (2007). A blended learning model in java programming: A design-based research approach. In *Proc. Comput. Sci. IT Educ. Conf* (pp. 283-308).
- Hadjerrouit, S. (2008). Towards a blended learning model for teaching and learning computer programming: A case study. *Informatics in Education*, 7(2), 181.
- Johnson, S. D., Aragon, S. R., & Shaik, N. (2000). Comparative analysis of learner satisfaction and learning outcomes in online and face-to-face learning environments. *Journal of interactive learning research*, 11(1), 29-49.
- Kay, J. S., & McKlin, T. (2014, March). The challenges of using a MOOC to introduce absolute beginners to programming on specialized hardware. In *Proceedings of the first ACM conference on Learning@ scale conference* (pp. 211-212). ACM.
- Kenny, D. A. (1987). *Statistics for the Social and Behavioral Sciences*. Boston: Little, Brown.
- Jenkins, T. (2002, August). On the difficulty of learning to program. In *Proceedings of the 3rd Annual Conference of the LTSN Centre for Information and Computer Sciences* (Vol. 4, No. 2002, pp. 53-58).
- Lahtinen, E., Ala-Mutka, K., & Järvinen, H. M. (2005). A study of the difficulties of novice programmers. *Acm Sigcse Bulletin*, 37(3), 14-18.

- Marciel, M., Michelinakis, F., Fanou, R., & Muñoz-Merino, P. J. (2013). Enhancements to Google Course Builder: Assessments Visualisation, YouTube Events Collector and Dummy Data Generator.
- Mathews, M. & Mitrovic, A. (2007). Investigating the Effectiveness of Problem Templates on Learning in ITSs. In: Luckin, R., Koedinger, K., Greer, J. (eds.) *Proc. Artificial Intelligence in Education*, 611–613.
- Melton, B. F., Bland, H. W., & Chopak-Foss, J. (2009). Achievement and satisfaction in blended learning versus traditional general health course designs. *International Journal for the Scholarship of Teaching and Learning*, 3(1), 26.
- Mitrovic, A., & Ohlsson, S. (2016). Implementing CBM: SQL-Tutor after fifteen years. *International Journal of Artificial Intelligence in Education*, 26(1), 150-159.
- Pollard, E., & Hillage, J. (2001). Exploring e-learning. Brighton: Institute for Employment Studies.
- Ponzurick, T. G., France, K. R., & Logar, C. M. (2000). Delivering graduate marketing education: An analysis of face-to-face versus distance education. *Journal of Marketing education*, 22(3), 180-187.
- Rosenberg, M. J. (2001). *E-learning: Strategies for delivering knowledge in the digital age*. New York: McGraw-Hill.
- Schweizer, H. (2004). E-learning in business. *Journal of Management Education*, 28(6), 674-692.
- Thai, N. T. T., De Wever, B., & Valcke, M. (2017). The impact of a flipped classroom design on learning performance in higher education: Looking for the best “blend” of lectures and guiding questions with feedback. *Computers & Education*, 107, 113-126.
- Valiathan, P. (2002). Blended learning models. *Learning circuits*, 3(8), 50-59.
- Waldrop, M. M. (2014). Massive open online courses, aka MOOCs, transform higher education and science.
- Wilkowski, J., Deutsch, A., & Russell, D. M. (2014, March). Student skill and goal achievement in the mapping with google MOOC. In *Proceedings of the first ACM conference on Learning@ scale conference* (pp. 3-10). ACM.
- Yuan, L. & Powell, S. (2013). MOOCs and open education: Implications for higher education. (JISC CETIS white paper). Retrieved from <http://www.academia.edu/download/33781834/MOOCs.pdf>
- Zhang, D., Zhao, J. L., Zhou, L., & Nunamaker Jr, J. F. (2004). Can e-learning replace classroom learning?. *Communications of the ACM*, 47(5), 75-79.
- Zhang, D., Zhou, L., Briggs, R. O., & Nunamaker, J. F. (2006). Instructional video in e-learning: Assessing the impact of interactive video on learning effectiveness. *Information & management*, 43(1), 15-27.

A STUDY ON THE INFLUENCE OF NEWS CREDIBILITY AND FALSE CONSENSUS EFFECT BY USER'S ALGORITHM-BASED DIGITAL NEWS SERVICE EXPERIENCE, PERCEIVED USEFULNESS, PERCEIVED RISKS AND PERCEIVED BIAS

Mikyung KIM

Faculty of Media Communication Department, Chungwoon University, South Korea
mkqueen@chungwoon.ac.kr

ABSTRACT

This study focused on how algorithmically generated digital news service influence the user's credibility of digital news and false consensus effect in algorithm age. Specifically, how the variables of the user's interaction with the content, the perceived usefulness, perceived general risk and the perceived bias effect the user's credibility of news and the user's false consensus of public opinion. Firstly, the factor analysis of the effects resulting from user's experience is separated into three categories: the users as 'spectator (passively interacting with content)', the users as a 'communicator (actively interacting with content)' and the users as 'producers (creators of content)'. Secondly, the regression analysis shows the users who have experience of 'a communicator' and 'a producers' have a positive effect on news reliability. Additionally the user's perceived risk and perceived bias of digital algorithm news have a positive effect to news credibility. Thirdly, user's experience of digital algorithm news service as 'a spectator', 'a communicator' and 'a producer' have a positive effect on false consensus of public opinion. In addition, the user's perceived usefulness and perceived bias have positive effects on false consensus. These findings suggest that the more users feel knowledgeable about the digital platforms and interactive with digital news and the more they actually have the experience of creating an agenda, the more they trust digital news. Therefore, it is necessary to promote an active user experience of digital news, that is, news literacy of producing news. Also, these findings suggest that the more users perceive risk of digital algorithm news and the more users perceive bias of news, the more users are reliable to digital news. Recognizing the risk of digital algorithm news is also important in shaping news credibility. Recognizing bias also has an important effect on the formation of news credibility. In addition, third finding suggests that all three user's experiences of digital news as 'a spectator', 'a communicator' and 'a producer' have effect on false consensus which is tendency to believe that his thoughts, attitudes, and actions were universal, not unlike others. Also it indicates that the more users perceive usefulness and bias of digital news, the more users overestimate the extent to which one's own thoughts and others' thought agree. The more users perceive digital news as useful and biased, the more people tend to believe it will be the same as their attitudes and beliefs.

Keywords: Algorithm based Digital News Service, Perceived Usefulness, Perceived Risk, Perceived Bias, News Credibility, False Consensus Effect

INTRODUCTION

The 50% of South Koreans consume news on their digital platforms, 77 % of whom consume news from digital brokerage services such as Naver, Daum and Google. (Korean press foundation, Digital News Report, 2017). The way users view news on the portal is by recommendation and search. For news recommendations, 'Daum' is recommended with an algorithm system called 'Lubics'. The system recommends news in a way that is customized based on the user's consumption way, users' gender and age groups. 'Naver' aims to eventually auto-deploy 100 percent by algorithm without being edited by humans. It has also introduced personalized news recommendation services to some of its mobile news. For searches, both 'Naver' and 'Daum' are placed by algorithms. Google is also being done by algorithms for both news recommendation and search. Facebook is selected by its algorithm to prioritize posts and to reflect the length of time it stays, 'reply' and 'like'.

Users' experience in algorithmic news consumption has an important effect on the formation of public opinion as well as their attitude to news. Many researchers argue that algorithmic editing and recommending are affecting news consumption attitudes and behavior. (Park-Oh, 2017; Oh, 2016; Choi, 2017).

According to the results of an online survey released by the Korea Press Foundation on September 17, 2018, 61% of the users believe that an artificial intelligence algorithm is fairer than editing a person does. This fairness allows users to recognize that algorithm news is useful. In addition, 75% of digital algorithms news users are concerned about the

dangers of algorithm news. Editing the way algorithm arranges articles, users' preferred consumption of certain news is accelerating, and contact with essential news is becoming difficult. Users are also concerned that the algorithms cause the news to be consumed by biasedly and cause users to come to false consensus.

This study examines how user experience of algorithm-based digital news service affects false consensus effects and news service credibility. It also wants to review how perceived usefulness, perceived risk and perceived bias of algorithm-based digital news affect false consensus effects and news service credibility.

LITERATURE REVIEW

The Digital Algorithm News Service and Evolution of User's Experience

The reason why algorithms are drawing attention in journalism is because the value of news depends on one's involvement in news preparation, editing, distribution, and use. The practical reason why we can provide good news by minimizing the controversy over subjective evaluation of the value of news and minimizing human involvement in the news process is to raise the usefulness of algorithms. Algorithms consist of two components: logic and control, which refer to knowledge used to solve problems, and control refers to a problem-solving strategy using knowledge (Robert, 1979). Journalism-related algorithms have a basic premise that minimizes human involvement. It also aims at "how can we make news easier" in terms of news production, "how can we show good news well" in terms of news editing and "how can we make news read more" in terms of news usage.

Table 1 Digital News Algorithm

	Algorithm type	Characteristics	Case
News Production	News writing algorithm	Generate articles with a natural language generation algorithm based on structured data	EQBOT, Stats Monkey, Aotomated Insights 'Quartz'
	News prediction algorithm	Predict future news based on articles and online data	Recorded future
	News summary algorithm	Calculate word and sentence similarity, extract key words from overlapping articles using algorithm, and present words in sentence form according to natural language processing method	NAVER summary bot DAUM news automatic summary
News Editing	News clustering algorithm	Clustering encompasses both finding common themes (keywords) from the collected news and grouping similar news according to the topic.	NAVER, DAUM
	Automatic classification algorithm	Algorithm classification is made through similarity analysis of title and content, but a 'classifier' is applied to be placed in a given classification.	Ziny news
	Algorithm to exclude duplicate news	Exclude overlapping articles within the media, exclude overlapping articles outside the media, and Google excludes overlapping articles within the media	K-Nearest Neighbor Classifier
News Usage	Recommended Algorithm	Content-based recommendations based on the nature of news/cooperative filtering recommendation based on similarities measured between users and news	Buzz feed
	News ranking algorithm	News ranking system	Google

Digital algorithm news provides news in a way that is different from that of traditional legacy media. Digital algorithm news shows a pattern that is determined by the user's usage pattern and the interaction pattern between the users. Symbolic reality from the interactive behaviors that users provide, exchange and utilize on their own is becoming the standard for news editing. Therefore, this study of the user's experience of digital algorithm news services should be concerned with the current state that not only the service provider but also the entire user population will interact and

organize together. Because the digital algorithm news service's news message system has the characteristics of messages being selected and determined by the user's use behavior, it will be necessary to consider user's voluntary and participatory activities other than involuntary and unintentional actions. User's Algorithm-based digital news experience consists of a variety of motivations.

Until now, user's experiences have mostly focused on the aspects of an individual's behavior in accepting a given information. However, individuals not only acquire information to solve the problem at hand or to reduce uncertainty, but also provide their own information to others to influence their attitude and decision making. As the media environment changes, the social and collective importance of user behavior to share and deliver information is growing.

Table 2 The Dimensions of User Experience

The dimensions of user experience	The user experience	Active use experience	Passive use experience
Feature		Planned and intentional behavior	Unplanned and unintentional behavior
Individual dimension	Information acquiring	Information seeking	Information processing
Social dimension	Information provision	Information production	Information sharing

Source: Kim, J-N., & Grunig, J. E. (2011). Problem solving and communicative action: A situational theory of problem solving. *Journal of Communication*. Re-composition

The above user experience dimensions and user experiences are to be applied and constructed in this paper. As a starting point for changing news, the digital news experience has a new aspect. Since the digital news innovation took place, users' experience in news use has been transformed into a highly involved "communicator" as they comment and share with friends. Moreover, when there is a high level of behavioral involvement, there is also an 'experience as a producer' that produces news directly. The majority, however, remain "experienced as spectator." In other words, they look at the news from personal curiosity or interest, get information from the news, or use it as a certain distance from news.

Acceptance and Resistance of Digital Algorithm News Service Innovation

Perceived Usefulness

In Technology Acceptance Model (TAM), Perceived usefulness is defined as "the degree to which one believes that one's work performance will be improved by using digital technology." Another concept, perceived ease, is defined as "the degree to which we believe that using digital technology does not require much effort." The TAM focused on the cognitive parameters of the user that appeared in the adoption of the new technology (Lee Jong-yeon, Choi Young, 2012).

As with rational behavioral theory, a technology acceptance model that pays attention to human behavior is very useful in explaining the advent of new technologies and the actions of users who use and adopt them, and it is highly descriptive. It is assessed that a concise model can be presented and is used in various areas (Chung & Nam, 2007; Zhou, 2008; Venkatesh & Davis, 2000).

The perceived usefulness of digital algorithm news services arises from the expectation that algorithm will be able to maintain more objectivity and fairness than when people are involved by editing news.

Perceived Risk

Perceived risks are often regarded as factors that increase users' resistance to reform and impede diffusion and adoption of new things (Bredahl, 2001; Ram & Sheth, 1989; Kleijnen, Lee, & Wetzels, 2009) on how individuals accept and perceive information given, unlike conventional technical or environmental or health risks. Thus, the risks from digital use are individually perceived and interpreted differently in the magnitude and extent of the risks. Therefore, it is very The risk of digital algorithm news in this study is about risks arising from news brokerage services such as portals, search engines and social media. These intermediary news services are operated by algorithm editing techniques and

set up important news based on the results of user interaction. This has caused users to develop biased news consumption habits, unable to accommodate a variety of information and being trapped in a filter bubble. Digital algorithm technology uses personal media usage data to recommend news, perform as directed input programs, and recommend certain things, but not explain the context. Therefore, news consumers' rigid exposure to news could lead to misconception and misinterpretation.

Perceived Bias

Media bias refers to media reporting in favor of a particular political party, candidate, or political and social position. These characteristics are factors that undermine the value of news, hindering the media's direction of accuracy, objectivity, fairness and unbiasedness. The perceived bias is the recognition of this media bias. The perceived bias, whether or not news reports are actually biased, refers to the perception of news consumers who consider news media biased in political and social issue reporting (Ho, Binder, Becker, Moy, Scheuffle, Brosard, & Günther, 2011). The perceived bias occurs as the perspective of the actual media itself is biased and it expands into the user's bias (deVreese & Elenbass, 2008).

News Service Credibility and False Consensus

News service credibility

News credibility consists of trust in news platforms, trust in news producers and trust in news messages (Metzger, Flanagin, Eyal, Lemus & McCann, 2003). News credibility is an assessment of whether news platform or news producer such as editor and reporter report the news messages in an objective and balanced view (Gunther & Liebhard, 2006; Gunther & Schmitt, 2004; Arpan & Raney, 2003; Giner-Sorola & Chaiken, 1994).

News users who trust news platforms, news producers, and news messages can change positively their attitude and behaviors (Wathen & Burkel, 2002).

False Consensus Effect

False consensus effect refers to a cognitive error overestimating the favorable public opinion environment by projecting one's opinion to others (Wojcieszak & Price, 2009). It is a tendency for people to believe that their own choices and judgments are relatively more common and appropriate for the present situation. Motivation of false consensus is due to the operation of psychology to maintain cognitive balance. The psychological balance that results from believing that many people will agree with your opinion strengthens your bias. It matures and stabilizes in the filter bubble. Therefore, it results in errors in situational judgment and decision making.

In the digital algorithm news service environment, false consensus is relevant to how much users are actively involved in news services. Wojcieszak (2008) explored the false consensus effect among ideologically homogeneous online discussion groups. He found that false consensus is influenced by how strong people's ideological orientation is and how enthusiastic people are in the debate.

RESEARCH QUESTIONS

This study looks at how user's experience in using digital algorithm news services, perceived usefulness, perceived risk and perceived bias affect news service credibility and false consensus.

Research Question 1: What is the user experience of digital algorithm news service?

Research Question 2: How does the user experience of digital algorithm news service such as spectator, communicator and producer, perceived usefulness, perceived risk and perceived bias affect false consensus?

Research Question 3: How does the user experience of digital algorithm news service such as spectator, communicator and producer, perceived usefulness, perceived risk and perceived bias affect news service credibility?

RESEARCH METHOD

Data Collection

The study was conducted on people from 20s to 60s who use digital algorithm news services a lot. The study was conducted online from Sept. 10-20, 2018, via Marketlink, a professional research firm. For this study, 1,000 randomly selected panels from the Marketlink were sent out. 584 of them completed the survey responses. A total of 530 people were selected for the survey, excluding 54 people who did not meet their gender, age or region allocation. According to the survey, 266 men (50.2 percent) and 264 women (49.8 percent). 106 people were distributed by age from 20s to 60s, and the average age was 44.35 years old (SD=12.48).

Operational Definition and Measurement Variables

- **User's Digital Algorithm News Experience:** User's digital algorithm news experience refers to the user's motivations that arise from algorithm-based news making, news editing and news-recommendations in news brokerage services such as Naver, Daum, and Google. This study has been applied by transforming the use motivation used in Kim Kyung-hee (2012) paper into the use experience. It was measured by the motivation of curiosity, interest, information search, communication materials use, time-spending, relaxation, self-efficiency, immersion, value judgment, communication with other users, empathy, agenda setting, advertisement and sensational content avoidance.
- **Perceived Usefulness:** This study defines perceived usefulness as the extent to which one believes that using digital algorithm news services will improve one's performance. Perceived usefulness has a positive effect on the intention of using digital news services. In this study, questions about perceived usefulness were measured by organizing four questions based on studies by Davis (1989) and Bae Jae-kwon (2016). It includes: 'I can get the information I want through digital news services', 'digital news services provide me with useful information, digital news services can easily find the information I want, and I think digital news services are generally useful to me.'
- **Perceived Risk:** The perceived risks in this study are defined as recognition of uncertainties that may result from the use of digital algorithm news services. In this study, questions concerning perceived risks of Bauer (1960) and Kim et al. (2003) were modified to suit the study. The survey items consisted of four questions: 'When searching for digital algorithm news, I am worried that my data was recorded when I read related search words', 'I am concerned that when an ad related to news search is recommended, my purchase information was recorded', 'I am concerned that my viewing information was exposed when my cultural tastes news was recommended while searching for news', 'I am concerned that I am being monitored when political biased news was recommended while searching for news'.
- **Perceived Bias:** In this study perceived bias is defined as the perception of news consumers who consider news media to be politically and socially biased in reporting issues. As the perspective of the actual media itself is biased, it expands into the receptor bias. In this study, the survey was constructed based on the study of the Stroud (2010): 'Recommendation of digital algorithm news strengthens existing political stance,' 'Recommendation of digital news strengthens existing brand loyalty,' and 'Recommendation of digital algorithm news strengthens existing cultural tastes.'
- **News Service Credibility:** Credibility is the subjective expectation that news services will act to meet the expectations or interests of digital news users despite the risks. The reliability measures of Hovland & Weiss (1963) were modified to fit the study: 'The news services I use are reliable', 'The news services I use are fair', 'The news services I use are valuable', 'The news services I use are in-depth', 'The news services I use provide various information' and 'The news services I use represent the interests of the news readers.'
- **False Consensus:** False consensus is a cognitive bias that overestimates the proportion of others agreeing with me. This refers to the mistaken perception of an agreement that does not really exist as it exists. This study was conducted after correcting the question of measuring false consensus presented by Na Eun-young (2012). I set up four questions to measure false consensus: 'users of digital algorithm news service will have similar opinions as mine.', 'users of digital algorithm news service will have a similar perspective to mine.', 'users of digital algorithm news service will evaluate the value of news in a similar way to mine. ', and 'users of digital algorithm news service will recommend and share news in a similar way to mine.'

Analysis method

The data collected for this study were analyzed using the statistical program, SPSS 21.0. For the basic analysis of data, descriptive statistics and frequency analysis were conducted and the validity of the scales were measured through factor analysis on the variables of the digital algorithm news service experience. The reliability analysis of the measurement scale was then performed.

RESEARCH RESULT

User's Experience Digital Algorithm News Service

A factor analysis was conducted on variables of user's experience of digital algorithm news. Each factor analysis was conducted with a principal component analysis and varimax rotation. Factor analysis of 18 items was performed on the user's experience of digital algorithm news service. As a result, three factors were derived: 'Experience as a spectator', 'Experience as a communicator' and 'Experience as a producer'.

Table 3 A factor analysis of user's experience of digital algorithm news

	Spectator	Communicator	Producer
Digital news makes us know what's going on in the world.	0.79		
Digital news delivers socially important news	0.73		
I can understand digital news and get the subject of conversation	0.66		
Digital news makes it easy to get the information you want.	0.64		
Digital news makes it possible to get a variety of information.	0.59		
Digital news arouses curiosity	0.51		
I can see people's reactions through digital news comments.		0.80	
Digital news is good for the public and for individuals.		0.60	
Digital news allows me to express my opinion.		0.58	
I can communicate with digital news producers.		0.56	
Digital news has a high sense of immersion.		0.56	
Digital news let me create a news agenda.			0.81
Digital news let me get other's opinion on my agenda.			0.70
I can be news producer			0.68
Digital news ads are indispensable.			
I can evade the sensationalism of digital news.			

Eigen Value	3.01	2.26	2.19
Explained Variance(%)	18.81	14.14	13.72
Cronbach's α	.810	.709	.718
Note) The result is no indication of values with a factor load rating of 0.4 or lower.			

The reliability of each variable was measured through the Cronbach's (α), which evaluates the internal consistency of the measurement scale. The reliability of the measurement scale is identified between .690 and .898, so it was judged to be at a level that could be used in this study.

Table 4 Descriptive Statistics and Reliability of Key Variables

Measurement Variables	Mean (Standard deviation)	Reliability (α)
News Service Reliability	3.21(0.64)	.843
False Consensus	2.98(0.68)	.731
Perceived Usefulness	3.43(0.61)	.779
Perceived Risk	3.10(0.78)	.782
Perceived Bias	3.15(0.58)	.694

Assessing the false consensus according to user's experience of digital algorithm news services, perceived usefulness, perceived risk, and perceived bias

After looking at the factors that affect *the false consensus*, the use's experience as a communicator ($\beta=0.09$, $p<.05$), and as a producer ($\beta=0.15$, $p<.001$), perceived risk ($\beta=0.13$; $p<.01$), and perceived bias ($\beta=0.46$, $p<.001$) have positive effects on false consensus.

Table 5 The factors that affect the reliability of the news service

	The false consensus					
	1		2		3	
	β	t	β	t	β	t
Spectator	.08	1.64	.05	.82	-.02	-.45
communicator	.14	3.09**	.14	2.97**	.09	2.23*
Producer	.27	5.91***	.27	5.86***	.15	3.58***
Perceived Usefulness			.05	.98	-.06	-1.21
Perceived Risk					.13	3.49**
Perceived Bias					.46	10.74***
R²	.244		.245		.445	
adjusted R²	.238		.238		.437	
ΔR^2	-		.001		.200	
F	42.25***		33.99***		59.74***	

* $p<.05$, ** $p<.01$, *** $p<.001$

Assessing the credibility of news services according to user's experience of digital algorithm news services, perceived usefulness, perceived risk, and perceived bias

After looking at the factors that affect the *credibility of news services*, the user experience as spectator ($\beta=0.17$,

$p < .001$), the user experience as a producer ($\beta = 0.24$ $p < .001$), perceived usefulness ($\beta = 0.13$, $p < .05$), and perceived bias ($\beta = 0.18$, $p < .001$) have a positive effect on the credibility of news services

Table 6. The factors that affect *the credibility of news services*

	the credibility of news services					
	1		2		3	
	β	t	β	t	β	t
Spectator	.29	6.72***	.20	3.76***	.17	3.37**
Communicator	.10	2.29*	.08	1.95	.07	1.56
Producer	.29	6.84***	.28	6.74***	.24	5.69***
Perceived Usefulness			.17	3.35**	.13	2.49*
Perceived Risk					.01	.34
Perceived Bias					.18	3.99***
R²	.375		.389		.412	
adjusted R²	.372		.384		.404	
ΔR^2	-		.013		.023	
F	79.17***		66.82***		53.33***	

* $p < .05$, ** $p < .01$, *** $p < .001$

CONCLUSION

In summing up the research results, the experience as a communicator and the experience as a producer affected the false consensus. In the effect of perceived usefulness, perceived risk and perceived bias on false consensus effects, perceived risk and perceived bias affected the false consensus. It means that due to perceived risk and bias of the algorithm news service, I mistake that my opinion will be consented by more people than it really is.

First, these findings have been demonstrated in this study, as shown by previous research that false consensus effects are significant to heavy users rather than light user in social media or digital news services (Na, Eun-young, 2012). The more voluntary and participatory use of digital algorithm news services means that they are active in acquiring information, sharing information and providing information, and they ensure high network homogeneity. And they connect a lot with people who are similar to themselves. Thus, the assumed similarity and probability of false consensus may be increased. This is a result of showing that voluntary and participatory users are highly likely to reach the false consensus.

Second, users avoid innovation by being aware of the risks of algorithm news, but they also embrace innovation when they perceive greater usefulness. When accepting algorithm news, a consensus group can be created by building networked homogeneity. You may mistake your opinion for being supported by the sympathetic group.

Third, the bias has been shown to strengthen the sense of agreement. This can lead to a tendency to believe that others will sympathize with their opinions, which can lead to the stuck-up of the bias. People who use biased news from algorithm news services are at greater risk of being trapped filter bubble forming echo chambers among them.

In summing up the research results, the experience as a spectator and the experience as a producer affected the news service credibility. In the effect of perceived usefulness, perceived risk and perceived bias on the news service credibility, perceived usefulness and perceived risk affected the news service credibility.

First, the user experience as spectator and as producers have affected the credibility of digital algorithm news services. It is understood that the credibility of digital algorithm news is high for universal users. it can be said that the user spectrum for news service credibility is wide, closely related to the perceived usefulness of users.

Second, the perceived usefulness and perceived bias in the effects of perceived usefulness, perceived risk and perceived bias on the credibility of news service affected news service credibility. The findings are consistent with previous research that found perceived usefulness raises users' expectations and enables them to embrace innovation.

Third, the perceived bias may be perception of media bias, but it is also a concept of user's bias created by exposure to media bias. The perceived bias means that you may have extreme trust in exposed news services because you are biased in accepting news. This is a consequence of enhancing cognitive bias in combination with false consensus effects. With credibility of news services and the false consensus effect is activating each other, users can be trapped in a filter bubble.

The significance of this study has demonstrated empirically that perceived bias and perceived risk of digital algorithm news are creating biased false consensus, demonstrating the problem that digital algorithm news can cause confirmation bias and filter bubble phenomena. It is also an important finding that the planned and intentional active users rather than the simple users of information processing have influenced the false consensus and the credibility of news services. The fact that active users have false consensus and credibility of news service rather than passive users provides important implications for setting targets for news literacy.

REFERENCES

- Arpan, L. & Raney, A.A. (2003). A Experimental Investigation of News Source and the Hostile Media Effect, *Journal & Mass Communication Quarterly* 80(2). 265-281.
- Bae, J. K. (2016). An Empirical Study on the Effect of Leakage Threat of Personal Information on Protective Behavior Intention in Big Data Environment : Based on Health Psychology Theory and Protection Motivation Theory, *The e-business studies*, 17(3), 191-208.
- Bauer, R. (1960). Consumer behavior as risk taking. in *Dynamic marketing for a changing world*, Hancock, R. (ed.), Chicago: American Marketing Association, pp. 389-98.
- Bredahl, L. (2001). Determinants of consumer attitudes and purchase intentions with regard to genetically modified foods – Results of a cross-national survey. *Journal of Consumer Policy*, 24, 23-61.
- Carveth, R. & Alexander, A. (1985). Soap opera viewing motivations and the cultivation hypothesis. *Journal of Broadcasting & Electronic Media*, 29, 259 ~ 273.
- Carveth, R., & Alexander, A. (1985). Soap opera viewing motivations and the cultivation process. *Journal of Broadcasting & Electronic Media*, 29, 259-336.
- Choi, J. Y. (2017). *A Legislative Study for Algorithmic Neutrality*, *Global Legislative Strategy Study* 17, 18(2). Korean Legislation Research Institute.
- Chu, C.W. and Lu, H.P. (2007). Factors influencing online music purchase intention in Taiwan: An empirical study based on the value-intention framework, *Internet Research*, 17(2). 139-155.
- Chung, D., & Nam, C. (2007). An analysis of the variables predicting instant messenger use, *New Media & Society*, 9, 212-234, 2007.
- deVreese, Claes H. & Elenbass, M. (2008). Media in the Game of Politics: Effects of Strategic Metacoverage on Political Cynicism, *Press/Politics* 13(3), 285-309.
- Gefen, D., Karahanna, E., and Straub, D. W. (2003). Trust and TAM in online shopping: an integrated model, *MIS Quarterly*, 27(1). 51-90.
- Gerbner, G., & Gross, L. (1976). Living with television: The violence profile. *Journal of Communication*, 26, 172 ~ 199.
- Gerbner, G., Gross, L., Signorielli, N., Morgan, N., & Jackson-Beck, M. (1979). The demonstration of power: Violence profile No. 10. *Journal of Communication*, 29, 177 ~ 196.
- Ginner-Sorolla, Roger & Chaiken, S. (1994). The Cause of Hostile Media Judgements, *Journal of Experimental Social Psychology* 30(2). 165-180.
- Gunter, A.C. & Schmitt, K.M. (2004). Mapping Boundaries of the Hostile Media Effect, *Journal of Communication*, 54(1). 55-70.
- Gunther, A. C., & Liebhart, J. L. (2006). Broad reach or biased source? Decomposing the hostile media effect. *Journal of Communication*, 56, 449-466. doi: 10.1111/j.1460- 2466.2006.00295.x
- Hong, H.N. (2017.11.07.). Naver's News Placement Algorithm, how far are people and how far are machines? Kinews, <http://www.kinews.net/news/articleView.html?idxno=113166>
- Hovland, C. I., Harvey, O. J., & Sherif, M. (1957). Assimilation and contrast effects in reactions to communication and attitude change. *Journal of Abnormal & Social Psychology*, 55, 244-252. doi: 10.1037/h0048480
- Hsu, C.L. and Lu, H.P. (2004). , Why do people play on-line games? an extended TAM with social influences and flow

- experience, *Information and Management*, 41(7). 853-868.
- Keum, J.K.(2016.11.14.). News disappearing through algorithm filtering, can you believe it? "Release the editorial principles"vs "appreciate the editorial rights of the portal news."... "Robot journalism, it's going to be hard to replace people.", Media Today, <http://www.mediatoday.co.kr/news/articleView.html?idxno=133293>
- Kim, D. W., Lee, T. M. & Kang, M.S. (2003). A study on the Effects of Perceived Risk and Perceived Quality on the Mobile-Commerce Adoption : An extension to the Technology Acceptance Model, *Korean Journal of Administration*, 35, 171-193.
- Kim, J. N., & Grunig, J. E.(2011). Problem solving and communicative action: A situational theory of problem solving. *Journal of Communication*, 61(1), 120~ 149.
- Kim, K. H (2012). Changes in News Consumption and the Evolution of News through News Portals and Websites of News Outlets, *Journal of Communication Research*, Vol. 49, No.2, 5-36.
- Kleijnen, M., Lee, N. & Wetzels, M.(2009). An exploration of consumer resistance to innovations and its antecedents, *Journal of Economic Psychology* 30(3):344-357.
- Kowalski, R.(1979). Algorithm = Logic + Control. *Communication of the ACM*, 22(7), 424-436. [Online] <http://www.doc.ic.ac.uk/~rak/papers/algorithm%20=%20logic%20+%20control.pdf>
- Lee, J.Y. & Choi, Y(2012). A Study on acceptance factors of smart TV, *Korean Journal of Broadcasting & Communication*, 26(4). 386-430, 2012.
- Lee, M.R, Choi, S.J. & Lee, Y.J (2015). A Study on the Adoption of UHD for Users Perceived usefulness and ease of use of UHDTV, *Journal of Broadcasting Engineering*, 20(1), 48-56.
- Lee, Y. Y. & Lee, N. K. (2005). Psychological Dimensions of Risk Perception, *Korean Journal of Cognitive Science*, 16(3), 199-211.
- Lin, J. and Lu, H.(2000). "Towards an understanding of the behavioural intention to use a web site, *International Journal of Information Management*, 20(3), 197-208.
- Metzger, M. J., Flanagin, A. J., Eyal, K., Lemus, D. R., & Mccann, R. M. (2003). Credibility for the 21stcentury: Integrating perspectives on source, message, and media credibility in the contemporary media environment. *Communications Yearbook*, 27, 293-335. Mahwah, NJ: Lawrence ErlbaumAssociation.
- Moon, S & Kim, K(2007). A Study on Factors Influencing Intentions to Use 'mini' (Internet radio), *Broadcasting & Communication*, Vol. 8, No. 2, 82-115.
- Na, E.Y. (2012). Differences in Reality Perception between SNS Heavy Users and Light Users: Cultivation and False Consensus Effects, *Korean Journal of Social and Personality Psychology*, 26(3), 63-84.
- Ho, Shirley S., Binder, Andrew R., Becker, Amy B., Moy, Patricia & Scheufele, Dietram A., Brossard, Dominique & Gunther, Albert C. (2011). The Role of Perceptions of Media Bias in General and Issue-Specific Political Participation, *Mass Communication & Society* 14(3):343 – 374.
- Oh, S.Y. (2016). An Exploratory Inquiry into the Convergence of Journalism and Algorithm, *Journal of Cybercommunication Academy Society*, 33(3).51-101.
- Ram, S., & Sheth, J. N. (1989). Consumer resistance to innovations: The marketing problem and its solutions. *Journal of Consumer Marketing*, 6(2), 5-14.
- Stroud N. J.(2010). Polarization and Partisan Selective Exposure, *Journal of communication*, 60, 556-576.
- Venkatesh, V. and Davis, F.D.(2000). A theoretical extension of the technology acceptance model: four longitudinal field studies, *Management Science*, 46(2), pp.186-204.
- Venkatesh, V., & Davis, F. D. A(2000). Theoretical extension of the technology acceptance model: Four longitudinal field studies, *Management Science*, Vol. 46, No. 2, 186-204.
- Wojcieszak, M. (2008). False Consensus Goes Online: Impact of Ideologically Homogeneous Groups on False Consensus, *Public Opinion Quarterly* 72(4). 781-791.
- Zhou, Y.(2008). Voluntary adopters versus forced adopters: integrating the diffusion of innovation theory and the technology acceptance model to study intra-organizational adoption, *New Media & Society*, 10, 475-496.

ADMINISTRATIVE FACTORS AFFECTING BRANDING OF PRIVATE SCHOOLS IN UDON THANI PROVINCE

Krit MUNGKALASAEN

Faculty of Education, Khon Kaen University, Thailand
Krit_m@kkumail.com

Dawruwan THAWINKARN*

Faculty of Education, Khon Kaen University, Thailand
dawtha@kku.ac.th

*Corresponding Author

Wallapha ARIRATANA

Faculty of Liberal Arts, Khon Kaen University, Thailand
wallapha@kku.ac.th

ABSTRACT

The purpose of this research was to study the administrative factors affecting the branding of private schools in Udon Thani province. This survey research consists of 310 school administrators and teachers' samples, which were obtained by Multi-Stage Random Sampling method; data were collected by using a 5-level estimation scale questionnaire with an alpha coefficient of 0.991. Data, then, were analyzed with Pearson's Product Moment Correlation and Stepwise Multiple Regression.

The results of the research showed that all 5 administrative factors; leadership, organizational structure, information technology, teamwork, and corporate culture, had effects on the branding prediction on of private schools in Udon Thani. Sorted of these 5 factors most affected prediction in descending order were; corporate culture, organizational structure, information technology, leadership, and teamwork respectively. Those 5 administrative factors were also the prediction of branding of private schools in Udon Thani with statistical significance at the level of 0.05, with predictive power of 76.40 percent.

Keywords: Administrative Factors, Branding

INTRODUCTION

One of the major goals in Thailand's education management plan is to ensure the participation of every partner. Change is a constant in the educational administration; therefore being a school director and leading the school is difficult and consequently, most professional end up taking direction from others (Dawruwan Thawinkarn, 2018). Private schools are an alternative option of the education system that also accommodates the need for quality education development. In serious competitive environments, changing organization is a key business decision in order for a private school to survive. Nowadays, private schools need to avoid the pitfalls of traditional education business management in order to create their own identity and make them more attractive to current and potential clients. The decreasing number of clients leads to declining in both the education and business dimension. To flourish in a competitive market, private schools require effective management of school structure. The school administration should facilitate resource management, quality development, changing acceptance and also create the organization's identity to survive in an increasingly competitive market. The school administrators should carefully estimate the branded school competitors. The essential elements in building up the competency for competition include not only quality development, but also the awareness raising among relevant participants. All school staff members should contemplate the particular executions and value the identity qualifications of their school (Goontalee Reunrom, 2013). Recently, Brand has played more of a role in private school administration because it is based on the customer's experience on the properties of the product or service, including the value, symbol, feature and characteristic. These properties create a uniqueness and establish an ownership of the identity. Brand is considered to be an important asset of the school because it is more tangible and visible than learning, teaching or services are. Brand has an important role in a school because it is the primary thing parents and students consider when choosing a school.

Private school administrators usually manipulate the different strategies in education management. Administrative system is crucial in brand development. The researcher aimed to investigate the administrative factors including leadership, organization structure, information technology, team work, and organizational culture that affect branding. It will provide the private schools in Udon Thani more approaches for effective education management, and students will be able to choose the best choice for their education. To develop the quality of education, private schools need to create more options and uniqueness

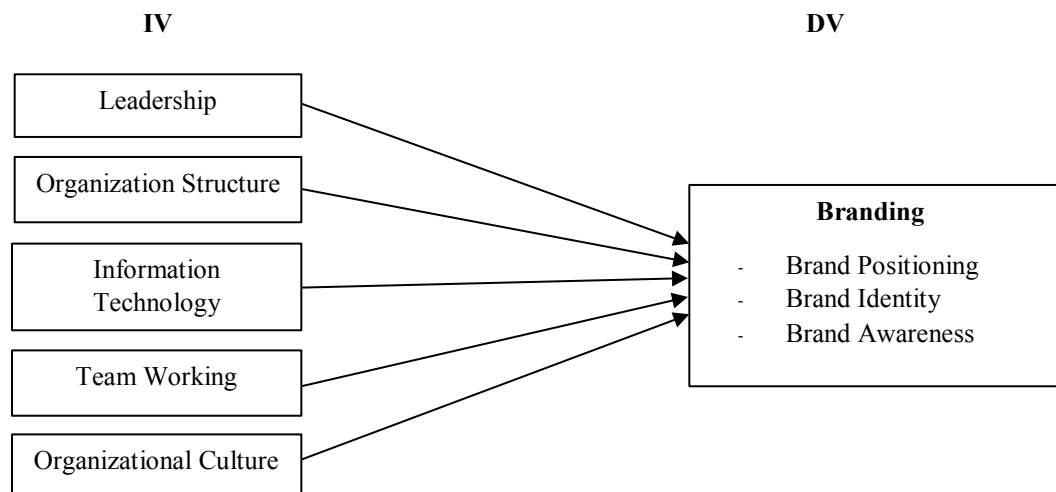
in order to establish an outstanding and trustworthy brand. It is a vital factor for survival marketing strategies in a highly competitive market.

Udon Thani has a wide educational service area with numerous private schools. Therefore, the intense competition in education quality is inevitably for private schools. If the private school branding successfully results in fulfilling the educational quality requirements of the customer, they will have a broader range of choices. The total numbers of private schools in Udon Thani Provincial Education Office are 60 and ranked from pre-kindergarten to high school. The researchers aimed to investigate the administrative factors affecting branding of private schools in Udon Thani province in order to determine the approaches for Udon Thani educational development planning. Furthermore, the findings will be beneficial for the school administrators in creating a school identity that attracts more students.

Objectives

To investigate the administrative factors affecting branding of private schools in Udon Thani province.

Conceptual Framework



METHODOLOGY

This study uses correlational research.

Population and samples: Population of the study was 84 school administrators and 1,437 teachers from 60 private schools in Udon Thani. The samples of the study were 17 school administrators and 293 teachers from private schools in Udon Thani.

Variables

Independent variables: Independent variables were 5 administrative factors; 1) *Leadership*, 2) *Organization Structure*, 3) *Information Technology*, 4) *Team Working*, and 5) *Organizational Culture*.

Dependent variables: Dependent variables were 3 branding elements; 1) Brand Positioning, 2) Brand Identity, and 3) Brand Awareness

Research tools: A 3-sectioned questionnaire was used.

Section 1 A check-list of general information of the informants

Section 2 A 5-Points Scale questions about the levels of administrative factors. The scales were ranked from Highest, High, Medium, Less, and Least. The IOC was 0.60 - 1.00, and reliability was at 0.99.

Section 3 A 5-Points Scale questions about school branding. The scales were ranked from Highest, High, Medium, Less, and Least. The IOC was 0.60 - 1.00, and reliability was at 0.98.

Data Collecting

The researcher sent 310 questionnaires and collected them back from the informants herself, 100% of the questionnaires were returned.

Data Analysis

The data was analyzed with Stepwise Multiple Regression Analysis Program.

RESULTS

The findings indicated the variables that predicted the Administrative Factors Affecting Branding of Private Schools in Udon Thani Province were statistically significant at the level of 0.05. The highest factor was *Organizational Culture*, and the second was *Organization Structure* while the levels of *Information Technology*, *Leadership* and *Team Working* were presented respectively. The results of the analysis showed that the multiple correlation coefficient was .874 ($R = .874$) with the predictive coefficient or predictive power at 76.40 percent ($R^2 = 0.764$). The result of Table 1 (Stepwise Multiple Regression Analysis) ADMINISTRATIVE FACTORS AFFECTING BRANDING OF PRIVATE SCHOOLS IN UDON THANI PROVINCE

Variabal	b	$S.E._B$	β	t	Sig.
(Constant)	0.990	0.113	-	8.796	.000
(X ₂) <i>Organization Structure</i>	0.180	0.048	0.212	3.731	.000
(X ₅) <i>Organizational Culture</i>	0.216	0.045	0.260	4.758	.000
(X ₃) <i>Information Technology</i>	0.164	0.042	0.206	3.961	.000
(X ₁) <i>Leadership</i>	0.130	0.046	0.157	2.803	.005
(X ₄) <i>Team Working</i>	0.104	0.047	0.130	2.211	.028

$R = 0.874$, $R^2 = 0.764$, Adjusted $R^2 = 0.761$, $S.E.est = 0.223$, $F = 197.303^{**}$

$** p < .05$

It can be used to create a regression equation from the regression coefficients of the predictors that were in the form of raw scores and standard scores as in the following.

(Unstandardized Score)

$$Y = 0.990 + 0.180*(X_2) + 0.216*(X_5) + 0.164*(X_3) + 0.130*(X_1) + 0.104*(X_4)$$

(Standardized Score)

$$Z = 0.212*(Z_{X_2}) + 0.260*(Z_{X_5}) + 0.206*(Z_{X_3}) + 0.157*(Z_{X_1}) + 0.130*(Z_{X_4})$$

DISCUSSION

The results of Administrative Factors Affecting Branding of Private Schools in Udon Thani Province showed that 5 administrative factors; 1) *Leadership*, 2) *Organization Structure*, 3) *Information Technology*, 4) *Team Working*, and 5) *Organizational Culture* cooperatively predicted branding of private schools in Udon Thani with high predictive power due to the dedicated procedure of administrative factor variables synthesis. The researcher had reviewed the concepts of the theory of research that were closely related and quite comprehensive, resulting in the acquisition of the administrative factor variables in accordance with the context and empirical data. Moreover, the research tools were qualified since they were examined by the experts. Furthermore, the processes of sampling and data collecting were conducted carefully and punctually resulting in the cooperative prediction capacity of the variables on branding of private schools. In addition, the schools content allowed 5 administrative factors; 1) *Leadership*, 2) *Organization Structure*, 3) *Information Technology*, 4) *Teamwork*, and 5) *Organizational Culture* to contribute to school branding.

When considering each aspect, it was found that the *Organizational Culture* factor had the highest predictive power of branding. It was because the administrators and teachers had beliefs and values in working to achieve common goals. Those beliefs and values could be seen as good deeds, morality and common interest promotion in schools. In addition, the executives created a working atmosphere that was conducive to enhancing work efficiency. It is followed by *Organizational Structure* factors. The administrators performed very good management which resulted in school efficiency. They designed a flexible school administration structure which was suitable for current and future changes. Furthermore, the administrators appropriately allocated the authority and responsibility according to individual's ability. The third was the *Information Technology* factor. The school employed systematic information management, it was sufficient and in perfect condition. The technology was used in communication to support teachers' work and in public relations with involved personnel. The administrators were also knowledgeable and skillful and were able to give advice to their personnel. The fourth was the *Leadership* factor. The administrators clearly demonstrated leadership, credibility, academic potential to teachers and the

general public. Moreover, their visions in education management were consistent with the current changes, and they could motivate teachers in schools to perform their full potential. The last was the *Teamwork* factor. The schools had regular internal supervision. The objectives and goals of school performance were determined by all parties. In addition, the administrators themselves were fair to all parties and trusted by everyone in the school. All administrative factors were at a high level. These five factors had predictive power cooperatively. The findings are consistent with Anuphong Infasang's article (2016) on *Organizational Culture: Factors for Success* which concluded that corporate culture was an important strategy in creating business advantages that affected the success or failure of an organization. Creating and developing organizational culture is an essential tool that links the relationship between members and organizations in order to achieve the success of the organization's sustainability. It is also correlated with the research of Chatwimol Khemphan, and Samrathit Nithay (2017) on *Organizational Culture That Affects The Effectiveness of Secondary School Administration Under The Office of Secondary Educational Service Area 42, Nakhon Sawan Province* which concluded that the organizational culture that affected school administration effectiveness was *Entrepreneurial Culture* and *Kinship Organizational Culture* respectively.

Acknowledgement: This work was supported by the Graduate School Khon Kaen University.

SUGGESTIONS

Suggestions for research implementation

1.1 Private school administrators in Udon Thani province can use the results of this study to improve the private schools. The results of the research showed that Organizational Culture is the administrative factor that has the highest predictive power for private school branding. Therefore, administrators should focus on building up beliefs and values in order to achieve common goals which will create the commitment of the school team to effectively work towards the goal. The effective management can be observed by the stakeholders. When it leads to trust and acceptance among those, an outstanding brand of private schools is created.

1.2 Private school administrators in Udon Thani should develop and pay more attention to factors all 5 administrative factors; 1) *Leadership*, 2) *Organization Structure*, 3) *Information Technology*, 4) *Team Working*, and 5) *Organizational Culture* because they highly associate with branding and resulting in the private school branding in Udon Thani which will lead to efficiency and effectiveness that lead to popularity and trust in school

Suggestions for further study

Operational research or developmental research should be conducted in order to implement the results of this study practically. The administrative factors in *Organizational Culture* has the highest effect on the school branding. Therefore, *Organizational Culture* should be practically examined in order to create a private school's brand.

REFERENCES

- Aaker, D.A. (2012). **Building Strong Brand**. Simon & Schuster UK
- Anuphong Infasang's. (2016). Organization Culture: Factors for success. **Academic Journal, Far Eastern University**, 10 (4), 45.
- Chatwimol Khemphan, and Samrathit Nithay. (2017). Organizational Culture That Affects The Effectiveness of Secondary School Administration under The Office of Secondary Educational Service Area 42, Nakhon Sawan Province. **Veridian E-Journal, Silpakorn University**, 10(3), 1758.
- Dawruwan Thawinkarn. (2018). Relationship between perceived directors' leadership and classroom quality of primary school in Thailand. **Kasetsart Journal of Social Sciences**, 39(2018) : 230-235.
- Domjan, M. (1996). **The Principles of Learning and Behavior Belmont**. California: Thomson Wadsworth.
- Goontalee Reunrom. (2013). **Corporate Brand Success Valuation**. Bangkok: cyberprint.
- Gordon, J. R. (1999). **Organizational Behavior: A Diagnostic Approach**. 6th ed. Upper Saddle River, NJ: Prentice Hall
- Gruenert, S., & Valentine, J.W. (1998). **The school culture survey**. Columbia, MO: University of Missouri-Columbia.
- Hatch, M. J., & Schultz, M. (2008). **Taking Brand Initiative .How Companies Can Align Strategy, Culture, and Identity Through Corporate Branding**: Wiley.
- Heding, T., Knudtzen, C.F., & Bjerre, M. (2009). **Brand management. research, theory and practice**. London , New York: Routledge.
- Kotler, Philip. (2008). **Marketing Management**. 11th ed. New Jersey : Prentice-Hall, Inc.
- Keller, K. L. (2013). **Strategic brand management: Building, measuring, and managing brand Equity**. 3rd ed. Upper Saddle River, NJ: Pearson/Prentice Hall.
- Robbins, S. P. & Coulter, M. (2002). **Management**. 7th ed. Englewood Cliffs, NJ : Prentice-Hall.
- Vallaster, C. (2009). **Aligning organizations along the corporate brand values in an intercultural environment: Contributions from structuration theory**. Berlin

ASTRONOMICAL PROJECTS FOR HIGH SCHOOL STUDENTS

Paola MAGNAGHI-DELFINO, Tullia NORANDO
Dipartimento di Matematica, Politecnico di Milano, Italy
paola.magnaghi@polimi.it, tullia.norando@polimi.it

ABSTRACT

In 2002/03, the FDS Laboratory of the Mathematics Department of the Politecnico di Milano began promoting projects aimed at high school students. The projects want to make people aware to students and teachers such as mathematics can enter into many aspects of human life, through the modeling of phenomena, situations, forms or studies predictive studies.

The experience aims to develop the ability to analyze a problem, to adequately formalize it, to identify a suitable resolution strategy, to verify the results obtained a posteriori. It also aims to consolidate in the group the capacity for cooperation, the exchange of knowledge / skills, the organization of work, and compliance with the set deadlines.

Astronomy is strictly related to mathematics but in Italian high schools is not very studied so therefore we decide to promote the study with interdisciplinary projects done with the help of the INAF of Merate (Italy).

INTRODUCTION

The first project was done in the 2008/09 school year because the General Assembly of the United Nations proclaimed 2009 as *the International Year of Astronomy* (IYA2009) since it was the fourth centenary of the publication of Kepler's first two laws of planetary motion in the *Astronomia Nova* and the first astronomical observations with the telescope by Galileo in Padua. The purpose of the project was to replicate the Ptolemy's geocentric model supposing that the astronomer was a scholar of another planet in the solar system and the students choose Mars and they called Marptolemaeus the hypothetical Martian astronomer. Indeed, as the earthly Ptolemaeus decided to put his own planet, the Earth, as point of reference, the same would do an astronomer born on Mars. The students have chosen Mars because it is the planet most like the Earth.

The second project was intended to calculate the mass of Jupiter because the calculation of the mass of Jupiter is essential to study the trajectory of the probes. Estimates of the mass of Jupiter were also made (1973) with the use of Pioneer probes. In order to calculate the mass, the students have chosen to observe the system constituted by Jupiter and the four Galilean satellites: Io, Europa, Ganymede, Callisto, in the annual time frame in which Jupiter is visible. The students acquired and analysed 792 digital images of the Jupiter-Galilean satellite system, of the Moon and the Pleiades.

The third project as the aim to complete the mathematical and geometrical planning as well as the construction of a fully working sundial, equipped with a solar calendar. It has also been necessary to choose the most suitable kind of sundial, taking account of its future location: finally, due to some technical needs (such as the difficulty in drawing all the necessary hour-lines with precision on the surface of a spherical sundial) a horizontal one has been decided.

The position of the hour-lines and datelines has been calculated and laid out through the application of some theorems about spherical trigonometry in order to sort out a spatial geometry problem. An important part of the project consists in planning a spreadsheet (with the application Microsoft Excel) which calculates the equations of hour-lines and datelines for a sundial working in Central Europe.

THE FIRST PROJECT: THE MARPTOLEMAEUS THEORY

The purpose of the first project was to replicate the Ptolemy's geocentric model, supposing that the astronomer was a scholar of another planet in the solar system and the students called Marptolemaeus the hypothetical Martian astronomer. Indeed, as the earthly Ptolemaeus decided to put his own planet, the Earth, as point of reference, the same would do an astronomer born on Mars.

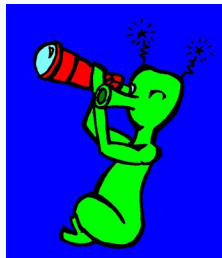


Fig.1: Marptolemaeus

Mars is the fourth planet of the Solar System and is nicknamed "red planet" for its characteristic color due to iron oxide, which abounds on its surface.

The mountains of Mars are of volcanic origin and the highest is Mount Olympus, which reaches 27 km in height. The soil of Mars is covered by a multitude of rocks and a layer of sand a few centimeters deep.

Characteristics of Mars are its polar caps, which are stratified deposits of carbon dioxide and sand.

Mars has two satellites called Phobos and Deimos, respectively in Greek Φόβος (fear) and Δεῖμος (terror) children of the god of war and Aphrodite, mentioned in the XV book of the Iliad. Their discovery dates to 7:48 UTC on 12 August 1877, by the American astronomer Asaph Hall, from the Naval Observatory in Washington. Curiously, their presence had been hypothesized already a century and a half before by the English writer Jonathan Swift, who had made the scientists of Laputa (the floating island of Gulliver's Travels) affirm that Mars had two small satellites.

Phobos, the innermost, and the largest of the two Mars satellites, orbits at a height of about 6000 km, and this feature makes it the closest satellite to its planet. Highly non-spherical in shape, Phobos is probably a captured asteroid, but a mystery remains as to how Mars imprisoned it in an almost perfectly circular (and therefore physically improbable) and rather unstable orbit; this suggests a relatively recent capture. Phobos, like the Moon, has a surface rich in craters, the largest of which is the Stickney crater, particularly visible. Seen from Phobos, Mars appears 6400 times larger and 2500 times brighter than the full Moon seen from Earth, and occupies a quarter of the sky. Seen from Mars, Phobos is one-third the size of the Moon seen from Earth. Its orbital period is 7 hours 39 min.

Deimos with an average diameter of 10km, is the smallest but the furthest of the two natural satellites of Mars. The origin of the satellite is still uncertain: the close resemblance between Deimos and the many little planets present in the main belt of asteroids would suggest that a celestial body of that type would have been captured by the Martian gravity due to a disturbance caused by the passage of Jupiter. However, this explanation is very unlikely, since the shape of the satellite's orbit is too regular and placed on a plane almost coinciding with the equatorial one of the red planet. The dispute remains on. Deimos is composed of rocks rich in carbon and ice.

Seen from Deimos, Mars appears 1000 times larger and 400 times brighter than the full Moon seen from Earth and fills 1/11 of the sky. Its orbital period is approximately 30.28 hours.

For their experiment, the students used Celestia, an excellent 3D simulator of all the celestial objects known today, as it contains a database of over 100,000 stars. It offers the possibility of "capturing" the images displayed and storing them even within a video file. Clicking on each celestial body displays the name, diameter of the planets, brightness of the stars, distance from which one is looking at the body, class of belonging and other information. Furthermore, using the zoom, one can get in touch with every planet or star, or move away, see the orbits. The students have delimited the field of study to the Sun, to the terrestrial and internal planets of Mars, Mercury, Venus and Earth and to the two Martian satellites Phobos and Deimos. They carried out the observations every ten days starting from 1 January 2009 until 27 December 2010.

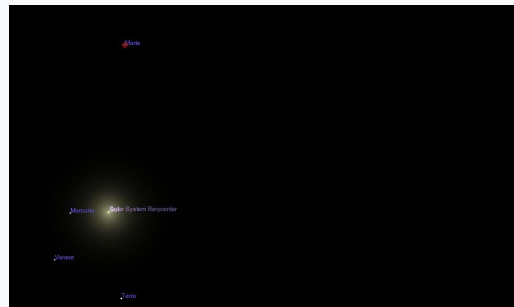


Fig.2: The Mars satellites

The students founded that the Sun makes a revolution around Mars in a period of about 1.96 years while, in reality, the Mars revolution is 1.88 years. They founded that the Earth makes the revolution around Mars in a period of about 736 days, Venus makes a revolution around Mars in a period between 696 and 706 days and that Mercury completes a revolution around Mars in a period between 706 and 716 days.

Thus, a Martian Solar System could have been described in two different ways:

- 1) The Sun's orbit would have been described by the parametric equation;

$$\begin{cases} x = R \cos \theta \\ y = R \sin \theta \end{cases}$$

and the planets would have followed the equation of a epicycloid

$$\begin{cases} x = (R + r) \cos \theta - r \left(\cos \left(\frac{R + r}{r} \theta \right) \right) \\ y = (R + r) \sin \theta - r \left(\sin \left(\frac{R + r}{r} \theta \right) \right) \end{cases}$$

where R is the radius of the solar orbit, r is the distance planet-Sun, $\theta = \omega t$, ω is the angular velocity and t is the time. The origin of the axes is not in Mars, but translated into a point called eccentric, while the angular velocities are calculated by placing the vertex in its symmetric with respect to the Earth, called equant, as in the Ptolemaic model of epicycles, but with the deferent of the satellites coinciding with the solar orbit.

2) The Sun would have traveled an orbit of parametric equation:

$$r(1 + e \cos(\theta)) = 1 \quad (\text{elliptical motion})$$

and the planets would have traversed trajectories as if they were rotating on a circumference whose center in turn rotated on the elliptical solar orbit. Not having found this curve in any geometry book, the students have decided to baptize this curve with the name of epiclissoide with the following equation

$$\begin{cases} x = (a + r) \cos \vartheta - r \cos \left(\frac{a + r}{r} \vartheta \right) \\ y = (a + r) \sin \vartheta - r \sin \left(\frac{a + r}{r} \vartheta \right) \end{cases}$$

where e is the eccentricity of the solar orbit, a is the distance of Sun-Mars, r is the distance planet-Sun, $\theta = \omega t$, ω is the angular velocity and t is the time.

THE SECOND PROJECT: THE MASS OF JUPITER

This project had the purpose of calculating the mass of Jupiter observing the four satellites (Io, Europa, Ganymede and Callisto) which both Galileo and Kepler used to follow with their means almost 400 years ago. This project implied several on-the-ground experiences at the Astronomical Observatory of Merate (AOM) which greatly enriched the students' knowledge about some astronomical related subjects that they had been studied at school only under their theoretical aspect.

The first part of the work was directed to learning how to use, maneuver and take digital pictures with the equipment given by the team of the AOM, which consisted of one large telescope named "Ruths", located in Merate, and three smaller remotely-operated telescopes placed in New York, Merate and Tokyo which granted the possibility to observe Jupiter and its satellites in almost every moment of the day.



Fig.3: the Ruths telescope

The students started taking images of Jupiter, its satellites, the Moon and the Pleiades from all the four telescopes for three months and ended up with having almost 800 images. They selected only 450 images for the analysis. Through these digital images they were able to determine the fictional distance in pixels between Jupiter and its satellites and to transform it into a kilometer-based distance. They achieved that taking advantage on the fact that we could compare the real dimensions of the Moon and the constant angular distance between two stars of the Pleiades with their fictional pixel-based dimensions and thus calculate an associated "scale factor". They had chosen the Moon as it was the most easily visible object of the night sky, while the two stars of Pleiades were constantly visible with the telescopes unlike the Moon. By this scale factor, the students have been able to calculate the distance from Jupiter of a given satellite. Then they elaborated the collected data using the program VANIC.XL provided by AOM and this gave a first set of orbital results of Jupiter satellites. In parallel, they performed the same calculations by making a simple C++ program. This program is much less complex than VANIC.XL but gave us a good control of orbital calculation algorithms and can be eventually improved in accuracy by small changes in its code. Finally, applying Newton's universal gravitational law and Kepler's third law to these satellite orbital data. they calculate the mass of Jupiter

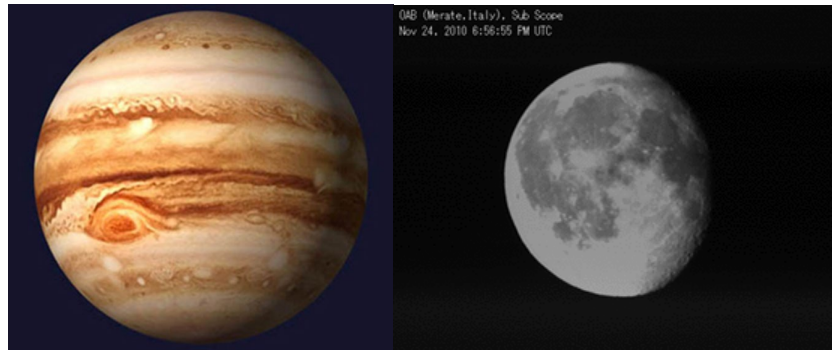


Fig.4: Jupiter

THE THIRD PROJECT: A SUNDIAL

The main aim of this project is to complete the mathematical and geometrical planning as well as the construction of a fully working sundial, equipped with a solar calendar. It has also been necessary to choose the most suitable kind of sundial, taking account of its future location: finally, due to some technical needs (such as the difficulty in drawing all the necessary hour-lines with precision on the surface of a spherical sundial) a horizontal one has been decided. The position of the hour-lines and datelines has been calculated and laid out through the application of some theorems about spherical trigonometry in order to sort out a spatial geometry problem. An important part of the project consists in planning a spreadsheet (with the application Microsoft Excel) which calculates the equations of hour-lines and datelines for a sundial working in Central Europe. The utilization of this spreadsheet makes the construction of a sundial easier, even for people who do not have a good knowledge of trigonometry and astrometry. In fact, the user, just filling in all the necessary information in the empty cells of the spreadsheet (e.g. the latitude and the longitude of the place where the sundial is intended to be set, the longitude of the reference meridian of the time zone in which the same place is and the height of the gnomon that casts the shadow onto the surface of the sundial), could have all the hour and date lines calculated by the computer in a few seconds. Moreover, through some applications of Microsoft Excel and GeoGebra4 which make the creation of charts and mathematical graphs possible, the users could also see the representation of the surface of a sundial perfectly working in the place of the Northern Hemisphere they have chosen. Furthermore, the sundial projected using this spreadsheet does not show the solar time, but it shows the clock time of the reference meridian chosen (precisely the one of Central Europe, 15° E). Finally, a watchful observer might also notice the presence of an original motto on the surface of the sundial (*Traces of shadow to grasp the transparency of time*), originally thought in Italian and later translated into Latin and other languages, in order to bring the ancient fascination of these clocks back to mind.



Fig. 5: the sundial

To determine the position of the various hour lines, the students have used essentially some principles of plane trigonometry (necessary to carry out the projections of the gnomon, depending on the position of the Sun, on a flat surface).

In order to greatly simplify the calculation, they have considered the projections of the various shadows only on the day of the equinox. In fact, the duration of the day at the equinox is exactly 12 hours (in any part of the globe), therefore at one hour both the twelfth part of the day and a displacement of the Sun on the celestial sphere equal to exactly 15° will correspond.

To design the sundial, the students used two software: Microsoft Excel (in the 2010 version) and GeoGebra (in the 4.0 version). Through Microsoft Excel they have set the formulas on the spreadsheet to determine the hour lines for the sundial at the latitude. In this way, by varying the latitude data within the calculation sheet, it is possible to

obtain the representation of the hour lines on the meridian plane at the given latitude (this reveals its versatility, since it lays the foundations for constructing a plane sundial at any latitude). Later, using Microsoft Excel, they have set formulas on another spreadsheet to obtain the declination curves to be represented on the sundial plane, which can thus also perform the calendar function. Then they transferred the data to the GeoGebra spreadsheet. These data were used to define the equations of the curves that were represented as places in the graphical view of the program. Using GeoGebra, the equation of time to be inserted on the meridian plane for the correction to be carried out at the time marked by the sundial, according to the period of the year, has also been reproduced. With GeoGebra, by modifying the data in the spreadsheet, it is also possible to obtain the plane of a sundial at different latitudes

To install the sundial, one must find the direction of the local meridian (north-south direction) which must coincide with the meridian line of the sundial. Even if it is possible to determine this direction with the use of a compass, note the magnetic declination of the place, we have used the method "of the Hindu circles" which consists in the use of a rod fixed perpendicular in O to a horizontal plane: path a circle, with centre in O, around the rod, in the course of a day the sun will describe a hyperbola that will meet the circumference in two points. Finally, a perpendicular to the segment joining these two points gave us the direction of the local meridian.

Once the sundial has been installed, to read the time it is sufficient to look at the position of the shadow of the gnomon on the dial: it is possible to obtain the solar time of the place and the period of the year determining to which hour lines and declination approaches of plus the shadow of the gnomon itself. Obviously, the reading must be carried out in the presence of sunlight, and therefore by day with favourable weather conditions. In the case of the sundial we designed, it is possible to read the time of the reference meridian; however, to know the civil time (t_c), which is what we usually use in everyday life, we need to make the following corrections:

It is necessary to add or remove a few minutes depending on the period of the year since every day the Sun delays or anticipates the passage on the meridian of the place with respect to the Average Time (t_m). This delay or advance (t_e) can be quantified with the equation of time, attached to the sundial, and necessary to correct the error to the extent due to the eccentricity of the earth's orbit and its inclination with respect to the ecliptic:

$$t_c = t_m + t_e$$

In many countries, for practical reasons, summertime is adopted in summer, which is achieved by moving the clocks an hour ahead of standard time. Therefore, if the sundial is read in these months, the time indicated on the dial, even if corrected with the equation of time, will differ by an hour from the civil one; consequently it will be necessary to add an hour to the value read for a correct measurement.

$$t_c = t_m + t_e + 1h$$

CONCLUSIONS

The three projects described in this article are an example of the activities carried out by the FDS laboratory of the Mathematics Department of the Politecnico di Milano. The laboratory has offered students and teachers of upper secondary school interdisciplinary projects that link mathematics with other disciplines such as art, music and literature. We think in this way to bring students closer to mathematics, overcoming the preconceptions that still exist today about this subject

REFERENCES

- Dreyer, J.L.E. (2003) *History of Astronomy from Thales to Kepler*, Dover Publications
Tannery, P., (1976) *Recherches sur l'histoire de l'astronomie ancienne*, New York, Arno press
www.astronomy2009.org
www.brera.inaf.it/docM/OAB/MARTE/index_marte.html
http://newrobin.mat.unimi.it/users/antonio/meccel/Meccel_1.pdf

“AUGMENTED PRACTICE-ROOM”: AN E-LEARNING TOOL FOR MUSIC STUDENTS

Neva Klanjscek, Matthias Frank, and Lisa David

Institute of Electronic Music and Acoustics, University of Music and Performing Arts, Graz, Austria
klanjscekneva@gmail.com

ABSTRACT

The acoustic properties of different rooms have considerable effects on the perception of the sound of an instrument or voice. How can music students experience these effects without actually practicing in various rooms? In our project “Augmented Practice-Room,” a new e-learning tool is developed to allow them to experience different rooms, such as a large concert hall or a church, inside a small practice room. This tool is going to be used by the students of the Conservatory of Graz over a period of two semesters. Data of the long-term experience with the e-learning tool is going to be gathered by various means of feedback received from students and teachers and subsequently analyzed in the context of different instruments and age levels.

The augmented reality, defined as an enhancement of reality by use of technology, could be an enriching learning tool for the study of classical instruments, such as guitar, violin, piano, cello, and clarinet: the manipulation of sounds could emphasize the effects on the audio-motor learning process. The team of the project is developing hardware and software to allow the students to hear the direct, real sound as well as the sound of a virtual concert hall.

This paper describes the e-learning tool and explores different approaches for evaluating its effects: the various qualitative and quantitative evaluation methods, such as non-structured and structured interviews, questionnaires, non-intrusive observations, group discussions, and scale rating. The approaches are going to be selected with regard to their chances and risks for the collection of data for this project.

INTRODUCTION

The acoustic properties of a room have considerable effects on the sound of an instrument and its perception by the musician playing (Kalkandijev, 2015). Normally, music students practice in a small room and then have to perform in a concert hall, where they have a fundamentally different acoustic perception of the instrument's sound. In our project called “Augmented Practice-Room”, a new e-learning tool is being developed to allow them to have the experience of playing in the acoustics of a concert hall or church while actually being inside the practice room.

In general, augmented reality is defined as an enhancement of reality by the use of technology such that the “real” and the virtual world become fused: within the real world, virtual objects, sound sources and information are displayed. This technology can be seen as an enriching learning tool for the study of classical instruments: the manipulation of sounds can emphasize the effects on the audio-motor learning process. In the field of music education this theme is indeed a relatively new subject of interest. Augmented reality in music education has been used in Serafin's study (2017), for Keebler's guitar learning system (2014), and in Orman's use for the purpose of enhancing music conducting skills (2017).

In the particular case of our project “Augmented Practice-Room”, hardware and software are being developed by the project team, to allow the students to hear the direct, real sound as well as the sound of a virtual concert hall – indeed an augmented reality. The hardware consists of modified open headphones or loudspeakers, which allow the student to hear the “real” sound produced by his or her playing along with the effects of a simulated large concert hall. Another pair of headphones will be used by teachers to hear the virtual sound produced by the student. Furthermore, the software will give the participants the opportunity to choose different room acoustics (such as a specific concert hall) and the position in the virtual space (e.g., in the center, the corner, etc. of the virtual concert hall).

Our main hypothesis is that repeated experience with different room acoustics will positively influence the audio-motor skills of the students in the areas of articulation, dynamics, agogics, etc. *Articulation* describes the attack and decay in the production of a single note and is related to its clarity; *dynamics* refers to variations in loudness and *agogics* is defined as the accentuation of a note by extending it slightly beyond its written time value. An additional hypothesis is that there will be motivational effects for the students as they experience listening to themselves playing in different rooms.

The empirical evidence of the effects of acoustics on performance is investigated in a study by Kalkandijev and Weinzierl (2015): the authors describe how the acoustic properties of a room influence the tempo, the loudness, the dynamic bandwidth and the timbre of a solo music performance. In particular, professional musicians tend to play slower in rooms with a long reverberation time, adjusting the timbre of the sound to suit the characteristic of

the room (by playing “harder” in rooms with a warm sound, for instance). The musicians tended to increase the tempo in rooms with very short reverberation times. In our project we are interested in the effects on the practice routine of students when using the e-learning tool during face-to-face lessons and an ensemble situation.

Our project takes place at the University of Music and Performing Arts in Graz with the collaboration of the Johann-Joseph-Fux Conservatory in Graz (Austria). The e-learning tool developed by the project team is going to be used by music students during the face-to-face lessons over a period of two semesters in the academic year 2019/2020. In addition, in the second semester the e-learning tool is going to be used in ensemble instrumental lessons (chamber music). Data from the long-term experience is going to be gathered by various means of feedback received from students and teachers, and the data will be subsequently analyzed in the context of different age levels and instruments. In particular, seven teachers are collaborating with the team project: two violinists, a cellist, a pianist, a clarinetist, a guitarist, and a singer. The age of the student is between 10 and 30: we are interested in the different perceptions of the e-learning tool with regard to the wide range of age levels. The level of expertise is very different, and does not necessarily correspond to the age of the participants. For instance, a teenager is at the beginning of his or her study but on the other hand, a child can already play difficult pieces and take part in international competitions: some of the students are indeed in a special educational program for outstanding students. The level of expertise could indeed influence the way the student expresses or talk about the studying experience: an advanced student is expected to be able to self-report his or her musical experience better than a beginner.

This paper is divided into two main parts. In the first, the technology behind the project is briefly described, and in the second part the different evaluation approaches, with which we are going to collect the feedback from the participants, are analyzed and compared. The advantages and disadvantages of the proposed methods are discussed with regard to the specific needs of our project.

THE E-LEARNING TOOL

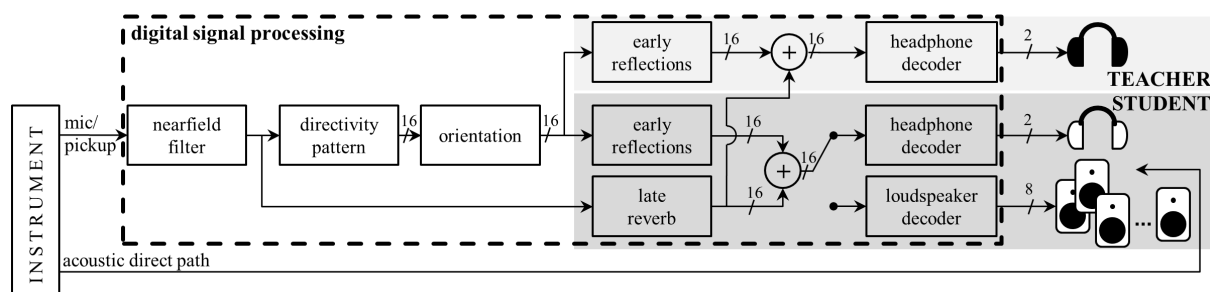


Figure 1: Simplified block diagram of the “Augmented Practice-Room” tool revealing its digital signal processing for the teacher (closed headphone, no direct sound from the instrument) and the student (open headphones or loudspeakers to enable direct sound from the instrument).

The basic idea behind the “Augmented Practice-Room” tool is that the direct sound of the instrument acoustically reaches the student’s ears and only the virtual room acoustics is played back via open headphones or loudspeakers. In a real room, first reflections reach the musician’s ears several milliseconds after the direct sound. The tool makes use of this natural delay for the computation of the digital signal processing creating the virtual room acoustics. This facilitates the playback of the virtual acoustics without any additional delay, which is important for unimpaired musical playing (Marentakis, 2012). The acoustic properties (e.g. room size, reverberation time) of the virtual room are adjustable and can also be based on measurements of real concert halls. The position and orientation of both the student/instrument and the teacher inside the virtual room can be controlled in real time. For example, the student can play on stage while the teacher listens to the music from within the audience. The entire signal processing uses the Ambisonics technology (Zotter & Frank, 2019), as it provides maximum flexibility (same processing for loudspeaker and headphone playback), scalability (spatial resolution can simply be adjusted to available processing power), and easy application of rotations (orientation of instrument/student and teacher). The following paragraphs describe the particular parts in the block diagram of the “Augmented Practice-Room” tool, as depicted in Figure 1.

The instrument’s direct sound propagates to the student’s ears via the acoustic direct path, as it would be the case without the tool. The unattenuated acoustic path to the student’s ear is facilitated by using either loudspeakers or modified open headphones to play back the virtual room. Simultaneously, the direct sound is captured with a close-up microphone or pickup and fed into the digital signal processing chain for generating the virtual room acoustics. A nearfield filter compensates for timbral differences between the close-up capture of the direct sound and the farfield sound that is required for the virtual room acoustics. This filtered sound is directly fed into a 64-

channel feed-back-delay network (Stautner & Puckette, 1982, Jot & Chaigne, 1991) to generate diffuse, late reverberation. In order to reduce computational load, only 16 channels are outputted to the next processing block. A fade-in enables an increased diffuse envelopment (Blochberger, 2019) and smoother transition into the early room reflections. As late reverberation is largely independent of the listening position (Clapp & Seeber, 2016), it can be employed for both student and teacher. In contrast, the early room reflections are strongly position-dependent, e.g. one can perceive a strong and early reflection when approaching a wall. The calculation of the early reflections employs an image-source model with up to 236 reflections. The model is fed by a 16-channel signal that includes both the directivity of each instrument and its orientation. The employed directivity patterns are based on measurements from TU Berlin (Weinzierl, 2017). They are restricted to a 3rd-order spatial resolution to reduce computational load, as our previous studies revealed that higher resolution is not necessary for our application (Frank & Brandner, 2019, Frank & Brandner, 2019a). Individual early reflections and the late reverberation are then summed up to a virtual room acoustics for student and teacher, respectively. For the student, the virtual room acoustics is played back over open headphones or loudspeakers so that the acoustic path of the direct sound can add. For the teacher, closed headphones are used to strongly attenuate the acoustic direct path, because the direct sound from the instrument has to be included in the virtual room acoustics for realistic reproduction. Headphone playback employs state-of-the-art binaural Ambisonic decoding of the virtual room acoustics (Zaunschirm, 2018) including incorporation of head rotations with a head-tracking device (Romanov, 2017), while loudspeaker playback employs the AllRAD approach (Zotter & Frank, 2012) for the application to arbitrary loudspeaker arrangements.

The implementation of the “Augmented Practice-Room” tool is based on open-source audio plug-ins (Rudrich, 2019) that have been developed at our institute and runs on standard PCs. It is planned that there will be a simplified version of the tool, which can run on mobile devices, at the end of the project. So far, we created four virtual rooms to demonstrate the tool to the teachers involved in the project: a small room, a chamber music hall, a larger concert hall, and a cathedral. During the demonstration in an anechoic chamber, the teachers were playing their own instruments with the tool. They were generally impressed by the quality of the virtual room and they could not hear a difference between loudspeaker and headphone playback. However, in case of the violin, the teachers preferred the loudspeaker playback as the headphones could touch the instrument, especially when children are playing. Some of the teachers requested to model additional concert halls where the students typically perform concerts.

THE EVALUATION APPROACH

The evaluation approach can be considered as highly explorative. The main roots of the research approach can be found in the research methodology of the grounded theory developed by Barney Glaser and Anselm Strauss (1967). The methodological genre of Evolved Grounded Theory can be generally described as “a theory that was derived from data, systematically gathered and analyzed through the research process” (Strauss & Corbin, 1998, p. 12). This research approach defines itself by not trying to prove hypothesis but by gathering data first. Through analysis this almost “blind” data collection leads to first hypothesis. The data collection is mainly led by qualitative research methods but can be enriched by quantitative methods as well. For this project we focus mainly on the core characteristics of grounded theory, namely the constant alternation of data collection, comparative analysis and theory building. It is very important to acknowledge that we gather data only on the construction of reality of the research participants: “Qualitative research is based upon the observations and interpretations of people’s perception of different events” (Khan, 2014, p. 225).

Not only the explorative character of this evaluation is particular, also the need for non-researchers’ participation in the research process is very unusual. The researcher team itself is not going to be present for a considerable amount of time of the data collection situations. The instrumental student’s teachers themselves are becoming the main resource of data collection as they work with the students mainly in one-on-one situations. This is why a mixed method approach seems natural.

The following methods for data collection are considered as valuable options for this project: group discussions, non-intrusive observations, unstructured interviews (qualitative methods) and questionnaires, structured interviews, and scale rating (quantitative methods).

Table 1: Methods and factors that can influence the evaluation in the project “Augmented Practice-Room”.

Method	Age level	Expertise	Expectation and attitude	Time schedule
Group discussion	Teenagers, adults	Experts	Observable	At the beginning, after a few months, at the end
Non-intrusive observation	For all	For all	Observable	At the beginning, after a few months, at the end
Unstructured and structured interview	Children, teenagers, adults	For all	Difficult to capture	After a few months, at the end
Questionnaire	Teenagers, adults	Experts	Difficult to capture	After each lesson (short version), after a few months, at the end
Scale rating	For all	For all	Difficult to capture	After each lesson

In Table 1, the quantitative and qualitative methods are analyzed with regard to the factors that can influence the data collection in our study. The fundamental questions regard which kind of combination of methods are appropriate for our project.

Group discussion: The group discussion or focus group method is a guided discussion where the interviewer has to prepare a set of five or seven questions to ask during a one- or two-hour session (Mertens, 2010, p. 370). An advantage of this method is the flexibility of the discussed arguments, that means that the interaction between the participants can arise in a constructive discussion. The adults, that are the teachers, are going to work with students using the e-learning tool, and they are going to give us during the discussion basic feedback about the possible effects of the tool and about the students' reactions. Regarding the testing schedule, we have planned a discussion session about the first impression, while the e-learning tool is routinely used, and record the final judgment of the experience. In addition, the teachers expectation and personal attitude towards the e-learning tool can be observed during the discussions; actually, certain behaviors can give an attentive researcher far more information than the written answers in a questionnaire.

Non-intrusive observation: The students and teachers can be observed in the “natural” environment of the classroom. The researcher has to observe and write down the dynamic of the participants behavior: the obvious advantage of this method is the fact that the age level is not a problematic factor, in fact the feedback is not filtered from the participants self-report ability. In addition, is interesting to take in consideration the different roles that in an experiment an observer can play. For example, Hesse-Biber and Leavy (2006 quoted from Mertens, 2010, p. 367) make a list of the possible roles: complete observer, observer-as-participant, participant-as-observer and complete participant. In the project, the figure of the researcher as a complete observer is going to be taken into consideration: the e-learning tool is going to be used during the lessons, where the researchers are instructed to observe the interaction between subjects and the reaction of the subjects, in a face-to-face and ensemble lesson situation. As reported by Mertens (2010), at the beginning of the session the observer can cause some participants reactions, otherwise after a short period of time he or she is supposed to become “invisible”. The obvious disadvantage of this method is the persisting perception of the researcher as a disturbing presence, even if he or she in no way interacts with the participants. In addition, our premise is that a higher level of expertise corresponds to a higher level of self-reporting ability. In the case of low self-reporting ability, the non-intrusive observation could be an appropriate approach.

Unstructured and structured interview: A considerable advantage of the unstructured interviews is the chance to choose among various arguments: this flexibility allows the researcher to better explore and discuss possible problems related to the use of the tool. The face-to-face interview is more suitable for teachers and young students than for children. The children are definitely able to self-report their experience, but a more flexible method, like an unstructured interview, may be more effective for this group. In addition, the presence of the interviewer can be seen as a consistent disadvantage. For instance, the researcher's body language or her or his particular vocal intonation could influence the participant's responses or can suggest a particular answer. In other words, the interviewer can bias the subject's responses (Mertens, 2010, p. 352). On the other hand, a disadvantage, related to the previous one, can be the subject's tendency to give answers that please the interviewer. The social desirability bias is in fact the tendency of the subjects to give socially desirable responses (Pauls & Stemmler, 2003). For instance the teachers and the students can report that the e-learning tool was very

useful for the development of a particular musical skills, such as the articulation or the control of the dynamic: maybe this opinion does not reflect what they “really” think about this topic rather than what they think is a “preferable” answer. Before the teachers and the students start using the e-learning tool in the classroom, the project team has planned to use the method of the unstructured interview to collect data from teachers first impressions.

Questionnaire: It is quite intuitive that the consistent pros of the questionnaire are the fact that the researcher can touch upon many topics, and that many participants can be tested within a relatively short span of time. Problems arise when the questions are unclear or perhaps even unsuitable. A related method is the so called “think aloud”: the aim of this approach is to ask the subjects to report what they are thinking during the process of answering the questions (Boeije & Willis, 2013). In this way the researchers have the opportunity to collect information about the clarity of the questions: the unclear one can be in a second phase modified or completely removed. Hence, for the next testing session can be prepared a set of better-structured items.

Rating scale: The method of rating scale is a quick way to collect data from each session: for example, the student and teachers could rate aspects of their performance on a scale from 0 to 10 on a weekly basis. Intonation, articulation, dynamics, agogics, and position of the body, could be judged with, for example, a scale that ranges from “I don’t agree” to “I agree” or from “very bad intonation” to “very precise intonation”. On one hand this approach can give a quick view on the perception of the ongoing experience, but on the other hand the level of his validity and reliability is strongly dependent on the construction of the items (Spector, 1992, pp. 26–27).

To summarize, all the analyzed methods have advantages and disadvantages. The use of a combination of them can counterbalance the specific problems, indeed using a mixed method. As explained before, the teachers are a part of our research team: they are going to help us to choose and to carry out the appropriate evaluation approach. In fact, previous discussions with the teachers suggest us to prepare a semi-structured “diary” consisting of different types of short questions, rating scales, and free annotations. The collected data is going to be used as well during the group discussions planned at the beginning, after a few months and at the end of the academic year. Finally, only the structured interview seems to be inappropriate because of the different age levels of the subjects involved and the presence of different music instruments: the standardized questions cannot be applied to such a heterogeneous group of participants. On the other hand, the non-intrusive observation and unstructured interviews seem to be a suitable approach to collect data from both students and teachers.

CONCLUSIONS

This paper presented the project “Augmented Practice-Room”, an e-learning tool for music students. The tool applies acoustically augmented reality to facilitate playing with the acoustics of a concert hall while actually being inside a small practice room. It employs Ambisonic technology in combination with efficient and interactive room simulation to play back the virtual concert hall acoustics over open headphones or loudspeakers while maintaining the acoustic direct sound of the instrument or the voice. Within the project, the tool is going to be used by students of different age level, expertise, and with different instruments/voice over a period of two semesters.

The project evaluates which influences long-term practice with the e-learning tool has on the development of musical skills, such as dynamic, agogics, articulation, as well as on self-perception of the sound and learning motivation. The paper presented an overview of various evaluation methods and their applicability to the project. The characteristics of the project suggests that a combination of multiple evaluation methods can counterbalance the specific disadvantages that each one has. The chosen mixed method approach will help us gather meaningful results on the newly developed “Augmented Practice-Room”.

ACKNOWLEDGMENTS

This work is supported by the project Augmented Practice-Room (1023), which is funded by the local government of Styria via Zukunftsfonds Steiermark (future fund of Styria). The authors thank all students and teachers for their participation in the project.

REFERENCES

- Blochberger, M., Zotter, F., & Frank, M. (2019). Sweet area size for the envelopment of a recursive and a non-recursive diffuseness rendering approach. *International Conference on Spatial Audio*, Ilmenau.
- Boeije, H., & Willis, G. (2013). The Cognitive Interviewing Reporting Framework (CIRF); Towards the Harmonisation of Cognitive Testing Reports. *Methodology*, 9 (3), pp. 87–95.
- Clapp, S. W., & Seeber, B. U. (2016). Sound Localization in Partially Updated Room Auralizations. *Fortschritte der Akustik*, DAGA 2016, Aachen.

- Frank, M., & Brandner, M. (2019). Perceptual Evaluation of Spatial Resolution in Directivity Patterns. *Fortschritte der Akustik*, DAGA 2019, Rostock.
- Frank, M., & Brandner, M. (2019a). Perceptual Evaluation of Spatial Resolution in Directivity Patterns 2. *International Conference on Spatial Audio*, Illmenau.
- Glaser, B. G. & Strauss, A. (1967; reprinted 2006). *The Discovery of Grounded Theory: Strategies for Qualitative Research*. New Brunswick, London: Aldine Transaction.
- Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The Qualitative Report*, 8(4), pp. 597–606.
- Jot, J.-M., & Chaigne, A. (1991). Digital delay networks for designing artificial reverberators. *90th AES Convention*, Paris. preprint. 3030.
- Kalkandjiev, Z. S. & Weinzierl, S. (2015). The influence of room acoustics on solo music performance: an experimental study. *Psychomusicology: Music, Mind and Brain*, 25 (3), pp. 197–207.
- Keebler, J. R., Wiltshire, T. J., Smith, D. C., Fiore, S. M., & Bedwell, J. S. (2014). Shifting the paradigm of music instructions: implications of embodiment stemming from an augmented reality learning system. *Frontiers of Psychology*, 5(471), pp. 1–19.
- Kelle, U., & Metje, B. (2010). Mixed Methods in der Evaluationsforschung. Das Verhältnis zwischen Qualität und Quantität in der Wirkungsanalyse in Knolle, N. (Hrsg.) *Evaluationsforschung in der Musikpädagogik* (9–39). Essen: die Blaue Eule.
- Khan, S. N. (2014). Qualitative Research Method: Grounded Theory. *Journal of Business and Management*, 9(11), pp. 224–233.
- Marentakis, G. et al. (2012). Latency tolerance enhancement in in-ear monitoring systems. *Fortschritte der Akustik*, DAGA 2012, Darmstadt.
- Mertens, D. M. (2010). *Research and Evaluation in Education and Psychology: Integrating Diversity with Quantitative, Qualitative, and Mixed Methods*. Los Angeles, London, New Delhi, Singapore, Washington DC: Sage Publications.
- Orman, E. K., Price, H. E., & Russell, C. R. (2017). Feasibility of using an augmented immersive augmented reality learning environment to enhance music conducting skills. *Journal of Music Teacher Education*, 27(1), pp. 24–35.
- Pauls, C. A. & Stemmler, G. (2003). Substance and bias in social desirability responding. *Personality and Individual Differences*, 35, pp. 263–275.
- Romanov, M. et al. (2017). Implementation and Evaluation of a Low-cost Head-tracker for Binaural Synthesis. *142th AES Convention*, Berlin.
- Rudrich, D. et al. (2019). IEM Plug-in Suite (1.10.2) [Computer software]. Graz, Austria. Online: <https://plugins.iem.at/>
- Ruokonen, I., & Ruismäki, H. (2016). E-Learning in Music: A Case Study of Learning Group Composing in a Blended Learning Environment. *Procedia – Social and Behavioral Science*, 217, pp. 109–115.
- Serafin, S., Adjorlu, A., Nilsson, N., Thomsen, L. & Nordahl, R. (2017). Considerations on the use of virtual and augmented reality technologies in music education. *IEEE Virtual Reality Workshop on the K-12 Embodied Learning through Virtual & Augmented Reality (KELVAR)*, DOI: 10.1109/KELVAR.2017.7961562.
- Spector, P. E. (1992). *Summated Rating Scale Construction: An Introduction*. Newbury Park, London, New Delhi: Sage Publications.
- Strauss, A. L. & Corbin, J. M. (1998). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. 2nd ed. Thousand Oaks, CA: SAGE.
- Stautner, J., & Puckette, M. (1982). Designing multi-channel reverberators. *Computer Music Journal* 6(1), pp. 52–65.
- Weinzierl, S. et al. (2017). A Database of Anechoic Microphone Array Measurements of Musical Instruments.
- Wu, H.-K., Lee, S. W.-Y., & Liang, J.-C. (2013). Current status, opportunities and challenges of augmented reality in education. *Computers & Education*, 62, pp. 41–49.
- Zaunschirm, M., Schörkhuber, C., & Höldrich, R. (2018). Binaural rendering of ambisonic signals by head-related impulse response time alignment and a diffuseness constraint. *Journal of the Acoustical Society of America*, 143(6), pp. 3616–3627.
- Zotter, F., & Frank, M. (2012). All-Round Ambisonic Panning and Decoding. *Journal of the Audio Engineering Society*, 60(10), pp. 807–820.
- Zotter, F., & Frank, M. (2019). *Ambisonics - A Practical 3D Audio Theory for Recording, Studio Production, Sound Reinforcement, and Virtual Reality*. Springer.

CASE STUDY: BEING AN ARAB UNIVERSITY STUDENT IN THE CZECH REPUBLIC

Tereza SVASKOVA, Michaela VONDRICHOVA

Information and Counselling Centre, UNIVERSITY OF WEST BOHEMIA, Czech Republic

tsvaskov@rek.zcu.cz, vizinova@rek.zcu.cz

ABSTRACT

This study provides an investigation into a range of activities of the Information and Counselling Centre of the University of West Bohemia in Pilsen, Czech Republic and in particular its Special International Counselling Centre. This special centre was opened in September 2018 as a reaction to the increasing number of foreign students coming to study in the Czech Republic. Its main aim is to provide members of foreign countries (i.e. those who do not have Czech nationality and did not study secondary school in the Czech Republic) with counselling services as well as to help them with cultural integration. Within the first phase of this project, the centre dealt with Arab students only. Arab students have dealt with many various barriers during their studies at the University of West Bohemia, the most challenging of which is the obligation to study in Czech. Moreover, the student online database for exam registrations and class evaluations is also only available in the Czech language. Formally, the system considers such students to be Czech students. Despite the language barrier, it has been assumed that the operation of such a support system will help the students through the Czech educational process and will also spread awareness in relation to the country's traditional cultural beliefs and practices. The other group of students becoming part of this counselling project in May 2019 are coming from Turkey and Iran. The study presents the vision and mission of the centre alongside implemented tools and activities. Most importantly, however, it also provides concrete figures on the results of the Counselling Centre's year-long operation. Evaluation of this on-going project has also highlighted the fact that support must be available for tackling more everyday problems affecting individuals' personal and social lives. A number of recommendations on ways in which the services should develop, and arising from the evaluation, are put forward.

INTRODUCTION

Activities of the Information and Counselling Centre of the University of Pilsen

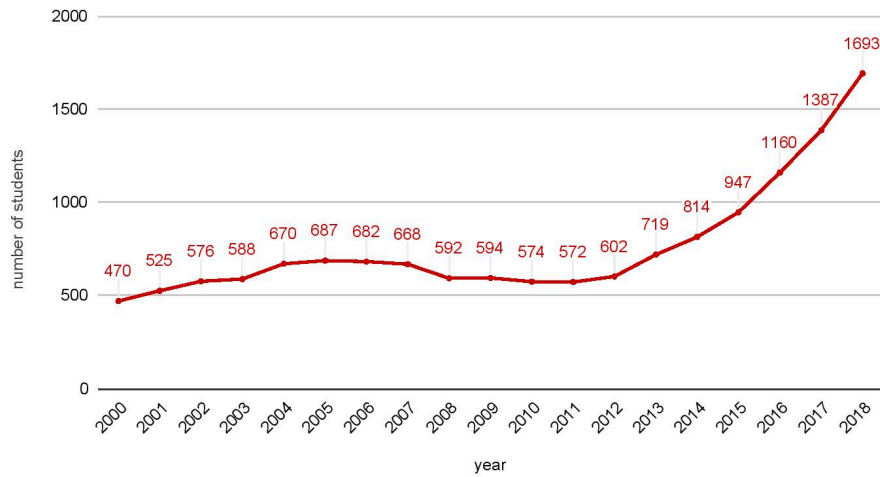
The Information and Counselling Centre of the University of West Bohemia in Pilsen (hereinafter as ICC) provides a complete system of services in regard to studies, social conditions, psychology and law to thousands of university students. The Centre also offers assistance and consultancy to students with special needs (including students from ethnic minorities and those with socioeconomic disadvantages) and fully supports the idea of equal opportunities and an open-minded environment for everyone within and beyond the field of education.

The ICC takes part in the realization of the European project "ESF Project of the University of West Bohemia" (European Social Fund founded by the European Union). The entire university participates in its key activities. The ICC is concerned with two particular program units, which cover the following target groups: consultants, academic workers, students with special needs and applicants for study. The project's activities are especially related to the development and innovation of consultancy services, improvement of consultants' competencies and, furthermore, the establishment of a system of support and motivation for students with special needs (including applicants for study) to decrease their rate of failure in study. Within the frame of each program unit, many activities are implemented, such as: educational programs for university employees, short-term internships and consultants' mobility, and motivating activities for students with special needs. Furthermore, a network of experts with work experience and from different organizations (educational institutions, elementary schools, high schools, NGOs) has been established. Recently, a counselling office for students who are non-native speakers of the Czech language has been opened, and much more.

This article deals particularly with the above-mentioned counselling office for non-native speakers of the Czech language, which we call the "Special International Counselling Centre". It has been established in the context of the increasing number of foreign students coming to the Czech Republic, including the University of West Bohemia in Pilsen (UWB). One of the long-term university strategic goals is internationalization in the field of education. Like many other Czech public universities, the UWB is also dealing with an increasing number of foreign students coming to complete their studies in full degree programs (Bc., Mgr., PhD degree program or MBA.).

In 2017, from a total number of 300,000 university students, there were 43,831 foreign students studying at higher education institutions in the Czech Republic, mainly from Slovakia, Russia, Ukraine, and Vietnam. The number has been increasing also in the case of students from Middle-Eastern countries.

Middle Eastern University Students in the Czech Republic



Countries:

Bahrain,
Israel,

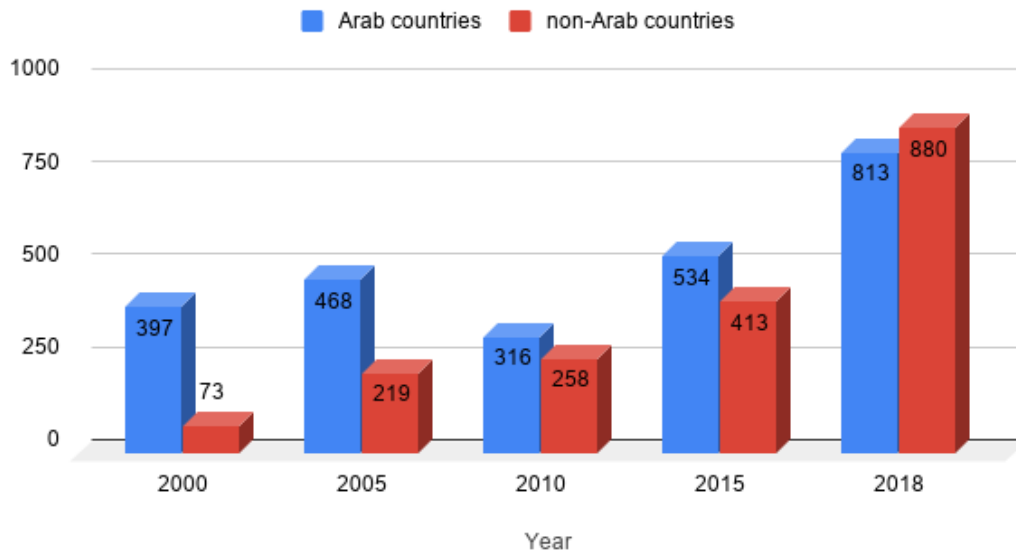
Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, South Sudan, Sudan, Syria, United Arab Emirates, Tunisia, Turkey, Egypt, Yemen.

(data taken from Ministry of Education, Youth and Sports, Czech Republic – SIMS)

Algeria,
Palestine,
Iraq, Iran,

As this study deals primarily with Arab students, the following chart gives us precise number

Middle Eastern students in the Czech Republic - Arab vs. non-Arab countries



* non-Arab countries: Israel, Iran, Turkey

(data taken from Ministry of Education, Youth and Sports, Czech Republic – SIMS)

We can expect the number to continue to increase in the following years. The Czech Republic is also one of the countries to have signed the Bologna Declaration. Therefore, the ECTS credit system has been instated, with courses very often offered in the English language. However, there are often some study fees involved. Despite this fact, studying programs in the Czech language at public and state universities is free.

Special International Counselling Centre

Mobility is one the key activities in terms of internationalization. It is no wonder then that there are offices for international students at all Czech public universities. However, specific counselling and continuing help for long-term mobility students has not yet been offered. Most public universities' offices focus on Erasmus+ program students, internships, and bilateral cooperation with foreign universities.

In reaction to this situation – i.e. the increasing number of foreign students in the Czech Republic – a team from the Information and Counselling Centre of UWB (ICC) has decided to establish a special office for foreign students in regular Czech study programs. When using the term “foreign students”, we mean those who do not have Czech citizenship and did not study at secondary school in the Czech Republic. We opened the centre in September 2018 with the following vision:

- providing members of foreign countries with counselling services and helping them with cultural integration;
- adaptation and orientation within the Czech educational system and university norms.

There are about 450 foreign students at UWB (449 foreign students from 10,273 in total in 2017). We can divide these students into three main target groups according to their numbers. Most of them come from post-Soviet countries, then from Vietnam and Middle-Eastern countries.

We have decided to divide our project into several phases as there were several complaints from the study offices of individual faculties regarding communication with Arab students at the university. This was an important element in the decision making process on how we should approach these students and what groups of students need our services the most. Therefore, we decided on the following project phases:

- from October 2018: Arab students
- from May 2019: Turkish and Iranian students
- from September 2020: Vietnamese students
- from September 2021: post-Soviet countries
- from September 2022: all countries

Arab University Students at UWB

There are up to 20 (the numbers for 2019 are not included) students at the UWB that come from Arab countries. They have chosen to study technical fields either at the Faculty of Applied Sciences, the Faculty of Electrical Engineering or at the Faculty of Mechanical Engineering. Most of them study on a scholarship basis. These UWB students are often here thanks to a bilateral agreement and they receive regular monthly scholarships (around 14,000 CZK). Within those agreements, students are obliged to participate at an 8-month-long Czech language course just one year before enrollment. At UWB, the course takes place at the university twice a week. At the end of the course, students should be able not only to communicate in Czech (spoken, written), but also get their specialization at the university. The Czech educational system treats them as Czech students. They attend courses together with (mainly) Czech students, and classes are in Czech. Moreover, the online system for exam registrations or lecture evaluation are also only in the Czech language.

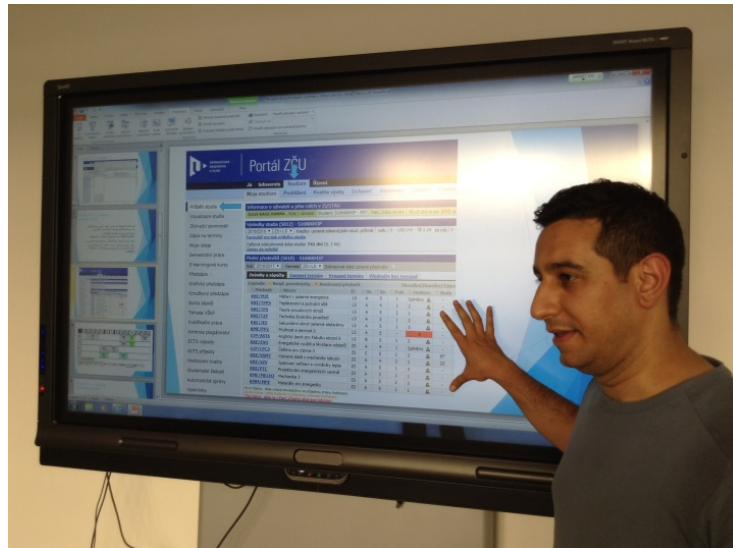
These students come mainly from Syria, Morocco, Yemen, Palestine, Saudi Arabia and Iraq.

In addition to the aforementioned issue of language, a lack of contact between Arab students and their Czech counterparts emerged as a problem. In cases where there is contact, Czech students welcome every opportunity to practice their English and therefore do not have enough patience for “Czech language beginners”. Also, the whole educational system differs greatly from the one in their native countries, including specific university rules.

Mission and Activities of the Special International Counselling Centre in 2018

The centre has also offered formal meetings and regular cultural activities within the first year of its operation (September 2018 – August 2019). There were individual consultations taking place twice a week in the ICC in the city centre, eight hours in total per week. The most common topics being discussed and dealt with there were health insurance, study consultations, part-time job seeking, then accommodation seeking and scholarship applications.

In October there was an introductory meeting for Arab students at UWB where the centre's staff members explained how to work within the university system and what the credit system rules are, and also prepared a presentation and a sample of traditional Czech cuisine.



Centre staff member Izzat Kass Hanna (at the time still a student) explains how not to get lost in the online university system.

As this type of event was quite successful, we have decided to offer such events regularly – we have called them “regular cultural events”. Such an event always consists of the presentation of an important topic (on study or life in the Czech Republic) and some fun activities or eating together afterwards. During the academic year, we have presented activities of UWB student organizations, examination rules, part-time job and volunteering offers in addition to popular tourist destinations in the Pilsen region, sport options and infrastructure in the city or guided culinary Middle-Eastern tours in the city. At the end of the summer semester, students themselves proposed topics for meetings and invited their Czech friends to take part as well. This has also surprisingly become a platform for talking about their everyday problems and experiences with Czech society. Together with students, we organized a special Ramadan dinner and a Moroccan breakfast for the public. There are already several Turkish and Iranian students involved in the event’s organization, as students from these countries will also be the main target group in the second project phase. There is also a strong connection with the Department of Middle-Eastern Studies of the Faculty of Arts as students of the Arabic language welcome the opportunity to practice their language skills with native speakers.

The coordinators of the centre are able to communicate in Arabic; however, there is always an emphasis to present all of the information in Czech first, then in Arabic and English. The most popular and widely-used communication tool has been a private Facebook page group (in operation since October 2018). Its content consists of various cultural event tips connected to UWB (e.g. the YEAR ONE festival for freshmen, Festival of Arab Culture) and important university deadlines and study information. Also, the terms of upcoming meetings have been negotiated there more effectively than via e-mail.

EVALUATION AND SUGGESTIONS

In June 2019, we distributed a questionnaire to Arab students to find out what difficulties they continue to face and learn how we can improve our services. To summarize, the greatest challenges are the language, the negative or reluctant attitude of the Czech community, and cultural differences and misunderstandings. These results were not surprising. Nevertheless, the students evaluated the activities and services of the centre as being highly useful and they even asked for more events to be organized (ideally connected to food so they can present their national cuisine to others).

In reaction to the language barrier, we have decided to implement a regular Czech language course in the winter semester for new students. It will be for free and one lesson (90 minutes) should be offered weekly.

For the future functioning of the centre, we would like to continue with organization of the same kind of events (individual consultation, introductory meeting for the new academic year and informal regular meetings). At the beginning of the project, we were met with silence on the part of students – many of them did not reply to our e-mail invitation at all. During the academic year more students got to know about our services and began using them more often – the principle of “getting to know something through a friend” has worked the best. Also, using social networks (especially the Facebook page) was a good decision, and we are planning to continue to publish important documents there such as online presentations or video manuals connected to university life and cultural tips as well. Thanks to the Facebook page, group students are in touch with the centre’s staff members immediately and they can ask about anything without going through formalities.

We are also planning to strengthen cooperation with Erasmus students – in terms of inviting them to our cultural events and to involve our target group in their organized activities like trips to Prague or other Czech cities.

Finally, the most crucial point according to our ICC team is the need for the active participation of students to create the content of meetings. In regard to the group of Arab students, we have offered a job to a Syrian student and this move has proved to be a brilliant one; we are now thinking about offering a part-time job to one of the Turkish or Iranian students as well. The services offered might be great and meaningful, but help “from student to student” has added value – this involves more than just a centre staff member, and there is room for creating new social ties and friendships.

REFERENCES

- The Bologna Process, www.ehea.info
Ministry of Education, Youth and Sports, Czech Republic, database SIMS
Ministry of Education, Youth and Sports, CZE - database SIMS
dsia.msmt.cz/vystupy/vu_vs_f2.html, document F23
University of West Bohemia, www.zcu.cz/en
Strategy of University of West Bohemia
https://old.zcu.cz/export/sites/zcu/pracoviste/str/strategicke-dokumenty/dlouhodoby-zamer-2016-2020/1_Dlouhodoby_zamer_ZCU_2016-2020.pdf

CO-DESIGNING OF A MOBILE EDUCATIONAL TOOL FOR INNOVATIVE TEACHING AND LEARNING AT THE COLLEGE OF BUSINESS EDUCATION, TANZANIA

Godfrey Isaac MWANDOSYA

College of Business Education, Department of ICT and Mathematics, Dar es Salaam Campus, Tanzania
g.mwandosya@cbe.ac.tz

Calkin SUERO MONTERO, PHD

School of Computing, University of Eastern Finland, Joensuu, Finland
calkin.montero@uef.fi

Esther- Rosinner MBISE, PHD

College of Business Education, Department of Business Administration, Dar es Salaam Campus, Tanzania
ermbise@gmail.com

ABSTRACT

Mobile technologies are increasingly becoming tools for enhancing access and smooth sharing of information, products, and services. In this realization, this study used a design science research users' participatory approach to co-design a mobile application prototype known as CBE Mobile Educational Tool (CBEMET) to enable lecturers of the College of Business Education (CBE) in Tanzania to share educational materials. The co-design of the prototype involved 3 researchers, one application developer and 25 lecturers of CBE. The testing of the CBEMET prototype shows that downloading and uploading of education resources to the system is adequate. The results also indicate that the prototype enables the access of uniform departmental-related materials by lecturers of the same department at different locations and, in so doing, it increases the quality of teaching and learning at the college. Furthermore, the testing of the prototype revealed that the design meets the requirements of the lecturers and has brought a significant change in their teaching and learning practices. The impact of the study is that it sets a groundwork for future studies involving lecturers in higher education and developers in co-designing and co-developing mobile education tools for innovative teaching and learning in Tanzania and in other emerging economies.

Keywords: innovative teaching and learning in higher education institutions; educational technology; co-design and development of mobile educational tools; mobile education tool usage; DSR; CBE, Tanzania;.

INTRODUCTION

Mobile education tools are regarded as one of the means to enhance innovative teaching and learning. It simplifies, adds value to the way education is delivered, enhances collaboration in learning and is a source of innovative teaching and learning process (Filippo, Barreto, Fuks, & Pereira de Lucena, 2006). With mobile education technologies, teaching and learning can contemporarily be done anywhere, anytime ubiquitously (Virvou & Alepis, 2005; Quinn, 2001; Sharples, 2000; Patten, Arnedillo, & Tangney, 2006; Ryu & Parsons, 2009; Porter, et al., 2016) In other words, technologies have got rid of the need for fixed classrooms and lecture rooms (Lee & Salman, 2012) which were the prerequisite in the past. ICTs technologies, in particular, have improved information accessibility; electronic file exchange; and most importantly enhanced the exchange of information between learner-tutor or learner-learner (Sife, Lwoga, & Sanga, 2007; Abouelenein, 2017) extended learning beyond the classroom (Fullan, 2011). A study by (Heath, Herman, Reeves, Vetter, & Ward, 2005) provide a highlight on how mobile learning application can be used to solve problems of retention of science and mathematics students in universities. Moreover, the new pedagogical method of learning through mobile devices has prominent benefits that other educational media cannot present, such as personal engagement, satisfaction, and high motivation regarding the learning process (Ryu & Parsons, 2009).

Increased application of mobile tools in education in HEIs relates to a concept of innovative teaching, learning, and assessment using social media technologies (Kivunja, 2015). Several studies (Mtega W. P., Bernard, Msungu, & Sanare, 2012; Mtebe J. S., Kondoro, Kisaka, & Kibga, 2015) show that the mobile phone is a useful tool for teaching in higher education solves many previous challenges. Mtebe and Kandoro (2016), specifically write that the Moodle learning management system (LMS) via mobile phones enables instructors and students to view courses, view grades, view notes and be able to hold discussions very efficiently than ever before. Research, therefore, point out that the use of innovative educational technology in teaching should be one of the requirements for accrediting a higher education institution (Borisova, Vasbieva, Malykh, Vasnev, & Bírová, 2016)

In Tanzania, the growth and advancement of Information and Communication Technologies (ICTs) are changing the mode of teaching and learning (see, Lee & Salman, 2012; Ryu & Parsons, 2009). According to Kazoka (2017) ICTs has enabled 300 teachers from primary schools to higher education institutions in Tanzania to attend teleconference seminars that improve their teaching of science in public schools. Further, the technology has enabled lecturers to teach in more than one school at the same time

Despite this development in using ICTs in Tanzania, many higher learning institutions have not taken the full advantage of the possibilities offered by the information and computer technologies in improving teaching and learning processes. Mwandosya and Suero Montero (2017), for instance, investigated the usage pattern of mobile devices for teaching and learning among teachers and students at the College of Business Education in 2017. They reported that the usage of such gadgets for education was stubbornly low among the participants of the study. It was also found that a substantial number of CBE lecturers only knew WhatsApp, electronic mails (e-mails), and normal text messages. As a result, CBE administration would fail to acquire uniform coverage of syllabi for the same subjects in their dispersed campuses of Dar es Salaam, Dodoma, Mwanza, and Mbeya¹. This is because WhatsApp, which was the most preferred application, failed to cater for the idiosyncratic communication needs of CBE teachers and students. According to Mwandosya and Suero Montero's study (ibid), CBE lecturers and students needed a mobile device to enable them to share educational resources and discuss the same issues across the campuses. CBE lecturers supposed that such mobile educational tool would enable lecturers and students to share ideas, and educational resources among themselves, and in so doing, facilitating innovative teaching and learning process.

Building on the findings of Mwandosya and Suero Montero in 2017, this study set to co-designed and develop CBEMET prototype by involving stakeholders through interviews, focus group discussions, and participation in design workshops conducted with lecturers of CBE.

The study set to fulfill the following objectives:

1. to identify the mobile education tool's design features and functionalities for innovative teaching and learning at CBE.
2. to co-design design and co-develop a mobile education tool prototype incorporating CBE lecturers' requirements
3. to demonstrate and use the CBE mobile education tool prototype to the CBE lecturers after its development.

The study intended to lay a groundwork for future co-designing and co-developing mobile software for contextualized innovative teaching and learning in higher education institutions in Tanzania and elsewhere.

MOBILE LEARNING THEORIES AND RELATED WORKS

Mobile learning theories

Mobile technologies contributions to the education sector have yielded a number of theories. In their Theory of Mobile Learning, (Sharples, Taylor, & Vavoula, 2005; Pea & Maldonado, 2006) consider a technology-mediated mobile learning as a personal and situated activity mediated by technology. The theory clearly explains the convergence between learning and technology, where learning is conducted in a mobile situation away from traditional classrooms and lecture halls through the use of mobile education tools. One of the aims of the Theory of Mobile Learning is to inform the design of new environments and technologies to support mobile learning. The theory is important in this study and has been applied in the sense that the co-designing and co-development of this mobile devices for CBE will enable teachers to share educational experiences and materials for the innovative teaching and learning irrespective of their location and time.

Further, the study applied the Activity Theory. This is a theory which gives insights on how designers can develop mobile tools using mobile technologies to better understand the social and material relations that affect complex human learning and the learners' interaction with others as mediated by mobile education tools (Uden, 2007). The Activity Theory emphasizes the involvement of users in the development of an application, in this case, the CBE teachers. It moves away from teacher-centered or student-centered learning approaches. In line with the theory, the participants move through the activities and progress from being partial participants who are heavily dependent on the material mediation of tools, to full participants, who are able to more flexibly use the cultural tools of the narrative practice (Gifford & Enyed, 1999). That is, a mobile technology in this perspective is not perceived as the object of learning, but as a tool to support students' learning activities which are applied

¹ Distance in kilometers from Dar es Salaam to Dodoma is 584 km, Dar es Salaam – Mwanza is 1145.58 km, and Dar es Salaam – Mbeya is 829.53 km.

in the study involving teachers' aspects in own teaching and learning activities using a mobile technology. Instead of designing mobile learning applications in isolation, the Activity Theory suggests the consideration of important features of human endeavor at large through the participation of the concerned users. This allows us to focus on the context of use. It maintains that mobile technology artifacts can only be understood in their context of use, as embedded in meaningful activity.

These two theories (the Theory of Mobile Learning and the Activity Theory) offered this study an initial framework for theorizing about mobile learning. Similarly, they highlighted and put forward the ground for carrying out further studies about the use of mobile technologies in higher educational environment for sharing teaching and learning activities, among other functions. They rationalized the need to grab opportunities offered by mobile learning to promote innovative teaching and learning. The following sections extend the base obtained from the mentioned theories by looking at multiple studies relating to innovative teaching and learning, collaborative learning, design, and development of mobile applications, and the user experience in the co-design and development of mobile education tools.

Innovative teaching and learning

Teaching innovation is when the appropriate strategies and skills are applied to technology use, making it a favorable tool for teaching, fostering effective learning (Bruce, 1989). Innovative teaching is both the practice of teaching for creativity and of applying innovation to teaching (Ferrari, Cachia, & Punie, 2009; Mtega W. P., Bernard, Msungu, & Sanare, 2012). Fullan, (2011) identified three innovative teaching practices namely: 1. Students' centered pedagogies including knowledge building, self-regulation assessment, collaboration, and skilled communication; 2. Extending learning beyond the classroom including problem-solving and real-world innovation; 3. The ICT use in the service of specific and concrete learning goals.

Research point out that innovations enhance competitiveness in a wide variety of sectors including the education sector. Khurshid and Ansari (2012), for example, separated two groups of students of grade I. One of these groups was the control group and was taught using conventional teaching methods, while the other group was the experimental group and was taught using innovative methods. The innovative methods applied were team projects, individual projects, field trips, flash cards, real objects, audio-visual aids, internet access, computer-assisted instructions, role play, worksheets, smart boards, group discussions, quizzes, and mind maps. A test was administered after one month of the teaching and the result showed that students taught using innovative means scored significantly higher than those taught using conventional methods did.

This confirms that innovative teaching improves learner's capability and that teaching has to be innovative (Lee, 2011; Borisova, Vasbieva, Malykh, Vasnev, & Bírová, 2016).

With regard to mobile education, technologies now make innovative teaching and learning easy and real. According to (Kaliisa & Picard, 2017), mobile technologies make it possible for someone to learn efficiently in anytime and almost anywhere. This study is therefore informed by the key role of technologies in the innovative teaching and the need to encourage the design and development of innovative curriculums, and mobile education applications designed in a collaborative way to involve the learners, lecturers, and experts in curriculum and application developers (Naismith, Lonsdale, Vavoula, & Sharples, 2004).

Co-designing and co-developing mobile applications

Co-designing and co-development of a mobile application refers to focusing on the users of the system rather than the developers of the system in order to obtain features and functionalities which will be compatible to the users' needs and in so doing to obtain maximum benefits of learning innovatively. Though the users of the mobile tool might not be technically oriented in designs of the mobile technologies, their contribution to the design is very important as they may observe out the functionalities of the application. Involvement of the users may lead to an application tool with ideal features for users. Co-designing and co-development of mobile applications ensure the success of the application in question at the implementation stage. This is because all problems with the application are early noticed by users of the application and are thus corrected during the design stage. A study by (Nielsen, 2017) elaborates ten usability heuristics for user interface design. Similarly, (Millard, Howard, Gilbert, & Wills, 2009), showed steps involved in co-designing and co-deployment of an innovative mobile learning system as: *scoping; sharing understanding; brainstorming; refining; and implementing* in this study, each of the five stages of Millard, Howard, Gilbert, & Wills' were followed through workshops and meetings with technical and domain experts in the design team.

Mobile educational tools – features and functionalities

A study by Filippo et al., (2006) described a mobile device as a tool for coordinating ‘conferences’ or ‘forums’ where learners and mediators’ messages could smoothly avail collaborative learning. The usefulness of any mobile application is associated with factors such as the quickness in searching and accessing the mobile learning materials and smooth coordination of contents shared by learners and mediators – lecturers at case study of CBE (Filippo, Barreto, Fuks, & Pereira de Lucena, 2006). A number of research have been done on how mobile learning tools can be developed and be applied in different teaching and learning environments.

A four-year project in three European countries to research and develop a practical, easy to use mobile learning toolkit specifically for lecturers, by (Attewell, 2005) produced three toolkits: the first one was a short messaging system (SMS, text message) known as quiz authoring tool, the second one was media board authoring tool, and the third one was pocket PC authoring tool useful for lecturers. The three toolkits suggested by the project study provide an insight on how to design and incorporate a bundle of tools in a mobile application to be used by teachers for effective and innovative teaching. A study by (Li, 2010) worked on a search tool for users to quickly access mobile phone data such as applications and contacts, by drawing gestures. The search tool was found to be useful in searching contents. A study by (Alzahrani, 2017), which was intended to enable students learn through discussion forums reveals the effects of using online discussion forums on students' learning indicating a positive result for enhanced innovative teaching and learning at one of the leading University in Saudi Arabia. It established that many users of mobile applications face slowness in sending requests and receiving feedback. They thus marked this factor as an important aspect to be looked at in the design of any mobile application. A study by (Foti & Mendez, 2014) focused on how students use education-related applications such as Quizlet by LLC a company which creates study tools enabling students to join through their website. The students were able to log in to the app where they found easy to collaboratively learn, do quizzes and some exercises in preparations for examinations. In a study by (Virvou & Alepis, 2005) features of a mobile education tool known as “The Mobile Author” made learning interesting and useful to students and their instructors.

Xie & Parsons (2009) found that functionalities of mobile tools depended on the available portion of the total bandwidth that a user is using. The bandwidth challenge can be solved by developing an application using, for example, the asynchronous JavaScript and XML (Ajax) which is an approach to Web application development that uses client-side scripting to reduce traffic between client and server and provides seamless user application experience (Xie & Parsons, 2009). A study by Ahmad et al., (2004) suggested the importance of learning users’ requirements of the interface. Furthermore, according to (Ahmad, Basir, & Hassanein, 2004), the interface of the tool should be easily adapted for different types of users with differing intelligence capabilities.

Gathering from the aforesaid studies, the need to engage users in the design of the mobile applications as a way of motivating them to collaborate is emphasized. In designing CBEMET prototype for the College of Business Education, therefore, lecturers were involved to come up with a system with features and functionalities that meet their requirements.

METHODOLOGY

In order to define the interface design requirements and contents specifically for the CBEMET prototype about how it will look and work, four workshops involving one application developer, 25 CBE lecturers, and three researchers (one based in Finland at the University of Eastern Finland, and two based in Dar es Salaam at CBE), were conducted at Dar es Salaam Campus of CBE. The workshops followed the design science research (DSR) framework which emphasizes the involvement of users (lecturers) from the onset in the design process of an artifact (the CBEMET prototype). By involving the lecturers, and the designers learnt about what to incorporate in the design.

Design Science Research

The DSR users’ participatory approach in designing the CBEMET prototype have been pivotal in this study. A participatory design approach is an approach that attempts to bridge a gap between researchers and designers and users by organizing co-operation between them (Muller, 2002). The DSR method is a methodological approach concerned with devising artifacts that serve human purposes (Dresch, Pacheco, & Antunes, 2015). DSR entails a systematic approach to studying a practical problem in order to develop a practical solution for an environment in a real world (Hevner, March, Park, & Ram, 2004; Hevner, 2007; Peffers, Tuunanen, Rothenberger, & Chatterjee, 2007). An important outcome of this type of research is an artifact that solves a domain problem, also known as a solution concept, which must be assessed against the criterion of value or utility. In the present study, DSR Framework by (Johannesson & Perjons, 2014) were adopted and modified (see Figure 1).

In applying the DSR at CBE, the task involved lecturers (ultimate users of the application), the developer (a former student, an ICT diploma graduate at CBE and a member ICT innovation group), and 3 researchers (2 based in Dar es Salaam and 1 in Finland).

In the CBEMET prototype co-designing phase, the prototype features and functionalities were designed through iterative discussions, interviews, observations. After the prototype demonstration and agreement on the proper interface design of the MET. Finally, after the demonstration phase, the MET prototype was presented to users to test its features and its effectiveness for sharing different contents. Figure 1 illustrates the co-designing and co-development process applied in this study.

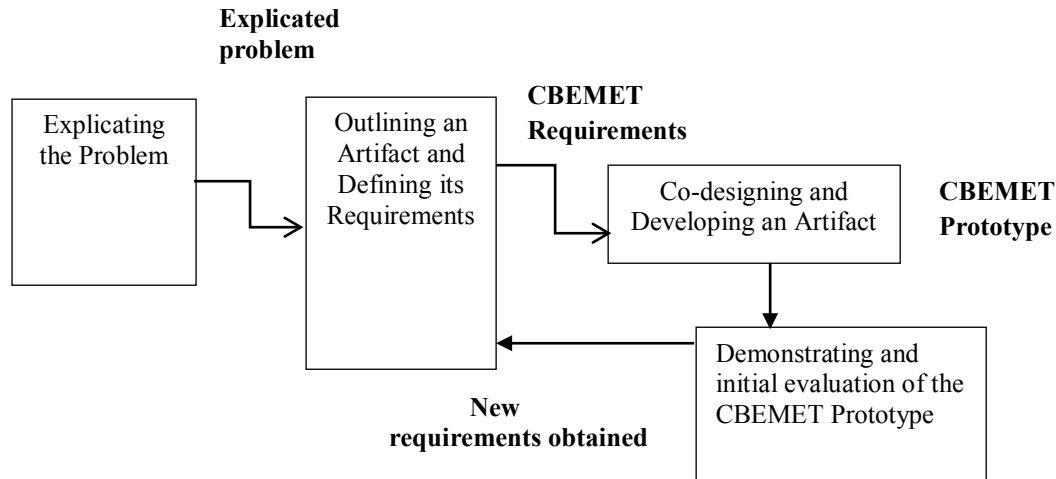


Figure 1. Design Science Research Framework adapted from (Johannesson & Perjons, 2014).

Participants

The population of the CBE academic staff as per the year 2017 records from human resource department is 161 lecturers. Out of 161 CBE teaching staff, whereby; 83 are based in Dar es Salaam Campus, 38 are based in Dodoma Campus, 31 are based in Mwanza Campus, while, 9 are in Mbeya Campus. In this study, 25 lecturers were purposively selected: 10 from Dar es Salaam Campus and 5 from each of the remaining 3 campuses. The purposive sampling was used because the target was the participant with the sought information (Bryman, 2012; Saunders & Philip, 2009; Denscombe, 2003).

Data collection method

Data for this study were collected in two phases. Phase I data aimed to gain an understanding and experience of CBE teachers in using mobile devices for educational related matters (see Table 1). Phase II data targeted soliciting views of the lecturers of the features and functionalities that MET need to possess (see Table 2). Data was collected through four interviews, one at each campus, and one FGD involving 8 teaching staff 2 from each campus. Observation on the working of the MET prototype was done in each campus and notes of the observed and interviews were taken and recorded for improving the application.

After the demonstration of the initial CBEMET prototype, the second phase of an interactive design discussion on the functionalities of the prototype together with the lecturers was undertaken. Table 1 shows sample questions used to probe the design features and functionalities of CBEMET in focus groups and interviews.

Table 1. Sample questions on the features and functionalities of the CBEMET Prototype

Demonstration of MET Prototype	Phase II – MET Prototype Experience
<p>Features expected:</p> <ol style="list-style-type: none"> 1. Log in interface 2. Available services 3. Navigation through 4. Access to different services 5. Arrangement of icons <p>The demonstration will pave way for the look on the following:</p> <ol style="list-style-type: none"> 1. Access to the services of the MET 2. Features of the MET 3. Functionalities of the MET <p>Outcomes:</p> <ol style="list-style-type: none"> 1. Testing of the services, features, and functionalities of the MET. 2. Lecturers' suggestions for improvement of the MET 	<ol style="list-style-type: none"> 1. What is your overall reaction to the observed functionalities of the MET prototype after using the initial design for two days? Please respond also to the following coming questions in this part: <ul style="list-style-type: none"> - How do you feel about sharing your contents online? - How do you feel about the arrangement of icons? 2. In terms of functionalities, what is missing? How can it be improved or changed? Why? 3. What is your opinion of the MET in terms of minimizing the educational-related challenges found at CBE? 4. In terms of features found on the screen, what do you think should be improved or changed? Why? 5. Briefly explain if the MET will be a solution to your personal development in your T & L environment and the innovative teaching. If NOT, please elaborate on your reaction.

Data coding and analysis

Data obtained from interviews and focus group discussions were subjected to content analysis while data obtained from observations and discussions, after the demonstration of the application, were used to re-design and develop the MET prototype to generate features of the mobile education tool that fully meets the needs of CBE teachers. The results of the observations and feedback obtained on the features and functionality of the tool are discussed in the results section of this paper.

CO-DESIGNING AND DEVELOPING CBEMET PROTOTYPE

The second objective of this paper was to co-design and co-develop a mobile education tool prototype incorporating CBE teachers' requirements. This was achieved through a series of iterations as presented in the subsequent subsections.

1st Iteration of co-designing and developing CBEMET Prototype

This was motivated as a result of a study by Mwandosya and Suero Montero, (2017) who identified the need for co-designing a mobile educational tool that meets lecturers' requirements of innovative teaching and learning at CBE.

In line with this need, the first phase of workshops for co-designing CBEMET prototype involved 10 teachers from Dar es Salaam Campus and 5 from each of the remaining 3 campuses. Figure 2 is a sample of such workshops at Dar es Salaam Campus.).

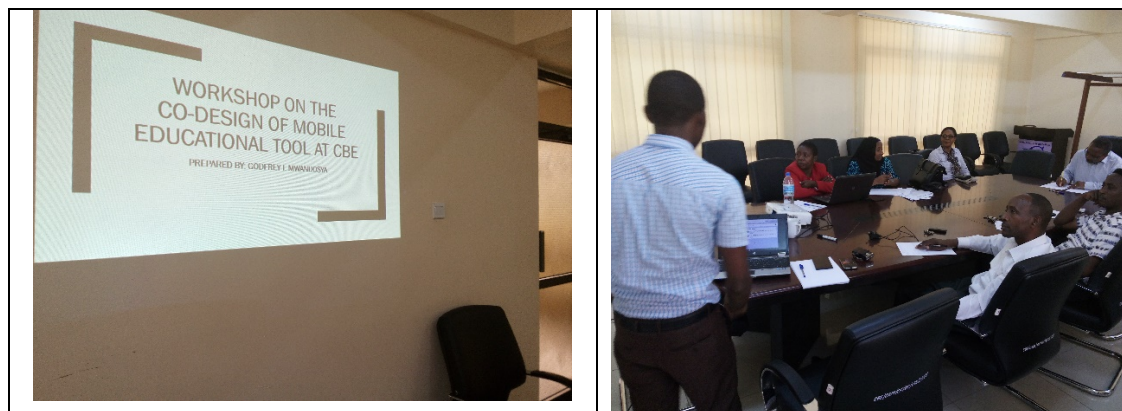


Figure 2. The first batch of lecturers' workshop at CBE, Dar es Salaam Campus

In these workshops, the developer and the researchers introduced the aim of the gatherings to lecturers for them to own the design of a mobile educational tool tailored for them before the start of the workshops.

Outcomes of the workshops:

The following feedback were obtained from CBE lecturers from Dar es Salaam Mwanza, Dodoma, and Mbeya campuses as the initial design requirements for CBEMET prototype

1. The login to the CBEMET prototype should be for CBE as a whole, not by campus-wise
2. The administrator of the system should be able to filter messages so that unwanted messages are blocked or sent to junk mails
3. The contents of the shared educational tool should be arranged by department-wise to minimize time to search and to realize a systematic approach to shared materials of the department in question
4. A lecturer should be able to delete a sent file in case it was wrongly picked or it is irrelevant
5. The CBEMET prototype should allow lecturers to record and post videos, audio presentations
6. CBEMET prototype should store videos and audio presentations for future use
7. CBEMET prototype should allow lecturers to change their passwords at next login
8. The CBEMET prototype should have its logo bearing the colors of CBE
9. It should be mandatory for user to register their first name, last name and e-mail address when logging in. Other particulars such as users' title, education background should remain optional until when users have started accessing the CBEMET prototype
10. Frequently asked questions (FAQs) should be presented somewhere in the system to make it friendlier to users
11. There should be an arrow to direct the user on where go next after logging in to the CBEMET prototype
12. There should be as little information as possible on one window. Only compulsory information should be portrayed at a time

2nd Iteration of the of the Co-design and development of the CBEMET Prototype

The second iteration came after the researchers and the developer of the CBEMET prototype had worked on the observed feedback from lecturers from all the four campuses and produced an initial design of the CBEMET prototype. This was an iterative process as lecturers had produced remarkable ideas for the designing each time they had a chance.

Another workshop was called upon in early December 2017 to proceed with the designing of the CBEMET prototype after obtaining the initial feedback on the design of the CBEMET prototype. In this workshop, the participants were presented the version of CBEMET prototype that considered the feedback they had stipulated in the first workshops. Figure 3 shows the initial design presented to the lecturers during the workshop.

**Mobile Education
Tool For CBE**

👤 Teachers Registration

[Register](#)

[Already have an account?](#)

[Login](#)

ORS - Copyright © 2018

Figure 3: The initial design of the CBEMET – registration, login menu

Activities that took place in this workshop were:

- the installation of the CBEMET prototype in the smartphone and mobile devices of the lecturers
- the navigation through the CBEMET prototype to see what has been done after the requirements

After the above activities, each of the lecturers were given two days to explore all features of CBEMET prototype to determine their usefulness. The findings of the observation would be presented in the following workshop as detailed in the subsequent subsection.

3rd Iteration of the Co-designing and development of the CBEMET Prototype

The next workshop was held in early January 2018 at Dar es Salaam Campus after each of the participating lecturers from all campuses had accessed the CBEMET prototype. Each of the participating lecturers in the co-designing activity had demonstrated a good command of using the CBEMET prototype by going through all the functionalities of the different menu items found.

A number of challenges were revealed during the discussions in this co-designing workshop. First, some of the lecturers had encountered access problem. They reported that the system did not work in their smartphones and other mobile devices their network bundles were small – which was noted by the researchers and the developer for future improvement of the system. Furthermore, it was reported that power saving options caused the screen of their devices to go to lock mode. Another challenge was the difficulty to select more than one file to download. At the post notes menu, it was not possible to upload contents. However, the menu items of the CBEMET application were found suitable. It was thus agreed in the workshop that all the challenges observed be rectified before the following workshop scheduled for June 2018.

Outcomes of the co-designing iterations

In a nutshell, all participants were largely satisfied with the outlook and the running of CBEMET prototype. The lecturers were excited in accessing CBEMET prototype online – they likened the application with the WhatsApp, but said the good thing with CBEMET prototype is that they owned it and are thus able to suggest further modifications they feel appropriate. In a nutshell, they felt really empowered in their work as lecturers. The lesson learnt by the researchers, the developer and lecturers during and after the re-designing sessions was that each participant learnt different ways to access, upload and download documents from and unto the CBEMET prototype.

Few suggestions for improvement raised were keenly recorded for the re-designing the CBEMET prototype so that it fully meets the requirements of the lecturers. Such suggestions were such as:

- in the registration part of the MET, the title should include Prof, and Dr. Initials, not only Mr., Mrs., Miss as the CBE institutions is ever expanding, and had 3 professors, 6 Ph.D. staff, and about 20 staff in Ph.D. programmes
- the function for changing the password received through email needs to work properly to enable lecturers to change their passwords for security reasons
- after logging in, a name of the logged in person should appear in the window
- the main menu or the login menu or both should have a logo that clearly indicates that the application belongs to CBE to ascertain copyright and visibility issues. This is because the application is will be accessed online through the Google Play Store.

At a discussion part, a name and photograph of the lecturer who is posting should also appear.

Re-designing CBEMET

The re-designing CBEMET prototype was done in consideration of feedback from the workshops. The re-designing involved the addition of a provision for each department to share their own notes. There was also the insertion of a CBE logo in the main menu window. Another improvement was the inclusion of titles of Dr. and Prof. in the registration window – as it was recommended by participants of the earlier workshops. Further, there was the inclusion of “News and updates” icon on the main menu, instead of inside one of the menus. The news and updates will remind users of important announcements on shared resources especially new modern technology and innovation inventions.

The third objective was to demonstrate the use of the CBE mobile education tool to CBE teachers after its improvement. In line with this objective, a training intended to demonstrate the modified version of the

CBEMET prototype to the 25 lecturers was organized at CBE Dar es Salaam Campus for all 25 lecturers from all campuses who had smartphones. The training aimed to make lecturers own the CBEMET prototype, familiarize themselves with the application and providing feedback for improvement. The researchers and the developer were closely monitoring the process to make sure that CBEMET prototype is working properly and that lecturers do not get stuck at any point. The activities that took place in the demonstration phase are summarized as follows:

Accessing CBEMET Prototype – the participants of these training would access CBEMET prototype through their smartphones using a provided domain. The process started by visiting the website **meducbe.ac.tz** and pressing “Enter” key. This opened a log in Window as shown in Figure 4:

Figure 4. The screenshot for login

With a registered e-mail (CBE e-mail) and a correct password one can log in and access the MET prototype.

Grouping lecturers – 25 lecturers were grouped into 5 groups consisting of 5 lecturers each. The objective was to get them collectively check how the CBEMET prototype works and thereafter give feedback for improvement.

FINDINGS

Focus group discussions – the FGDs were conducted after the demonstration phase to solicit the views of lecturers on the running of MET and to explore their suggestions for improvement. Major outcomes of the FGDs was a proposal to include video conferencing function into the system to enable lecturers to converse online. For example, one participant said, *“even the meetings can be done online between members of the management, instead of members of the management team traveling all the way from Mwanza, Dodoma, and Mbeya to Dar es Salaam just for a 2 hr meeting.”* This was taken up for further improvement of the system. also, the lecturers during the discussion revealed that training program should be prepared for all the lecturers of CBE to start using the prototype immediately.

Interviews—interviews were also held to solicit views of lecturers after the demonstration of CBEMET prototype phase. The interviews equally realized fruitful feedback which were taken on board in the improvement of CBEMET so that it enhances the teaching and learning in HEIs. One of the participants who had an issue with the security said, *“I am worried about sharing my documents online, what about if someone accesses them and use it in another institution?”*

Observation of lecturers’ reaction to CBEMET Prototype

The developer and the researchers simultaneously observed the reaction of lecturers to CBEMET. Generally, they were happy about the design of the MET prototype, especially because it enabled them to transfer experiences of using other social media contents to the system.

Agreements – to make sure that CBEMET is owned by all parties involved in its design, it was agreed that every suggestion on the improvement of the design and modifications of the CBEMET is dully checked by all the participants and the final agreement documented thereof was produced.

Documentation of how the system works, what were observed and resolved during the demonstration of the MET was done for future reference and maintenance of the application.

This section presents the features and functionalities of the version of CBEMET prototype which considered the requirements of 25 lecturers from all the four campuses of CBE. We start the presentation with the technical description of the CBEMET prototype and ends with the observed challenges and future plans for the similar works.

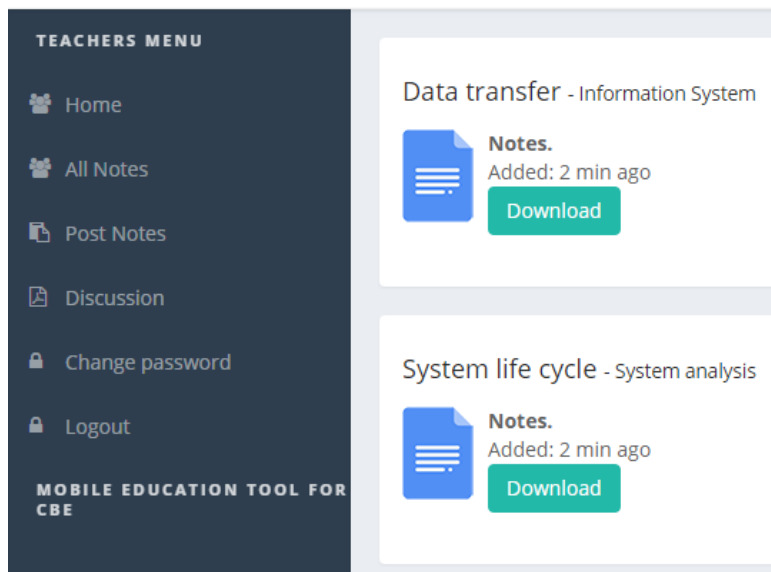


Figure 5. The main menu of the CBEMET prototype

Technical Description of the CBEMET Prototype

The application was developed using the framework Laravel v.5.4, Bootstrap 4. The front-end interface was developed using the HTML, CSS. The Server-side script being PHP (Object-oriented Programming). On the part of the Client-side Script, JavaScript, Ajax, and JQuery were used. This was done purposely due to their efficiency in developing applications. User's data is stored in an SQL database using MySQL for Android App and Java, JSON API for data retrieval. The MET prototype has 3000 lines of code.

A brief explanation of the CBEMET Prototype characteristics

The development of CBEMET prototype comes at a time when HEIs in Tanzania needs changes in the teaching and learning to match the technological changes that are taking place in world. Briefly, the characteristics of the CBEMET prototype is that it can run in mobile devices (smartphones, tablets, PDAs), laptops, and desktops as long as there is an internet connection. It is an application that is mobile in nature, it can be applied anywhere, anytime. Also, the CBEMET prototype involves only those who have CBE's email that is, members of staff in the emailing system of CBE.

The initial observations on the impact of the features of the CBEMET prototype have shown that teachers have abundant academic resources at their disposal which were not known and can now share them very easily through CBEMET prototype. Secondly, MET prototype has opened chances to teachers to collaborate in different projects. For example, one lecturer from the Business Administration department has shared his new project named *"Entrepreneurship sensitization for entrepreneurs doing business around the College of Business Education"* and has called for teachers to join and collaborate with him in writing project proposals. This suggest that the interaction among the teachers has tremendously increased through CBEMET.

Brief explanations of the functionalities of the CBEMET

The MET prototype starts with:

- i. registering by entering details such as title (Mr., Mrs., Prof, Miss. Ms., and Dr.), first name, surname, telephone number, and an email address
- ii. Login to CBEMET using an email address as a username and a password that is automatically brought to an email address the user registered. This automatic password enables the user of the CBEMET prototype to access the application and can be changed after accessing.
- iii. After logging in the system, the user will automatically be directed to a window with menus such as *Home page, All notes, Post Notes, Discussions, Change Password and Logout.*
- iv. On this page, users have an option to select the function they want.

A brief explanation of the menu items

Home- provides information about the MET prototype and a starting point to different menu items **All Notes** - is designed for viewing and downloading notes shared by lecturers for enhancing the shared experience in innovative teaching and learning. It thus enables lecturers to teach and learn at the same time

Post-Notes - this is designed for posting notes, innovations, PowerPoint presentations, multimedia resources, etc. It is designed to meet the requirements of the lectures as stipulated in (Mwandosya & Suero Montero, 2017).

Discussion - at the discussion menu, it is expected that lecturers will be able to post issues and interact online on issues that need quick responses ubiquitously. That is why the MET prototype is known as a mobile education tool!

Change Password – this is a feature for changing a temporary password supplied during the registration through the registered email of the user. The feature is meant to ensure the security of the users and content in the system.

Logout - after using the CBEMET the features allow user to leave the system safely.

DISCUSSIONS

The first objective of this paper was to identify mobile education tool's design features and functionalities for innovative teaching and learning at CBE. This objective was clearly realized because the 25 lecturers were able to give feedback and suggest a number of design features during the workshops held at different times.

The second objective was to co-design and co-develop a mobile education tool prototype incorporating CBE lecturers' requirements. Interesting design skills were observed during this stage, lecturers were able to pinpoint some design suggestions as if they were real application developers. They felt they own the prototype and were satisfied by the involvement. The third objective was to demonstrate the use of the mobile education tool to the CBE teachers after its development for feedback and suggestion for improvement before it was taken to the whole community of 161 lecturers. This objective was clearly met through focus group discussions, observations, workshops and interviews whereby a number of constructive feedbacks was collected to improve the working of the CBEMET prototype.

Earlier activities of the study focused on outlining the artifact and defining its requirements. The requirements were divided into two parts. The first part was about the contents to be included in the CBEMET prototype. The second part was about the functionalities and features of the CBEMET prototype itself. The activities in this stage were successful in the sense that they brought curiosity among lecturers that is, the manner in which they were enthusiastic to discuss how the system can enable them to share their innovative teaching and learning issues, anytime and anywhere. The ability to post notes and hold discussions with fellow lecturers and students online fostered teamwork and trust among themselves, analogous to this is a study by Cheong et al., (2012) who designed a Mobile-app-based Collaborative Learning System known as *myVote*, which was designed to support social interaction in order to promote higher-order thinking skills an objective that was highly attained whilst CBEMET prototype was primarily meant to promote innovative teaching and learning. The design stage of the CBEMET prototype generated a number of interesting design ideas from the participating lecturers, the researchers, and a developer which were used to improve the system, see for example, (Ford & Leinonen, 2006). The design stage proved that co-designing the CBEMET prototype with the lecturers, developers and researchers result in a technology that suits users' contextual background and needs for example Mramba et al., (2016). Contrary to a study by Oyelere et al., (2016) who in their study designed a mobile learning application for computing education (MobileEdu) which was tested through an experiment with 142 third year undergraduate students mainly for checking if MobileEdu improved their learning experience and not the design of MobileEdu. The main aim of their experiment was therefore to assess if the students who learned through MobileEdu attained improved learning engagement, results, and had better pedagogical experiences than those who learned by following the traditional face-to-face method. The students as users were not involved in the design of MobileEdu, meanwhile in the design of CBEMET prototype teachers as users were involved directly. In using

MobileEdu though, the students showed improved learning capabilities. A study by Ford & Leinonen, (2016) who developed a mobile tools and services platform for formal and informal learning (MobilED) showed similar process of a way of testing the functionalities of the tool as the way it was done with CBEMET prototype whereby the ideas of the learners from the first and second pilots were used to improve the MobilED an exercise that was successfully done and attained the objectives set.

Generally, it was established that CBEMET prototype has changed the perception of lecturers on the use of mobile devices for teaching and learning. Lecturers are seen shifting from frequent social media access to using the CBEMET prototype for teaching, learning and coordinating activities. For example, one notable change is that CBEMET prototype has made it possible to implement a project entitled “Introduction of Mobile Learning in Higher Education Institutions in Tanzania”. This project is expected to unite members of management teams, teachers, and students from selected higher education institutions in teaching using mobile learning tools. The sharing of projects’ activities will be done through the discussion forum of the CBEMET prototype. Furthermore, CBEMET prototype has realized the innovative teaching and learning through the use of educational audio and video tools, access of different shared educational resources, preparation of multimedia learning contents, and presentation skills.

CONCLUSION

The objectives of the study were (1) to identify the mobile education tool’s design features and functionalities for innovative teaching and learning at CBE, (2) to co-design design and co-develop a mobile education tool prototype incorporating CBE teachers’ requirements, and (3) to demonstrate and use the CBE mobile education tool to the CBE teachers after its development. In fulfillment of these objectives, we have demonstrated how mobile application can be co-designed and co-developed by developers and users in the contextual environment. Different features and functionalities of the CBEMET prototype were observed, discussed, and agreed upon for future improvement of the application. Through the workshops, lecturers were able to participate fully to design different items of the CBEMET prototype. With all the challenges that have been recorded as a result of co-designing of the prototype, the study’s objectives have been met. That is, a mobile education tool which emphasize interactivity, adaptivity, and instilling a sense of ownership of the application has been developed. The demonstration results were very encouraging and showed the appreciation of the contribution of mobile software features to education. The challenges encountered will be used to improve the CBEMET prototype until it is fully developed into a real integrated system for the entire community of CBE.

The biggest contribution of this paper is therefore using a DSR participatory approach combining lecturers, researchers, and software developers to design and develop a suitable mobile education tool to enhance teaching and learning in a contextualized environment (Muller, 2002). This study has shown how using DSR user participatory approach in designing a mobile education tool application can be done collaboratively and how the end product of such collaborations suits the requirements of users and inform subsequent designs, development of similar products. It underscores that collaborations and sharing of innovative experiences of individual teachers is vital for quality education in higher education institutions. Further, it proves that collaborations can be easily achieved through mobile technologies and the development of mobile education application tools. Moreover, the study stimulates the need to changes from the traditional way of teaching and learning mostly face-to-face to innovative teaching in higher learning institutions to serve the needs of the society in the best way and sustainably.

As a result, the CBEMET prototype has enabled CBE lecturers to share educational resources online, to uploading and downloading educational resources, and to access departmental related documents. It provides uniformity of learning materials across all campuses, and in so doing, increases the quality of education. The CBE lecturers have been positively impacted by the CBEMET prototype and more suggestion has been received as using the MET prototype gaining momentum.

LIMITATIONS OF THE STUDY AND FUTURE WORK

The requirements and the development of the MET prototype only considered CBE environment, which means that some features may not apply in different set of environments. Furthermore, the lack of bandwidth appeared a limitation to the use of the application; by users who cannot afford buying large internet bundles from the internet operators. In addition, the system did not focus on the needs of students who are also the stakeholders of higher education in Tanzania. Therefore, future development of CBEMET should look into integrating students’ needs of access notes, recording lectures and other related educational materials to ensure innovative teaching and learning campaign.

The CBEMET prototype also lacks interactive forums that would make it more productive in terms of teaching and learning – compared to similar systems in developed countries such as Finland, Norway, Sweden, United Kingdom, and Turkey just to mention a few. These countries have shown tremendous development in using

innovative teaching and learning in HEIs. Other related activities of importance to be considered in future include assessing students' work electronically as suggested by (Alsadoon, 2017) and the importance of online instructional environment where instructors and students share for the innovative teaching and learning (Sarsar & Harmon, 2017).

CONFLICT OF INTEREST

There is no conflict of interest in this study.

Acknowledgments

Special appreciation goes to the developer and CBE lecturers who agreed and whole heartedly participated in the co-designing and developing of the CBEMET prototype. Also, special gratitude to the University of Eastern Finland whom the College of Business Education is affiliated with.

REFERENCES

- Abouelenen, Y. (2017). Using electronic resources centers by faculty members at university education: Competencies, needs, and challenges. *The Turkish Online Journal of Educational Technology*, 16(1), (pp. 219-245).
- Ahmad, A.-R., Basir, O., & Hassanein, K. (2004). Adaptive User Interface for Intelligent E-Learning: Issues and Trends. *The Fourth International Conference on Electronic Business* (pp. 925-934). Beijing: ICEB2004.
- Alsadoon, H. (2017). Students' perception of e-assessment at Saudi Electronic University. *The Turkish Online Journal of Educational Technology*, 16(1), (pp. 147-153).
- Alzahrani, M. G. (2017). The effect of using online discussion forums on students' learning. *The Turkish Online Journal of Educational Technology*, 16(1), (pp. 164-176).
- Attewell, J. (2005). From Research and Development to Mobile Learning: Tools for Education and Training Providers and the Learners. *4th World Conference on mLearning*.
- Back, Y., Zhang, H., & Yun, S. (2017). Teachers' attitude toward mobile learning in Korea. *The Turkish Online Journal of Educational Technology*, 16(1), (pp. 154-163).
- Borisova, O. V., Vasbieva, D. G., Malykh, N. I., Vasnev, S. A., & Bírová, J. (2016). Problems of Using Innovative Teaching Methods for Distance Learning Students. *IEJME - Mathematics Education*, 11(5), (pp. 1175-1184).
- Bruce, R. (1989). Creativity and instructional technology: great potential, imperfectly studied. *Contemporary Educational Psychology*, 14, (pp. 241-256).
- Bryman, A. (2012). *Social Research Methods 4th Edition*. New York: Oxford University Press.
- Cheong, C., Bruno, V., & Cheong, F. (2012). Designing a Mobile-app-based Collaborative Learning System. *Journal of Information Technology Education: Innovations in Practice*, 11, (pp. 97-127).
- Denscombe, M. (2003). *The Good Research Guide: For Small-scale Social Research Projects 4th Edition*. Philadelphia: Open University Press.
- Dresch, A., Pacheco, L., & Antunes, J. A. (2015). *Design Science Research: A Method for Science and Technology Advancement*. New York: Springer International Publishing.
- Ferrari, A., Cachia, R., & Punie, Y. (2009). *Innovation and Creativity in Education and Training in the EU Member States: Fostering Creative Learning and Supporting Innovative Teaching*. Seville, Spain: European Commission.
- Filippo, D., Barreto, C. G., Fuks, H., & Pereira de Lucena, C. J. (2006). Collaboration in Learning with Mobile Devices: Tools for Forum Coordination. *22nd ICDE-Conference on Distance Education* (pp. 1-10). Rio de Janeiro: ICDE.
- Ford, M., & Leinonen, T. (2006). MobilED – A Mobile Tools and Services Platform for Formal and Informal

- Learning. *mLearn 2006, the 5th World Conference on Mobile Learning* (pp. 22-25), Banff, Canada.
- Foti, M. K., & Mendez, J. (2014). Mobile Learning: How Students Use Mobile Devices to Support Learning. *Journal of Literacy and Technology*, 15(3), (pp. 58-78).
- Fullan, M. (2011). *Whole system reform for innovative teaching and learning*. SRI International.
- Gifford, B. R., & Enyed, N. D. (1999). Activity centered design: Towards a theoretical CSCL. *Proceedings of the 1999 Conference on Computer Support for Collaborative Learning* (p. 22). Palo Alto, California: International Society of the Learning Sciences.
- Heath, B., Herman, R. L., Reeves, J., Vetter, R., & Ward, C. R. (2005). Developing a mobile learning environment to support virtual education communities. *Technological Horizons in Education Journal Online*, (pp. 1-9).
- Hevner, A. R. (2007). A Three Cycle View of Design Science Research. *Scandinavian Journal of Information Systems*, 19(2), (pp. 87-92).
- Hevner, A. R., March, S. T., Park, J., & Ram, S. (2004). Design Science in Information Systems Research. *MIS Quarterly*, 28(1), (pp. 75-105).
- Johannesson, P., & Perjons, E. (2014). *An Introduction to Design Science*. Stockholm: Springer International Publishing.
- Kaliisa, R., & Picard, M. (2017). A systematic review on mobile learning in higher education: The African perspective. *The Turkish Online Journal of Educational Technology*, 16(1), (pp. 1-18).
- Kazoka, L. (2017, August 17). Dodoma schools adopt tele-school systems. *Daily Newspaper*. Dar es Salaam, Tanzania.
- Khurshid, F., & Ansari, U. (2012). Effects of Innovative Teaching Strategies on Students' Performance. *Global Journal of Human Social Science Linguistics and Education*, 12(10), (pp. 46-54).
- Kim, P. H. (2009). Action research approach on mobile learning design for the undeserved. *Education Technology Research Development*, 57, (pp. 415-435).
- Kivunja, C. (2015). Innovative Methodologies for 21st Century Learning, Teaching and Assessment: A Convenience Sampling Investigation into the Use of Social Media Technologies in Higher Education. *International Journal of Higher Education*, 4(2), (pp. 1-26).
- Kuo, Y.-H., & Huang, Y.-M. (2009). MEAT: An Authoring Tool for Generating Adaptable Learning Resources. *Educational Technology & Society*, 12(2), (pp. 51-68).
- Lee, K. B., & Salman, R. (2012). The Design and Development of Mobile Collaborative Learning Application Using Android. *Journal of Information Technology and Application in Education*, 1(1), (pp. 1-8).
- Lee, Y.-J. (2011). A study on the effect of teaching innovation on learning effectiveness with learning satisfaction as a mediator. *World Transactions on Engineering and Technology Education*, 9(2), (pp. 92-101).
- Li, Y. (2010). Gesture Search: A Tool for Fast Mobile Data Access. *UIST* (pp. 3-6). New York, USA.: ACM.
- Millard, D., Howard, Y., Gilbert, L., & Wills, G. (2009). *Co-design and co-deployment methodologies for innovative m-learning systems*. Retrieved from http://eprints.soton.ac.uk/267555/1/Co-design_and_deployment_chapter-preprint.pdf.
- Muller, M. J. (2002). Participatory design: the third space in HCI. In the *Human-Computer International Handbook: fundamentals, Evolving Technologies and Emerging Applications*, J. Jacko and A. Sears (eds), (pp. 1051-1068). Mahwah, New Jersey: Lawrence Erlbaum Associates.

- Mramba, N., Tulilahti, J., & Apiola, M. (2016). Bookkeeping for Informal Workers: Co-creating with Street Traders. In the *11th International Conference on Design Science Research in Information Systems and Technology (DESRIT)*, (pp. 1-16).
- Mtebe, J. S., & Kondoro, A. W. (2016.). Using Mobile Moodle to Enhance Moodle LMS Accessibility and Usage at the University of Dar es Salaam. *IST - Africa Conference Proceedings*. (pp. 1-11). Dar es Salaam.: IIMC International Information Management Corporation.
- Mtebe, J. S., Kondoro, A., Kisaka, M. M., & Kibga, E. (2015). Using SMS Mobile Technology to Assess the Masterly of Subject Content Knowledge of Science and Mathematics Teachers of Secondary Schools in Tanzania. *International Journal of Social, Behavioral, Educational, Business and Industrial Engineering*, 9(11), (pp. 3498-3506).
- Mtega, W. P., Bernard, R., Msungu, A. C., & Sanare, R. (2012). Using Mobile Phones for Teaching and Learning Purposes in Higher Education Institutions: A Case fo Sokoine University of Agriculture in Tanzania. *5th UbuntuNet Alliance Annual Conference*, (pp. 118-129).
- Mtega, W. P., Bernard, R., Msungu, A. C., & Sanare, R. (2012). Using Mobile Phones for Teaching and Learning Purposes in Higher Learning Institutions: the Case of Sokoine University of Agriculture in Tanzania. *The 5th UbuntuNet Alliance Annual Conference* (pp. 118-129). Dar es Salaam: UbuntuNet Alliance.
- Mwandosya, G. I., & Suero Montero, C. (2017). Towards a Mobile Education Tool for Higher Education Teachers: A User Requirements Definition. *Proceedings of the 2017 IEEE Science Technology & Innovation for Africa Conference* (pp. 908-914). Cape Town: IEEE.
- Naismith, L., Lonsdale, P., Vavoula, G., & Sharples, M. (2004). *Literature Review in Mobile Technologies and Learning*. Birmingham: Futurelab.
- Nielsen, J. (2017, October 26). *10 Usability Heuristica for User Interface Design*. Retrieved from Nielsen Norman Group: <https://nngroup.com/articles/ten-usability-heuristics>
- Patten, B., Arnedillo, S. I., & Tangney, B. (2006). Designing collaborative, constructionist and contextual application for handheld devices. *Computers and Education*, 46, (pp. 294-308).
- Pea, R., & Maldonaldo, H. (2006). WILD for learning. In E. K. Sawyer, *The Cambridge handbook of the learning sciences* (pp. 427-441). New York: Cambridge University Press.
- Peffers, K., Tuunanen, T., Rothenberger, M. A., & Chatterjee, S. (2007). A Design Science Research Methodology for Information Systems Research. *Journal of Management Information Systems*, 24(3), (pp. 45-78).
- Penuel, W., Tatar, D. G., & Roschelle, J. (2004). The Role of Research on Contexts of Teaching Practice in Informing the Design of Handheld Learning Technologies. *Journal of Educational Computing Research*, 30(4), (pp. 353-370).
- Porter, G., Hampshire, K., Milner, J., Munthali, A., Robson, E., De Lannoy, A., . . . Abane, A. (2016). Mobile Phones and Education in Sub-Saharan Africa: From Youth Practice to Public Policy. *Journal of International Development*, 28, (pp. 22-39).
- Quinn, C. (2001). Get ready for m-learning. *Training and Development*, 20(2), 20-21.
- Ryu, H., & Parsons, D. (2009). *Designing Learning Activities with Mobile Technologies*. Massey, New Zealand: IGI Global Publishers.
- Sarfo, F. K., Amankwah, F., & Konin, D. (2017). Computer self-efficacy among high school teachers in Ghana and the functionality of demographic variables on their computer self-efficacy. *The Turkish Online Journal of Educational Technology*, 16(1), (pp. 19-31).
- Sarsar, F., & Harmon, S. (2017). Student and instructor responses to emotional motivational feedback in an online instructional environment. *The Turkish Online Journal of Educational Technology*, 16(1), (pp. 115-127).

- Saunders, M., & Philip, T. (2009). *Research Methods for Business Students 5th Edition*. Essex: Prentice Hall.
- Sharples, M. (2000). The design of personal mobile technologies for lifelong learning. *Computers and Education*, 34, (pp. 177-193).
- Sharples, M., Taylor, J., & Vavoula, G. (2005). Towards a theory of mobile learning. *Proceedings of MLearn*, (pp. 1-9).
- Sife, A. S., Lwoga, E. T., & Sanga, C. (2007). New Technologies for Teaching and Learning: Challenges for Higher Education Institutions in Developing Countries. *International Journal of Education and Development Using ICT*, 3(2), (pp. 57-67).
- Uden, L. (2007). Activity theory for designing mobile learning. *International Journal of Mobile Learning and Organization*, 1(1), (pp. 81-102).
- Virvou, M., & Alepis, E. (2005). Mobile educational features in authoring tools for personalized tutoring. *Computer and Education*, 44(1), (pp. 53-68).
- Xie, F., & Parsons, D. (2009). Chapter XVI - Assessing the Benefits of AJAX in Mobile Learning Systems Design. In H. Ryu, & D. Parsons, *Innovative Mobile Learning: Techniques and Technologies* (pp. 324-355). New York: Information Science Reference.

COMPARISON OF COMPUTER-AIDED INSTRUCTION AND INQUIRY-BASED TEACHING ON STUDENTS' ANXIETY TOWARDS SCIENCE

Prof. Dr. Hasan KAYA
Erciyes Üniversitesi, Eğitim Fakültesi,
hasankaya@erciyes.edu.tr

Arş. Gör. Dr. Aslı SAYLAN KIRMIZIGÜL
Erciyes Üniversitesi, Eğitim Fakültesi,
aslisaylan@erciyes.edu.tr

ABSTRACT

The present study was conducted to explore the effect of the use of computer-aided and inquiry-based teaching approaches on 7th grade students' anxiety towards science. The research was carried out in the spring semester of 2016-2017 academic year with the participation of 69 students from two classes of a middle school in Kayseri, Turkey. The pre-test and post-test quasi-experimental design without a control group was used. Within the scope of the study, "Reflection in the Mirrors and Absorption of the Light" unit was taught through computer-aided instruction in experimental-1 group, and inquiry-based teaching in experimental-2 group by developing suitable activities for each approach. In the study, data were collected through Science Anxiety Scale. The data were analyzed through paired-samples and independent samples t-tests. According to the results, although both teaching approaches decreased the level of science anxiety, it was seen that computer-aided instruction was more effective than inquiry-based learning. In addition, in terms of five sub-dimensions of the scale, there are significant differences between two groups' post-test scores in favour of experimental-2 group. Lastly, although girls were more anxious towards science based on the pre-test scores, no significant difference was found between post-test scores in terms of gender.

Keywords: Science anxiety, Computer-aided instruction, Inquiry-based teaching

INTRODUCTION

The middle school years, from grades 5 to 8, have a critical importance of learning science. Not only cognitive characteristics, but also affective features such as attitude and motivation affect the learning process. It is known that there is a close relationship between anxiety and learning. Anxiety is the feeling that occurs when situations threaten the ability to meet basic human needs such as competence, control, self-esteem (Fiske, Morling, & Stevens, 1996), whereas science anxiety is the total of experiences such as fail to solve a science problem or understand a scientific concept, failing a science exam (Mallow, 1986). It is known that a high level of science anxiety leads to a decrease in students' success and attitude towards science, and discourage them from entering science-related professions (Udo, Ramsey, & Mallow, 2004). For this reason, it is important to determine the students' anxiety levels and eliminate the reasons of anxiety in order to stimulate their interests, attitudes and achievement towards science.

In the literature, it was emphasized that physical phenomena such as light and mirrors are not sufficiently related to daily life and remain abstract. Consequently, these concepts cannot be understood clearly and may cause science anxiety (Colin & Viennot, 2001; Galili & Hazan, 2000). It is thought that the teaching methods or activities used by teachers have important effects on students' science anxiety (Jegede, 2007). Active student participation in science course will enhance students' self-confidence and lower their science anxiety levels (Kaya & Yıldırım, 2014), enable concretization of the scientific concepts and link them with daily life (Zacharia, 2003). At this point, computer-aided instruction (CAI), which plays an important role in the concretization of abstract concepts by addressing many sense organs, and inquiry-based teaching (IBT), which enable students to reach a solution by researching, questioning, hypothesizing and interpreting data (Perry & Richardson, 2001), come to the fore.

Computers play an important role in doing dangerous experiments, obtaining and processing data quickly, and providing immediate feedback. In several studies, it was concluded that computer reduces anxiety when it is used for educational purposes (Newhouse, 2002; Rutten, van Joolingen, & van der Veen, 2012). The main approach suggested by the Ministry of National Education in Turkey is guided inquiry. In guided inquiry, which was used in this study, the teacher does not give the information directly, instead of this, the students investigate to find concepts that have been determined by the teacher. For both teaching approaches, the students involved directly in the learning process almost all the time.

“Reflection in the Mirrors and Absorption of the Light” unit in Turkish science curriculum is well suited for teaching through both CAI and IBT approaches, and there is no accessible study comparing the effects of these two approaches on students’ anxiety levels. In the new science curriculum, it was stated that “Individuals’ characteristics such as interest, attitude, value and success that are subject to measurement and evaluation may change over time. For this reason, instead of measuring these properties at one time, measurements that take into account changes in the process should be used.” (MoNE, 2018). Within this context, the research question of the current study was determined as “Is there a statistically significant difference between science anxiety levels of the 7th grade students who taught “Reflection in the Mirrors and Absorption of the Light” unit through CAI and IBT?” Within the scope of this research question, the following sub-problems were searched:

1. Is there a statistically significant difference between pre-test and post-test scores of the students in the experimental groups?
2. Is there a statistically significant difference between the post-test scores of experimental groups in terms of entire scale, and in terms of sub-dimensions of the scale?
3. Is there a statistically significant difference between pre-test and post-test scores of the students with respect to the gender?

METHOD

Research Design

In the study, the pre-test and post-test quasi-experimental design without a control group was used. The instrument was conducted two times, before and after the five-weeks implementation.

Sample

The sample, which was selected through convenience sampling method, consisted of 69 (34 girls, 35 boys) 7th grade students from two classes of a middle school in Kayseri, Turkey in 2016-2017 spring semester. While one class including 34 students (17 girls, 17 boys) was assigned to be the experimental group-1 (E1), one class including 35 students (17 girls, 18 boys) was assigned to be the experimental group-2 (E2).

Instrument

Science Anxiety Scale developed by Uluçmar Sağır (2014) was used to determine the students’ anxiety levels towards science in the study. This 5-point Likert scale has 25 items and 5 sub-dimensions namely; (1) focusing on class, (2) lack of self-confidence, (3) studying and anxiety for the exams, (4) disturbance, (5) interest. These five factors include 7, 6, 6, 4 and 2 items, respectively. While higher total scores obtained from the scale indicate high science anxiety level, lower total scores indicate low science anxiety level.

Implementation

“Reflection in the Mirrors and Absorption of the Light” unit has six main subjects: Mirrors and their usage, image formation in mirrors, interaction of light with matter, white light contains all colors, reflection and absorption of light, the importance of solar energy. During 5 weeks (4 hours a week), unit was taught to E1 through CAI, and to E2 through IBT. Each course was evaluated by two observers using teacher and student evaluation rubrics which were prepared by the researchers. In E1 group, subjects were taught using smartboard, computers through digital images, videos, animations, simulations (i.e. Algodoo), interactive tests. In E2 group, students were challenged to solve the given problem through six main steps: curiosity, determination of the problem, hypothesizing, data collection, data analysis and evaluation, presentation, reinvestigation.

Data Analysis

SPSS (Statistical Package for the Social Sciences) Version 24.0 was used for analysis of the quantitative data. In order to examine the first sub-problem, paired-samples t-test was conducted; whereas to examine second and third sub-problems independent samples t-test were conducted.

RESULTS

Independent samples t-test results indicated that no significant difference was found between E1 ($M=58.00$, $SD=10.354$) and E2 group ($M=58.14$, $SD=8.218$) students’ pre-test mean scores [$t(67)=0.064$, $p>.05$]. Similarly, no significant difference was found between two groups’ pre-test mean scores in terms of the five sub-dimensions ($p>.05$). On the other hand, a significant difference was found between pre-test mean scores of girls ($M=60.41$, $SD=9.026$) and boys ($M=55.80$, $SD=9.042$) in favour of girls [$t(67)=2.120$, $p<.05$]. Eta-squared was found as 0.06, suggesting a small effect size (Cohen, 1988).

Paired-samples t-test results indicated that for E1 group, there was a significant difference between pre-test ($M=58.00$, $SD=10.354$) and post-test mean scores ($M=42.68$, $SD=9.524$) in favour of pre-test scores ($t(33)$

=6.006, $p<.05$). Eta-squared was found as 0.35, suggesting a large effect size (Cohen, 1988). Different from E1 group, for E2 group, there no significant difference was found between pre-test ($M=58.14$, $SD=8.218$) and post-test mean scores [$(M=57.80$, $SD=8.242$, $t(34) = 0.170$, $p>.05$]. In other words, CAI activities in E1 group significantly reduced the anxiety levels of the students, whereas IBT activities did not make any significant difference.

According to independent samples t-test results, there was a significant difference between E1 ($M=42.68$, $SD=9.524$) and E2 groups ($M=57.80$, $SD=8.242$) students' post-test scores in favour of E2 group [$t(67)=-7.060$, $p<.05$]. Eta-squared was found as 0.43, suggesting a large effect size (Cohen, 1988). In Figure 1, a bar graph regarding the pre and post-test total average scores of E1 and E2 was given.

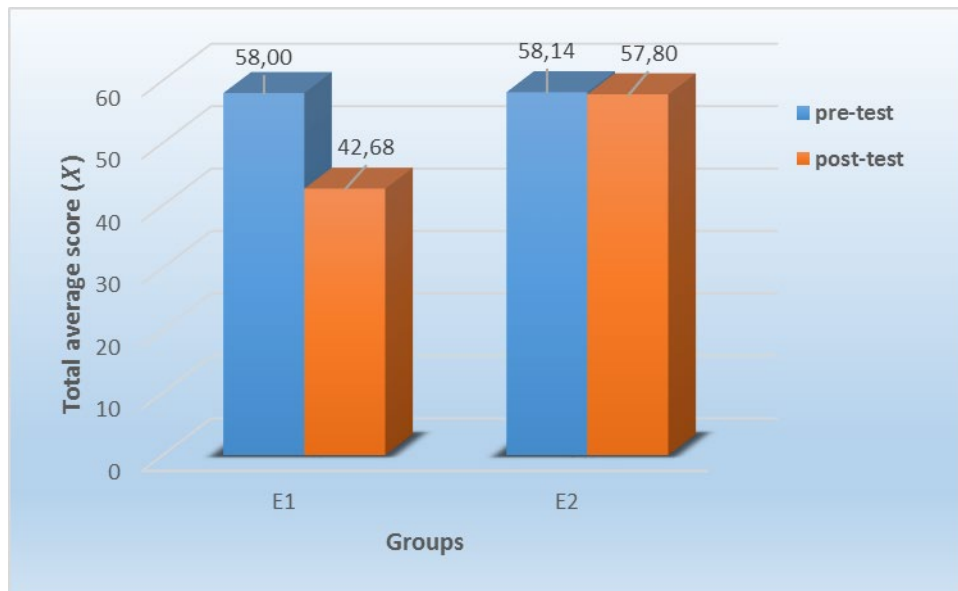


Figure 1. Bar graph regarding the comparison of the groups' pre and post-test total average scores

The results also indicated that regarding post-test scores, there is a significant difference between E1 and E2 groups for all the five sub-dimensions in favour of E2 ($p<.05$) (Table 1). For focusing on class, lack of self-confidence, studying and anxiety for the exams, disturbance and interest sub-dimensions, eta-squared values were found as 0.28, 0.32, 0.22, 0.23 and 0.06, respectively. While 0.06 indicates a small effect, other values indicate large effects (Cohen, 1988).

Table 1: Independent samples t-test results according to the average post-test total scores for Science Anxiety Scale sub-dimensions

Sub-dimensions	Group	N	Min.	Max.	M	SD	t-test		
							t	p	η^2
1. Focusing on class	E1	34	7	19	10.18	3.371	-5.061	0.000	0.28
	E2	35	7	21	14.17	3.185			
2. Lack of self-confidence	E1	34	6	19	10.94	3.550	-4.354	0.000	0.32
	E2	35	9	26	14.77	3.750			
3. Studying and anxiety for the exams	E1	34	6	18	10.00	3.153	-5.663	0.000	0.22
	E2	35	8	21	14.17	2.965			
4. Disturbance	E1	34	4	12	7.88	2.332	-4.416	0.000	0.23
	E2	35	6	15	10.26	2.133			
5. Interest	E1	34	2	7	3.68	1.273	-2.110	0.039	0.06
	E2	35	2	8	4.43	1.668			

In Figure 2, a line chart regarding the post-test mean scores of the groups for the five sub-dimensions was given. According to the chart, students in both groups had highest mean score in the fourth sub-dimension (disturbance), whereas they had lowest mean score in the first sub-dimension (focusing on class).

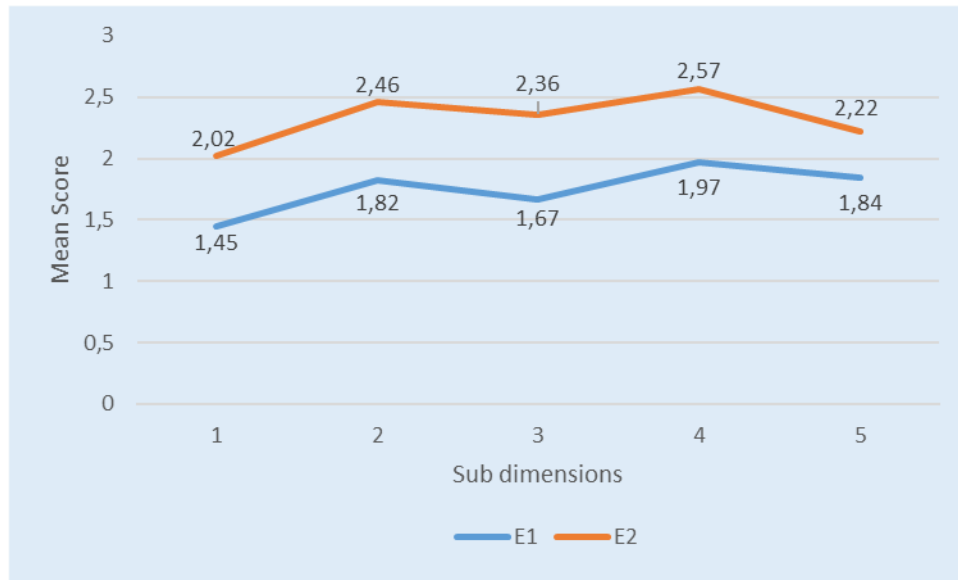


Figure 2. Line chart for the comparison of the groups' post-test mean scores regarding the five sub dimensions

In Figure 3 and 4, line charts regarding the pre and post-test mean scores of the groups for the five sub-dimensions were given. According to Figure 3, anxiety levels of the students in E1 decreased for all the five sub-dimensions. On the other hand, anxiety levels of the students in E2 decreased for three sub-dimensions, while the levels increased for the second and third sub-dimensions, namely lack of self-confidence and studying and anxiety for the exam.

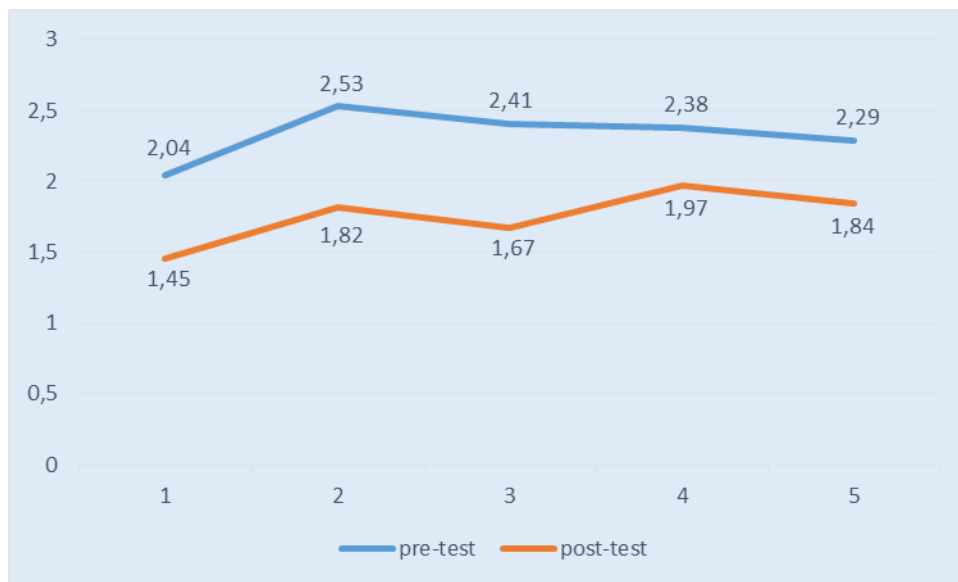


Figure 3. Line chart for the comparison of E1's pre and post-test mean scores regarding the five sub dimensions

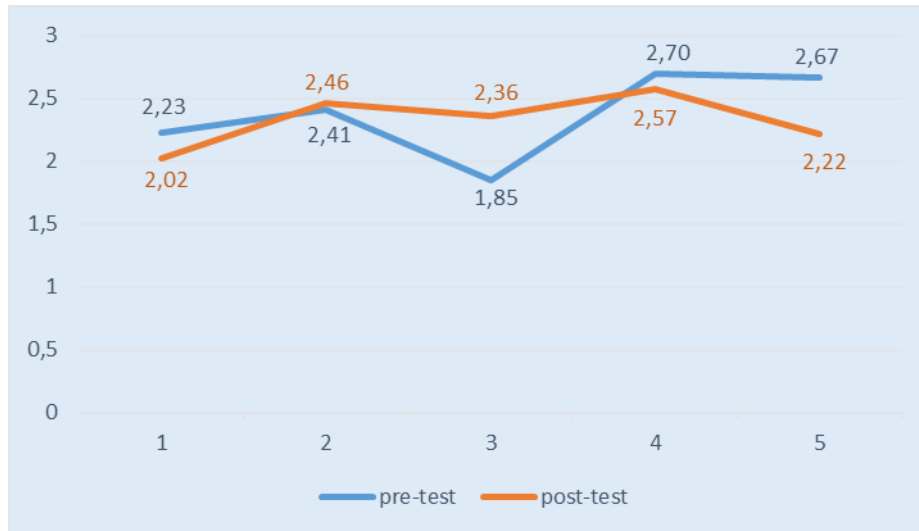


Figure 4. Line chart for the comparison of E2's pre and post-test mean scores regarding the five sub dimensions

Lastly, independent samples t-test results indicated that no significant difference was found between post-test mean scores of girls ($M=49.88$, $SD=11.083$) and boys ($M=50.80$, $SD=12.343$), [$t(67)=-0.325$, $p>.05$].

DISCUSSION OF FINDINGS AND IMPLICATIONS

The research findings revealed that both teaching approaches decreased students' anxiety towards science. However, CAI is more effective than IBT. IBT usually involves collaborative activities and this may be the reason for the anxiety levels of the students in E2 increased for lack of self-confidence, and studying and anxiety for the exams sub-dimensions. Unlike IBT, students usually work individually and feedback is given directly to the student in CAI. Therefore, students do not worry about being criticized by their teacher or friends when they make a mistake and this encourages students to participate in the course (Sevim, 2015), and their self-confidence increases while anxiety for the exams decreases. It is thought that the use of computer, which the students frequently use in daily life, in the learning process actively makes students feel more comfortable and decreases their anxiety levels (Newhouse, 2002; Rutten, van Joolingen, & van der Veen, 2012).

According to the findings, while the teaching approach used had a small effect on interest sub-dimension, it had major effects on focusing on class, lack of self-confidence, studying and anxiety for the exams and disturbance sub-dimensions. Accordingly, it is thought that more time should be spent to change the level of interest than other variables. In parallel with this finding, related literature indicated that changing the level of attitude or interest require more time (Neiderhauser, 1994; Sadi & Çakıroğlu, 2011).

In the study, it was found that gender has a small effect on pre-test mean scores. Accordingly, girls are more anxious towards science. On the contrary, no significant difference was found between post-test mean scores of girls and boys. In the related literature, no study was reached that examine the effects of CAI and IBT on middle school students' science anxiety levels in terms of gender. However, a limited number of studies examining the effect of gender on middle school students' science anxiety revealed that gender had no statistically significant effect on science anxiety (Akpınar, Yıldız, Tatar, & Ergin, 2009; Gömleksiz & Yüksel, 2003; Kurbanoğlu, 2014). Therefore, this finding regarding post-test scores is consistent with the literature.

Since this study is limited to the selected sample and teaching approaches, it is recommended that future studies be conducted to validate the findings by incorporating- a larger sample size, different grade groups, a longer period of time, and different teaching approaches.

ACKNOWLEDGEMENT

This research was financially supported by Erciyes University Scientific Research Project Unit, contract no: SDK-2017-7115. The authors are grateful to Erciyes University Scientific Research Project Unit.

REFERENCES

- Akpınar, E., Yıldız, E., Tatar, N., & Ergin, Ö. (2009). Students' attitudes toward science and technology: An investigation of gender, grade level, and academic achievement. *Procedia-Social and Behavioral Sciences*, 1(1), 2804-2808.

- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Mahwah, NJ: Lawrence Erlbaum.
- Colin, P. & Viennot, L. (2001). Using two models in optics: Students' difficulties and suggestions for teaching. *American Journal of Physics*, 69(1), 36-44.
- Fiske, S. T., Morling, B., & Stevens, L. E. (1996). Controlling self and others: A theory of anxiety, mental control, and social control. *Personality and Social Psychology Bulletin*, 22(2), 115-123.
- Galili, I. & Hazan, A. (2000). Learners' knowledge in optics: Interpretation, structure and analysis. *International Journal of Science Education*, 22(1), 57-88.
- Gömlüksiz, M. N. & Yüksel, Y. (2003). İlköğretim 4. ve 5. sınıf öğrencilerinin fen bilgisi dersine ilişkin kaygıları. *Doğu Anadolu Bölgesi Araştırmaları*, 1(3), 71-81.
- Jegede, S. A. (2007). Students' anxiety towards the learning of chemistry in some Nigerian secondary schools. *Educational Research and Review*, 2(7), 193-197.
- Kağıtçı, B. (2014). *Fen dersine yönelik kaygı ölçeği geliştirilmesi ve ortaokul öğrencilerinin fen dersi kaygı ile tutum puanlarının çeşitli değişkenlere göre incelenmesi* (Yayınlanmamış yüksek lisans tezi). Sakarya Üniversitesi Eğitim Bilimleri Enstitüsü.
- Kaya, E. & Yıldırım, A. (2014). Science anxiety among failing students. *İlköğretim Online*, 13(2), 518-525.
- Mallow, J. V. (1986). *Science anxiety: Fear of science and how to overcome it*. Florida: H & H Publishing Company.
- Neiderhauser, D. S. (1994). *The role of computer-assisted instruction in supporting fifth grade mathematics instruction cognitive and attitudinal outcomes* (Doctoral dissertation). University of Utah.
- Newhouse, P. (2002). *Literature review: The impact of ICT on learning and teaching*. Perth, Western Australia.
- Perry, V. R. & Richardson, C. P. (2001). The New Mexico tech master of science teaching program: An exemplary model of inquiry-based learning. *31st ASEE/IEEE Frontiers in Education Conference, Reno*.
- Rutten, N., van Joolingen, W. R., & van der Veen, J. T. (2012). The learning effects of computer simulations in science education. *Computers and Education*, 58(1), 136-153.
- Sadi, Ö. & Çakıroğlu, J. (2011). Effects of hands-on activity enriched instruction on students' achievement and attitudes towards science. *Journal of Baltic Science Education*, 10(2), 87-97.
- Sevim, O. (2015). *Kuramdan uygulamaya bilgisayar destekli öğretim materyali geliştirme (Türkçe eğitimi uygulama örnekleri)*. Ankara: Nobel Yayıncılık.
- Udo, M. K., Ramsey, G. P., & Mallow, J. V. (2004). Science anxiety and gender in students taking general education science courses. *Journal of Science Education and Technology*, 13(4), 435-446.
- Uluçınar Sağır, Ş. (2014). İlköğretim öğrencilerine yönelik fen kaygı ölçeği. *Buca Eğitim Fakültesi Dergisi*, 37, 1-20.
- Zacharia, Z. (2003). Beliefs, attitudes, and intentions of science teachers regarding the educational use of computer simulations and inquiry-based experiments in physics. *Journal of Research in Science Teaching*, 40(8), 792-823.

CONFIRMATORY FACTOR ANALYSIS AND RELIABILITY OF THE BARRIERS TO SEEKING PSYCHOLOGICAL HELP SCALE AMONG TURKISH ADULTS

Nursel Topkaya

Faculty of Education, Ondokuz Mayıs University
nursel.topkaya@omu.edu.tr

Ertuğrul Şahin

Faculty of Education, Amasya University
ertugrulsahin@amasya.edu.tr

ABSTRACT

The Barriers to Seeking Psychological Help Scale (BSPHS) was originally developed to measure factors that kept college students from seeking mental health assistance. However, the underutilization of mental health services among adults is also common, and understanding the factors that inhibit adults from seeking help for mental health issues is necessary. One important first step to increasing the use of mental health services among this population is to identify the barriers preventing them from using such services through valid and reliable scales. However, no validated and reliable scale currently exists in the Turkish language to measure the barriers to seeking psychological help among adults. Thus, the purpose of this cross-sectional study was to examine the underlying factor structure and reliability of the BSPHS among Turkish adults. A convenience sample of 208 (134 female, 74 male, $M=35.58$) Turkish adults completed the BSPHS and a demographic information form. Confirmatory factor analyses were performed to test the underlying factor structure of the BSPHS using three competing models. Reliability analysis was also used to examine mean inter-item correlation and item-total correlations, as well as to estimate Cronbach alpha reliability. The results of this study suggest that the BSPHS has a similar five-factor structure as suggested by Topkaya, Şahin, and Meydan (2017). Reliability analyses also suggested that all subscales of the BSPHS had adequate mean inter-item correlation, item-total correlations, as well as Cronbach alpha reliability. Therefore, the BSPHS can be used to measure the factors that inhibit Turkish adults from seeking psychological help. Future studies can examine convergent, divergent, and predictive validity and test-retest reliability of the BSPHS among Turkish adults.

Keywords: Barriers to seeking psychological help scale, confirmatory factor analysis, reliability, Turkish adults.

INTRODUCTION

Help-seeking is a term generally used to refer to the “behavior of actively seeking help from other people” (Rickwood, Deane, Wilson, & Ciarrochi, 2005). Help-seeking can be informal (e.g., trying to solve the problem on their own or seeking help from friends and family) and/or formal (e.g., seeking help from mental health professionals, college counseling centers, teachers) (Rickwood et al., 2005). Meta-analytic evidence suggests the efficacy of psychological therapies and counseling for treating mental disorders (Lipsey & Wilson, 1993; Shadish, Navarro, Matt, & Phillips, 2000). On the other hand, not seeking help or delaying help-seeking can result in negative health indicators, such as lower quality of life, substance abuse, engaging in risky sexual behavior, and premature death (Anderson & Lowen, 2010; Brindis et al., 2007; Brindis, Park, Ozer, & Irwin, 2002; Laski, 2015). Empirical evidence also suggests that distressed people receiving empirically supported therapies commonly experience increases in well-being, happiness, and quality of life and decreases in perceived life stress and negative mental health outcomes (Spring, 2007; Wampold & Imel, 2015). Although the benefits of help-seeking have been well documented in the literature, as well as the high prevalence of mental health problems reported among the general population in Turkey (Erol, Kılıç, Ulusoy, Keçeci, & Şimşek, 1998), the rates of formal help-seeking for psychological problems are rather low among Turkish adults (Topkaya, 2015a, 2015b). Therefore, understanding the factors that inhibit Turkish adults from seek mental health help is necessary.

A possible initial step to increase the use of mental health services among this population is to identify barriers inhibiting them from using such services through validated and reliable scales. However, there is currently no validated and reliable measure in the Turkish language that can be used to measure the barriers to seeking psychological help among adults. The Barriers to Seeking Psychological Help Scale (BSPHS) was originally developed to measure the factors that keep college students from seeking mental health assistance and may also be used to screen barriers to seeking psychological help among adults. However, since its development, its factor structure has rarely been examined in different populations, such as Turkish adults. This is concerning because the barriers to seeking psychological help may be different and the proposed factor structure may not be the same for Turkish adults. Consequently, using the BSPHS subscale scores for Turkish adults may lead to erroneous

conclusions without having observed consistent relationships between the BSPHS subscale items and related latent variables (Horn & McArdle, 1992).

The BSPHS consists of 17 items and five subscales, namely fear of being stigmatized by society, trust in the mental health professional, difficulties in self-disclosure, perceived devaluation, and lack of knowledge. The fear of being stigmatized by society subscale measures irrational beliefs clients hold related to seeking psychological help in society. Trust in the mental health professional measures clients' concerns related to the mental health professional. Difficulties in self-disclosure measures clients' perceived difficulties disclosing their problems to a mental health professional. The perceived devaluation subscale measures self-derogatory beliefs related to seeking psychological help. Lastly, the lack of knowledge subscale measures lack of information about seeking psychological help. In the initial development of the scale across five studies, researchers examined the validity and reliability of the BSPHS and reported evidence for construct, convergent, and discriminant validity, as well as test-retest reliability and internal consistency.

Specifically, the BSPHS demonstrated a five correlated factor structure using exploratory factor analysis (EFA) in a college student sample. The fear of being stigmatized subscale was composed of four items and explained 34.24% of the total variance. This subscale's factor loadings, based on EFA, ranged from .74 to .94. The trust in the mental health professional subscale also consisted of four items and explained 10.30% of the total variance. Its factor loadings ranged from .31 to .81. Difficulties in self-disclosure was composed of three items and explained 8.33% of the total variance. The factor loadings ranged from .64 to .87. The perceived devaluation subscale also consisted of three items and explained 7.08% of the total variance, with factor loadings ranging from .40 to .86. Lastly, the lack of knowledge subscale consisted of three items and explained 6.71% of the total variance. Its factor loadings ranged from .33 to .95. Confirmatory factor analysis (CFA) using the robust maximum likelihood estimate also supported a five correlated factor structure in a cross-validation sample. Cronbach alpha internal consistency reliability estimates for the BSPHS subscales across two studies were also good, ranging from .58 (lack of knowledge) to .91 (fear of being stigmatized by society). The three-week stability coefficient or test-retest reliability was also good, ranging from .56 (perceived devaluation) to .75 (for difficulties in self-disclosure) among the subscales. Although researchers found evidence for validity and reliability of the BSPHS, evidence regarding the factor structure and reliability among Turkish adults is scarce. Thus, the purpose of this cross-sectional study was to examine the factor structure and reliability of the BSPHS among Turkish adults.

METHOD

Participants

A cross-sectional research design was used in this study. Participants were 208 Turkish adults living in the Central Black Sea Region of Turkey. They were selected using convenience sampling (Cohen, Manion, & Morrison, 2018). Specifically, the researchers included their relatives, acquaintances, and friends in the study sample. Then, they asked these people to help them find adults from Samsun city who were able to complete the survey. There were 134 women (64.4%) and 74 men (35.6%) who participated in the study. The age of the participants ranged from 18 to 80 years old, and the mean age was 35.58 years (*SD*: 13.15). Five participants did not report their age.

Measures

Demographics. A personal information form was used to collect information about the participants' sex and age.

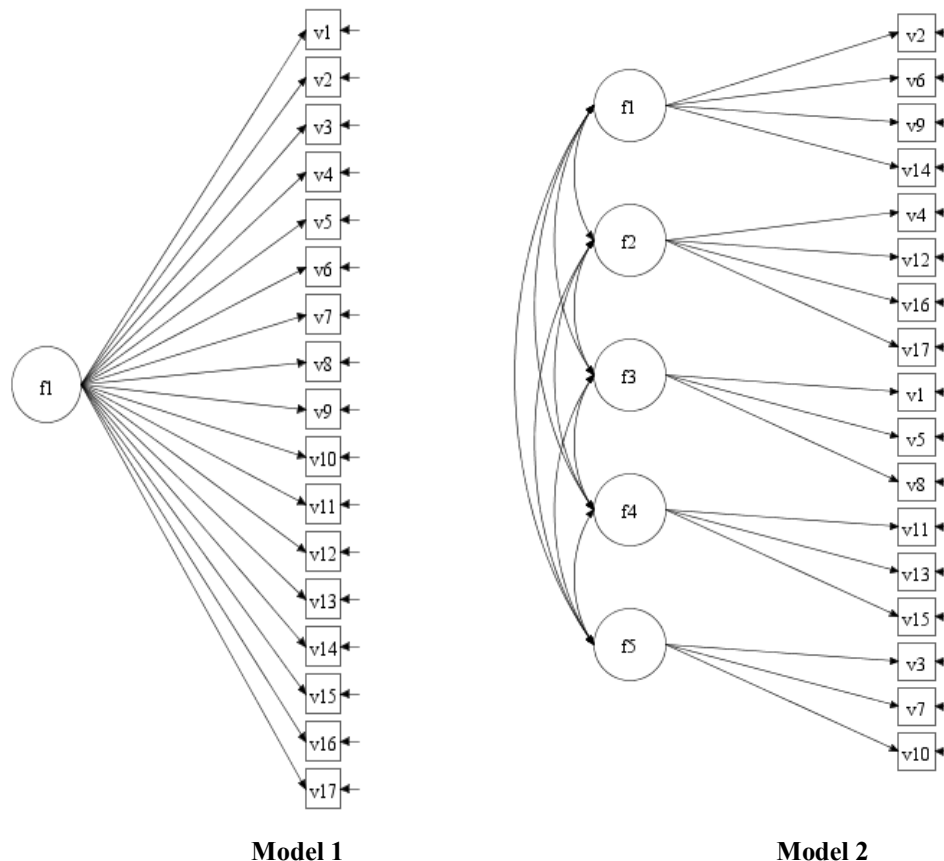
BSPHS: The barriers to seeking psychological help among Turkish adults was measured by the BSPHS (Topkaya et al., 2017). More detailed information about the psychometric characteristics of the BSPHS were given in the introduction. Participants indicate their degree of agreement or disagreement with each item on a five-point Likert-type scale ranging from strongly disagree (1) to strongly agree (5). Scores can range from 4 to 20 for the fear of being stigmatized by society and trust in mental health professional subscales and from 3 to 15 for difficulties in self-disclosure, perceived devaluation, and lack of knowledge subscales. Higher scores reflect higher levels of perceived barriers in each dimension.

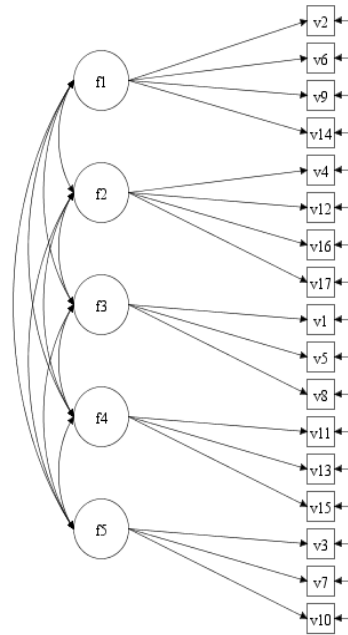
Procedure

Data was collected between January and March 2019. Participants were informed about the study's purpose and ethical considerations. Specifically, the researchers told them that participation in the study was voluntary, the answers would remain anonymous, and the participants could withdraw from the study without any consequences. Written informed consent was also obtained from all participants prior to completing the questionnaires. All adults voluntarily participated in the study and completed the questionnaires in approximately 10 minutes.

Statistical Analysis

All statistical analyses were performed using SPSS 23 and Mplus 7.0 (Muthén & Muthén, 1998–2015). All CFA models were estimated using the mean and variance adjusted maximum likelihood estimator (MLMV) taking into account of the use of ordered-categorical variables with five response categories (e.g., Likert-type scales) in this study (Finney & DiStefano, 2013; Rhemtulla, Brosseau-Liard, & Savalei, 2012). The MLMV produces parameter estimates and standard errors, as well as mean and variance adjusted chi-square statistics that are robust to non-normality (Muthén & Muthén, 1998–2015). In a recent extensive simulation study, Maydeu-Olivares (2017) found that the MLMV estimator is the optimal choice among different ML estimators across different normal and non-normal distributions with accurate Type I and standard errors. Three competing models were tested in this study: a single-factor model (Model 1), a correlated five-factor model (Model 2), and a correlated five-factor model that permits residual variances to be correlated based on substantive values or previous studies (Model 3). A schematic presentation of all competing models tested in the present study can be found in Figure 1. Assessment of model fit was based on multiple goodness of fit statistics: the adjusted Chi-Square (χ^2/df), Root Mean Square Error of Approximation (RMSEA) with its 90% confidence interval and significance level, Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and standardized root mean square residual (SRMR). Although no absolute standards exist for cut-off values for goodness of fit indices in CFA, values lower than 5 but higher than 3 typically indicate adequate model fit for χ^2/df , and values smaller than 3 indicate excellent fit. Values smaller than .08 or .06 for the RMSEA indicate adequate and excellent model fit, respectively. Values greater than .90 and .95 for the CFI and TLI indicate adequate and excellent model fit, respectively. Lastly, a SRMR value close to or less than .08 indicates a good fit to the data (Byrne, 2012; Gana & Broc, 2019; Keith, 2019; Wang & Wang, 2013). Reliability analyses were performed using mean inter-item correlation, item-total correlation, and Cronbach alpha internal consistency coefficient. The data that support the findings of this study are available in Open Science Framework (osf.io/hnfv4).





Model 3

Note: v=item, F1=Fear of being stigmatized by society, F2=Trust in the mental health professional, F3=Difficulties in self-disclosure, F4=Perceived devaluation, F5=Lack of knowledge in Model 2 and Model 3.

RESULTS

A series of CFAs were conducted to examine competing models among Turkish adults. Goodness of fit indices for the competing models are shown in Table 1. As seen in Table 1, the goodness of fit values for the single-factor model were poor (Model 1). The five correlated factor model, as suggested by Topkaya et al. (2017) for undergraduate students, had an acceptable fit to data (Model 2). However, inspection of local fit via normalized residual covariances and modification index for Model 2 suggested releasing error covariances between item 4 and item 12. Both items are related to worries about the mental health professional and from the trust of the mental health professional subscale.

Table 1: Goodness of fit indices for competing models

	χ^2	df	χ^2/df	CFI	TLI	RMSEA	p	RMSEA 90% Confidence Interval	SRMR
Model 1	287.425	119	2.415	.765	.731	.082	.001*	.070-.095	.078
Model 2	164.081	109	1.505	.923	.904	.049	.514	.033-.064	.062
Model 3	149.281	108	1.382	.942	.927	.043	.755	.024-.059	.056

Note: $p < .001$.

Thus, Model 3 estimated adding item 4 and item 12 to correlated errors. As seen in Table 1, Model 3 was the best fitting model to the data. Most goodness of fit indices were excellent. Table 2 shows standardized item factor loadings, item standard errors, z-values, latent factor correlations, and squared multiple correlation of items (R^2). The estimated R^2 values give information about how much variance of each observed BSPHS item was explained by the factor that item is loaded on and also equivalent to the squared standardized item factor loading for each item. All factor loadings and latent factor correlations were large and statistically significant at least at $p < .001$. The estimated R^2 values also ranged from medium to large effect sizes.

Table 2: Results of confirmatory factor analysis

Item No/Item	λ	S.E	z	R^2
Fear of being stigmatized by society (F1)				
2. I worry about being stigmatized as “problematic” and/or “crazy” if I seek psychological help.	.630	.060	10.501	.397
6. I worry about what other people would think about me if I seek psychological help.	.830	.033	25.120	.688
9. I worry about whether my friends would mock me if I seek psychological help.	.796	.036	21.932	.633
14. I don’t want to seek psychological help as it’s not accepted as “normal/natural” in the culture in which I grew up.	.740	.038	19.409	.548
Trust in the mental health professional (F2)				
4. I don’t trust professionals to keep my issues confidential.	.647	.056	11.454	.418
12. I worry that the professional wouldn’t understand me.	.767	.041	18.596	.589
16. I worry about whether the professional would listen to me adequately.	.689	.039	17.646	.474
17. I worry that the professional would be insensitive to my problems, as s/he constantly meets people with similar problems.	.632	.053	11.910	.399
Difficulties in self-disclosure (F3)				
1. I have difficulty in sharing my problems with a stranger even though he is a professional.	.664	.058	11.460	.441
5. I feel ashamed to tell my problems to the professional giving psychological help.	.812	.043	18.989	.659
8. I refuse to give information about my private problems (sex, violence, etc.), even to a professional.	.738	.045	16.589	.545
Perceived devaluation (F4)				
11. I would feel weak if I told my problems to a professional.	.770	.049	15.713	.593
13. My self-confidence might decrease if I seek psychological help.	.875	.035	25.111	.766
15. I worry that if I take psychological help once, then I would need it whenever I have a problem.	.532	.056	9.497	.283
Lack of knowledge (F5)				
3. I don’t want to spend time seeking psychological help as it would take too long.	.464	.076	6.144	.216
7. I don’t know how to contact professionals who provide psychological help.	.535	.069	7.717	.287
10. I don’t want to seek psychological help as places that provide such services are far away.	.660	.067	9.848	.436
Latent Factor Correlations	F1	F2	F3	F4
F1				
F2	.610			
F3	.636	.657		
F4	.692	.622	.577	
F5	.653	.635	.572	.606

Note: λ =Item factor loading. All factor loadings and latent factor correlations were statistically significant at least at $p<0.001$.

The reliability of the BSPHS was analyzed by means of mean inter-item correlation, item-total correlations, and Cronbach alpha internal consistency coefficient. The results of the reliability analyses are shown in Table 3.

Table 2: Results of BSPHS Reliability Analyses

	<i>r</i>
Fear of being stigmatized by society	
BSPHS2	.562
BSPHS6	.746
BSPHS9	.697
BSPHS14	.641
Mean inter-item correlation	.553
Cronbach alpha (α)	.831
95% CI Cronbach alpha	.790–.866
Trust in the mental health professional	
BSPHS4	.457
BSPHS12	.483
BSPHS16	.663
BSPHS17	.619
Mean inter-item correlation	.438
Cronbach alpha (α)	.756
95% CI Cronbach alpha	.697–.806
Difficulties in self-disclosure	
BSPHS1	.579
BSPHS5	.664
BSPHS8	.609
Mean inter-item correlation	.543
Cronbach alpha (α)	.778
95% CI Cronbach alpha	.720–.825
Perceived devaluation	
BSPHS11	.591
BSPHS13	.697
BSPHS15	.453
Mean inter-item correlation	.504
Cronbach alpha (α)	.747
95% CI Cronbach alpha	.681–.801
Lack of knowledge	
BSPHS3	.261
BSPHS7	.299
BSPHS10	.497
Mean inter-item correlation	.283
Cronbach alpha (α)	.532
95% CI Cronbach alpha	.410–.632

Note: *r* = corrected item-total correlation, CI: Confidence interval.

As seen in Table 3, all subscales had an adequate mean inter-item correlation that ranged from .283 (lack of knowledge) to .553 (fear of being stigmatized by society). The item-total correlations of the subscales were also adequate, with levels ranging from .562 to .746 in fear of being stigmatized by society, .457 to .663 in trust in the mental health professional, .579 to .664 in difficulties in self-disclosure, .453 to .697 in perceived devaluation, and .261 to .497 in the lack of knowledge subscale. Cronbach alpha reliability estimates also ranged from .532 (lack of knowledge) to .831 (fear of being stigmatized by society).

DISCUSSION

As underutilization of mental health services among adults is common, it is important to understand the factors that inhibit adults from seeking psychological help. However, there is currently no available validated and reliable measure in the Turkish language that can be used to measure the barriers to seeking psychological help among adults. Thus, this study examined the underlying factor structure of BSPHS items and its reliability among Turkish adults. Specifically, this study tested one general factor model, a five correlated factor model, and a five correlated factor model with correlated errors in Turkish adults using confirmatory factor analyses. The results of the

confirmatory factor analyses found no support for the one-factor model, indicating that a common underlying factor was not adequate to account for the pattern of covariance across BSPHS items. There was adequate support for the correlated five-factor model and almost excellent support for the correlated five-factor model with correlated errors terms. The study findings are in line with Topkaya et al.'s (2017) study among undergraduate students showing that the five correlated factor model best fit the BSPHS. These findings suggest that the BSPHS may be used for assessing barriers related to seeking help for mental health issues among Turkish adults

The results of this study also suggest that the subscales of the BSPHS had a mean inter-item correlation ranging from .283 (lack of knowledge) to .553 (fear of being stigmatized by society). According to Clark and Watson (1995), average inter-item correlation is to be in the range of .15 to .50, but it could even be higher if the construct of interest is narrowly defined. All subscales of the BSPHS had a mean inter-item correlation within or above this criterion, suggesting that the subscales contain items that are particularly intercorrelated and measure different aspects of the construct of interest. The item-total correlation values for each item were also above .20 in each subscale, indicating good discrimination, such that higher scores on the item are associated with higher scale scores in each subscale and each item is a good indicator of the construct of interest (Meyers, Gamst, & Guarino, 2013). All subscales also had a Cronbach alpha coefficient above .70, except for the lack of knowledge subscale. However, the internal consistency reliability estimate of the lack of knowledge subscale was similar to that in Topkaya et al. (2017). According to DeVellis (2017), measurement tools with a Cronbach alpha reliability coefficient of .70 or above can be used for screening and research purposes. Thus, the BSPHS may also be used for screening and research purposes, with the notable exception of the lack of knowledge subscale. However, considering that the Cronbach alpha reliability coefficient is related to the number of items in a scale and mean inter-item correlation (DeVellis, 2017), the relatively low reliability of the lack of knowledge subscale may be related to the limited number of items in the subscale as the mean inter-item correlation was adequate (Clark & Watson, 1995). Overall, the findings of this study suggest that the BSPHS is a valid and reliable scale that can be used to measure factors that inhibit Turkish adults from seeking mental health assistance.

Finally, this study has some limitations. First, only a limited number of Turkish adults from a specific region of Turkey were used to test the underlying factor structure of the BSPHS. Thus, the external validity of this study is low. Future studies should examine the factor structure of the BSPHS using a more representative sample of Turkish adults. Second, this study only examined the construct validity of the BSPHS. Future studies should also look at the convergent, divergent, and predictive validity of the BSPHS among Turkish adults. Lastly, the reliability analyses of the BSPHS were limited to item analyses and Cronbach alpha internal consistency analyses. Future studies should also examine short-term and long-term test-retest reliability of the BSPHS.

REFERENCES

- Anderson, J. E., & Lowen, C. A. (2010). Connecting youth with health services: Systematic review. *Canadian Family Physician*, 56(8), 778–784.
- Brindis, C. D., Hair, E. C., Cochran, S., Cleaveland, K., Valderrama, L. T., & Park, M. J. (2007). Increasing access to program information: A strategy for improving adolescent health. *Maternal and Child Health Journal*, 11(1), 27–35. <https://doi.org/10.1007/s10995-006-0143-6>
- Brindis, C. D., Park, M. J., Ozer, E. M., & Irwin, C. E. (2002). Adolescents' access to health services and clinical preventive health care: Crossing the great divide. *Pediatric Annals*, 31(9), 575–581. <https://doi.org/10.3928/0090-4481-20020901-10>
- Byrne, B. M. (2012). *Structural equation modeling with Mplus: Basic concepts, applications, and programming*. New York: Routledge.
- Clark, L., & Watson, D. (1995). Constructing validity: Basic issues in objective scale development. *Psychological Assessment*, 7(3), 309–319.
- Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education* (8th ed.). New York: Routledge.
- DeVellis, R. F. (2017). *Scale development: Theory and applications* (4th ed.). Los Angeles: SAGE.
- Erol, N., Kılıç, C., Ulusoy, M., Keçeci, M., & Şimşek, Z. (1998). *Türkiye Ruh Sağlığı Profili Raporu* [Turkey Mental Health Profile Report]. Ankara: T.C. Sağlık Bakanlığı Temel Sağlık Hizmetleri Genel Müdürlüğü.
- Finney, S. J., & DiStefano, C. (2013). Non-normal and categorical data in structural equation modeling. In *Structural equation modeling: A second course* (2nd ed., pp. 439–492). Greenwich, CT: Information Age Publishing.
- Gana, K., & Broc, G. (2019). *Structural equation modeling with lavaan*. Hoboken, NJ: John Wiley & Sons Inc.
- Horn, J. L., & McArdle, J. J. (1992). A practical and theoretical guide to measurement invariance in aging research. *Experimental Aging Research*, 18(3), 117–144. <https://doi.org/10.1080/03610739208253916>
- Keith, T. Z. (2019). *Multiple regression and beyond: An introduction to multiple regression and structural equation modeling* (3rd ed.). New York: Routledge.

- Laski, L. (2015). Realising the health and wellbeing of adolescents. *BMJ*, 351, h4119. <https://doi.org/10.1136/bmj.h4119>
- Lipsey, M., & Wilson, D. (1993). The efficacy of psychological, educational, and behavioral treatment: Confirmation from meta-analysis. *American Psychologist*, 48(12), 1181–1209. <https://doi.org/10.1037/0003-066X.48.12.1181>
- Maydeu-Olivares, A. (2017). Maximum likelihood estimation of structural equation models for continuous data: Standard errors and goodness of fit. *Structural Equation Modeling: A Multidisciplinary Journal*, 24(3), 383–394. <https://doi.org/10.1080/10705511.2016.1269606>
- Meyers, L. S., Gamst, G. C., & Guarino, A. J. (2013). *Performing data analysis using IBM SPSS*. Hoboken, NJ: Wiley.
- Muthén, L. K., & Muthén, B. O. (1998–2015). *Mplus user's guide* (7th ed.). Los Angeles, CA: Muthén & Muthén.
- Rhemtulla, M., Brosseau-Liard, P. É., & Savalei, V. (2012). When can categorical variables be treated as continuous? A comparison of robust continuous and categorical SEM estimation methods under suboptimal conditions. *Psychological Methods*, 17(3), 354–373. <https://doi.org/10.1037/a0029315>
- Rickwood, D., Deane, F. P., Wilson, C. J., & Ciarrochi, J. (2005). Young people's help-seeking for mental health problems. *Australian E-Journal for the Advancement of Mental Health*, 4(3), 218–251. <https://doi.org/10.5172/jamh.4.3.218>
- Shadish, W. R., Navarro, A. M., Matt, G. E., & Phillips, G. (2000). The effects of psychological therapies under clinically representative conditions: A meta-analysis. *Psychological Bulletin*, 126(4), 512–529. <https://doi.org/10.1037/0033-2909.126.4.512>
- Spring, B. (2007). Evidence-based practice in clinical psychology: What it is, why it matters; what you need to know. *Journal of Clinical Psychology*, 63(7), 611–631. <https://doi.org/10.1002/jclp.20373>
- Topkaya, N. (2015a). Factors influencing psychological help seeking in adults: A qualitative study. *Educational Sciences: Theory and Practice*, 15(1), 21–31. <https://doi.org/10.12738/estp.2015.1.2094>
- Topkaya, N. (2015b). Willingness to seek psychological help among Turkish adults. *Revista de Cercetare Si Interventie Sociala*, 48, 149–163.
- Topkaya, N., Şahin, E., & Meydan, B. (2017). The development, validity, and reliability of the Barriers to Seeking Psychological Help Scale for college students. *International Journal of Higher Education*, 6(1), 48–62. <https://doi.org/10.5430/ijhe.v6n1p48>
- Wampold, B. E., & Imel, Z. E. (2015). *The great psychotherapy debate: The evidence for what makes psychotherapy work* (2nd ed.). New York, NY: Routledge.
- Wang, J., & Wang, X. (2013). *Structural equation modeling: Applications using Mplus*. Hoboken, NJ: Wiley.

CYBERBULLYING AND NEW TECHNOLOGIES AN EDUCATIONAL PROJECT FOR EMOTIONAL ORIENTATION AND CYBERBULLYING PREVENTION

Alessio Catiglione
Università degli Studi di Palermo
alessioxcastiglione@gmail.com
Giorgia Coppola
Università degli Studi di Palermo
giorgiacoppola@email.it
Giacchino Lavanco
Università degli Studi di Palermo
comunicazioni@giacchinolavanco.it

ABSTRACT

Cyberbullying as a new form of bullying demands new coping strategies. As a result of new technology there has been a constant growth in the spread of harmful online behavior. The instant project “Cyberbullying and new technology”, which started from cooperation between school and university, was planned for pupils in the third year at “Leonardo Da Vinci” secondary school in Palermo. The project was started and carried out within the school setting with a focus on students, parents and teachers.

Objectives: the main aim was to identify useful actions and precautions to help face cyberbullying (on smartphone and mobile applications) using technology to create a campaign of peer to peer sensitization.

Methods: the methods applied in the classroom have been drawn from community pedagogy and psychology, as well as through direct teaching that allowed students to be participant and protagonist in this process of providing information and training in prevention. In the first phase the use of role-play, groupe parole and focus groups facilitated a rethinking of new technology, which was then used in the second phase when the pupils independently produced multimedia material aimed at dealing cyberbullying.

Results: the brief project permitted the creation of significant educational products for the school (a pictorial/graphic exhibition by the pupils, sensitizing advertisements and videos shared among students and teachers) and the publication of an information brochure developed from cooperation between the school, the Sicilian Regional Government, the Centro Siciliano Sturzo and the department of Community Psychology at the University of Palermo.

Conclusion: “Cyberbullying and new technology” is aimed at the caring professions. It is justified, in theory and practice by elements of community pedagogy and psychology for didactic experimentation with new strategies and methods, to counter the risks associated with the complicated problem of cyberbullying. The description of this field experience is aimed at prevention and comparison of this phenomenon.

INTRODUCTION

Around the seventies we witness the birth of a new community desire, new ways of being together and communicating, almost as if this were the antidote to rampant individualism. This new need for belonging emerges from modernity and brings with it a profound symbolic burden made up of needs, possibilities, research for new stimuli, links, opportunities to feel that they belong to a community ideal.

In recent years the term community sets aside its own geographical meaning to focus on its relational value. In these terms it allows us to experience belonging, sharing values and interests, in a plot in which individual and collective become two sides of the same coin.

The new social dynamics emerging in the 1960s, charged with the need for sharing and participation, and the development of new means of communication contribute to the creation of what scholars define as virtual communities. This term refers to that very particular form of community that overcomes any kind of border to favor the development of a non-physical place where users share common interests and needs.

In recent decades, virtual communities, in addition to representing themselves as a resource, have gradually become a limit to relationships, a place full of dangers that nullifies the authenticity of the person.

The authors William Strauss and Neil Howe, as a result of the studies concerning the digital generations, have coined the term Generation Z.

Given the profound changes in the communication and fruition of young people to the new technological means, the authors indicate the subjects Generation Z born after one thousand nine hundred and ninety-five, characterized by a mind that is not oriented to symbolism and lacking emotional-relational skills that interfere with the development of the dimension of autonomy, intimacy and privacy. Today the risks of the new technological tools seem to multiply, due to the lack of awareness in the use of these means by numerous young people. The speed of

the technological evolution and the greater fruition by the different users, makes the possibility of identifying clear boundaries, functional to discern acceptable behaviors on the net from the problematic ones.

One of the most widespread phenomena among digitized young people is cyberbullying, a variant of bullying traditionally understood, a complex phenomenon that manifests itself in articulated ways. The most obvious difficulties are: the possibility for the aggressor to remain anonymous; the number of spectators; absence of supervision by adults; the separation between gesture and attributed meaning. This phenomenon implies the need to promote digital and affective-relational education through educational activities capable of preventing the numerous and complex dangers of the network, so as to foster a healthy psychosocial development of the person inserted - or trapped - in a network of relationships to be connected to a protected line of thought.

The speed of technological evolution and the increasing use by subjects with different characteristics makes the possibility of identifying clear boundaries, functional to discern acceptable behaviors on the net from problematic ones, highly complex.

One of the most widespread phenomena among digital natives is Cyberbullying, a variant of bullying traditionally understood. By this term we mean "an aggressive and intentional act, conducted by an individual or groups of individuals, using various forms of electronic contact, repeated over time against a victim who has difficulty defending himself" (Smith et al., 2008).

Cyberbullying represents a complex phenomenon that manifests itself in articulated ways. The most obvious difficulties are: the possibility for the aggressor to remain anonymous; the number of spectators; absence of supervision by adults; the separation between gesture and attributed meaning.

From the Istat results of 2014, it emerges that in Italy more than 22.2% of adolescents have been victims of some arrogance, through the use of new technologies. Among these the highest percentage is characterized by 11-13 year-old girls.

This phenomenon implies the need to promote digital and affective-relational education, through educational activities capable of preventing the dangers of the network.

It is fundamental to educate to respect reciprocity, social norms, intentionality of us, cooperation.

The project "Cyberbullying and new technologies", born from a collaboration between the University of Palermo and the Leonardo Da Vinci school, was created and activated in order to prevent this phenomenon.

The project was implemented in 11 classes in the last year of lower secondary school, involving parents and teachers across the board.

TARGETS

- address the participants to a conscious and critical use of social media, learning to think and take advantage of the media language in an autonomous and responsible way;
- raise awareness among young people on the issue of cyber bullying and the risks it includes, promoting the use of tools to combat it;
- encourage the promotion of dialogue and understanding on the issue of cyber bullying, directing emotions, promoting social skills, manifesting and socializing the emotions of cyber bullying actors.

METHODS

The "Cyberbullying and new technologies" intervention was designed for pupils and pupils of third grades of "Leonardo Da Vinci" secondary school in Palermo. Designed, activated and implemented within the school setting with a trifocal look aimed at students, parents and teachers. In addressing the problem of cyberbullying at school, a key element was to convey the importance of partnership between teachers, pupils and universities.

One of the main objectives was to identify the actions useful to deal with the aggressive acts coming from cyberspace in real life, using the weapons of cyberbullying (smartphones and mobile applications) as new technologies useful for producing peer to peer awareness campaigns.

The methods applied in the classroom were derived from pedagogy and community psychology through active teaching which allowed the students to be participants and active protagonists of this process of training, information and prevention. The two introductory activities chosen to conduct the beginning of the classroom meetings with the students were the ice-breaking: "game of the ball", functional to present, without benches and in a circle, the metaphor of the virtual network that can trap, and a "brainstorming of emotions" related to cyberbullying actors. In this first phase the use of reflexive methods, role-playing games, word groups and focus groups facilitated the previous re-signification of the new technologies used in the second phase of the intervention, when the participants involved produced autonomously multimedia materials aimed at contrasting the cyberbullying realizing audio, video and graphic-pictorial products with their smartphones. Starting from the way in which digital social interactions develop today, schools should propose a conscious and responsible educational action in synergy, which aims to provide students (and their parents) with information and tools useful for recognizing their potential and limits of the Web, with particular attention to social networks, in order to promote the assumption of behaviors based on the respect of the "rules" and of the juridical norms recently implemented concerning the cyberbullying phenomenon. Knowledge of the policy will enable young people to recognize the

seriousness of acts and facts relating to cyberbullying by promoting the development of pro-social behavior that can help them live and develop healthy relationships inside and outside the school walls. It is therefore important to promote a psychological climate in which all students feel understood and in which complaints of cyberbullying are addressed through educational and communicative tools, not repressive ones.

INSTRUMENTS AND ACTIVITIES

- ice-breaking: through the "game of the ball" we gave students the chance to metaphorically reproduce a virtual network introduced with the help of stimulating questions on the cyber bullying phenomenon. Through this activity we have stimulated the creation of a positive and relaxed environment;
- brainstorming of emotions: a tool used to bring out knowledge and ideas aimed at creating a dialogue on cyber bullying and associated actors. This tool allowed the students to become authors and protagonists of their training;
- creation of audio, video and graph-pictorial products through the use of pedagogically inspired methodologies;
- use of smartphones as connectors between the project and the intervention, to produce multimedia content to be broadcasted chat to chat.

RESULTS

Following the realization of the workshop activities, significant cultural products have emerged for the Institute: drawings, audio and video spots created by the beneficiaries of the intervention.

In the perspective of adolescent prevention and training, learning is not reduced to a purely cognitive activity of transmission and reception of information, but involves the recovery of individual and collective experience.

The laboratories are, therefore, stimulating spaces capable of developing the capacity to question oneself, to tolerate doubt, frustration and failure, to contain anxieties and defensive dynamics and, therefore, to be able to face the new and the change.

To promote the dissemination of actions to prevent and combat cyberbullying in the territory, the preparation of a graphic-pictorial exhibition within the school produced by the students involved in the project "Cyberbullying and new technologies".

It is essential to inform, raise awareness and educate public opinion, starting from the young generations so that they are an instrument for promoting a new educational age.

The collaboration between the school, the Sicilian Region, the Sicilian Sturzo Center and the University of Palermo - Chair of Community Psychology, therefore, supported the final realization of an awareness video, taken from previous multimedia products, and the publication of an information and budget brochure on the phenomenon distributed in some schools in the Palermo area.

CONCLUSIONS

In 2002 the Canadian professor Bill Belsey, adding the cyber prefix to bullying, creates for the first time the term coins the term cyberbullying. In 2006 the Canadian educator Peter Smith scientifically develops it in one of the first definitions: "a form of voluntary and repeated prevarication, implemented through an electronic text, acts against an individual or a group with the aim of hurting and making the victim of such behavior that fails to defend itself". Twelve years later this term has evolved parallel to the technology that allows its existence. Cyberbullying is one of the many undesirable effects of scientific and technological progress in computer engineering. Staying connected has become the prerogative to stay connected to the world, to feel part of one or more virtual communities. Such communities dispersed on the World Wide Web have emerged thanks to the poetic vision of the hippie counterculture of the sixties. It could be argued that the Internet is born of peace and love, of an exciting sense of idealism present in the municipalities (self-sufficient communities), passing from the monopolistic Silicon Valley and today disruptive in the lives of all those who have a Wi-Fi modem or a mobile network. Since the 2000s, the Internet seems to connect an incredibly large part of the global population thanks to the help of a computer or a smartphone that gives the feeling of avoiding the risk of a possible and unacceptable isolation.

According to the 2018 Report of the Global Annual Digital Growth, the big tech companies have five billion registered users worldwide, of which more than three billion users appear to be exclusively social mobile. The panorama in Italy does not differ and follows the interactionist line subject to an exponential increase in the use of the Internet and related social media. We Are Social and Hootsuite polls record that 57% of the Italian population is active in the various social networks existing in the network. The annual Atlas of childhood at risk published by the two thousand and sixteen by Treccani, born from the work of Save The Children Italy, analyzes the youth social fabric reporting numbers relating to the Italian juvenile population: in two thousand fifteen more than one child out of three surfs every day on the Internet (38.6%). In a sample of a thousand young people between the ages of twelve and seventeen it appears that almost all, 95%, have a profile on at least one social network. The average age of ownership of the first smartphone has fallen since 2001 year after year, until reaching the eleven years in 2017. A preadolescent has at least one technological device connected to an internet network.

The "digital natives" seem to use the network mainly to keep in touch with peers, through instant messaging programs, such as Whatsapp or Messenger. Many of them are used to update their Facebook profile, add photos

or "stories" on Instagram or Whatsapp, browse in search of new friends in the hope of feeling understood, considered, appreciated, with an extra like or message. The parents and the school of Generation Z have the task of transferring a media and digital competence that faces the new challenges that this generation is experiencing and undergoing, inserting the subjects at risk in projects and programs aimed at this "broadband" problem difficult to resolve. The law was instead entrusted with the task of intervening on cyberbullying episodes criminally punishable by the introduction of a judiciary (L. 71/2017 - "Provisions for the protection of minors for the prevention and contrast of the phenomenon of cyberbullying"), which guarantees the protection of victims involved in cyber-violence. Because staying online continuously from the age of eleven to seventeen is not just "spending time" or feeling "in company", but it is putting the vulnerability of those who still have to work on their weaknesses and self-worth. Therefore the definition of cyberbullying, conceived by Peter Smith, should be updated to the latest possible versions concerning the new lifestyles of adolescents immersed in the technological evolution of an unstoppable and potentially risky progress for the health of the next adults.

The collective underestimation of the transformation of bullying into cyberbullying is extremely topical and is a consequence of the role of the de-responsibility of the parental figures and of the educational institutions that have become increasingly marginal compared to the smartphones, probably because they are not able to read and withstand the gravity of the wide sea of the web, its depth and the risk conditions that digital kids can drown. Those who drive navigation and the growth of millennials are not parents, but youtubers with their tutorials on how not to learn life. Although parents and teachers have also become homo-smartphonicus, they navigate on different channels where risks can be glimpsed but not identified. The Internet universe can be even more exterminated and undermined by the living space concretely experienced by generation X. Cyberbullying is one of the dangers and is a new model in continuous change. As serious facts and acts are spreading and are attracting the attention of journalists and educational agencies, the phenomenon is becoming increasingly chameleon-like and invisible in the eyes of the law and the adults of reference. Unlike bullying which is easier to identify because it is more linear and physical.

The cyberbully is a structured coward, in him we find basic elements of bullying, strategically studied mental processes and de-responsibility. The degeneration of violent social behavior produced by non-existent rules, not only on the Internet, but also at school, at home; and therefore in the life of a teenager. Thus cyberbullying becomes the key to reading today's society that has had to become aware of the phenomenon in order to start fighting it and preventing it. The planning and the relative realization of this intervention is a portrait inserted inside the bill n.1261 in the article 1 comma 2 where the juridical definition of the cyberbullying phenomenon resides. In this portrait we see the pupils in the foreground, in the background the teachers supported by the pedagogists and the school as a frame: the representation of a positive educational pact. A picture, more than a photograph, It has the fragility of being able to be easily ruined if it is not placed accurately on a safe, rigid, not unsafe wall. In this portrait we have the manifestation of a small educating community; the promise of improvement in the school environment, and, consequently, social. A healthy image of the work done in class, where the classroom becomes a metaphor for a field as endless as life can be. A field without borders, without walls where paintings can be hung. The challenge is to build functional and protective walls in this case. Because the absence of these could be the absence of rules, the absence of boundaries where we feel protected because not with the freedom alone we learn the responsibility. Freedom is not expressed by induction. The school wall is not a limit, a wall can have windows, doors, paintings to be able to admire and learn with progression and observation ability the external and endless three-dimensionality of real life, which becomes for a teenager a world without limits no longer Two-dimensional.

REFERENCES

- Buccoliero, E., Maggi M., (2017), *Contrastare il bullismo, il cyberbullismo e i pericoli della rete*, Milano: FrancoAngeli.
- Capriolo, I., (2017), *Cyberbullismo: la complicata vita sociale de nostri figli iperconnessi*, Milano: Il leone verde.
- Foer, F. (2018). *I nuovi poteri forti: come Google, Apple, Facebook e Amazon pensano per noi*. Milano: Longanesi.
- Genta M.L. Brighi A. Guarini A., (2017), *Cyberbullismo: Ricerche e strategie di intervento*, Milano: FrancoAngeli.
- Genta M.L., (2017), *Bullismo e Cyberbullismo. Comprenderli per combatterli. Strategie operative per psicologi, educatori ed insegnanti*, Milano: FrancoAngeli.
- Lavanco, G., Novara, C. (2012). *Elementi di psicologia di comunità. Progettare, attuare e partecipare il cambiamento sociale*. Milano: The McGraw-Hill Companies.
- Sclavi, M. (2003). *Arte di ascoltare e mondi possibili*. Milano: Bruno Mondadori.
- Shariff. (2005). *Cyber-dilemmas in the new millennium: School to provide student safety in a virtual school environment*. McGill Journal of Education.

DETERMINATION OF CRITERION WEIGHTS AFFECTING ENTREPRENEURSHIP LEVEL BY SWARA METHOD

Alper Kiraz¹, Hüseyin Eski²

¹Sakarya University, Faculty of Engineering, Industrial Engineering Department, Sakarya, Turkey

²Sakarya University, Faculty of Computer and Information Sciences, Computer Engineering Department, Sakarya, Turkey

¹kiraz@sakarya.edu.tr, ²heski@sakarya.edu.tr

ABSTRACT

As a result of the current economic developments, the importance of entrepreneurship has increased. For this reason, entrepreneurs are needed to ensure global and regional development. Entrepreneur means the individual who realizes the gap in the economy and realizes his / her creative ideas and eliminates this gap. When the literature is examined, it is seen that the characteristics such as self-confidence, individual risk taking behaviour, openness to innovation, locus of control, determination, sociality, creativity, leadership, research spirit, commercial ethics and team spirit are effective criteria on entrepreneurship level. In this study, the weights of each of these 11 factors were calculated by using SWARA method. Then, a questionnaire was prepared to measure the factors affecting the entrepreneurial spirit. The survey was conducted on 69 people so that they cannot change their answers and only resolve them once. The respondents were asked to give them the most appropriate answers to the questions and finally to evaluate themselves in terms of the spirit of entrepreneurship. The consistency of the study was calculated by various statistical error types by comparing the values obtained with the survey study and the values found with SWARA method. Errors between the entrepreneurial level of individuals measured by the SWARA method and the level of entrepreneurship obtained from the survey results were found by Mean Absolute Percent Error (MAPE), Mean Absolute Error (MAE) and Root Mean Square Error (RMSE) and the results were compared. When we measure the entrepreneurial tendency of people with the model we work; When statistical error analysis techniques were used in accordance with the responses of the individuals, it was observed that the study was consistent with 90% of the study. The aim of this study is to provide an awareness of the fact that entrepreneurship tendency, which is a lifestyle that can be increased, is an approach that can be gained later. **Keywords:** entrepreneurship, factors affecting entrepreneurship, SWARA method, entrepreneurship level measurement model

1. INTRODUCTION

Entrepreneurship plays a big role in the economy. Entrepreneurship is an issue that should be introduced to the society in order to increase the comfort level of the society and provide a happier life for individuals. Entrepreneurship is a feature that can be developed apart from being present in person. The spirit of entrepreneurship is affected by family structure, education, the city, the age, the personal characteristics as well as the people around. However, people are not aware of the potential, so they are noncommittal in terms of getting a new job. For example; A person with beautiful voice but with lack of self-confidence is afraid to sing in the society. Many examples can be given. In other words, the individual should be aware of his / her potential and work on attribute that needs improvement. Efforts to encourage the entrepreneurship in our country are not sufficient. More work should be done to bring the entrepreneurial spirit to the individual. Nowadays, it is very difficult to work as entrepreneur person as difficult as distinguish people who are prone to entrepreneurship. Our study plays an important role in solving this problem.

Entrepreneurship; It is a process that creates changes in the economic system by creating innovations for individuals and society, by creating or responding to economic opportunities[1]. In addition to this definition, entrepreneurs aim to achieve an innovation or change by closely following economy and developments and changes in the sector. The most basic factors of entrepreneurship is sorted in order; courage, talent and knowledge. The entrepreneur searches for the work he is going to do and takes all risk factors into account. However, every definition made in terms of entrepreneurship has a missing side. The reason for this is that each entrepreneur has a different understanding of entrepreneurship and follows different methods. Entrepreneurship plays a major role in the recognition of new sources and technologies by society, as well as the re-use of unused or underused resources, both in terms of economic and employment development. Entrepreneurship is able to keep up with the ever-developing technology age. In order to keep up with this change and to exist in the future, all new needs must be met. Entrepreneur is one of the necessary elements to meet this need because of the effort to develop the new idea or to create a new idea. Moreover, these developments force companies to shrink and increase the unemployment rate. This situation leads to the entrepreneurship that young people will establish their own businesses and provide their assurance [2]. The individual with an entrepreneurial personality has features that distinguish him / her from other individuals. It is evident that the individual who has started entrepreneurship has a certain vision and a passion

for entrepreneurship and a desire to win. When we look at the personality traits of these individuals, it is seen that these people have creative thinking structure, can make decisions in an active and fast way, and have the ability to think analytically. Entrepreneurial people have the power to face the challenges of business life and will not hesitate to take risks [3]. The entrepreneurial tendency in individuals is as shown in Figure 1 [4].

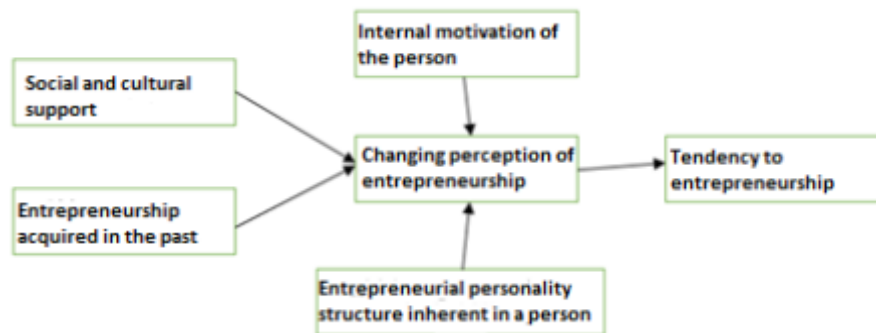


Figure 1. Process of Entrepreneurship in Individuals

1.1.Factors Affecting Entrepreneurship

When the literature is examined, it is seen that there are multiple factors affecting entrepreneurship. We can examine these factors under eleven titles “Self-confidence, individual risk-taking behavior, openness to innovation, locus of control, determination, sociality, creativity, leadership, research spirit, business ethics, team spirit”

Self-confidence: The entrepreneur is confident that his or her goals will be achieved successfully. They become aware of their talents and respects themselves. The self-confidence factor includes and affects ten other factors that affect the entrepreneurship that we commit in our study. Self-confident people take risks more easily, become better leaders, and express themselves better socially. This factor eases the initiative processes and provides a positive impact.

Individual Risk-taking Behavior: One of the most important characteristics of entrepreneurial personality is individual risk taking behavior. The entrepreneur must be prone to risk taking economically, socially or psychologically. Entrepreneurship involves risk, believing that the expected return will be maximum and making the initiative through rational decision-making [2].

Openness to Innovation: Innovative behavior is also high in people with high entrepreneurship tendencies. Entrepreneur follows innovations and makes efforts to implement these innovations as they are innovators or open to change. Knowing that the more innovative the project, the more profitable it will be from the competition, the entrepreneur will make more effort to implement the innovation required for his investment.

Locus of Control: People with locus of control want to intervene in the events that develop around them and to be effective in their development. Entrepreneurs think about producing the most appropriate solution by taking control in every developing factor even in their group work [5].

Determination: Stability creates a social status both in terms of social and business life. This allows the entrepreneur to exhibit consistent behaviors in achieving his goal. The individual needs to be determined to achieve success in business life and to ensure continuity. He won't know how close he is to success if he gives up. Entrepreneurs must be determined, because success is an action that takes time and patience.

Sociality: Being social facilitates entrepreneurship activities. It will ensure that if a partnership is to be established, it will be provided with confidence and that the job will be promoted easily. Social people are also prone to be successful in their venture project. Because people with this feature communicate easily with people. This ensures both social and entrepreneurial success.

Creativity: Creativity is an important factor in its success as it attempts to develop the entrepreneur or create a new idea. This factor makes it possible to attract interest and create a successful project by making a difference in the sector or by providing change. People with creative personality catch the deficit in the sector and manage to get out of the competitive environment in the most beneficial way.

Leadership: Entrepreneurial people are able to make their activities different from their competitors with the help of their leadership abilities and find answers to the changes that are taking place today. Transformational leadership

is a leadership approach that directs the people who follow them to organizational goals in their areas of interest and enables them to transmit their knowledge and experiences to the organization. As a result of transformative leadership behaviors, employees increase their sense of belonging to their organizations and adopt their own works. This brings about successful entrepreneurship [6].

Research Spirit: People with a research spirit learn about the requirements, constraints and outputs of the job in order to be aware of their responsibilities and not to fail. This spirit of research facilitates the prevention of all possible problems and prevents problems from occurring.

Business Ethics: In addition to making profits, it is the duty of the entrepreneurs to increase the welfare level of the society, to meet the human needs at the highest level and to use the resources in the most efficient and effective way. While making a profit, it should consider moral values in this way, should not see every way to make money as an interest, and should behave ethically. Entrepreneurs who care about commercial ethics are afraid of actions such as cheating consumers and evading taxes. Entrepreneurs who care about the business ethics of their business are highly qualified people in society.

Team Spirit: Issues like ensuring unity and solidarity in the team, the creation of an atmosphere of trust, cooperation and the ability to use the skills for the benefit are important factors in a team's success. As the mistakes and problems encountered in the work with team spirit are transferred to the team mates, a rapid growth is observed and innovation and change processes can be overcome more easily. Yet, when there is a team spirit, a safe environment is created and continuous improvement can be achieved.

2. METHODOLOGY

In order to find out the entrepreneurship tendency of the individuals, the answers given to the questions prepared in the questionnaire had to be evaluated on the basis of criteria. Since the significance level of each criterion was different, the method used to determine the significance of the criteria was SWARA. The weights of the criteria were determined using the SWARA method. The results obtained from the application were evaluated with the help of statistical error analysis tests.

2.1. SWARA (Step-Wise Weight Assessment Ratio Analysis) Method

SWARA (Step-Wise Weight Assessment Ratio Analysis) is a method developed by Keršulienė et al. to determine criterion weights for MCDM (Multiple-criteria decision analysis) problems. It is known in the literature as an expert-oriented method. Because the main feature of the method is the ability to predict expert opinions on the importance of criteria in the determination of criteria weights. In addition, the method is important for gathering information from experts and bringing them together [7, 8]. The method can directly decide on the criteria and their priorities, so it is also suitable for cases where criteria weights are known in advance [9]. The application steps of the SWARA method are as follows:

Step 1: Sorting Criteria

Criteria are sorted by decision-makers from the most important to the less important.

Step 2: Determination of Relative Importance Levels

The most important criterion is written first. Starting from the second criterion, the relative significance level of each criterion is determined. If we call the criteria j , j criteria is compared with the previous ($j - 1$) criteria. This value is also indicated by the s_j icon. The s_j value is called the comparative importance of the average value.

Step 3: Determination of Coefficients

The coefficient (k_j) is determined by the following equation:

$$k_j = \begin{cases} 1 & j = 1 \\ s_j + 1 & j > 1 \end{cases} \quad (1)$$

Step 4: Recalculation of Importance Weights

The importance vector q_j is calculated with the following equation:

$$q_i = \begin{cases} 1 & j = 1 \\ \frac{x_{j-1}}{k_j} & j > 1 \end{cases} \quad (2)$$

Step 5: Determination of criterion weights

The calculation of the weights (w_j) of the criteria is provided by the following equation: w_j indicates the relative importance of the criterion j .

$$w_j = \frac{q_j}{\sum_{k=1}^n q_k} \quad (3)$$

2.2. Methods Used for Statistical Analysis

Average Absolute Error (MAE): The absolute value of the difference between the actual value and the predicted value is added each other up to N samples. The results are divided by n samples.

$$MAE = \frac{1}{n} \sum_{j=1}^n |e_j| \quad (4)$$

Average Absolute Percentage Error (MAPE): The absolute value of the difference between the actual value and the predicted value is added to N samples. The value found is divided by the sum of the actual values of the n samples. The result is multiplied by 100 and divided by the number of n samples.

$$MAPE = \frac{100}{n} \sum_{j=1}^n \frac{|e_j|}{|A_j|} \quad (5)$$

Root Mean Square Error (RMSE): The sum of the square of the difference between the actual value and the predicted value is the sum of N samples. The value found is divided by the number of n samples and taken from the root. RMSE is the standard deviation of prediction errors. The line that best fits the data tells you how dense that data is around the line.

$$RMSE = \sqrt{\frac{1}{n} \sum_{j=1}^n e_j^2} \quad (6)$$

3. APPLICATION

.Criteria Affecting Entrepreneurship are presented in Table 1

Table 1. Criteria Affecting Entrepreneurship	
Criterion No.	Criteria Name
C1	Self Confidence
C2	Individual Risk Taking Behavior
C3	Openness to Innovation
C4	Locus of Control
C5	Determination
C6	Sociality
C7	Creativity
C8	Leadership
C9	Research Spirit
C10	Business Ethics
C11	Team Spirit

Five decision-makers were identified in order to determine the significance of the evaluation criteria. The five decision-makers are listed in Table 2, where each criterion is sorted by least significant.

Table 2. Order of Importance Assigned to Criteria by Decision-makers

	DM1	DM2	DM3	DM4	DM5
C1	1	2	9	3	3
C2	4	9	2	10	4
C3	8	1	10	7	9
C4	6	11	3	6	11
C5	3	7	6	5	7
C6	10	10	1	11	6
C7	7	3	8	4	10
C8	2	5	7	2	1
C9	5	4	4	1	5
C10	11	8	11	8	2
C11	9	6	5	9	8

The criteria are listed by the relative importance levels (s_j) for each criterion starting from the second criterion and the relative importance levels (s_j) for each criterion starting from the second criterion, with the most important one being the most important one for each decision-maker. Criterion weighting procedures are given in Table 4.

Table 3. Importance Degrees by Order of Decision-makers

Importance Degree	DM1		DM2		DM3		DM4		DM5	
	Line	s_j	Line	s_j	Line	s_j	Line	s_j	Line	s_j
1	C1	-	C3	-	C6	-	C9	-	C8	-
2	C8	0,20	C1	0,70	C2	0,35	C8	0,70	C10	0,10
3	C5	0,25	C7	0,20	C4	0,55	C1	0,45	C1	0,65
4	C2	0,60	C9	0,55	C9	0,50	C7	0,50	C2	0,30
5	C9	0,65	C8	0,75	C11	0,40	C5	0,25	C9	0,50
6	C4	0,35	C11	0,45	C5	0,65	C4	0,55	C6	0,20
7	C7	0,40	C5	0,60	C8	0,25	C3	0,10	C5	0,60
8	C3	0,10	C10	0,50	C7	0,35	C10	0,15	C11	0,40
9	C11	0,55	C2	0,30	C1	0,70	C11	0,35	C3	0,15
10	C6	0,15	C6	0,15	C3	0,20	C2	0,20	C7	0,55
11	C10	0,05	C4	0,25	C10	0,45	C6	0,30	C4	0,45

Table 4. Weighting Criteria

Decision-maker 1					Decision-maker 2					Decision-maker 3					Decision-maker 4					Decision-maker 5					
Line	Criteria	SJ	KJ	qj	Wj	Criteria	SJ	KJ	qj	Wj	Criteria	SJ	KJ	qj	Wj	Criteria	SJ	KJ	qj	Wj	Criteria	SJ	KJ	qj	Wj
1	C1		1	1	0,26	C3		1	1	0,34	C6		1	1	0,31	C9		1	1	0,33	C8		1	1	0,26
2	C8	0,2	1,2	0,83	0,22	C1	0,7	1,7	0,59	0,20	C2	0,3	1,3	0,74	0,23	C8	0,7	1,7	0,59	0,20	C10	0,1	1,1	0,91	0,24
3	C5	0,2	1,2	0,65	0,17	C7	0,2	1,2	0,49	0,17	C4	0,5	1,5	0,48	0,15	C1	0,4	1,4	0,45	0,13	C1	0,6	1,6	0,55	0,14
4	C2	0,6	1,6	0,41	0,11	C9	0,5	1,5	0,35	0,11	C9	0,5	1,5	0,32	0,11	C7	0,5	1,5	0,20	0,07	C2	0,3	1,3	0,42	0,11
5	C9	0,6	1,6	0,25	0,07	C8	0,7	1,7	0,15	0,06	C11	0,4	1,4	0,23	0,07	C5	0,2	1,2	0,25	0,07	C9	0,5	1,5	0,28	0,07
6	C4	0,3	1,3	0,15	0,05	C11	0,4	1,4	0,15	0,05	C5	0,6	1,6	0,15	0,05	C4	0,5	1,5	0,15	0,05	C6	0,2	1,2	0,23	0,06
7	C7	0,4	1,4	0,14	0,04	C5	0,6	1,6	0,07	0,02	C8	0,2	1,2	0,15	0,03	C3	0,1	1,1	0,13	0,04	C5	0,6	1,6	0,14	0,04
8	C3	0,1	1,1	0,13	0,03	C10	0,5	1,5	0,05	0,02	C7	0,3	1,3	0,08	0,03	C10	0,1	1,1	0,14	0,04	C11	0,4	1,4	0,11	0,03
9	C11	0,5	1,5	0,08	0,02	C2	0,3	1,3	0,04	0,01	C1	0,7	1,7	0,05	0,02	C11	0,3	1,3	0,08	0,03	C3	0,1	1,1	0,09	0,02
10	C6	0,1	1,1	0,07	0,02	C6	0,1	1,1	0,03	0,01	C3	0,2	1,2	0,04	0,01	C2	0,2	1,2	0,07	0,02	C7	0,5	1,5	0,06	0,02
11	C10	0,0	1,0	0,07	0,02	C4	0,2	1,2	0,02	0,01	C10	0,4	1,4	0,02	0,01	C6	0,3	1,3	0,05	0,02	C4	0,4	1,4	0,04	0,01

Firstly, coefficients (kj) values were reached by using sj's. The significance vector (qj) values of each criterion were then calculated. Finally, weights (wj) of the criteria were calculated. The values of kj, qj and wj calculated for each criterion are shown.

Table 5. Calculated Criteria Weights of Decision-makers

Criteria	DM1	DM2	DM3	DM4	DM5
C1	0,261	0,2027	0,0156	0,1336	0,144
C2	0,107	0,0137	0,2305	0,0228	0,11
C3	0,0339	0,3436	0,0125	0,0424	0,0236
C4	0,0496	0,0069	0,1495	0,0456	0,0105
C5	0,1723	0,0241	0,0436	0,0717	0,0367
C6	0,0183	0,0103	0,3115	0,0163	0,0602
C7	0,0366	0,1684	0,0249	0,088	0,0157
C8	0,2167	0,0619	0,0343	0,1922	0,2618
C9	0,0653	0,11	0,0997	0,3257	0,0733
C10	0,0183	0,0172	0,0062	0,0358	0,2382
C11	0,0209	0,0412	0,0717	0,0261	0,0262

The criterion weights obtained as a result of averaging the criterion weights of each decision maker are presented in Table 6. Table 6. Final Criteria Weights

Table 6. Final Criteria Weights

Kriterler		Nihai Kriter Ağırlığı
C1	Self-confidence	0,1514
C2	Individual Risk Taking Behavior	0,0968
C3	Openness to Innovation	0,0912
C4	Locus of Control	0,0524
C5	Determination	0,0697
C6	Sociality	0,0833
C7	Creativity	0,0667
C8	Leadership	0,1534
C9	Research Spirit	0,1348
C10	Business Ethics	0,0631
C11	Team Spirit	0,0372

Final criterion weights were achieved by averaging the evaluations of the decision makers. The most important criterion was determined as leadership criterion. When the answers given by the individuals were evaluated according to the criteria weights, the results found are shown in Table 7. The results of the evaluation give the entrepreneurship tendency of individuals over 100.

Table 7. Responses and Evaluation Results

		Criteria	Points Received by Answers									
			Ind. 1	Ind. 2	Ind. 3	Ind. 4	Ind. 5	Ind. 6	Ind. 7	Ind. 8	Ind. 9	Ind. 10
Weights	25	Self-Confidence	14	19	19	17	16	12	16	20	17	12
	20	I.Risk taking behavior	13	10	13	12	10	14	11	10	7	12
	25	Openness to Inovation	11	17	15	17	9	14	13	12	12	13
	20	Locus of Control	11	10	14	14	13	14	13	11	12	14
	25	Determination	18	17	13	15	13	16	16	12	14	15
	25	Sociality	16	14	14	15	12	20	18	20	15	17
	25	Creativity	19	18	16	12	18	21	18	19	16	16
	25	Leadership	20	17	13	17	15	18	17	19	13	14
	25	Research Spirit	9	22	15	21	24	18	23	19	14	17
	25	Business Ethics	10	19	20	17	20	17	17	17	18	17
	25	Team Spirit	19	20	18	16	18	18	21	18	18	18
		Entrepreneurship Score given by individuals at the end of the survey	55	70	60	65	70	65	70	85	40	65
		Entrepreneurship Score As a Result of Developed Model	60	69	63	67	64	67	69	68	57	60

4. STATISTICAL ANALYSIS

The sample of the study consisting of answers of 10 people is given in Table 8. In the table, the scores given to them, the average scores of the survey results and the entrepreneurship scores calculated as a result of the model developed are given.

Table 8. Entrepreneurship Points of the Persons

Person No.	Individuals Entrepreneurship Score	Survey Results Calculated Entrepreneurship Score	Developed Model Result Calculated Entrepreneurship Score
Person 1	70	68,37	69,44
Person 2	60	64,27	63,29
Person 3	65	68,73	67,27
Person 4	40	58,45	57,12
Person 5	80	73,27	74,21
Person 6	70	73,55	72,63
Person 7	70	65,91	67,11
Person 8	80	67	68,11
Person 9	70	72,82	70,99
Person 10	50	62	61,59

When the statistical analysis of the model developed in the study was performed, the following results were obtained. MAPE, MAE and RMSE values of the developed model and the results of the survey were calculated and it was observed that the developed model gave more realistic results considering the scores given to them by individuals. The results are given in Table 9.

Table 9. Statistical Analysis Results

	MAPE	MAE	RMSE
Developed Model	10,716	5,902	7,968
Survey results	12,492	7,027	8,780

5. RESULTS AND DISCUSSION

A questionnaire was prepared in order to determine how much the characteristics of entrepreneurship tendency are found in the individual. A study was carried out revealing different characteristics under each question. The survey was conducted on 69 people in such a way that they could not change their answers and only solve them once. At the end of the survey, people were asked to evaluate their entrepreneurial spirit out of 100. As a result of the study, it was calculated that 90% accurate results were obtained according to statistical methods. With this application, since the susceptibility of individuals to entrepreneurship is calculated, it is ensured that the initiatives are performed by the right people. For example; KOSGEB can create a criterion by using our application while providing entrepreneurial support. This criterion has a significant impact on the development of entrepreneurship and the right initiatives.

REFERENCES

- [1] Muzyka, D. Koning, A. and Churchill, N. (1995). "On Organization and Adaptation: Building The Entrepreneurial Corporation". *European Management Journal*, 13, (4) 352-365.
- [2] Arıkan, S. (2002) "Girişimcilik Temel Kavramlar ve Bazı Güncel Konular" , Siyasal Kitabevi, s.38-39-41, Ankara.
- [3] Tekin, Mahmut; (1999), Girişimcilik, Kendi İşini Kurma, İşletme, Damla Ofset, Konya.
- [4] Aşar, Mustafa (2007) "Yüksek Öğretimde Öğrencilerin Girişimcilik Eğilimlerinin Araştırılması, Çukurova Üniversitesinde Bir Uygulama", Çukurova Üniversitesi, Sosyal Bilimler Enstitüsü, Yayınlanmamış Yüksek Lisans Tezi, Adana.
- [5] Kaufmann, J. Patrick, Welsh, H.B Dianne ve Bushmarin, Nicholas, (1995), "Locus of Control and Entrepreneurship in the Russian Republic," *Entrepreneurship Theory and Practice*, 20 (1), p. 43-56.
- [6] Karcıoğlu, F ve E. Kaygın (2013), Girişimcilik Sürecinde Dönüştürücü Liderlik Anlayışı: Otomotiv Sektöründe Bir Uygulama, *İktisadi ve İdari Bilimler Dergisi*, 27, 3.
- [7] Aghdaie, M. H., Zolfani, S. H. & Zavadskas, E. K. (2013). Decision making in machine tool selection: An integrated approach with SWARA and COPRAS-G methods. *Engineering Economics*, 24(1): 5-17.
- [8] Keršuliene, V., Zavadskas, E. K., & Turskis, Z. (2010). Selection of rational dispute resolution method by applying new step-wise weight assessment ratio analysis (SWARA). *Journal of business economics and management*, 11(2), 243-258.
- [9] Aytac Adalı, E., Tuş Işık, A., (2017), Bir Tedarikçi Seçim Problemi için SWARA ve WASPAS Yöntemlerine Dayanan Karar Verme Yaklaşımı, *International Review of Economics and Management*, 4, pp. 56 -77.

DETERMINING THE WEIGHTS OF CRITERIA AFFECTING THE PERFORMANCE OF STUDENT CLUBS BY SWARA METHOD

Alper Kiraz¹, Hüseyin Eski²

¹Sakarya University, Faculty of Engineering, Industrial Engineering Department, Sakarya, Turkey

²Sakarya University, Faculty of Computer and Information Sciences, Computer Engineering Department, Sakarya, Turkey

¹kiraz@sakarya.edu.tr, ²heski@sakarya.edu.tr

Abstract: Student clubs on campuses provide opportunities to join, lead, expand horizons, make friends and have fun to every student. Students have the opportunity to develop themselves in the areas of interest through club work and contribute to the development and prestige of their universities. Student clubs should take care of their own development while benefiting personal development. The need for a measurement model where the performance of student clubs can be assessed and as a result it is important to identify areas where club performance needs to be improved. In this study, it is aimed to determine the weight of the criteria affecting this performance in order to develop the performance evaluation model of student clubs operating in universities. Development processes of student clubs have been observed for the evaluation of performances. This study was carried out considering Sakarya University student club activities. A total of 10 decision makers, including 5 students club presidents, 1 club vice president, 3 academic chairmen and 1 Sakarya University Health Culture and Sports Department Specialist, have benefited from their knowledge and experience to determine the criteria affecting the performance of the student club and to get expert opinions. These criteria are as follows: (1)the use of sponsors in activities, (2)the suitability of the club's activities for the purpose of its establishment, (3)satisfaction rate of the member/participant, (4)prestige, (5)annual activity plan compliance, (6)social responsibility/cooperation, (7)benefit/personal development, (8)belonging, (9)active use of social media, (10)transparency and (11)order. The criteria were assessed by 10 different decision makers to achieve a more precise result. As a result of the studies conducted, the performance criteria affecting the performance of student clubs were determined and the weights of these criteria were determined by SWARA (Step by Step Weight Assessment Ratio Analysis) method. The clubs within the university will carry out their annual activities planning and working methods by taking these important criteria into consideration and will reach more effective and positive results. Health Culture and Sports Departments to which student clubs are affiliated can analyse the performance of clubs through this measurement model and will provide a fairer and efficient use of resources based on performance values measured by this model which is proposed for the students clubs.

Keywords: student club performance, SWARA method, performance measurement model

1. INTRODUCTION

Factors such as improper planning of the activities performed by student clubs in universities, not getting satisfied feedbacks after the event, organizing activities beyond the aim of the club, sustaining success and routineization of success achieved at certain levels cause performance loss. This means that the loss of performance is not measured and therefore the club cannot improve itself.

The aim of this study is to determine the criteria that affect the performance of student clubs by using SWARA (Step-Wise Weight Assessment Ratio Analysis) which is one of the multivariate decision making techniques and to observe the applicability of the model.

Student clubs are the group where students come together in order to carry out educational, health, sports, social, science and cultural activities in a planned and organized manner in accordance with the directives of university student clubs. It enables students to participate in scientific, cultural, social, artistic and sporting activities, support their academic development with such activities, and develop their personal potential to the extent of their knowledge, talent and interest, and grow as self-confident, responsible individuals with the importance of teamwork. It covers student clubs that students form in order to operate continuously in scientific, social, cultural, artistic, sporting and professional fields.

The student clubs are responsible for the utilization of the clubs within the scope of the university facilities depending on the activity made, the clubs, member records, incoming and outgoing documents, decision books and minutes, procurement of materials, inventory records and all kinds of official documents and documents. Members may not receive any cash benefits under a membership fee or other name; however, club members may provide the same material support to the club with their consent and the approval of the club advisor. Student clubs work areas are as follows:

- Sports / Outdoor Sports
- Culture / Arts / Literature
- Health / Life
- Social Activities and Volunteering Services
- Education / Science / Technology
- International Activities
- Personal evolution

Student clubs are one of the social opportunities provided by schools. In this context, clubs provide students with group work awareness, skills development and opportunities to spend their free time in a useful, useful way and to improve themselves. With such activities in student clubs, people become more useful in business life either because of their group work awareness in their respective departments or because they develop their skills by taking part in their favorite clubs. In these clubs, they develop themselves by meeting different people, gaining different perspectives on different subjects and learning new information. Student clubs not only benefit people in terms of development, but also help people in terms of discharge. This is the benefit of student clubs for individuals.

Student clubs should benefit from personal development and care for their own development. For this reason, the purpose of the research is to ensure that there is no standardization in which the performance of student clubs can be evaluated and that the performance of the club cannot be improved. In order to evaluate the performances, it has been tried to learn how clubs can become the most developed from the most basic form to the most developed. Therefore, it was necessary to conduct this research evaluating the performance of student clubs.

1.1. Research in the literature about student clubs

There are many methods used in weight determination such as Abstract Vector Method, SWARA Method, Analytical Hierarchy Process (AHP), ANP, Combined Analysis, Entropy Method.

The literature review of the criteria used to evaluate the performance of student clubs is shown in Table 1 in summary.

Table 1. Literature Research for Studies on Student Clubs

Topic	Author, Year	Method	Result
The contribution of social club activities to the development of students' management qualities	Sezgin Karşlı, 2006	Scanning model, Survey	The aim of improving the managerial characteristics of the students through social club studies was found to be moderately achieved in the first and second level [2]. Significant differences are observed between private and public schools in terms of leisure time. This is due to the fact that school administrations value social activities. it is not a difference that cannot be closed [3].
Recreational evaluation of social club activities in schools	Ertan Özkaptan, 2007	Scanning model, Survey	It was found that club advisors and students practiced club principles moderately [4].
Evaluation of student clubs	Nurcan Yiğit, 2008	Scanning model, Survey	The data obtained were obtained to improve the efficiency of similar processes [5].
Approaches of university students about extracurricular activities	Mehmet Nama, 2010	Descriptive scanning model, Survey	It has been found that student club activities have a positive effect on the evaluation of leisure time and have a good level of qualification for leisure time [6].
The place of student clubs in primary schools in the evaluation of leisure time	Emel Emineoğlu, 2011	Scanning model, Survey	It has been concluded that the effect of student clubs on socialization is "rarely ve and that student responses differ according to research variables [7].
The effect of student clubs on socialization	Serkan Yalçın, 2014	Scanning model, Survey	It was found out that there were differences according to gender, the status of opening the desired social clubs, whether the schools club activities continued regularly or not, according to the appropriate space variables [8].
Functionality of social clubs in schools	Hande Birtürk, 2015	Scanning model, Survey	

Educational club activities	Gamze Çağlayan Şahin, 2015	Descriptive scanning model , Survey	Suggestions such as providing the students with a functional qualification and focusing on the educational program element of the studies have been made [9].
Effectiveness level of student club activities in developing basic skills	Kübra Ay, 2015	Scanning model,Survey	It was concluded that teachers who thought that their activities were conducted in accordance with the regulations found that club activities were more effective in developing basic skills [10]. It was found that students who worked in the same club for a long time evaluated the situation more positively and those who studied in technical high schools evaluated the situation more positively than those who studied in other high schools. When students evaluated the structure and effectiveness of social clubs in schools, it was concluded that the overall result was medium level [11].
Effectiveness of social club activities	Mehmet Gögebakan, 2016	Kalmagorov-Smirnov test ,Vision scale	

For expert opinions, the presidents, vice-presidents and academic presidents of student clubs at Sakarya University were preferred. Accordingly, the criteria affecting the performance of student clubs are determined as follows:

Use of Sponsors : Student clubs organize many projects and events throughout the year. At this point, sponsorship comes to the forefront in order to provide better service to the event participants. Thanks to the sponsorship of the products or services offered at the events, a better experience is provided and the costs allocated for the project are reduced. There are many institutions that have signed sponsorship agreements with university clubs both financially and in kind. At this point, there is a need for guidance on which institutions should be contacted and how. Before the event; In addition to the needs such as sponsorship file, list of potential institutions, website design, poster design, mailing, social media management, press sponsorship and print sponsorship come to the fore. During the event; food and beverage (water, juice / nectar, mineral water, tea, coffee, acidic beverage, sweet-savory cookies / cocktail variety of food or new product suitable for the audience), accommodation, Wi-Fi, communication, simultaneous translation, mailing, experience areas, clothing, transportation, etc. After the event; reporting, mailing, mass food, after party issues come to the fore.

Suitability of the club purpose : It enables students to participate in scientific, cultural, social, artistic and sporting activities, support their academic development with such activities, and develop their personal potential to the extent of their knowledge, talent and interest, and grow as self-confident, responsible individuals with the importance of teamwork.

Member / Participant Satisfaction after the Event: Student communities should use the surveys to get feedback before and after the event. In this way, the interest of the sponsors, participants and staff members to the activities that they can participate or want to participate / support is evaluated. Thanks to the satisfaction survey, it is ensured that the necessary actions are taken by measuring the participant's communication skills, activity environment, event organization, event purpose, outputs of the event and overall satisfaction in accordance with the purpose of event satisfaction.

Prestige : According to the Turkish Language Institution, prestige, which means respectability, has been examined in the sense of recognition and recognition of the club during the evaluation of student clubs. In this context, the ratio of the number of club members to the total number of students in the university will express prestige.

Plan Compliance : Being planned, in the 'Encyclopedia of Teachers and the Dictionary of Pedagogy [12], is defined as a plan, an action plan, the order of what is designed for him or others, and the way to actualize them. In the Great Turkish Dictionary (1996: 907), planning means proper and measured. Compliance with the plan is to plan the student club's activities to be carried out as a club throughout the year at the beginning of the academic year and to proceed in accordance with this plan and to report in writing the results of these studies. In order to carry out the planned activities in the student clubs, they should be planned effectively and be recorded before and after the studies are in progress.

Social Responsibility / Cooperation: " Collaboration is working together, contributing, helping others in a joint work " (Pedagogical Dictionary 1994: 246). In the Great Turkish Dictionary (1996: 562), cooperation means "act jointly with a business or activity". Collaboration has an important place in student clubs. Because the purpose of the club is to make students compatible and useful individuals with the society in which they live. This happens when students learn to work in collaboration with individuals of different status, both inside and outside the club. According to Hollrah from Rombokas (1995), social activities and student club work allow students to engage in activities and communication not only with their close friends but also with other students.

Benefit / Personal Development : Certificates are an indication that people are knowledgeable and that information is given to them. Students can attend a seminar organized by the university and obtain a certificate. The seminars are generally organized by student clubs. Persons working in these clubs have the opportunity to communicate and meet one-to-one with business representatives.

Belonging : When the characteristics of the groups are taken into consideration, it will be seen that the individuals will work together in line with the basic goals and norms and carry out continuous activities with team spirit. In this way, it is possible to talk about a state of belonging. Considering that individuals perform their activities motivationally, it is seen that they tend to accomplish a team work and be a part of this team.

Active Use of Social Media : Towards the end of the 90s, the Internet became very popular and websites allowed users to create and create content. In 1997, the first social networking site Sixdegree.com was launched. In 2002, many social networking sites, such as Friendster and Myspace, were introduced. After this date, the number and use of social media tools has become widespread globally [13]. Although there is no consensus on the definition of the concept of social media in the literature, the following definitions are frequently encountered. Social media is a set of web-based applications that form the ideological and technological foundations of Web 2.0 and allow the creation and sharing of user-generated content [14]. Social media is the latest online communication tool that allows users to create a public or private profile to interact with people on their networks [15]. Social media are web-based services that allow individuals to create a public or semi-public profile within a limited system, add a list of other users to whom they share a link, view the link lists, and view and switch connections among others [16]. The majority of university students are students of the Y generation. Generation Y is the first generation to grow with digital media in multiple environments and is extremely versatile in multi-tasking with multiple devices. Almost all of them have smartphones, tablets and computers and use these tools mostly for personal purposes. [17] They are very active in using, contributing, searching, sharing and consuming all kinds of social media networks. Therefore, they have a strategic importance for social media platform managers or researchers.

Transparency: The needs of the student clubs are met by faculties and colleges to the extent possible, and they are provided with space within the means. Accountability and transparency are not limited to the financial dimension of the business. Transparency, beyond being financially auditable, means explaining why each activity is performed, what results are obtained and how much resources are spent.

Order : Books and documents must be kept in each club and requested to be brought to the Student Clubs Coordination Board (Ö.K.K.K.). These are the member register book, the board of directors decision book and the minutes of the general assembly, the operating book, income and expense documents, the list of the fixtures for use in the club and their fixture numbers.

2. METHODOLOGY

In this study, criterion weights were determined by SWARA method which is one of the multi criteria decision making methods. In Figure 1, the workflow of the criterion weighting process made by the SWARA method can be seen in a broad way. The following is a 5-step representation of the criteria weights to be evaluated in the method.

Step 1: The criteria are listed starting with the most important.

Step 2 : For each criterion, relative severity levels are determined starting from the second criterion. For this, j criteria is compared with the previous criterion (j-1). This ratio is called karşılaştır comparative significance of the mean value ve and is indicated by the symbol s_j .

Step 3 : The coefficient (k_j) is determined.

$$k_j = \begin{cases} 1 & j = 1 \\ s_j + 1 & j > 1 \end{cases} \quad (1)$$

Step 4 : The significance vector q_j is calculated with the equation shown below :

$$q_j = \begin{cases} 1 & j = 1 \\ \frac{x_{j-1}}{k_j} & j > 1 \end{cases} \quad (2)$$

The notation x_{j-1} indicates q_{j-1} .

Step 5 : The calculation of the weights (w_j) of the criteria is provided by the following equation.

$$W_j = \frac{q_j}{\sum_{k=1}^n q_k} \quad (3)$$

w_j is to show the relative importance of criterion j [19].

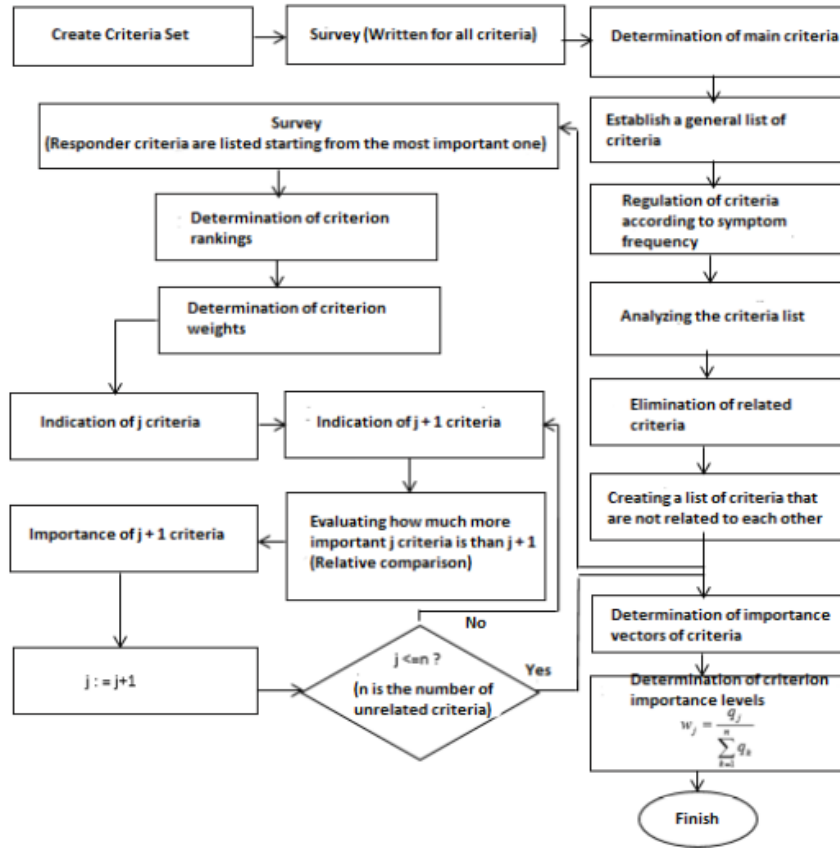


Figure 1. Determination of Criterion Weights by SWARA Method [18]

The capabilities and characteristics of the experts are important factors that increase the quality of the results produced by multivariate decision-making methods. 10 experts in the study have sufficient and comprehensive knowledge about student clubs consisting of student club academic others (4), 1 specialist responsible in SKS and student club student heads (4).

3. APPLICATION

In order to determine the criteria affecting the performance of student clubs, 10 decision-makers and 11 criteria were first determined. SWARA method was used to determine the significance of the 11 criteria. Expert opinion was used to determine the importance of the criteria.

The severity of the criteria is determined by 10 different decision makers. The reason for this is to achieve a more accurate result. The tools to be used for the solution stages of the problem are shown in Table 2.

Table 2. Solution Steps of the Problem and Tools Used for Solution

Solution Stages	Work Done	Solution Tool
1	Evaluation of Criteria	Expert Opinion
2	Finding criterion weights	Excel (SWARA Method)
3	Evaluation of Clubs Performance	MS Excel

The SWARA method and the evaluation process were carried out following the steps in Figure 2.

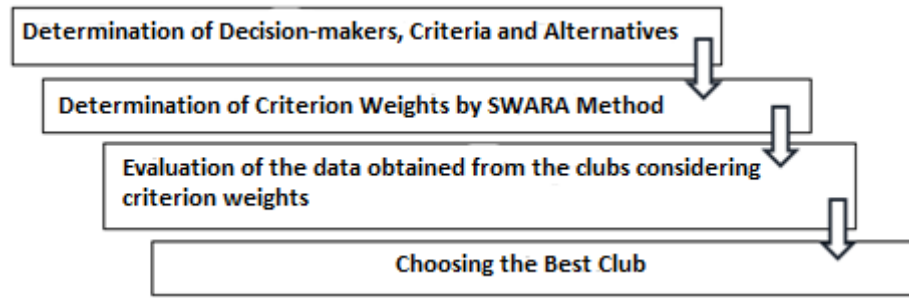


Figure 2. SWARA Method and Evaluation Phase

In order to determine the significance of the performance criteria, 10 decision makers were identified. First, the process of sorting the criteria from the most important to the least important was carried out by each decision-maker, the initial step of the SWARA method. The results of the sequencing are shown in Table 3.

Table 3. Criteria Ranking by Decision-makers

Criteria	DM1	DM2	DM3	DM4	DM5	DM6	DM7	DM8	DM9	DM10
Sponsor	10	3	3	10	7	11	1	1	6	5
Suitability of the Club Purpose	1	7	2	6	3	7	6	6	1	1
Participant Satisfaction after the Event	6	11	11	2	11	1	9	7	2	3
Prestige	2	6	9	3	4	2	4	5	9	2
Benefit / Personal Development	3	8	1	1	1	6	8	8	3	6
Plan Compliance	5	5	6	8	6	3	3	2	5	4
Belonging	7	1	5	4	5	4	5	4	8	11
Social responsibility	9	9	10	11	2	9	11	11	7	7
Active Use of Social Media	8	10	7	9	10	5	10	10	10	8
Transparency	11	4	8	5	9	10	7	9	4	10
Order	4	2	4	7	8	8	2	3	11	9

The criterion rankings shown in Table 3 by decision makers are shown in Table 4 as comparative at the decision level as follows.

The criteria weighting steps applied by SWARA method are carried out as follows:

The coefficient (k_j) values were reached by using Equation 1 and s_j . The significance vector (q_j) values were then calculated according to each criterion with the help of Equation 2. In the last step, weights (w_j) of the criteria were calculated with Equation 3; k_j , q_j , w_j values are calculated for each criterion of decision maker (DM) 1 and are shown in Table 5.

Table 4. Comparative Importance of Criteria at Decision-Making Level

Imp. Seq.	DM1	DM2	DM3	DM4	DM5	DM6	DM7	DM8	DM9	DM10
	Line	s_j	Line	s_j	Line	s_j	Line	s_j	Line	s_j
1	10	/	3	/	3	/	10	/	7	/
2	1	0,75	7	0,6	2	0,8	6	0,9	3	0,95
3	6	0,8	11	0,9	11	0,9	2	0,5	11	0,5
4	2	0,5	6	0,9	9	0,75	3	0,8	4	0,4
5	3	0,5	8	0,9	1	0,8	1	0,9	1	0,8
6	5	0,6	5	0,5	6	0,9	8	0,8	6	0,75
7	7	0,5	1	0,5	5	0,2	4	0,9	5	0,8
8	9	0,4	9	0,75	10	0,1	11	0,9	2	0,6
9	8	0,2	10	0,3	7	0,3	9	0,5	10	0,5
10	11	0,2	4	0,05	8	0,7	5	0,8	9	0,5
11	4		2	0,3	4	0,2	7	0,7	8	0,7

Table 5. Process of Calculating Criteria Weights of Decision Making 1 by SWARA Method

Ranking	Criteria	s_j	k_j	q_j	w_j
1	Suitability of the Club Purpose	/	1	1,00	0,3970
2	Prestige	0,75	1,75	0,57	0,2268
3	Benefit / Personal Development	0,8	1,8	0,32	0,1260
4	Order	0,5	1,5	0,21	0,0840
5	Plan Compliance	0,5	1,5	0,14	0,0560
6	Satisfaction after the Event	0,6	1,6	0,09	0,0350
7	Belonging	0,5	1,5	0,06	0,0233
8	Active Use of Social Media	0,4	1,4	0,04	0,0167
9	Social responsibility	0,2	1,2	0,03	0,0139
10	Use of Sponsors	0,2	1,2	0,03	0,0116
11	Transperancy	0,2	1,2	0,02	0,0096

In Table 5, the criterion weights obtained as a result of the calculations made for Decision-maker 1 for other decision-makers are also shown in Table 6.

Table 6. Weight of Criteria Calculated on DMs

Criteria	DM1	DM2	DM3	DM4	DM5	DM6	DM7	DM8	DM9	DM10
Sponsor	0,0116	0,1376	0,1275	0,0025	0,0178	0,0038	0,4323	0,3954	0,0722	0,0463
Suitability of the Club Purpose	0,3970	0,0169	0,2422	0,0248	0,1413	0,0189	0,0290	0,0381	0,2180	0,4435
Satisfaction after the Event	0,1675	0,0055	0,0061	0,2291	0,0029	0,4076	0,0078	0,0254	0,1982	0,1334
Prestige	0,2268	0,0254	0,0124	0,1527	0,1009	0,2547	0,0744	0,0648	0,0190	0,2334
Benefit / Personal Development	0,1260	0,0097	0,4360	0,4353	0,4134	0,0339	0,0148	0,0134	0,1524	0,0250
Plan Compliance	0,0560	0,0381	0,0213	0,0069	0,0320	0,1377	0,1264	0,2326	0,1155	0,0834
Belonging	0,0233	0,4183	0,0405	0,0849	0,0561	0,0706	0,0465	0,0874	0,0322	0,0026
Social Responsibility	0,0139	0,0074	0,0073	0,0015	0,2120	0,0101	0,0036	0,0045	0,0451	0,0152
Active Use of Social Media	0,0167	0,0071	0,0178	0,0046	0,0049	0,0441	0,0043	0,0064	0,0111	0,0082
Transperancy	0,0096	0,0724	0,0161	0,0447	0,0074	0,0075	0,0207	0,0095	0,1270	0,0039
Order	0,0840	0,2615	0,0728	0,0131	0,0111	0,0111	0,2402	0,1224	0,0093	0,0051

The criterion weights obtained in Table 6 were obtained by averaging the weights of the criteria for each decision-maker. The results are shown in Table 7. As a result of the evaluations, the decision makers concluded that the most important criterion is the "Personal Development / Benefit" criterion with a value of 0,165998.

Table 7. Final Criteria Weights

Criteria	Final Criteria Weight
Benefit / Personal Development	0,165998
Suitability of the Club Purpose	0,156973
Use of Sponsors	0,124936
Prestige	0,116456
Satisfaction after the Event	0,105085
Belonging	0,086246
Plan Compliance	0,084988
Order	0,08306
Social responsibility	0,033111
Transperancy (Accountability)	0,031903
Active Use of Social Media	0,011941

Table 7 shows the final results of benchmark weights. The final results were obtained by averaging the evaluations of the decision makers. The averages of the evaluations made by the experts can lead the researchers to the final criteria weights. After obtaining these results, student clubs had the opportunity to perform the evaluation process as a result of the criteria weights obtained.

The data for the two student clubs evaluated for the study are given in the table below.

A and B clubs data for 2018;

Table 8. Data Obtained for Student Clubs

Questions asked by criteria	A Club	B Club
Total number of events	40	22
Number of certified events	10	4
Number of events organized out of purpose	8	6
Number of Active Sponsors Used	5	3
Total number of students	1153	750
Number of satisfaction surveys conducted at events	0	0
Number of members still active in the previous year	575	100
Number of events canceled from planned activities	0	1
Number of socially responsible activities	8	1
Interactions for the last 1 week on social media	1934	1088
Order	11	11
Number of technical trips	8	5

The data in Table 8 is obtained from student clubs. It is then calculated on the basis of predetermined criteria with the help of the following data. The final criterion in Table 7 is multiplied by the weights. In this context, the data in Table 9 is obtained.

Benefit / Personal Development = Number of Certified Events / Total Events

Suitability of the Club Purpose = 1-(Number of Activities not related to Purpose of the Club / Total Events)

Use of Sponsors = Number of Active Sponsors

Prestige = Number of Club Members / Total Number of Students of Sakarya University

Member / Participant Satisfaction after the Event = Number of Satisfaction Surveys / Number of Events

Belonging = Number of active students compared with previous year / Number of Club Members

Plan Compliance = 1-(Canceled Events / Total Events)

Social responsibility = Number of Social Responsibility Activities / Total Number of Activities

Active Use of Social Media = Number of Interactions for the Last Week in Social Media

Transparency = (Number of Technical Trips + Number of socially responsible activities) / Total Events

Order = Responsibility to the questions above

Table 9. Performance Results of the Club

Criteria	Criteria Weights (Final)	A Club	B Club
Benefit / Personal Development	0,165998	0,714286	0,285714
Suitability of the Club Purpose	0,156973	0,571429	0,428571
Use of Sponsors	0,124936	0,625	0,38
Prestige	0,116456	0,019659	0,012788
Satisfaction after the Event	0,105085	0	0
Belonging	0,086246	0,498699	0,133333
Plan Compliance	0,084988	0,975	0,909091
Order	0,08306	0,5	0,5
Social responsibility	0,033111	0,2	0,045455
Transparency	0,031903	0,40	0,27
Active Use of Social Media	0,011941	0,639974	0,360026
TOTAL		0,483073	0,307839

4. RESULTS AND DISCUSSION

In this study, 11 criteria for T.C. Sakarya University Student Clubs were evaluated by 10 experts and their weights were calculated by SWARA Method. The criteria determined for the clubs were firstly ranked according to importance by the experts, and then scores were given to determine the relationship of each with the previous one. As a result of the study, the five most important criteria were determined as the personal development and utilization characteristics of the clubs, the activities of the club in accordance with the purpose of the club, the support of the sponsor, the prestige of the club and the satisfaction survey of the participants after the event. In addition, it was concluded that the criterion with the highest importance was the ‘‘Personal Development / Benefit’’ criterion and the criterion with the lowest importance was the ‘‘Active Use of Social Media’’ criterion.

Student clubs should benefit from personal development and care for their own development. For this reason, the purpose of the research is to ensure that there is no standardization in which the performance of student clubs can be evaluated and that the performance of the club cannot be improved. In order to evaluate the performances, it has been tried to learn how clubs can become the most developed from the most basic form to the most developed. Therefore, it was necessary to conduct this research evaluating the performance of student clubs. As a result of the data obtained as a result of the research, the aim of the club is to make the club activities more efficient and active. Students will have the opportunity to develop themselves in the areas they are interested in with club activities, will benefit the development of the university where they study and as a result will have a positive effect on the relationship of the universities with the environment. When the total scores calculated in Table 9 are considered, it can be said that the performance of the club A is better than the club B.

When the priority ranking is examined according to the determined criteria weights, finding sponsors for the financing of the event is in front of the event. Club members; The target sponsors from networking and networking in finding sponsors shape the activities in line with their field of activity, which again affects the performance.

REFERENCES

- [1] Yükseköğretim Kanunu 1981 tarih ve 2547 numaralı www.yok.gov. (10.12.2018)
- [2] Karşlı, Sezgin, ‘‘İlköğretim Okullarında Sosyal Kulüp Çalışmalarının Öğrencilerin Yöneticilik Niteliklerinin Gelişmesine Katkısı’’, Gazi Üniversitesi, Eğitim Bilimleri Enstitüsü, Gazi Üniversitesi, Eğitim Bilimleri Enstitüsü, Yüksek Lisans Tezi, (2006).
- [3] Özkaptan, Ertan, ‘‘Okullardaki Sosyal Kulüp Etkinliklerinin Rekreatif Açısından Değerlendirilmesi (Adapazarı Ortaöğretim Kurumları Örneği)’’, Sakarya Üniversitesi, Sosyal Bilimler Enstitüsü, Beden Eğitimi ve Spor Öğretmenliği Anabilim Dalı, Yüksek Lisans Tezi, (2007).
- [4] Yiğit, Nurcan, ‘‘Ortaöğretim Kurumlarında Uygulanan Öğrenci Kulüplerinin Değerlendirilmesi’’, Anadolu Üniversitesi, Eğitim Bilimleri Enstitüsü, Eğitim Bilimleri Bölümü, Eğitim Programları ve Öğretimi Anabilim Dalı, Eğitim Programları ve Öğretim Bilim Dalı, Yüksek Lisans Tezi, (2008).
- [5] Nama, Mehmet, ‘‘Üniversite öğrencilerinin ders dışı etkinlikler konusundaki yaklaşımları’’, Anadolu Üniversitesi, Sosyal Bilimler Enstitüsü, Eğitim Bilimleri Bölümü, İletişim Bilimleri Anabilim Dalı, İletişim Bilimleri Bilim Dalı, Yüksek Lisans Tezi (2010).
- [6] Eminoğlu, Emel, ‘‘Boş zamanların değerlendirilmesinde ilköğretim okullarındaki öğrenci kulüplerinin yeri’’, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Eğitim Bilimleri Anabilim Dalı, Yüksek Lisans Tezi (2011).
- [7] Yalçın, Serkan, ‘‘Meslek liselerindeki öğrenci kulüplerinin sosyalleşmeye etkisi’’, Marmara Üniversitesi, Fen Bilimleri Enstitüsü, Teknoloji Eğitimi Anabilim Dalı, Yüksek Lisans Tezi, (2014).
- [8] Birtürk, Hande, ‘‘Okullarda sosyal kulüplerin işlevselliği’’, Yeditepe Üniversitesi, Eğitim Bilimleri Enstitüsü, Eğitim Yönetimi ve Denetimi Anabilim Dalı, Yüksek Lisans Tezi, (2015).
- [9] Ç. Şahin, Gamze, ‘‘Kars ilindeki ilkokullarda yürütülen eğitsel kulüp çalışmalarının öğrenci ve öğretmen görüşleri çerçevesinde incelenmesi’’, Kafkas Üniversitesi, Sosyal Bilimler Enstitüsü, Eğitim Bilimleri Anabilim Dalı, Eğitimde Program Geliştirme Bilim Dalı, Yüksek Lisans Tezi, (2015).
- [10] Ay, Kübra, ‘‘Öğrenci Kulüp Etkinliklerinin Öğretim Programında Yer Alan Temel Becerileri Geliştirmedeki Etkililik Düzeyine İlişkin Öğrenci Ve Öğretmen Görüşleri’’, Pamukkale Üniversitesi, Eğitim Bilimleri Enstitüsü, Eğitim Bilimleri Anabilim Dalı, Eğitim Programları Ve Öğretim Bilim Dalı, Yüksek Lisans Tezi, (2015).
- [11] Gögebakan, Mehmet, ‘‘Liselerde sosyal kulüp etkinliklerinin etkililiği’’, İstanbul Sabahattin Zaim Üniversitesi, Sosyal Bilimler Enstitüsü, Eğitim Bilimleri Anabilim Dalı, Eğitim Yönetimi ve Denetimi Bilim Dalı, Yüksek Lisans Tezi, (2016).
- [12] Pedagoji Sözlüğü, Sosyal Yayınları, (1953: 909) İstanbul, 1994.
- [13] Mahadi, S. R. S., Jamaludin, N. N., Rozarina J., Intan N. ve Firdaus, M. F. (2016) ‘‘The Impact of Social Media Among Undergraduate Students: Attitude’’, Procedia - Social and Behavioral Sciences 219(31), pp.472-479.
- [14] Gikas J. ve Grant, M. M. (2013), ‘‘Mobile Computing Devices in Higher Education: Student Perspectives On Learning With Cellphones, Smartphones & Social Media’’, The Internet and Higher Education, 19, pp. 18- 26.

- [15] Kirschner, P. A. ve Karpinski, A. C. (2010) “Facebook and Academic Performance”, *Computers in Human Behavior* 26 (6), pp. 1237-1245.
- [16] Alalwan, A. A., Rana, Nripendra P., Dwivedi, Yogesh K. ve Algharabat, R. (2017) “Social Media in Marketing: A Review And Analysis of The Existing Literature”, *Telematics and Informatics* 34(7), pp. 1177-1190.
- [17] Taleb, Z. ve Sohrabi, A. (2012) “Learning on The Move: The Use Of Mobile Technology To Support Learning For University Students”, *Procedia Social and Behavioral Sciences* 69, pp.1102-1109.
- [18] Çakır, E., and Karabıyık Kutlu B., Bütünleşik SWARA - COPRAS Yöntemi Kullanarak Bulut Depolama Hizmet Sağlayıcılarının Değerlendirilmesi. *Bilişim Teknolojileri Dergisi*,4,Ekim 2017.
- [19] S. H. Zolfani, M. H. Esfahani, M. Bitarafan, E. K. Zavadskas, and S. L. Arefi, “Developing A New Hybrid MCDM Method for Selection of The Optimal Alternative of Mechanical Longitudinal Ventilation of Tunnel Pollutants During Automobile Accidents,” *Transport*, vol. 28, no. 1, pp. 89–96, 2013.

DEVELOPMENT OF THE INSTRUCTIONAL ACTIVITIES FOR ENHANCING STUDENT TEACHERS' ABILITY IN DEVELOPING INSTRUCTIONAL INNOVATION FOCUSING ON LOCAL-RELATED CONTENT BY USING LESSON STUDY APPROACH

Arthitaya KHAOPRAAY
Phetchabun Rajabhat University, Thailand
khaopraay.a@gmail.com

ABSTRACT

The aims of this research were to develop and study the effect of using instructional activities for enhancing student teacher' ability in developing instructional innovation which focuses on local-related content by using lesson study approach. The target group included 24 third-year student teachers who majored in General Science at the Faculty of Education, Phetchabun Rajabhat University. This study was consisted of 3 steps. The first step included developing instructional activities and carrying out a pilot study on the implementation of the instructional activities for enhancing student teacher' ability in developing instructional innovation which focuses on local-related content by using lesson study approach. The second step was to implement instructional activities for enhancing student teacher' ability in developing instructional innovation which focuses on local-related content by using lesson study approach. The third step was to improve the instructional activities for enhancing student teacher' ability in developing instructional innovation which focuses on local-related content by using lesson study approach. The research instruments were instructional activities plans by using lesson study approach, learning achievement test, the instructional innovation development ability which focuses on local-related content test and the instructional innovation assessment form.

The research results showed that the development instructional activities for enhancing student teacher' ability in developing instructional innovation which focuses on local-related content by using lesson study approach consists of 6 learning activities including 1) analyzing problems together 2) selecting appropriate innovations 3) selecting local-related content 4) designing instructional innovation 5) implementing instructional innovation and 6) publishing instructional innovation. This was a three-phase lesson study cycle including 1) plan 2) see and 3) reflect. The instructional activities were considered feasible at high level. The results of using instructional activities for enhancing student teacher' ability in developing instructional innovation which focuses on local-related content by using lesson study approach were as follows; the student teachers had the knowledge for developing instructional innovation which focuses on local-related content after learning higher than before learning at the significant level of .05, the student teachers had abilities for developing instructional innovation which focuses on local-related content after learning at 80.25 percentage which was significantly higher than the predefined criterion standard (75%) at the significant level of .05 and the local contents in which the student teachers had into the instructional innovation were relevant to the student and school' contexts. Every single one of their developed instructional innovations was evaluated and ranked at a very good level.

Keywords : Instructional Activities, Instructional Innovation Development, Lesson study, The Infusion of Local-Related Contents, Student Teachers

INTRODUCTION

The ability to develop innovation is an important skill of the 21st century, especially for teachers because a quality of teaching can occur if teachers are able to apply new knowledge, concepts, methods, techniques or inventions in teaching to suit the problems or real conditions that occur in their own classes in accordance with the Teachers Council of Thailand regulations Regarding professional standards, 2013, item 8, innovation performance and educational information technology that teachers should have. In addition to Dachakupt and Khaengkhan (2012) suggested that the performance of the teacher should have one aspect: use of information technology and educational innovation. Therefore said that the ability to develop innovative teaching is one of the key talents of teachers and is considered an important role of the teacher production institute to develop this ability for students teachers to prepare for becoming a professional teacher in the future. Tantaviwong (2014) said that the quality of modern thai teachers in the 21st century, teachers must have deep science, subject matters and art in teaching (Methodology). There is a technique to transfer to learners with the spirituality of teachers that aims to create learning for the learners and themselves. By being able to think and analyze to create knowledge to link local conditions to international standards. Therefore, the ability of teachers to link local conditions or local learning

materials into the class which may be an issue that is often overlooked in the development of teachers, although it is very important because learning that relates to the real life of the learner is meaningful learning. Therefore, modern teachers should have the ability to link local learning into the learning management that is consistent with the context in order to make an impact on community and society change to be stronger if the teacher is able to bring local learning content, integration into teaching and learning in the classroom considered a professional teacher, not only developing knowledge but also enhance the desirable characteristics for learners. Therefore, it is necessary to develop teachers to be able to develop teaching innovation that focuses on local-related content. Researcher as a course instructor in scientific curriculum development of Bachelor of Education Major of General Science, Faculty of Education, Phetchabun Rajabhat University in Thailand has designed teaching processes to enhance the ability to develop innovative learning management for students by using the process of teaching innovation and research process as a basis which is widely used in the development of teaching innovation. But still found a major problem is that students cannot design innovations and cannot design innovations that integrate local-related content or can design innovations but cannot actually be used with students in the school. The study found that because students are not able to truly identify the problems of learning of students, lack of data collection or observing students in real class context, lack of thinking and systematic planning students often design teaching innovative according to their own interests. There is a lack of education in local information. Students will study only documents, texts or websites did not survey or collect data from the actual area and also found that when the teaching innovations of the developed students were not able to solve the problems of the students at the point. Lesson Study originated in Japan (Isoda 2007, Saito 2012). It has the characteristics of effective professional development: teachers are actively involved in both the process as the products, the focus is on content and specifically on students learning this content, it takes place over a longer time span, and there is coherence between the activities (Garet et al. 2001, Penuel et al. 2007). In Lesson Study, teachers in collaboration select a topic and plan and prepare a lesson (called a research lesson), one teacher enacts the research lesson and the others observe the students in class, and finally teachers discusses their observations (Lewis et al. 2006, Isoda et al. 2007, Stepanek et al. 2007) the implementation cycle with 3 phases: 1) *plan* which is identify students' problems targeting and planning lesson development together. Which the words here are meant to cover the teaching and learning plans state of teaching and learning management and learners' learning results. 2) *see* to observe and collect information about thinking and learning of learners directly while studying and 3) *reflect* by discussing reflection examination of performance results from empirical evidence obtained from classroom observations for improvement of lessons and exchange. This research is interested in applying the concepts, principles and processes of developing lesson study together to be applied and developed as a teaching process for enhancing student teacher' ability in developing instructional innovation which focuses on local-related content so that students can identify problems of students, define the objectives of innovation and can design innovation to truly solve problems.

THE STUDY

This research is conducted by using the research and development process. There are 3 steps to proceed.

Step 1: Creating and inspecting the quality of instructional activities for enhancing student teacher' ability in developing instructional innovation which focuses on local-related content by using lesson study approach. This step was researcher studied the basic information about the development guidelines for instructional innovation and lesson study development concepts then designed the instructional activities and checking quality by experts in curriculum and instructional, measurement and evaluation, and lesson study for 5 persons, considering the suitability. The tools used in the research were: 1) plans to organize instructional activities using the concept of lesson study and 2) assessment form for instructional activities appropriateness which is characterized by rating scale 5 levels, data analysis using average values and standard deviation.

Step 2: Experiment using instructional activities. This step is the implementation of the instructional activities created in step 1 to be used to test the effectiveness of the student teacher' ability in developing instructional innovation which focuses on local-related content 3 aspects: 1) comparing knowledge in developing instructional innovation which focuses on local-related content before and after organizing activities 2) comparing on the ability in developing instructional innovation which focuses on local-related content threshold to 75 percent, and 3) evaluation instructional innovation of student teachers. The samples used in the experiment were student teachers, General Science Major, 3rd year, Faculty of Education, Phetchabun Rajabhat University in Thailand who studied in the course of the development of science courses, 24 people by purposive sampling. The tools used in the research consisted of 1) plans to instructional activities using lesson study concept 2) knowledge test on developing instructional innovation which focuses on local-related content were 4 choices, 20 items with IOC between 0.80 - 1.00. The test is used to experiment with student teachers of general science, 3rd year, which is not a sample of 30 people. The Discrimination by Brennan's method is between 0.40 - 0.82 and has the reliability by Lovett's method of 0.86. 3) The assessment of the ability to developing instructional innovation which focuses

on local-related content by analytic rubric with IOC between 0.80 - 1.00 with inter-rater reliability to 0.84 4) innovation evaluation for instructional innovation of student teachers by 5-level rating scale 5) learning log form as open-ended questions and 6) AAR assessment form as open-ended questions with 5 items

Step 3: Improve instructional activities by questioning the opinions and satisfaction of the student teachers who were the sample groups for instructional activities and bring the process to the experts for review again and improve according to observations and suggestions. Present the research results according to the research objectives and summarize the research findings and give suggestions and this research used one group pretest - posttest design.

1. Test the knowledge in developing instructional innovation which focuses on local-related content before organizing instructional activities.

2. Conduct instructional activities according to the activities plan. The period of trial operation between February - March 2019 for 16 hours

3. During the course of instructional activities the researcher observed behavior and asked student teachers to write a learning log.

4. After the trial is completed, the researcher will proceed as follows:

- 4.1 Testing of knowledge in developing instructional innovation which focuses on local-related content by testing as well as testing before class

- 4.2 Assess the ability to developing instructional innovation which focuses on local-related content by checking the activity sheet and evaluation of instructional innovation that which focuses on local-related content of assigned students

- 4.3 Students to write a learning log.

Data analysis was divided into 1) quantitative data analysis; 1.1) comparison of knowledge in developing instructional innovation which focuses on local-related content of students by t-test dependent samples, 1.2) compare the ability to developing instructional innovation which focuses on local-related content of students after organizing activities with 75 percent criteria by t-test, one sample and 1.3) evaluating student instructional innovation by finding the mean, and standard deviation 2) qualitative data analysis by content analysis from learning log.

FINDINGS

1) The results of creating and monitoring the quality of instructional activities for enhancing student teacher' ability in developing instructional innovation which focuses on local-related content by using lesson study approach. It was found that the activities of instruction were 6 activities; 1. analyzing problems together 2. selecting appropriate innovations 3. selecting local-related content 4. designing instructional innovation 5. implementing instructional innovation and 6. publishing instructional innovation. The six main steps were according to the concept of the lessons study. This was 2 lesson study cycle and each cycle had 3 phases: 1) plan 2) see and 3) reflect. The 1st cycle in steps 1-4 is the development of lesson study in the context of peer-to-peer teaching. And the second cycle in step 5 and 6 is the development of lessons study in the context of real instructional activities for students in the school (Figure 1) at a high level.

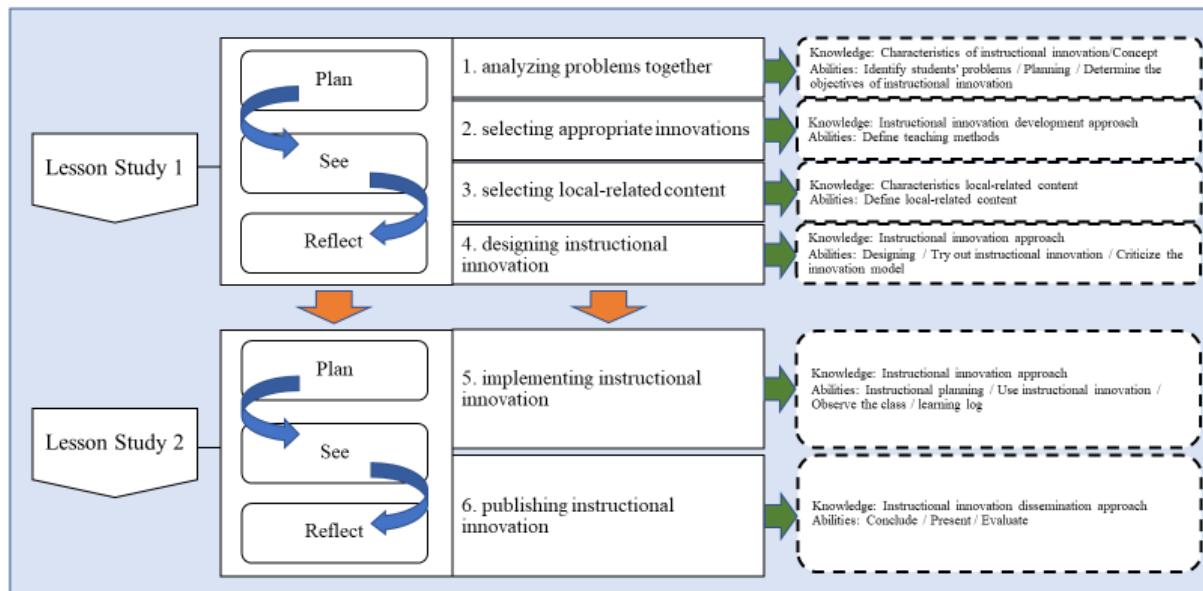


Figure 1 instructional activities for enhancing student teacher' ability in developing instructional innovation which focuses on local-related content by using lesson study approach

2) The student teachers had the knowledge for developing instructional innovation which focuses on local-related content after learning higher than before learning at the significant level of .05 (Table 1.)

Table 1. the results of comparison of knowledge in developing instructional innovation which focuses on local-related content before and after learning (n = 24)

activities	full mark	\bar{x}	S.D.	t	P
before	20	8.50	0.55	57.74*	.000
after	20	14.50	0.67		

P < .05

3) The student teachers had abilities for developing instructional innovation which focuses on local-related content after learning at 80.25 percentage which was significantly higher than the predefined criterion standard (75%) at the significant level of .05 (Table 2)

Table 2. Comparison of the ability to develop instructional innovation which focuses on local-related content after learning with 75 percent criteria standard (n = 24)

Instructional Activities	full mark	\bar{x}	percent	S.D.	t	P
Analyzing problems together	5	3.88	77.60	0.54	7.74*	.000
Selecting appropriate innovations	5	4.23	84.60	0.56	13.25*	.000
selecting local-related content	5	4.15	83.10	0.62	14.25*	.000
designing instructional innovation	5	4.18	83.70	0.45	12.45*	.000
implementing instructional innovation	5	3.83	76.70	0.55	14.68*	.000
publishing instructional innovation	5	3.79	75.80	0.58	7.58*	.000
Total/Average	30	4.01	80.25	0.58	21.36*	.000

P < .05

4) The results of content analysis from student learning log showed that students had a view on instructional innovation and development of instructional innovation that integrated clear local-related content especially in the issue of choosing the right innovation to connect to the selection of local-related content and design of instructional innovative and can be used practically and appropriately. The local contents in which the student teachers had into the instructional innovation were relevant to the student and school' contexts. Every single one of their developed instructional innovations was evaluated and ranked at a very good level. Most of the work is instructional media and instructional activities.

CONCLUSIONS AND DISCUSSIONS

Instructional activities for enhancing student teacher' ability in developing instructional innovation which focuses on local-related content by using lesson study approach consists of 6 learning activities including 1) analyzing problems together 2) selecting appropriate innovations 3) selecting local-related content 4) designing instructional innovation 5) implementing instructional innovation and 6) publishing instructional innovation. This was 2 lesson study cycle and each cycle had 3 phases: 1) plan 2) see and 3) reflect. The instructional activities were considered feasible at high level. The results of using instructional activities for enhancing student teacher' ability in developing instructional innovation which focuses on local-related content by using lesson study approach were as follows; the student teachers had the knowledge for developing instructional innovation which focuses on local-related content after learning higher than before learning at the significant level of .05, the student teachers had abilities for developing instructional innovation which focuses on local-related content after learning at 80.25 percentage which was significantly higher than the predefined criterion standard (75%) at the significant level of .05 and the local contents in which the student teachers had into the instructional innovation were relevant to the student and school' contexts. Every single one of their developed instructional innovations was evaluated and ranked at a very good level. Developed instructional activities can help student teachers instructional design activities that focuses on local-related content successfully and can be used effectively because the instructional activities encourage student teachers to think and work systematically. Promoting cooperative learning until it can produce innovation successfully and efficiently able to link local knowledge to instructional activities that is in line with the context in order to have a stronger impact on the change of community and society. Moreover, this instructional activities has a strength that encourages student teachers to take active learning, to learn to solve problems through practical work in class. Use knowledge in a variety of disciplines that have previously led to the practice of teaching. Resulting in learning and being able to develop instructional innovation very well and clearly. Participating student teachers reported that engagement in this form of lesson study with a mentor was an effective way to help them grow individual teaching skills, knowledge and confidence in teaching placements (Cajkler and Wood, 2016) and Lesson study contributed teachers' PCK development. The combination of two phases in this professional development program proved instrumental for this PCK development (Coenders and Verhoef, 2019). In addition to clear knowledge and understanding. Student teacher also develop skills and characteristics in many areas, such as good attitudes towards instructional development, being a teacher, working with others and being open-minded to the opinions of others which corresponds to the results of the joint lesson development that many experts (Lewis, 2002, Baba & Kojima, 2004 & Yoshida, 2005) indicate that developing lessons together helps develop student teachers to think deeply about long-term goals for students. To help student teachers learn about observation and criticism while building a teacher image. Helping student teachers become more confident and develop competency through their own initiative. Complementary cooperation and mutual respect.

REFERENCES

- Baba, T., and Kojima, M. (2004). Lesson study. In E. Maurice (ed). *The history of Japan's educational development: What implications can be drawn for developing countries today*. Tokyo: Japan International Cooperation Agency.
- Cajkler, W., and Wood, P. (2016). Adapting 'lesson study' to investigate classroom pedagogy in initial teacher education: what student-teachers think. *Cambridge Journal of Education*. 46 (1), 1-18.
- Coenders, F., and Verhoef, N. (2019). Lesson Study: professional development (PD) for beginning and experienced teachers. *Professional Development in Education*. 45 (2), 217-230.
- Dachakupt, P., and Khaengkhan, P. (2012). Teacher competency and guideline for teacher development in social change. In P. Sinlarat (ED.), *Excellence of education in Thailand* (pp. 30-35). Bangkok: Kurusapa Printing Ladphrao.
- Garet, M.S., et al. (2001). What makes professional development effective? Results From a national sample of teachers. *American Education Research Journal*. 38 (4), 915-945.
- Isoda, M. (2007). A brief history in mathematics Lesson Study in Japan. In: M. Isoda, Y. Ohara, and T. Miyakawa, eds. *Japanese Lesson Study in mathematics* NJ: World Scientific.
- Isoda, M., et al. (2007). *Japanese Lesson Study in mathematics: its impact, diversity and potential for education improvement*. Singapore: World Scientific Publishing Co., Pte. Ltd.
- Lewis, C. (2002). *Lesson Study: A handbook of teacher-led instructional change*. Philadelphia: Research for better school.
- Lewis, C., Perry, R., and Mutara, A. (2006). How should research contribute to instructional improvement? The case of Lesson Study. *Educational Researcher*. 35(3), 3-14.
- Penuel, W., et al. (2007). What makes makes professional development effective? Strategies that foster curriculum implementation. *American Education Research Journal*. 44 (4), 921-958.

- Saito, E. (2012). Key issues of Lesson Study in Japan and the United States: a literature review. *Professional Development in Education*. 38 (5), 777-789.
- Stepanek, J., Apple, G., Leong, M. T., & Mitchell, M. (2007). *Leading Lesson Study: a practical guide for teachers and facilitators*. Thousand Oaks, CA: Corwin Press.
- Tantaviwong, A. (2014). *The transformative of learning point to change Thailand*. Bangkok: Sahamitr Printing and Publishing.
- Yoshida, M. (2005). An overview of lesson study. In P. Wang-Iverson & M. Yoshida (eds). *Building our understanding of lesson study*. pp. 3-14. Philadelphia: Research for better school.

DIGITAL LITERACY OF SCHOOL ADMINISTRATORS IN WORLD-CLASS STANDARD SCHOOLS: A CONFIRMATORY FACTOR ANALYSIS

Panita ARDWONG

Faculty of Education, Khon Kaen University, Thailand

Panita.a@phukhiao.ac.th

Dawruwan THAWINKARN*

Faculty of Education, Khon Kaen University, Thailand

dawtha@kku.ac.th

*Corresponding Author

ABSTRACT

This research aimed to study the elements of digital literacy for administrators World-Class standard school. The research design is a descriptive research on 2 steps; 1) to review 14 documents about digital literacy for synthesis the elements of digital literacy and 2) to analyze confirmatory factor analysis of digital literacy of school administrators. The samples used consist of 330 participants; 30 school administrators and 300 teachers, which were derived from the sample group selection by Multi-Stage Random Sampling. The questionnaire was used as an instrument to identify the digital literacy. The Cronbach's alpha reliability coefficients of the questionnaire was 0.91. The confirmatory factor analysis by the test of the measurement model elements consistent with empirical data. The results were as follows; The digital literacy for administrators World-Class standard school consisted of 4 main elements included: 1) knowing and understanding the value of digital, 2) using digital tools, 3) creativity and innovative thinking and 4) communications and networking. The results of the test of the goodness of fit index (GFI) of all 4 main elements with elements weight from 0.9921 – 0.998, $\chi^2 = 52.229$, Df = 41, $\chi^2 / Df = 1.2738$, RMSEA = 0.029, SRMR = 0.016, CFI = 0.997, TLI = 0.995 and statistically insignificant (P-Value = 0.1123) indicated that the model measuring elements are blend with the empirical data.

Keywords: Leadership Literacy, World – Class Standard School

Introduction

Technology advancement leads to major changes in society through competitiveness in the public and private sectors. Change is a constant in the educational administration; therefore being a school director and leading the school is difficult and consequently, most professional end up taking direction from others (Dawruwan Thawinkarn, 2018). These type of changes forces adaptation of every organization including paradigm and organizational management strategies in order to stay afloat. The important characteristics of people nowadays are their readiness to learn and levels of digital literacy regarding information technology, communication, and information technology skills. The Thai government has recognized the importance of these changes and issued the modification in vision to lead the country to the Thailand 4.0 model in which the improvement of the infrastructure and effective communication is a primary concern. This includes the internet network that covers most of the country to accommodate the economy and societies drive for innovation. Advanced technology in the digital age as well as internet network communication greatly affects people's creative behavior and use of information technology for communication (Suwit Mesinsee, 2016)

Accordingly, digital awareness has become one of the great skills in the present where technology has a key role in daily life. The Thai government has attempted to raise people's awareness in learning and using technology as a tool to promote and facilitate learning and improving the quality of life in various aspects (Secretariat of the House of Representatives, 2015). Due to the significance of digital technology in the present, it has immense power to drive learning development of people as well as that of the economy and society. Every member of society needs to understand receptive and productive digital technology media including the management, creation, working process and communication of information technology. This also includes the emotional handling of oneself on online platforms. Therefore, it is important to educate people and equip them with necessary technological skills as well as analytical ability and digital literacy so that people can use digital tools to safely yet creatively produce digital information while being aware of the responsibility towards what they produce. The aforementioned is a key to developing a complete digital citizen (Ashley, et al., 2012). The Digital Ministry of Economy and Society is concerned about the development of digital awareness inasmuch that digital awareness was included in the digital development plan for the economy and society in the 3rd strategic plan, meant to promote equality through technology. The primary goal of this plan is for all people to have awareness, understanding and skills in using digital technology, so as to be useful and creative. Digital literacy corresponds with basic knowledge like literacy

and mathematics (Karpati, 2011). Additionally, it can develop learners' intellectual abilities to a high level following the learning processes such as analysis, evaluation, and creation by creating and implementing digital literacy in such a way that is good for learning.

School administrators or educational managers are important parts in the implementation of quality management. Crucial characteristics of executives in the present is having the leadership wisdom to incorporate relevant individuals such as teachers or others to creatively build approaches and learning skills development in the age of change to achieve quality education management. In doing so, executives need digital understating and ability, creativity, innovation skills, effective communication skills, as well as promoting an effective working culture of individuals regarding digital literacy to encourage quality educational management.

This research aimed to study factors regarding the digital literacy of school administrators in world-class schools. It intends to raise awareness of individuals or organizations related to educational institution development on school administrator development to be a digitally knowledgeable leader in effectively managing their world-class schools; in order that their schools can adapt to the rapid change through the ability to creatively use technology media and build digital innovation networks in an efficient manner for ultimate benefits for the development of educational quality in the future.

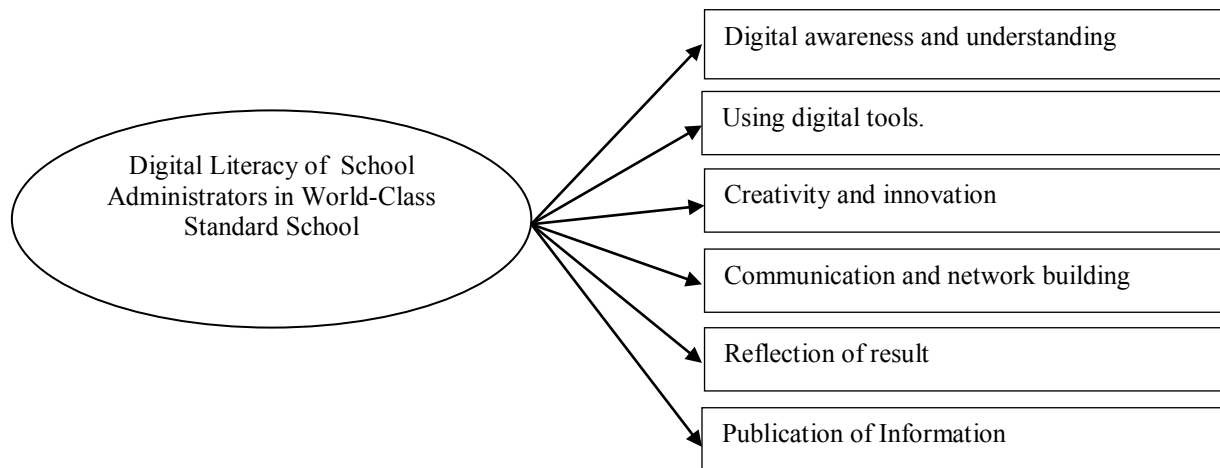
Research objectives

To study factors of digital literacy of school administrators in world-class schools.

Population and sample

The population was 937 school administrators and teachers of world-class schools in Chaiyaphum Province. The sample was classified using confirmatory factor analysis using the ratio between the sample unit and the number of variables at 20:1 (in this number, 16 parameters used 20:1 ratio). As a result, 320 school administrators and teachers from world-class schools Chaiyaphum Province Thailand were determined, and then were derived from the sample group selection by Multi-Stage Random Sampling.

Conceptual Framework



Research procedure

This study is a descriptive research to investigate digital literacy leadership factors of school administrators in world-class schools. Accordingly, the research procedure was divided into 2 phases, each phase is detailed as follows.

Phase I. A document study was done to analyze and synthesize factors related to digital literacy from theories and related research.

Phase II. Confirmatory Factor Analysis (CFA) was employed to confirm factors related to digital literacy of school administrators by testing the correlation of the model indicators of digital literacy of school administrators and world-class schools, with empirical data collected from primary sources.

RESULTS

From the document study of concepts and research from the scholars and researchers, the results suggest as per the following tables.

1. Confirmatory Factors Analysis results of digital literacy leadership of school administrators in World-Class Standard Schools see the Table 1.

Table 1. Results of analyze and synthesize factors related to digital literacy.

digital literacy	viram&Eshet-Alkala(2006)	Martin &Grudziecki(2006)	Bowden (2007)	Media Awareness Net(2011)	Hague & Payton (2010)	Hobb (2010)	Ala-Mutka (2011)	Eshet (2012)	Cordell (2013)	Jisc (2014)	The University Library of The University of Illinois (2014)	Sommarat Pibulmanee (2017)	Offices of civil servants and civil servants. (2560)	Office of Science and Technology (2559)	Frequency
1. Digital awareness and understanding	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	15
2. Using digital tools.	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	13
3. Creativity and innovation		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	13
4. Communication and network building	✓	✓	✓		✓		✓	✓	✓	✓		✓	✓	✓	11
5. Reflection of result						✓						✓			2
6. Publication of Information			✓				✓								2

From Table 1, the analyze and synthesize of factors related to the theoretical framework of digital literacy was analyzed to determine the frequency of these factors into the highest and the most relevant in terms of administrative roles of school administrators and world-class schools. The results suggested four key factors, which are 1) digital awareness and understanding, 2) using digital tools., 3) creativity and innovation, and 4) communication and network building.

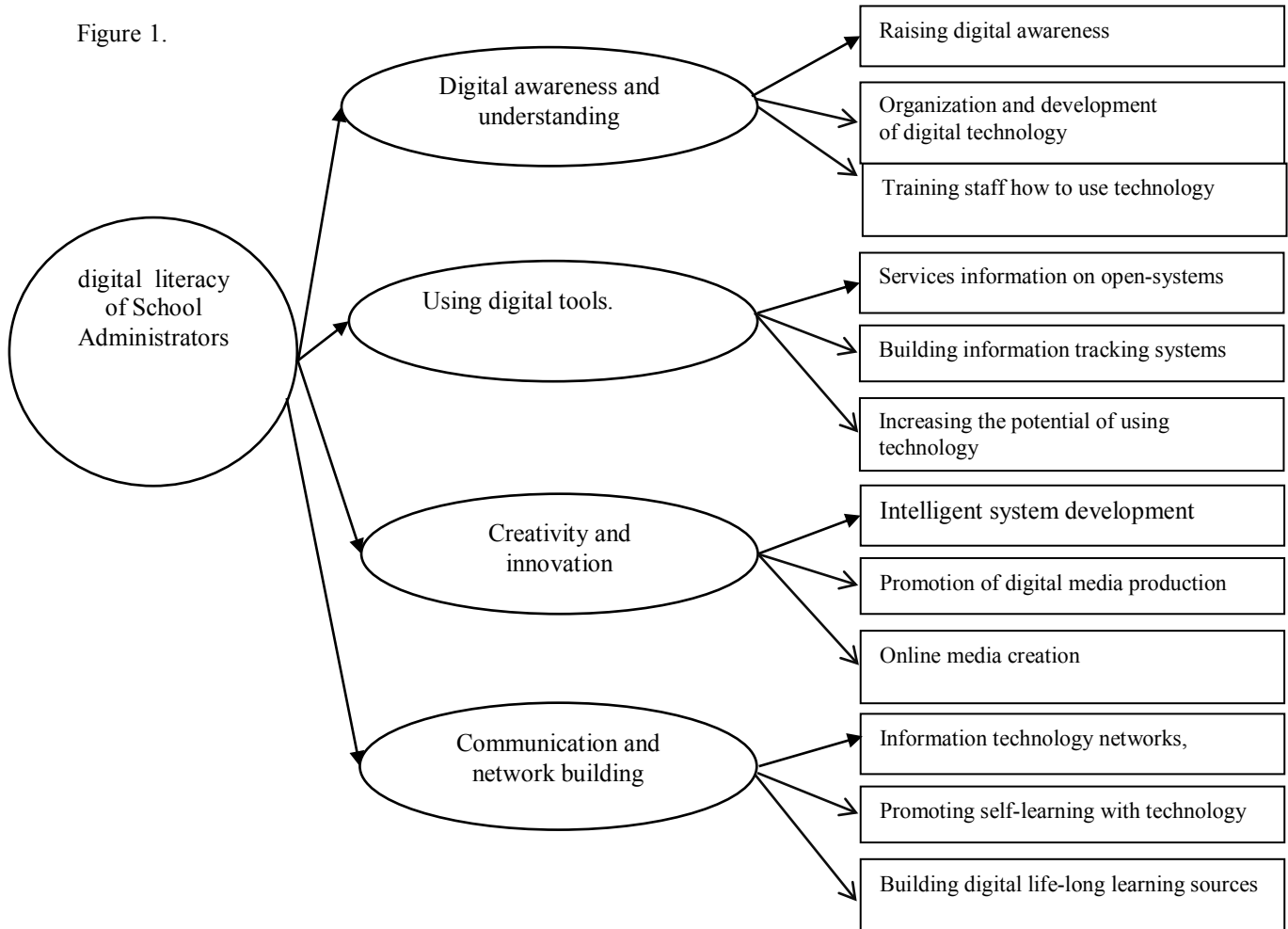
Table 2. Digital literacy factors synthesizing.

Key factors	Operational definition	Indicators
1) Digital awareness and understanding	School administrator's awareness of the important role of technology that will be used to develop their schools to be adaptable in the digital age and to effectively plan quality learning through policy, strategy, and budget distribution regarding technology development, classroom information systems and other operation rooms. Also, it could be useful for developing the service system of the organization to be more responsive and have digital literacy when dealing with information system organization.	1) Raises school staff's awareness of the importance of technology in the digital age. 2) Establishes policies, strategies, strategic issues, development guidelines, and mission to develop educational institutions. 3) Makes annual digital technology development plan and operational plan for schools. 4) Arranges high speed internet Wi-Fi for all area information access. 5) Arranges or develops technology systems for the purpose of educational institution management. 6) Arranges or develops operational rooms with medial, equipment, and technology suitable for digital education. 7) Educates and trains staff to be ready to work with digital technology.
2) Using digital tools.	Work process of skills of teachers or school administrators or the readiness of equipment for the ultimate purpose using	8) Promotes database development by allowing everyone access to the same database that is used for school administration.

	information technology for systematic management and quality services. Moreover, teachers and staff can effectively work using technology specially designed for the purpose of public relations.	9) Develops or employs a technology system that is able to keep track of all school projects and activities. 10) Promotes the use of modern technology for performance evaluation among teachers and staff 11) Trains teachers in the use of technological media and equipment for teaching and learning 12) Trains teachers and staff in the use of smartphones, tablets, and free applications for teaching and learning
3) Creativity and innovation	The ability of teachers and school administrators to think creatively in such a way that benefits the school, staff, students, parents, community and society by using digital technology effectively. This can be done by developing intelligent systems for schools to facilitate school contacts and for internal use. Also, schools can build knowledge banks that collect journals, academic papers, and knowledge content that are constructed or used by the school as a means of promoting schools' performance and knowledge exchange with other schools.	13) Creates an intelligent management system to serve teachers and staff. 14) Develops grades and reports via the internet so that students and parents can access the system conveniently. 15) Organizes smart classrooms to facilitate online use and e-learning and create online media resources for learning. 16) Creates websites for useful academic related information to promote students' self-learning. 17) Creates research bank collection of research journals of teachers and students for the purpose of information exchange. 18) Trains teachers how to produce digital teaching and learning materials. 19) Encourages reporting of progress using digital media information processing.
4) Communication and network building	The process or operation of school administrators or teachers to systematically build learning networks, collaboration, and monitoring processes through digital technology media and promote team networking in building a digital community of learning inside and outside the school for the collective good.	20) Create school websites to disseminate news and updates from schools. 21) Promotes the use of technology media in communication and remote administration. 22) Builds online networks within the organization so that teachers and staff can communicate. 23) Builds online monitoring systems using digital technology media. 24) Systematically manages knowledge sources to be beneficial for teachers and students. 25) Builds a learning community to promote knowledge and for school public relations. 26) Builds networks to exchange knowledge with prospective partners in the development of world-class schools.

From Table 2, the results of the synthesizing of factors related to the digital literacy of school administrators of world class schools are 1) digital literacy including three sub-factors which are raising digital awareness, organization and development of digital technology, and training staff how to use technology; 2) using digital equipment comprising of three sub-factors which are information services via open-systems, building information tracking systems, and increasing the potential of using technology; 3) creativity and innovation consisting of three sub-factors which are intelligent system development, the promotion of digital media production, and online media creation; and 4) communication and network building which consists of building information technology networks, promoting self-learning with technology, and building digital life-long learning sources. The results of the synthesis of digital literacy factors of school administrators and world-class schools, are shown in Figure 1.

Figure 1.



2. The results of Confirmatory Factor Analysis of factors related to digital literacy of school administrators, world-class schools, and empirical data are shown in Figure 2 and Table 3.

Figure2.The model of measuring the digital literacy of school administrators.

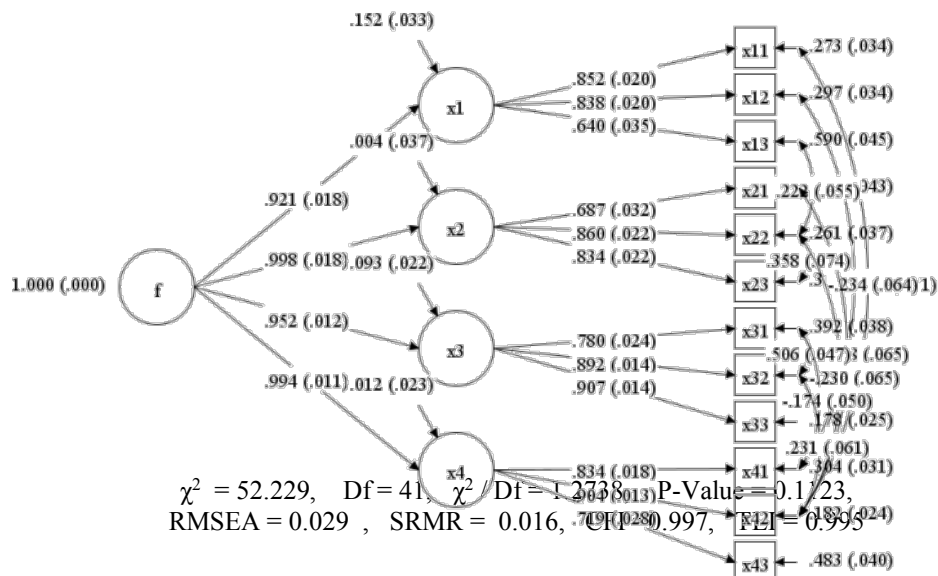


Table 3. The results of the test of fit index (GFI) for all 4 main elements.

Index of fit	Standard	The results	Considering the results.
χ^2 – Test	insignificant $P > 0.05$	$\chi^2 = 52.229$, Df = 41 P-Value = 0.1123	pass
χ^2 / Df	< 2.00	1.2738	pass
RMSEA	≤ 0.05	0.029	pass
SRMR	≤ 0.08	0.016	pass
CFI	≥ 0.95	0.997	pass
TLI	≥ 0.95	0.995	pass

From Table 3, the harmonic index of the model of digital literacy factors measurement is in line with the criteria. When considering Chi-square (χ^2) = 52.229, the degree of freedom (Df) = 41, and P-value = 0.1123 shows no statistical significance; RMSEA = 0.029, SRMR = 0.016, CFI = 0.997, TLI = 0.995, it suggests that the measure model is in accordance with empirical data as shown in Table 4.

Table 4

Factors of digital literacy	Factor Loading			(R ²)	Factor Scores (FS)
	β	S.E.	t		
1. Digital awareness and understanding	0.921	0.01	51.505	0.848	0.002
		8			
2 Using digital tools.	0.998	0.01	54.530	0.996	0.007
		8			
3. Creativity and innovation	0.952	0.01	81.462	0.907	0.005
		2			
4. Communication and network building	0.994	0.01	86.748	0.988	0.006
		1			

Table 4 shows the results of the confirmatory factor analysis of key factors related to digital literacy of school administrators in world class schools. It was revealed that factors measured in standard score has the highest weight values that are using digital tools ($\beta = 0.998$, $R^2 = 0.996$); communication and network building ($\beta = 0.994$, $R^2 = 0.988$); and creativity and innovation ($\beta = 0.952$), respectively. Additionally, the lowest weight values are that of digital literacy and understanding ($\beta = 0.921$, $R^2 = 0.848$).

DISCUSSION

The study of factors related to the digital literacy of school administrator in world class schools was done through the synthesis of relevant documents and research papers as well as confirmatory factor analysis to determine the key factors and indicators of digital literacy of school administrators in world class schools, corresponding to the world-class school contexts. That is, four key factors and 12 sub-factors related to digital literacy of school administrators were determined as 1) digital literacy and understanding including raising digital awareness, digital technology organization development, personnel development in digital technology; 2) using digital tools including information services via open systems, creating information tracking systems, and increasing the potential of technology use; 3) creativity and innovation including developing intelligent systems, encouraging digital media production, and creating an online media library; and 4) communication and network building including creating information technology networks, increasing opportunities for learning with technology, and creating life-long digital learning resources. The results were obtained under careful design informed by a literature review to ensure

the contextualization of the research itself. Moreover, data collected from questionnaires was analyzed for confirmatory factors and index of digital literacy of school administrators in world class schools. The research is in line with the concept proposed by Ala-Mutka(2011) pointing out that digital literacy involve four dimensions. The first dimension is computer literacy or technology literacy referring to the ability to use computers and software effectively. Secondly, internet or network literacy is an important skill for searching, choosing, and evaluating information on the internet. Thirdly, information literacy is another key skill for information searching and organization in an effective manner following moral principles, including the application of information technology to construct and disseminate knowledge. Lastly, media literacy is a skill necessary in analyzing, evaluating, and constructing various contents, whatever the type of content. Furthermore, it is also in accordance with the concept of Cordell (2013) suggesting five components of digital literacy. 1) Multiple skills cover thinking processes and techniques needed for doing research, evaluating information, understanding information and communicating appropriately with information technology. 2) The ability to use different technologies by appropriately choosing the most effective one to search and retrieve information as well as proper interpretation of the search adhere to the quality of the information technology. 3) Understanding of the technology and being aware that it needs continuous learning, and understanding privacy rights and the boundaries of using information technology. 4) Being able to use skills in communication and selection of information technology suitable for work, operators, and the community. 5) Being able to employ the digital skills in doing community activities and playing a part that rejuvenates the community by bringing news with responsibilities.

Acknowledgement

This work was supported by the Graduate School Khon Kaen University and the Center for research on plurality in the Mekong Region (CERP).

Recommendations

Suggestions for research implementation

1. The office of the Educational Service Area can apply the digital literacy development model of school administrators in world-class schools from the research in determination visions, directions, and missions of a school on development.
2. The office of the Educational Service Area or Education Management Agency can apply the research as guidelines for digital literacy development of school administrators at their schools that have a similar context to a world-class school for effective management of the school.

Suggestions for further research

1. The research results revealed that the highest weight valued factor is the use of digital tools; therefore, it is suggested that future research may empirically study the development of digital tools or skills in order to successfully manage education.
2. It is recommended that the model can be used to develop digital literacy of school administrators in R&D or further improve the existing digital literacy.
3. There should be further study on digital literacy development models of school administrators in different school settings other than world-class schools.

REFERENCE

- Ala-Mutka(2011)
- Ashley, et al. (2012). Learning literacies through collaborative enquiry ; collaborative enquiry through learning literacies. **Journal of Information Literacy**, 6(1), 49-71.
- Aviram, A., & Eshet-Alkalai, Y. (2006). **Towards a theory of digital literacy : Three scenarios for the next steps**. Retrieved from <http://www.eurodl.org/materials/contrib/2006>.
- Bowden, D. (2007). Origins and concepts of digital literacy. (p.19-34) In Lan kshear, C. & Knobel,M. (Eds.). **Digital literacies : Concepts, policies and practices**. New York : Lang Pub.
- Cordell, R. (2013). Information literacy and digital literacy : Competing or complementary? **Communication in Information literacy**, 7(2), 177-183.
- Dawruwan Thawinkarn. (2018). Relationship between perceived directors' leadership and classroom quality of primary school in Thailand. **Kasetsart Journal of Social Sciences**, 39(2018) : 230-235.
- Eshet.Y. (2012). Thinking in the Digital Era: A Revised Model for Digital Literacy. **Issues in Informing Science and Information Technology**, (9), 267-276.

- Hague, C. and Payton, S. (2010). **Digital literacy across the curriculum.** Bristol : Futurelab.
- Hobbs, R. (2010). **Digital and media literacy : A plan of action (knight commission on the information needs of communities in a democracy).** Washington, DC : Aspen Institute & Knight Foundation
- Jisc, (2014). **Developing digital literacies.** Retrieved 20 August 2018, from <https://www.jisc.ac.uk/guides/developing-digital-literacies>.
- Karpati, A. (2011). **Digital literacy in education.** Retrieved 31 March 31, 2017, From <http://unesdoc.unesco.org/images/0021/002144/214485e.pdf>.
- Martin, A. (2006). **Literacies for the digital age.** In Martin, A. & Madigan, D. (Eds.) Digital literacies for learning. London : Facet Pub.
- Sommarat Pibulmanee. (2017). **“Librarian Space: Digital Literacy.”** Accessed June 24. Available from <http://km.li.mahidol.ac.th/librarian-space-digital-literacy>.
- Suwit Mesinsee. (2016). **“Concepts countries Thailand 4.0.”** Accessed June 28. Available from http://planning2.mju.ac.th/government/20111119104835_planning/Doc_25590823143652_358135.pdf.
- The University Library of the University of Illinois. (2014). **“Digital literacy definition and resources.”** Retrieved from <http://www.library.illinois.edu/diglit/definition.html>
- Aviram, A., & Eshet-Alkalai, Y. (2006). **“Towards a theory of digital literacy : Three scenarios for the next steps.”** Retrieved from <http://www.eurodl.org/materials/Contrib>.
- Offices of civil servants and civil servants. (2560). **“Digital Literacy.”** Accessed November 7, 2018. Retrieved from <https://www.ocsc.go.th/DLProject/mean-dlp>.
- Office of Science and Technology. (2559). **“Digital Literacy.”** Accessed November 19, 2018. Retrieved from <https://www.nstda.or.th/th/nstda-knowledge/142-knowledges/2632>.

EFFECT OF BLENDED LEARNING APPROACH ON THE PERFORMANCE OF TECHNICAL COLLEGE STUDENTS IN WOODWORK, IN OYO STATE, NIGERIA

Dr. Badmus Ayodeji Muideen
Department of Educational Foundations
Faculty of Education
National Open University of Nigeria
aabadmus@noun.edu.ng 08067897787

ABSTRACT

Blended learning approach is an education program that combines online digital media with traditional classroom methods which requires the physical presence of both teacher and student, with some element of student control over time, place, path, or pace. In this study, the researcher examined the effect of blended learning approach on the performance of technical college students in woodwork, in Oyo State, Nigeria. The study was a pretest, posttest control quasi experimental type. Purposive sampling technique was used to select two co-educational technical colleges in Oyo State. Twenty (20) students of Government Technical College Ibadan were used for Blended Learning Approach (BLA) as experimental group while also 20 students of Government Technical College Awe participated as control group for Conventional Learning Method (CLM). Three research instruments were used for this study, Blended learning approach package on introduction to woodjoint, Learners' achievement test (LAT) and Questionnaire on students' attitudes towards blended learning approach (QSATBLA). BLA package was evaluated and validated by educational technologists to ensure that the package is developed in line with the principle of instructional design while ICT expert ensured that navigation process runs appropriately. LAT was subjected to reliability using Kuder-Richardson formula 20 (KR-20) with the reliability index of 0.81 while QSATBLA also subjected to reliability utilizing Cronbach alpha with an index of 0.85. The findings of the study showed that there was a significant difference in the mean scores of experimental and control groups ($t_{(38)}=7.74$, $p<0.05$) in favour of the experimental group and there was significant difference in the attitude of experimental and control groups with $t_{(38)}=-3.623$, $p>0.05$. Based on the findings, it was recommended among others, that teachers in technical colleges should expose themselves to various available instructional software packages that can foster improve their teaching strategies and further enhance teaching competency and students should be exposed to blended learning approach to promote and encourage positive students' social interaction.

Keywords: Blended learning approach, Traditional classroom methods, Technical College and Woodjoint,

INTRODUCTION

Nigeria like any other developing country in Africa is highly sensitive to the need of providing vocational and technical education to her teeming population in order to equip them with saleable skills (Alade, 2004). Since human demands may be sociological, psychological, philosophical, political and economic in nature, the pursuit of man therefore, is to function in the society in ways satisfactory to the above demands. In this vein, it is essential to note that no matter the high level of expertise of Nigerian populace, a modern nation, like Nigeria, can be built better and faster if high premium is given to vocational and technical education (VTE). In other words, the introduction of VTE into Nigeria education is to:

- provide trained manpower in the applied science, technology and business particularly at craft, advanced craft and technical levels.
- provide the technical knowledge and vocational skills necessary for agricultural, commercial and economic development.
- give training and impacting the necessary skills to individual who shall be self-reliant economically (FRN, 2004).

The national Policy on Education (NPE) has placed a great premium on VTE in view of its important role in technological and industrial development of Nigeria. It has recognized it as an aspect of education which leads to the acquisition of practical and applied skills as well as basic scientific knowledge (FRN, 2004). Vocational education (VE) is any form of education whose primary purpose is to prepare persons for gainful employment in a chosen occupation or to prepare individuals for enrolment in advanced technical education programmes (Okoro, 1993). Vocational education provides knowledge, develops skills, and also inculcates the attitudes that are necessary for entry and progress in an occupation. It is usually provided at upper secondary level, includes general education, practical training for the development of skills required by the chosen occupation and related theory.

Technical education is a special grade of vocational education in which success is dependent largely on technical information and understanding of the laws of science and principles of technology as applied to modern design, production, distribution and service (Osuala, 1995). It a post-secondary vocational training programme, and graduates of technical education programmes usually bridge the gap between the professional engineer and the craftsmen (Alade, 2004). It is an aspect of education which utilizes scientific knowledge in the acquisition of practical and applied skills, in the solution of technical problems. However, VTE as a type of education or training designed for preparing the individual learner to earn a living, that is, to be self-reliant, or increase his earnings. It is kind of education which promotes the dignity of labour by entrenching work as the goal of education. The study of VTE makes the environment more useful and convenient for man.

Technical colleges are set of institutions which are sometimes called Technical Training Schools (TTS) in some states are where specialized trades are learned to highly skilled level. In addition, all the students undertake general education which includes English language, Mathematics and related sciences. Graduate of these institutions are designed as Craftsmen who carry out skilled functions in engineering industries requiring the use of variety of machinery and handtools (Adebute, 1990). The courses available in the Technical colleges as stipulated in the National Policy on Education include Mechanical Trade, Computer Craft Practice, Electrical Engineering Trades, Building Trades, Wood Trades, Hospitality, Textile Trades, Printing Trades, Beauty Culture trades and Business Trades.

Training in technical education in Nigeria dated back to pre-colonial era when trades were owned and jealously guarded by individual families. During this period, skills of the trades were passed down from one generation to another through father/son relationship. This type of skills acquired under this arrangement was purely psychomotor. No emphasis was laid on related trade, theory and design skills which are an integral part of technical education curriculum. Under formal system of education, demonstration is the only method adopted by workshop instructor in technical institutions in general to make students acquire the relevant workshop practical skills.

With the introduction of educational technology into our educational system, the traditional roles of the classroom teachers have changed through the acquisition and utilization of wide variety of resources and procedures. Yusuf (2000) opined that effective teaching is dependent on good communication between the teacher and the students. He further emphasized, that only media can promote student-teacher interaction and student-student interaction. The results of researchers have indicated that the importance of the use of instructional media in the teaching-learning process cannot be over-emphasized, and one of those media is information and communication technologies (ICTs). In recent years, there has been increased emphasis on student-centred instructions and ICTs to facilitate learning at all levels of education and training.

The contemporary age is regarded as knowledge age and the usefulness of ICT is no longer in contention. This is succinct recognition of the pervasive influence of ICT which have made knowledge the most priced commodity (Yusuf, 2005). Over the last couple of years educators have been introduced to new technologies that facilitate learning in and outside of the classroom and provide many opportunities for collaborative and interdisciplinary activities (Daccord, 2006). The rapid development of ICT has given different views in the teaching-learning process where conventional learning is no longer used by the teachers.

Face to face learning provides the social interaction which is needed for learning. In other words, face-to-face processes are important and it should not be left behind in learning (Bonk, 2004 & Iga, 2017). The ICT that can combine traditional and online learning is blended learning. Blended learning is a term increasingly used to describe the way e-learning is being combined with traditional classroom methods and independently study to create a new hybrid teaching methodology. Blended learning is a teaching style that consists of both traditional instruction combined with online and digital instruction. Blended learning is the combination of traditional (face-to-face) and online learning so that instruction occurs both in the classroom and online (Rovai & Jordan, 2004; Garrison & Vaughan, 2008). The benefits of blended learning include collaborative learning experience between the students and instructor; improves access as well as student attitude towards learning, communication is improved between the lecturers and students, and successful students' evaluations via the use of online testing and assessment with reporting features.

Statement of the Problem

The conventional methods of teaching have been in use for decades without change in technical colleges and this has contributed to the yearly low enrolment of the students to the VTE. Most of the studies on the use of ICTs for individualized learning cut across different disciplines in Nigeria but much have not been done to technical education. The use of blended learning as an ICT learning tool has been proved to benefit students globally. However, this learning tool also can be used in technical colleges. Therefore, this study determined the effect of blended learning approach on students' performance and attitudes in technical colleges in Oyo State.

Purpose of the Study

The purpose of this study was to determine the effects of blended learning approach on students' performance and attitude in technical colleges in Oyo state. Specifically, this study found out the:

1. significant difference in the achievement of the students taught using blended learning approach and conventional methods
2. attitude of students towards using blended learning approach for practical instruction in technical colleges

Research Questions

1. Is there any significant difference in the achievement of the students taught using blended learning approach and conventional learning methods for practical instruction?
2. Is there any significant difference in the attitude of the students exposed to BLA and CLM?

Research Hypothesis

Ho1. There is no significant difference in the achievement of the students using blended learning approach and conventional learning method

Ho2. There is no significant difference in the attitude of the students exposed to BLA and CLM.

METHODOLOGY

The study adopted the pretest-posttest control group quasi-experimental design. It was employed to investigate the effects of blended learning approach on students' performance in technical colleges.

The target population comprised all technical college students in Oyo State, Nigeria. Out of four technical colleges in Oyo State, two technical colleges were purposively selected for the study due to availability of ICT tools and proximity of the institutions to the researcher. These selected institutions are Government Technical College Ibadan and Government Technical College Awe, Oyo, Oyo State, Nigeria. Wood Trades as a course in the technical college was chosen because it is one of the practical subjects that students found difficult and purportedly having low students' enrolment. Introduction to woodwork practical skills which is compulsory as a subject under the Wood Trades was selected for the study. Twenty (20) students of Government Technical College Ibadan were used for Blended Learning Approach (BLA) and 20 students of Government Technical College Awe exposed to Conventional Learning Method (CLM).

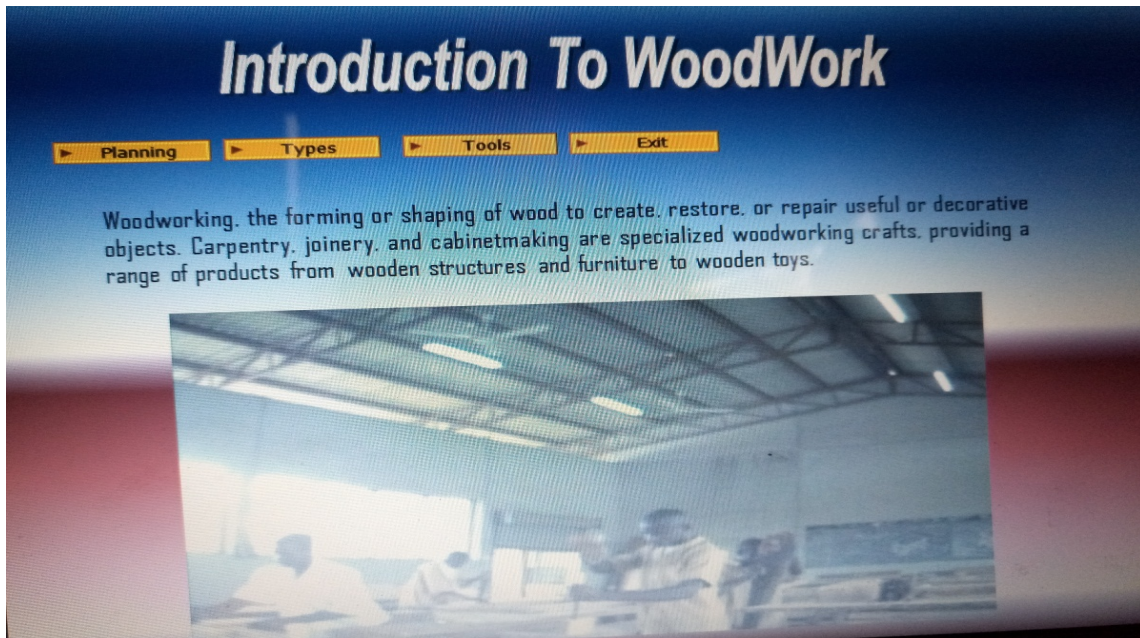
Instruments for Data Collection

The following three research instruments were used.

- a. Blended learning approach package on introduction to woodwork
- b. Learners' achievement test (LAT) on introduction woodwork
- c. Questionnaire on students' attitudes towards blended learning approach (QSATBLA)

Description of the Instruments

Blended learning approach was developed utilizing computer assisted instruction strategy on introduction to woodwork with special emphasis on the various types of woodwork, tools and processes of making the woodwork in the workshop. The package was designed in offline mode utilizing PowerPoint, and Learning Management System (LMS). The package also contained the motion, visual and audio modes of instruction.



Homepage screen of Blended Learning Approach

The learners' achievement test which was an essay test covered the content in the blended learning approach package and the same content taught with conventional learning method. The test has five questions and student to answer four. The questionnaire contained two sections (A and B). Section A contained respondent's personal information while section B contained 10 items that were appropriately responded to an adapted four-point Likert scale (strongly agree (SA), agree (A), disagree (D) and strongly disagree (SD). The instrument were validated by the experts, two from educational technology, one information and communication technology expert, two technical college teachers and one educational evaluation expert. Blended learning approach package was evaluated and validated by educational technologists to ensure that the package is developed in line with the principle of instructional design which ICT expert ensured that navigation process runs appropriately. LAT was subjected to reliability using Kuder-Richardson formula 20 (KR-20) with the reliability index of 0.81 while QSATBLA also subjected to reliability utilizing Cronbach alpha with an index of 0.85.

Procedure for Data Collection

The study lasted for four weeks. During the first week, LAT was administered on the students for the pretest while 2 and 3 were used for the treatment and control group. The students in experimental group were informed about blended learning and they were introduced on how to use the instructional approach. BLA was developed in offline mode for easy accessibility and installed on computer systems. BLA students were allocated to computer with aid of ICT instructors of the selected technical college and the conventional method of learning using demonstration was carried out for control group by the teacher in charge in CLM group. Posttest was conducted on forth week. Data collected were analyzed using t-test and descriptive statistic if estimated marginal mean was used to determine the magnitude of performance scores of the experimental and control group.

RESULTS AND DISCUSSION

To investigate the effect of blended learning approach in terms of students' achievement, in comparison to conventional learning method. This study conducted a t-test analysis for independent sample. In the pretest result, there was no significant difference, therefore t-test statistics was employed to analyse the data.

Table 1: t-test on the achievement of students at pretest level for the two groups

Groups	N	Mean	Std.	df	t	p	Remarks
BLA	20	17.20	4.28	38	0.08	2.021	Not Sig

CLM	20	17.09	3.89
-----	----	-------	------

From Table 1, it can be interpreted that there was no significant difference ($t_{(38)} = 0.8$, $p > 0.05$) between the BLA (Experiment group) and CLM (Control group) scores. This indicated that there is no significant different in the entry knowledge of the selected students in the two groups before the treatment and the two groups had similar levels of knowledge.

Hypothesis One

In order to test the hypothesis 1, the posttest scores of the experimental and control groups were subjected to t-test. The mean scores of the groups were presented in Table 2.

The hypothesis states that there is no significant different in the achievement of the students exposed to BLA and CLM. To test the hypothesis, t-test was used for the analysis of the two group results.

Table 2: t-test of posttest on the achievement of the student exposed to BLA and CLM

Groups	N	Mean	Std.	df	t	p	Remarks
BLA	20	29.9	4.74	38	7.74	2.021	Not Sig
CLM	20	18.70	4.41				

From Table 2, it showed that there was a significant difference ($t_{(38)} = 7.74$, $p < 0.05$) between score of the BLA (Experiment group) and CLM (Control group). The implication was that there was significance differences in the achievement mean score of students exposed to BLA and CLM. This implied that BLA group performed significantly better than that of CLM group.

Hypothesis Two

There is no significant difference in the attitude of the students exposed to BLA and CLM. The t-test statistic was also employed to test the hypothesis.

Table 3: t-test on the attitudes of the two groups

Groups	N	Mean	Std.	df	t	p	Remarks
BLA	20	22.80	4.13	38	-3.623	0.001	Sig.
CLM	20	19.15	1.31				

Based on the result on Table 3, it showed that there was a significant difference between the students exposed to BLA and CLM in their attitude with $t_{(38)} = -3.623$, $p > 0.05$. The mean attitude of BLA (22.80) was greater than those taught with CLM (19.15).

DISCUSSION OF THE FINDINGS

The present study was to determine the effect of blended learning approach on technical college students' achievement in Woodwork. The findings revealed that there was a significant difference in the achievement of the students exposed to BLA and those that exposed to CLM. This finding was in line with the result of finding of Iga (0217) which stated that the learning result of students taught using blended learning model was higher than the learning result of students taught with traditional mode. Also, Ruba, Lubna, Osama, montaha Ansar and Nabeel (2014) carried out a study on effect of blended learning on academic achievement of students in the University of Jordan and found out that there was a significant and positive impact of blended learning on academic achievement of the students in University of Jordan. The findings have shown that blended leaning has proved to be effective in facilitating the acquisition of technical skills among the students than CLM in woodwork of technical education. Also, students' attitude toward the two methods was significantly significant. The better attitude of the students that exposed to BLA over CLM has helped to improve the students' motivation towards practical skills in technical education. The superiority of BLA over CLM in the attitude of the students in technical skills may be connected with the involvement or participation of the students in the operation of ICTs and could also be attributed to the fascinating ways the blended learning approach brought to teaching-learning process.

CONCLUSION

The results show that the achievement scores of the students are not same when they exposed to different methods of instruction. The use of blended learning approach in presenting lesson especially in the workshop increases the achievement score of students in technical education and students have better positive attitudes towards technical education when exposed to BLA. Blended learning approach therefore brings about effective learning in teaching and learning of technical skills in technical education. This is an indication that BLA could be a very effective method of enhancing the practical knowledge acquisition in the technical colleges. Although, the use of

conventional learning method is gradually losing its acceptance, educators are yet to explore the innate advantage of BLA in the working of teaching and learning. Blended learning approach encourages students to learn more actively.

Recommendations

Based on the major findings of this study, the following recommendations are proffered:

1. Teachers in technical colleges should expose themselves to various available instructional software packages that can foster their teaching strategies and further enhance their teaching competency.
2. Teachers should expose their students to blended learning approach that promote and encourage social interaction, active classroom participation, increases thinking faculty, motivation and positive attitude among the students towards technical education.
3. Technical college management should assist and encourage their teachers to use relevant ICT-based instructional innovative like bended learning. This will enhance cooperative learning, creative thinking, provide avenue for individual difference and promote teaching and learning among the students in technical colleges.
4. Software developer and computer programmer should develop relevant computer packages for use within the Nigerian technical colleges.

REFERENCES

- Alade, I. A. (2004). Improving the status of vocational technical education. A route to national development. In Elaturoti D. F. *et al Teacher Mandate on Education and Social Development in Nigeria*. Stiring-Horden Publishers (Nig.) Limited.
- Bonk, C. J. and Graham, C. R. (2004). Handbook of blended learning: Global perspectives, local design. San Fransisco: Pfeiffer Publishing.
- Federal Republic of Nigeria (2004). *National policy on education*. Lagos. NERDC Press.
- Garrison, D. R. and Vaughan, N. (2008). *Blended learning in higher education* (Jossey-Bass, San Fransisco.
- Iga, S. U. (2018). The effect of blended learning model on senior high school student' achievement. SHS Web of Conference 42. Retrieved from <https://doi.org/10.1051/shsconf/20184200027>
- Osuala, E. C. (1995). Foundations of vocational education. Nsukka: Falladu Publising Company
- Rovai, A. P. and Jordan, H. M. (2004). International Review of Research in Open and Distance Learning, **5**, 2
- Ruba, O., Lubna, N. E., Osama, H., Montana, A., Ansar, K., and Nabeel A. (2014). Effects of blended-learning on achievement of students in the University of Jordan. *International Journal of emerging Technologies in Learning*, 9(2).
- Yusuf, M. O. (2002). Information technology: New dimensions to the development of teacher education programme. *Nigeria Journal of Computer Literacy*, 4, 56 - 63.
- Yusuf, M. O. (2005). An investigation into junior secondary school students' attitudes towards mediated instructions. *Ife Journal of Curriculum Studies and Development*, 2(2), 56 - 63.

EFFECTS OF CONCEPT CARTOONS ON NIGERIAN PRIMARY FOUR PUPILS ACHIEVEMENT IN BASIC SCIENCE AND TECHNOLOGY

Bernadette Ebele Ozoji
mbozorji@yahoo.com

Michael Emaikwu
emaikwumichael@gmail.com

Eyiaromi Adeleke
Adefire4life@gmail.com

Peter Lemarck Tibin
lemarckpeter@gmail.com

Odigiri Matthew Adikpe
amodigiri@yahoo.com

Olanrewaju Adebukola Oyebimpe
Felbim1@gmail.com

Department of Science and Technology Education
Faculty of Education
University Of Jos
Nigeria

Dung Mohammed Dauda
dungmohamed@gmail.com

Department of Integrated Science
Federal College of Education Pankshin
Nigeria

ABSTRACT

The Study investigated the effects of concept cartoons on primary four pupils' achievement in Basic Science and Technology in Jos, Plateau State Nigeria. The non-randomized pre-test, post-test quasi experimental control group design was employed. A sample of 78 pupils from a population of 2000 pupils was used in the study. Two intact classes in one, out of 50 schools in the area of study were assigned to experiment and control groups, respectively. The experimental group was taught the concept of energy and its conversion using concept cartoons while the control group was taught the same concepts with the lecture method. A basic science and Technology Achievement Test with a reliability index of .85 was used to collect data from the pupils. Two research questions were answered using mean and standard deviation while two hypotheses were tested using Analysis of Covariance at 0.05 level of significance. Findings indicated that the experimental group taught using concept cartoons achieved higher than the control group taught using the lecture method $F(1, 78) = 6.819, p = .011$. Moreover, gender was found to have a significant influence on the achievement of four primary four pupils exposed to concept cartoons in favour of boys $F(1, 78) = 6.802, p = .013$. It was concluded that the use of concept cartoons significantly improved the achievement of primary four pupils in Basic Science and Technology. In the light of the findings, it was recommended that teachers should incorporate concept cartoons in teaching Basic Science and Technology concepts in primary schools.

INTRODUCTION

Science, technology engineering and mathematics (STEM) disciplines have been the subject of attention to stakeholders in STEM Education. This is as result of the relevance of STEM education to the growth and development of nations of the world which has necessitated the search for innovative and effective strategies of teaching STEM courses for improved learning and understanding (Larson, 2012). In view of the significant role of science and technology to national development, the Nigerian government through the Joint Admissions and Matriculation Board (JAMB) put in place a policy of 60:40 ratio in admissions for science-based courses in conventional universities and 70:30 ratio in technology-based universities in favour of science-based courses. The policy is in line with the goal of science education (Federal Republic of Nigeria [FRN], 2014) which is to produce scientists for national development and further studies, and, the course of technological development. In further pursuance of this goal, the government put in place other laudable efforts to promote the teaching and learning of science and technology in schools at the various levels of education. These include the establishment of more universities of technology, and special science schools at the secondary school level in many states of the federation; reviewing the basic and secondary school curricular in line with global trends in science and technology, making the study of basic science and technology compulsory at the basic level of education, training of science and technology teachers abroad in the technical aid programme and implementation of the STEP B project as well as provision of science kits to schools at the basic level of education.

Despite the fore-going efforts by the government to improve the teaching and learning of science and technology courses, Nigerian children recorded poor achievement in the subjects (Obeka, 2010; Ozoji, 2010; Usman, 2015; Micah, 2017). Some other studies have revealed that students' achievement in science and technology related-courses at the basic school level was not impressive (Kaduna State Ministry of Education, 2016; Micah, 2017). This may have contributed to the steady decline in the quality of SSCE results over the years in science subjects. is a clear indication of the low achievement. West African Examinations Council results of science and technology related courses such as chemistry, physics and biology show that the highest percentage number of students with credits in Biology, Physics and Chemistry from 2006 to 2011 were 38.08%, 46.89% and 50.94%, respectively (WAEC, 2011). These results show low achievement by the students. This is in consonance with the findings by Ezenwa (2005), that, the performance of students in science-related subjects is still below average. This has become a source of worry to all stakeholders in Nigeria education system. Researchers, educators, parents, the government and society express concern over the state of underachievement in science and technology subjects that are important in national development.

Existing research in STEM (Sadler, Sonnert, Hazari & Tai, 2012) disciplines indicate that exposure to STEM in early years of schooling is most strongly linked to taking up science, technology and mathematics courses and disciplines at the secondary and higher levels of education and consequently, STEM careers later in life. Basic Science and technology is taught at the basic level of education in Nigeria.

A number of factors have been put forward by researchers as being responsible for this state of affairs. Factors responsible for students' underachievement in science can be grouped into teacher related and facility-oriented factors. These factors include the teaching methods and materials used among other things (Ogunkola, 2008).

A number of factors have been put forward by researchers as being responsible for this state of affairs. Factors responsible for students' underachievement in science can be grouped into teacher related and facility-oriented factors. These factors include the teaching methods and materials used among other things (Ogunkola, 2008).

There have been growing concerns about the modes of teaching basic science and technology in Nigerian primary schools which are predominantly teacher-centered and do not engage pupils in hands-on activities. This situation makes learning of science and technology concepts boring and uninteresting to the learners, particularly at the basic level of education. This might be the reason STM teaching and learning in Nigeria do not appear to yield the desired outcomes.

Problems of underachievement, poor attitudes to science and lack of interest continue to be recorded in STM subjects at the primary level (Katnison & Mundi, 2011) which is the foundation stage for further science. This is not good enough for a country that is aspiring to be one of the world's big economies come 2020. This calls for a paradigm shift in basic science and technology delivery in line with the objectives of the national policy on education which emphasizes teaching science with activity-oriented and effective methods for improved thinking and achievement outcomes. Such methods the problem-solving strategy, concept mapping strategy, computer simulation strategy and the use of concept cartoons.

Concept cartoons are cartoon-style drawings that show a range of viewpoints of an everyday event (Chris, 2006) in science for instance. They are visual representations of science ideas in ways that are designed to motivate and engage learners and stimulate discussion of their ideas. Cartoons were designed by Keogh and Naylor (1999) as an innovative strategy to probe students' ideas where learners challenge their thinking while developing knowledge in scientific concepts. The use of concept cartoons is based on constructivism which emphasizes the construction of knowledge by the learner.

Significant features of concept cartoons according to Chin and Teou are that they challenge learners' misconceptions and help to correct them. Concept cartoons make learning easier and motivates learners of all ages and backgrounds (Katiniyon & Duguryil, 2019). They enhance problem-solving skills, argumentation, thereby help to promote and stimulate thinking in children.

OBJECTIVES

The objectives of the study were to:

1. Investigate the effects of concept cartoons on primary four pupils' achievement in basic science and technology in Jos, Nigeria.
2. Determine the pre-test mean achievement scores between primary four pupils taught Basic Science using concept cartoons and their counterparts taught using the lecture method?
3. Find out the post-test mean achievement score difference between primary four pupils taught Basic Science using concept cartoons and their counterparts taught using the lecture method?
4. Find out the difference between the post-test mean achievement scores of male and female students taught basic science and technology using concept cartoons?

Research Questions

1. What is the post-test mean achievement score difference between primary three pupils taught Basic Science using concept cartoons and their counterparts taught using the lecture method?
2. What is the difference between the post-test mean achievement scores of male and female students taught basic science and technology using concept cartoons?

Hypotheses

3. There is no significant difference between the post-test achievement mean scores of students taught using concept cartoons and those taught using the lecture method.
4. There is no significant influence of concept cartoons on gender with regard to the post-test achievement mean scores of primary four pupils.
- 5.

METHOD

A sample of 78 primary four pupils in two arms of one private school out of 50 schools taken from a population of 2000 pupils was used in the study. The non-randomized pre-test, post-test quasi experimental control group design was employed. The pupils were used in their intact classroom settings. They were exposed to a pre-test on Basic Science and Technology Achievement Test. One arm, the experimental group, was taught the concepts of energy and its conversion with concept cartoons while the second arm, the control group, was taught the same concepts with the lecture method. The teaching exercise lasted for five weeks.

A basic science and Technology Achievement Test with a reliability index of .85 was used to collect data from the pupils. Two research questions were answered using mean and standard deviation while two hypotheses were tested using Analysis of Covariance at 0.05 level of significance.

RESULTS

Results obtained from the study are presented on the basis of research questions and hypotheses as follows:

Research Question One

What is the post-test mean achievement score difference between students taught Basic Science and Technology using concept cartoons and their counterparts taught using the lecture method?

Table 1: Post-test Mean Score Difference between Students Taught Basic Science using Concept Cartoons and their Counterparts taught using the lecture method

Groups	Mean	SD	Mean difference
Experimental	54.91	16.20	8.17
Control	46.74	11.78	

Table 1 shows the post-test mean achievement score difference between students taught Basic Science and Technology using concept cartoons and their counterparts taught using the lecture method. Students taught Basic Science using concept cartoons had a mean of 54.91 and a standard deviation of 16.20 while the students taught using lecture method had a mean of 46.74 and standard deviation of 11.78. The mean difference was 8.17 in favour of pupils taught Basic Science and Technology using concept cartoons.

RESEARCH

What is the difference between the post-test mean scores of Male and Female students taught basic science and technology using concept cartoons?

Table 2: Post-test Mean Score Difference between Male and Female Students Taught Basic Science Using Concept Cartoons

Groups	Mean	SD	Mean difference
Female	56.03	23.29	4.03
Male	52.00	9.35	

Table 2 shows the post-test mean score difference between of Male and Female students taught basic science and technology using concept cartoons. Female Students taught Basic Science using concept cartoons had a mean of 56.03 and a standard deviation of 23.29 while the Male students taught using lecture method had a mean of 52.00 and standard deviation of 9.35. There was a mean difference of 4.03 between the mean achievement of scores of male and female students taught Basic Science using concept cartoons.

Hypothesis 1

There is no significant difference between the pre-test post-test achievement mean score of students taught using concept cartoons and those taught using the lecture method.

Table 3: Analysis of Covariance of Pre-test and Post-test Achievement Mean Scores of Experimental and Control Groups

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	2126.270 ^a	3	708.757	4.785	.004
Intercept	176900.030	1	176900.030	1194.304	.000
GROUP	1010.079	1	1010.079	6.819	.011
Pretest posttest	834.435	1	834.435	5.634	.020
GROUP*	213.947	1	213.947	1.444	.233
pre-test posttest					
Error	11553.340	78	148.120		
	193504.000	82			
Corrected Total	13679.610	81			
a.	R Squared = .155 (Adjusted R Squared = .123)				

Table 3 reveals the Analysis of Covariance of pre-test and post-test mean scores of pupils in experimental and control groups. This groups results show that $F(1,78)=6.819$, $p=0.011$) is less than 0.05 level of significance. Since the p-value is less than 0.05, this implies that there was a significant difference between the post-test achievement mean scores of students taught using concept cartoons and those taught using the lecture method. Therefore, null hypothesis was rejected.

Hypothesis 2

There is no significant effect of concept cartoon strategy on gender and post-test achievement mean scores of primary four pupils.

Table 4: Analysis of Covariance on Significant Effect of Concept Cartoon Strategy on Gender the between pretest and posttest achievement mean scores of Experimental and Control Groups

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	2297.970 ^a	3	708.757	4.785	.004
Intercept	96447.400	1	176900.030	1194.304	.000
GROUP	1265.470	1	1010.079	6.802	.011
Pretest posttest	1032.136	1	834.435	5.634	.020
GENDER * pre-test posttest	244.379	1	213.947	1.444	.013
Error	6069.667	40	148.120		
	11876.000	44			
Corrected Total	8367.636	43			
a.	R Squared = .275 (Adjusted R Squared = .220)				

Table 4 reveals the Analysis of Covariance (ANCOVA) of pre-test and post-test mean scores of pupils effect of concept cartoon strategy achievement mean scores of Experimental and control groups based on gender. These groups results indicate that $F(1, 78) = 6.802$, $p = 0.013$). The P-value 0.013 is less than 0.05 level of significance. Therefore, there was a significant influence of gender on pre-test and post-test achievement mean scores of the experimental group. Hence, the null hypothesis was rejected.

DISCUSSION

Findings indicated that the experimental group taught using concept cartoons achieved higher than the control group taught using the lecture method $F(1, 78) = 6.819$, $p=.011$). The findings of this study lends credence to that of

Nel and Evriki (2008). Moreover, gender was found to have a significant influence on the achievement of four primary four pupils exposed to concept cartoons in favour of boys $F(1, 78) = 6.802, p = .013$. The idea of using concept cartoons in teaching science is not new. For instance, studies by Naylor and McMurdo (1990), Keogh and Naylor (1997), Wilson (1998) Duguryil, Katniyon and Biska (2019) investigated the effectiveness of teaching using concept cartoons.

Observations in the course of engaging the experimental group in working with worksheets in addition to posters, showed that primary four pupils were motivated and interested in learning the concept of energy and its conversion. These and the quality of classroom interactions in the course of teaching and learning of energy and its conversion must have contributed to the improved achievement outcome of pupils in the experimental group against their counterparts in the control group.

CONCLUSION

It was concluded that the use of concept cartoons significantly improved the achievement of Nigerian primary four pupils in Basic Science and Technology. Furthermore, gender was shown to have a significant influence on primary four pupils' achievement in Basic Science and Technology.

REFERENCES

- Federal Republic of Nigeria (2014). *National policy on education* Abuja: NERDC.
- Katniyon, H.D., Duguryil, Z.P & Biska, W. B. (2019). Transforming primary school pupils' thinking using concept cartoons in the teaching of basic science and technology. *Journal of Science Mathematics and Technology*, 1 (1), 73-78
- Ozaji, B.E. (2010). *Effects of concept mapping technique on technique on junior secondary students' achievement in integrated science in Jos*. Unpublished PhD thesis, University of Jos.
- Micah, M. (2017). *Effects of v-mapping strategy on junior secondary students' achievement in basic science and technology in Kafanchan, Kaduna State of Nigeria*. Unpublished PhD thesis, University of Jos.
- Umaru, M.G. (2019). *Effects of computer simulation puzzle strategy on senior secondary school students' achievement and retention in Physics in mechanics in Akwanga, Nasarawa State*. Unpublished PhD thesis, University of Jos.
- West African Examination Council (2011). *Chief examiner's report*. Lagos: WAEC.

EFFECTS OF CONCEPT MAPPING ON TEST ANXIETY AND ACHIEVEMENT IN MATHEMATICS AMONG SECONDARY STUDENTS IN LAGOS ISLAND, NIGERIA

AYEOBASAN, Anthony Akinyemi (Ph.D) LAGOS

Directorate of Degree Programmes

Federal College of Education (Tech), Akoka, Lagos

ABSTRACT

The study was undertaken to investigate the relative efficacy of one training method (concept mapping) on Test Anxiety and Achievement in Mathematics among secondary students in Lagos Island, Nigeria. The participants in the study comprised 164 senior secondary school II students (83 male and 81 female) who were randomly selected from two co-educational secondary schools in Lagos Island. The following instruments were used in the study: Mathophobia Check-Up (M-CU) and Mathematics Achievement Test (MAT). All instruments were used for pre and post-test assessments test. Three research hypotheses were raised to guide the study. The research design was Quasi experimental pre and post-test control design. The pre and post test scores were analysed using t-test. There were significant effects of training on mathematics anxiety. Mathematics achievement and gender among participants in the experimental groups, consequently, the three hypotheses were rejected ($p < 0.05$). It was recommended that efforts should be made to formally train teachers on the use of concept mapping as an instructional option.

Keywords: Concept Mapping, Test Anxiety, and Achievement in Mathematics

INTRODUCTION

Two pedagogical limitations have been identified as the major shortcomings in traditional secondary education, lecture based instruction and teacher centre instruction. Lecture based instruction emphasizes the passive acquisition of knowledge where students becomes passive recipients of knowledge and resort to rote learning, while teacher centred instruction dominates classroom activity with the teacher doing well over 80% of the talk.

The traditional classroom is characterized by direct demonstrations and activities to verify previously introduced concepts. Instruction, therefore is not for conceptual understanding but rather for memorizing and recalling of facts (Grows & Cebula, 2006 in Ayeobasan, 2012). Kulbir (2006) asserted that students of mathematics develop doubts about the fundamentals of the subject and this doubt further hinders their achievement throughout. He stressed further that teachers should not hesitate to explain them over and over again because only a clear understanding of these fundamentals can build a sound foundations for learning mathematics.

Osarenren & Asiedu (2007) submitted that the traditional way of teaching mathematics has not helped the growth of mathematics in Nigeria. This is the reason why performance of students is not really improving. Students are not able to think critically and their analyses of mathematical phenomena are quite faulty. A conceptual understanding requires students to think critically and act flexibly with what they know. Students often ask “how did you calculate that” instead of “why did you calculate it in that way”. Osarenren & Asiedu further concluded that it is high time to move away from the traditional way of teaching and learning mathematics to the realistic mathematics education. Teaching of mathematics should aim at assisting students to achieve high level of success which is commensurate with their abilities and potentials and that the mind of every Nigerian students could be developed in every aspect of mathematics through a well – thought-out innovative method of teaching and learning the core concepts which form the basis of comprehension that leads to problem solving.

Poor performance of students in mathematics at all levels of our education has been attributed to many factors. The Chief Examiners report of West African Examinations Council (WAEC) for May/June 2012 – 2014, revealed that students lacked understanding of basic principles and that they did not prepare for the examinations. The reports of the Chief Examiners have not improved over the years. Ayeobasan (2016) concurred with the submission of the Chief Examiners reports and further observed that students could not understand basic principles and concepts of mathematics correctly as well as prove logically and precisely a geometric proof.

However, since mathematics is a compulsory subject to be mastered for the progression in both individual and national development, there must be other methods that can be used to teach and learn mathematics successfully. For instance, conveying information to students is very important but teaching students how to think is more important. This is why concept mapping becomes imperative. Kulbir (2006) submitted that concepts are basic building blocks for thinking in any subject especially in mathematics where students need to classify objects and ideas as well as

derive rules, formulae and principles which provide the foundations for ideal networking to solve mathematical problems.

Esiobu (2018) described concept maps as graphical tools for organizing and representing knowledge. They include concepts usually enclosed in circles or boxes of some type and relationships between the two concepts. Words on the lines are referred to as linking words or linking phrases which specify the relationship between the two concepts. One major characteristics of concept maps is that the concepts are represented in a hierarchical fashion with the most general concepts at the top of the map and the more specific, less general concepts are arranged hierarchically structure for a particular domain of knowledge also depend on the context in which that knowledge is being applied or considered.

Richard (2012) further described concept teaching as models developed primarily to teach key concepts that serve as foundations for student higher- level thinking and to provide a basis for mutual understanding and communication. Such models are not designed to teach large amounts of information to students. However, by learning and applying key concepts within a given subject, students are able to transfer specific learning to more general areas. Concept learning is more than simply classifying objects and forming categories. It is also more than learning new labels or vocabulary to apply to classes of objects and ideas. Instead, concept learning involves the process of constructing knowledge and organizing information into comprehensive and complex cognitive structures.

There is an increasing recognition that affective factors play a critical role in the teaching and learning of mathematics. One affective factor that has probably received more attention than any other area that lies within the affective domain is anxiety towards mathematics. Anxiety is a universal human feelings which is been experienced from time to time. It becomes a problem requiring professional help when it intensifies and spread beyond normal limits. According to Gudy (2002) anxiety is an affective variable that includes the feeling of being uneasy, tense, worried or apprehensive about what might happen. It is a feeling that is produced by one's thought to a strange predicament. Moin (2006) describes anxiety as a very disagreeable and in most situations, ambiguous feelings which comes with unwanted changes in our physical situations such as dizziness, extreme perspiration shaking etc.

Ascraft (2002), submitted that mathematics anxiety is a feeling of tension, apprehension or fear that interferes with mathematics performance, Ayeobasan (2018) described same as the more intense feeling that a student exhibits in mathematics classrooms such as confidence, frustration, fear and mental disorganization to manipulate numbers and shapes. Mathematics anxiety is related to poor mathematics performance on mathematics achievement tests and subsequently connected to mathematics avoidance. Mathematics avoidance results in less completing exposure and mathematics practices leaving students more anxious and mathematically unprepared to achieve. Therefore, effective learning strategy such as concept mapping learning could enhance favourable learning outcomes in mathematics as well as reducing test anxiety in mathematics with improved mathematics achievement.

Statement of the Problem

Student's performance in mathematics among Nigerian students has not been encouraging over the years, despite concerted efforts made by the stakeholders. The West African Examination Council Chief Examiners Reports (2012 – 2014) and analysis of past mathematics results in Senior Secondary Certificate Examinations by WAEC (2016-2018) corroborated this observation of poor performance and high failure rate among senior secondary school students in mathematics.

Over the years the government has provided relevant text for effective teaching and learning of mathematics, instructional aids have also been provided and of recent, the state government implemented a policy of recruiting only trained teachers to the schools. All these were put in place with the sole aim of enhancing performance. In spite of these, performance in mathematics at the senior secondary school examination has not witnessed significant improvement. It even appears students have come to terms with their performance in mathematics. However, bearing in mind the potential benefits of studying and excelling in mathematics and the requirement of at least a credit pass for university admission, students could approach mathematics with zeal and enthusiasm with effective conceptualization of mathematics terms. If appropriate learning methods and necessary psychological supports are given, this zeal can be translated to high achievement.

Purpose of the Study

The purposes of this study are to:

1. investigate the relative effectiveness of training (concept mapping) on test anxiety in mathematics among participants.
2. determine the effect of training (concept mapping) on mathematics achievement among participants.

3. ascertain the effect of training (concept mapping) due to gender on mathematics achievement among participants.

Hypotheses

The following hypotheses were formulated and tested at 0.05 level of significance.

- i. There is no significant effect of training (concept mapping) on test anxiety post test scores of the participants in the experimental groups.
- ii. There is no significant effect of training (concept mapping) on mathematics achievement post test scores of the participants in the experimental groups.
- iii. There is no significant effect of training (concept mapping) due to gender on mathematics achievement post test scores of the participants in the experimental groups.

METHODOLOGY

The study adopted a pre-test/post test control group quasi experimental design. The population of the study comprised all secondary school students in Lagos Island metropolis in Lagos State, Nigeria.

Sample and Sampling Technique

The study sample comprised 164 (one hundred and sixty four) secondary school II students, who completed the pre-assessment measures, the students were selected from two secondary schools in Lagos Island Metropolis. The sample size in each of the schools were 84 and 80 totaling 164 from 326 senior secondary II students in the two selected schools.

The sampling procedure was multi stage sampling technique. All secondary schools in Lagos Island metropolis were put into two strata using the two educational zones in the metropolis (North and South). There are 14 (fourteen) schools with the following distributions: 8 in Lagos Island south and 6 in Lagos Island North zone of which one senior secondary school was purposively selected from each stratum. Two schools randomly selected using the hat and draw method were randomly assigned to training and one school for the control group.

The training and the control schools have two streams each with average class of 82, purposively selected intact classes from the streams in each selected schools were used for this study. The average age of the participants was 16.0 years. a total of 83 male and 81 female students participated in the study.

Instrumentation

The following two instruments were used for this study:

1. Mathophobia Check –Up (MC-U): This is a 30 items questionnaire designed by Hodges (1995) in Ayeobasan (2012) to measure students' state of health in mathematics whether they are low in mathophobia (no fear of mathematics) moderately high fear or an extreme fear of mathematics (a terminal stage of mathophobia). The test re-test reliability coefficient of 0.71 was obtained at a four weeks interval by the researchers during pilot study.
2. Mathematics Achievement Test (MAT): This was a 50 items multiple choice objective test in mathematics drawn from past mathematics questions of WAEC/NECO for the year 2015-2018). Though already validated by WAEC and was re-validated by the researcher for the purpose of this study. It has a high stability coefficient of 0.86 at 0.05 level of significance when tested during the pilot study using test re-test method within a four weeks interval.

RESULTS

There is no significant effect of training (concept mapping) on mathematics anxiety post test scores of the participants in the experimental groups.

Table 1

Pretest Mean

Pretest/Post test mean and standard deviation scores on participants

Mathophobia Check-Up

Group Participants	Pre-test Score	Post test Score	MD
Concept Mapping			
Mean	60.20	40.40	
N	84.00	84.00	19.80
S.D	8.40	5.40	
Control			
Mean	60.20	61.60	
N	80.00	80.00	1.40
S.D	8.80	8.90	

t-test Analysis

Groups	N	\bar{X}	S.D	tcal	Tcrit
Training	84	40.40	5.40		
Control	80	56.9	8.80	7.40	1.25

$P < 0.05$, $df = 162$, $t_{cal} = 7.4$, $t_{crit} = 1.25$

Since $t_{cal} > t_{crit}$, then the null hypothesis is rejected and therefore uphold the alternative hypothesis, that is, there is a significant effect of training on post test scores of the participants in the experimental groups

Hypothesis 2: There is no significant effect of training (concept mapping) on mathematics achievement post test scores of the participants in the experimental groups.

Table 2

Pretest/Post test Mean and Standard Deviation Scores on Participants

Mathematics Achievement Test

Group Participants	Pre-test Score	Post test Score	MD
Concept Mapping			
Mean	30.4	54.6	
N	84.00	84.00	24.20
S.D	4.20	6.80	
Control			
Mean	44.00	46.50	
N	80.00	80.00	2.50
S.D	4.80	5.20	

t-test Analysis

Groups	N	\bar{X}	S.D	t-cal	t-crit
Training	84	54.60	6.80		
Control	80	46.50	5.20	0.72	0.55

$P < 0.05$, $df = 162$, $t_{cal} = 0.72$, $t_{crit} = 0.55$

Since $t_{cal} > t_{crit}$, then the null hypothesis is rejected and therefore uphold the alternative hypothesis, that is there is a significant effect of training on mathematics achievement post test scores of the participants in the experimental groups.

Hypothesis 3

There is no significant effect of training (concept mapping) due to gender on mathematics achievement post test scores of the participants in the experimental groups.

Table 3

Pretest/Post test and standard deviation scores across gender on mathematics achievement.

Group Participants	Pre-test Score	Post test Score	MD
Male			
Mean	40.20	56.80	
N	84.00	84.00	16.60
S.D	14.50	18.40	
Female			
Mean	38.00	42.50	
N	80.00	80.00	4.50
S.D	12.60	14.20	

t-test Analysis

Groups	N	\bar{X}	S.D	t-cal	t-crit
Male	83	56.80	18.40		
Female	81	42.50	43.50	0.65	0.24

$P < 0.05$, $df = 82$, $t_{cal} = 0.65$, $t_{crit} = 0.24$

Since $t_{cal} > t_{crit}$, then the null hypothesis is rejected and therefore uphold the alternative hypothesis, that is, there is no significant effect of training (concept mapping) due to gender on mathematics post test scores.

DISCUSSION

The result of hypothesis one indicated that there was significant effect of training on mathematics anxiety post test scores among the participants. This is an indication that the training (concept mapping) is effective instructional technique of reducing anxiety in mathematics, the training group had 40.40 post mean score against control with 61.60, this findings concurred with the submission of Richard (2012) who found concept mapping as an effective and efficient strategy in reducing mathophobia among learners of mathematics. Akanbi (2011) also affirmed concept mapping and exposure therapy as very useful in the treatment of fear and anxiety related disorders such as test anxiety.

Effects of training on mathematics achievement post test scores among the experimental groups. The results of hypothesis two indicated that there was a significant effect of training on mathematics achievement post test scores among the participants. This is an evidence that the training (concept mapping) is efficient instructional option for enhancing achievement in mathematics. The post mean scores of 54.60 and 46.50 training and control groups respectively indicated a clear disparity in the mathematics achievement.

This finding is in accordance with Esiobu (2018) who submitted that learner with lower phobia in mathematics demonstrates higher conceptual insight than students with higher phobia in mathematics.

Effect of training due to gender on mathematics achievement post test scores among participants. Male participants had higher post test mean scores 56.80 of mathematics achievement test than female participants who had 42.50. Similarly, there is a significant difference due to gender in the post test scores of mathematics achievement among participants.

This finding concurred with the submission of Lee & Lockheed (1990) in Ayeobasan (2012) that female students show little or no interest in subjects that are calculation oriented such as mathematics, physics, chemistry and further mathematics. They rather show greater interest in subjects that are literally oriented such as English Language, Christian/Islamic religion knowledge or history.

CONCLUSION

In the light of the findings, the following conclusions can be drawn.

1. There was a significant effect of training on mathematics anxiety post test scores among the participants. Training group had lower 40.40 against 61.60 post mean test scores on mathophobia check-up scale.
2. There was a significant effect of training on mathematics achievement post test scores among the participants. Training group had higher 54.60 against 46.50 post mean test scores on mathematics achievement test.
3. There was a significant effect due to gender on mathematics achievement test among participants. Male had 56.80 and 42.50 post mean test scores on mathematics achievement test.

Recommendation

In view of the findings, the following recommendations are therefore put forward.

1. Training in concept mapping as confirmed by this study is an efficacious means of reducing anxiety in mathematics among students. Based on this, effort should be made to formally train teachers on the use of concept mapping as an instructional option.
2. Training in concept mapping as confirmed by this study is a practicable means to positively enhance students' achievement in mathematics. This therefore, suggests that concept learning may serve as a viable means of improving low achievement in mathematics. Based on this, effort should be made to formally train teachers of mathematics the rudiments of concept learning.

REFERENCES

- Akanbi, J.B. (2011) Effectiveness of Concept Mapping on Science Achievement among Selected Students in Oyo State. *Journal of Science Education* 4(1), 10 – 14.
- Ascraft, M.H. (2002) Mathematics Anxiety: Personal, Educational, Cognitive Consequences and Current Directions in Psychological Science. *Journal of Educational Research*, 11, 188-195.
- Ayeobasan, A.A. (2012) Effects of Concept Mapping and Cooperative Learning on Attitude and Achievement in mathematics Among Senior Secondary Students in Ondo Town. Unpublished Ph.D Thesis, University of Lagos, Nigeria.
- Ayeobasan, A.A. (2016). Assessment of Gender on Achievement in Basic mathematics among College Students in Lagos State. *Journal of Educational Foundations*. 3(12-18).
- Esiobu, A.N. (2018) *Concept Learning Theory, Research and Practice*. Lagos, Onuka Publishers.
- Gudy, A.U. (2002) *Psychology of Education in Colleges*. Lagos: Fresbyter Press.
- Hodges, I. (1983). *Mathophobia Check-up*. New York: Free Press.
- Kulbir, S.S. (2006) *The Teachers of Mathematics*, New Delhi: Sterling Publishers Private Limited.
- Moin, Y.D.(2006). Efficacy of Exposure Therapy on Mathematics Anxiety among selected students in Osun State. *Journal of Science Education* 4(1) 18 – 23.
- Osarenren, N. & Asiedu, A.A. (2017). Counselling Implications on the Role of the New Mathematics Teacher in the teaching and learning of Mathematics. *International Journal of Educational Research* 3(2), 12-20.
- Richard, B.M. (2012). *Learning to Teach*. Ibadan: Mototain Publishers
- WAEC (2012 – 2014) Senior School Certificate Examination (SSCE). Mathematics Chief Examiners Report. (Nigeria)

EUROPEAN EMERGENCY NUMBER ASSOCIATION AS A RESPONSE TO THE LACK OF EDUCATION FOR EUROPEANS

Barbara Kaczmarczyk

General Tadeusz Kościuszko Military University of Land Forces

barbara.kaczmarczyk@awl.edu.pl

Karolina Lis

General Tadeusz Kościuszko Military University of Land Forces

karolina.lis@awl.edu.pl

Abstract

This Article presents the essence of creating a single European emergency number 112. By means of statistical data, the level of awareness of the number among the citizens of all the European Union countries was presented. The article has been divided into several parts. First of all, the phenomenon of creating and functioning of emergency numbers is described. This was the basis for further reflection on the European Emergency Number Association, an organisation that contributes to increasing safety and security of the citizens in Europe by focusing on improving the emergency number 112. The Association also plays an active role in raising the awareness of the emergency number 112 among Europeans, as presented in the last part of this paper.

Keywords: European Emergency Number Association, emergency number, education, technology, society

METHODOLOGY:

The aim of the article was to present the possibility of using the European Emergency Number Association for improving the European emergency number 112. The following research problem was adopted in the article: How is the European Emergency Number Association platform built and what is its potential for improvement of the emergency number 112?

The articles were prepared using theoretical and empirical research methods. The analysis, synthesis and reasoning of the literature within the scope of safety, threats, emergency notification system, as well as Polish and international legal acts were carried out during the deliberations. The results of empirical research in the form of interviews with experts from the Police, State and Voluntary Fire Service, Polish Armed Forces, Tatra Mountain Volunteer Rescue Service and Polish Volunteer Mountain Rescued Service, scientists dealing with security issues, crisis management practitioners, as well as coordinators and operators of emergency numbers 112 were also presented.

1. Characteristics of the phenomenon in Europe - introduction

The European Union was created as a result of long standing political, economic and social integration of European countries. The roots of the European unity between particular states go back to the post-war period. Already then, the associated states established various forms and mechanisms of cooperation, such as organisations, institutions and bodies, the aim of which was integration. As the number of the Community members was increasing, the scope and areas of unification were being expanded. A common economic policy was being built, a foreign policy was being strengthened and a (military) security policy and cooperation on internal security and administrative cooperation between Member States was added. It should be noted that one of the objectives included in the Treaty on European Union (EU) is to develop the area of freedom and security, which the EU is to become, through the introduction of common legal and social standards as well as continuous improvement of the

citizens' standard of living. Security is a fundamental need of every human being, which is why the safety sciences constitute a mapping of social needs in problem theory, and therefore, the security is an object and subject of scientific research. The purpose of safety sciences is to provide people with knowledge that helps them to explain, understand, assess and predict the phenomena related to the safety of a particular entity. Such an attempt was made in this article in respect of the emergency number 112 and the necessity to make Europeans aware of its existence (Kaczmarczyk, 2014, p. 3).

The unique feature of the European Union is the fact that, while all Member States are sovereign and independent, when it comes to the Community they have decided to combine part of their sovereignty in particular areas. Moreover, the EU has created a single market based on four freedoms, within which there is a free movement of goods, persons, services and capital between all Member States. The single market means that over 500 million EU citizens can move freely within the territory of Member States and settle wherever they want to. As a result, every citizen of the EU has the right to choose in which Member State they wish to study, work or live permanently. In view of such an easy and unrestricted movement of people of different nationalities, the Member States must deal with a number of tasks. It should be stressed that the priority, both for the EU as a whole and for each Member State individually, is to ensure that every citizen is safe and that their rights are respected.

Ensuring safety is first and foremost the possibility of calling emergency services in the event of an emergency situation threatening life, health, property or the environment. Already in the last century it was asserted that the possibility to call for help must take place at supranational level, so that every citizen – without restrictions or barriers such as language barriers – could feel safe. That is why in 1991 The Council of the European Communities has decided to establish a single pan-European emergency number 112. This was to serve as an additional security measure at the European level.

The emergency number 112 is free of charge and can be reached in the territory of the European Union by both landlines and mobile phones. A call can be made also from phones with no SIM card. The pan-European emergency number is primarily intended to make it possible to call for complex help for both citizens of a particular country and visitors. In addition, the idea of establishment focused on the integration of services, entities and institutions designated by law to protect life, health, property and the environment.

The creation of the emergency number 112 was legally standardized by the Directive of the European Parliament and of the Council 2002/22/EC on universal service in 2002. The European Union has decided that the users should "...be able to call emergency numbers, in particular the single European emergency number 112, free of charge from any telephone (...) without any form of payment..."(Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (Universal Service Directive). These guidelines were to be implemented by the Member States by July 2003, and by the newly joined Member States until 1 May 2004. As a result, the Member States again have been faced with the important task of introducing and disseminating a new emergency number.

However, according to studies carried out by the European Commission, in 2011, only a quarter of EU citizens were aware of the existence and functioning of 112 as an emergency number that can be used to call for assistance in any of the EU Member States. The survey's results also show that little progress has been made as regards dissemination of knowledge on the number 112 among the citizens of the EU over the early years of its operation.

While in 2008, 22% of citizens of the Member States were aware of this number existence, in 2011 the level of civic knowledge rose to only 26%. However, by 2017 the awareness of the public has increased significantly. When asked about the knowledge of the emergency number functioning within the EU territory, almost half of respondents (49%) indicated the number 112. Nevertheless, these results are not satisfactory, because 39% of the respondents were not able to give the emergency number at all (European Commission Special Eurobarometer Report, *E-Communications and Digital Single Market*, UE 2018). Experts (emergency numbers coordinators) confirm this state of affairs. Unfortunately, most people do not know the emergency number, and if they have heard of it, they do not know how to use it.

The European Commission consistently calls on the Member States to increase their efforts to disseminate information concerning the number 112 among their citizens and to promote its usage. Ineffectiveness and negligence within the scope of functioning and usage of the emergency number 112 were reasons for the lawsuits filed by the European Commission against 14 Member States. As a result of the proceedings, these countries had to take reparation measures, making the full implementation of the EU standards in this area possible.

It is a difficult undertaking to ensure the proper functioning of 112 in all EU Member States. However, an organisation that contributes to improving the security thanks to the 112 emergency number on international level, has been established. European Emergency Number Association – EENA is a specific space for cooperation and learning for all entities involved in security creation.

2. Characteristics of the EENA platform

The idea behind the pan-European emergency number creation was to ensure that all citizens had access to help from the emergency services, regardless of the country where they currently stayed. This also gave rise to the need for a supranational body to support and synchronise these efforts.

The European Emergency Number Association (EENA) is tackling the problems faced by Member States in ensuring efficient emergency notification. It is a non-governmental organisation including more than 1500 representatives of emergency services from over 80 countries world-wide, 11 international organisations and more than 100 researchers.

The EENA's mission is to contribute to improving the security and safety of citizens. For this purpose, the EENA's works are concentrated on improving the emergency response services provided for citizens, mainly when using the pan-European emergency number 112.

The EENA constitutes a platform for searching practical solutions to the problems faced by the emergency services at local, regional and national level. It implements new technologies for efficient communication between emergency services and promotes the awareness of the emergency number 112 among Europeans.

The association operates on several levels of involvement, including conferences, workshops, working groups and online meetings. They address numerous areas of activities faced by emergency services. Nowadays, it is important to solve the problem of how to locate the caller who cannot explain where he or she is, and to effectively warn the public about local threats and crises. Although the location determination based on mobile phones has been available for nearly 10 years, one of the biggest challenge the emergency services are facing is still determination of the exact location of people in danger.

According to the experts (emergency numbers operators), determination of the victims' localization is currently the greatest difficulty that makes the immediate response impossible. The technologies being in use do not provide the exact location of the victim, and sometimes it also happens that the locations provided are false. This makes the work of emergency number operators very difficult. According to the experts (experts in crisis management), with regard to warning the public about the threats, many methods are used, but it depends on the solutions applied in different regions. The solution that is the most commonly used is media (television, radio, social media). The division into social groups is important in this case. Each group is reached in a different way. Thus, for example: as regards the youth, the social media are the most effective way of communication (e.g. Facebook, Instagram, chat), when for the elderly it would be radio and television. In smaller towns, more traditional solutions are used, which boil down to communicating information about the threat through the sound system installed in police cars. The Government Centre for Security has been sending warnings about bad weather conditions to all mobile phone users for some time now. In order to determine the exact location of the person who needs help and effective methods to warn about threats, the most effective solutions are constantly being sought. In the opinion of experts (the Police, the Fire Brigade, the Armed Forces of the Republic of Poland, voluntary services), the systemic solutions are needed, and they should be the same for all regions of the EU.

It should be noted that these issues are being tackled by many countries. Facing this type of problem, they are implementing a new technology which makes it possible to take full advantage of the 21st century opportunities.

Advanced Mobile Location (AML) has been developed in the United Kingdom as a solution when the caller is in the problematic location in emergency situations. When a person in danger calls the emergency services using a smartphone with AML enabled, the phone automatically activates its location service in order to determine the location and it sends the information to the emergency services via SMS (Annual Report 2018, 2019, p. 16.). The service uses GPS or Wi-Fi, whichever is better at the moment. It has been estimated that this technique is up to 4000 times more accurate than the previously used localisation system. AML is being implemented in the United Kingdom by a growing number of smartphone manufacturers and mobile operators. The accuracy of this solution is confirmed by statistics prepared in 2018, according to which almost $\frac{3}{4}$ of all emergency calls (73%) were made using a mobile phone (Implementation of the single European emergency number 112 – Results of the twelfth data-gathering round, 2019, p. 2.).

Currently, AML is fully implemented in Belgium, Estonia, Finland, Ireland, Lithuania, Malta, Slovenia and in the United Kingdom. The European Commission contributes to these results by funding the implementation of AML in Germany, Denmark, France, Croatia, Hungary, Portugal and Sweden, bringing the number of AML countries to fifteen. This service is also available in countries outside Europe, including New Zealand, the United Arab Emirates and the United States.

It is extremely important that the European Electronic Communications Code has ordered all the EU Member States to implement the AML by December 2020.

In addition, EENA's activities focus on helping more than 80 million disabled Europeans, for whom the current emergency notification system is not fully accessible, as it is mainly based on voice calls. According to the experts (emergency numbers operators, emergency services of the Tatra Volunteer Water Search and Rescue), the notifications from disabled people are qualified as the most difficult ones. That is because the system is not adapted

to their capabilities. EENA's works are aimed at integration of new technologies with the emergency services to pick up not only voice, but also information on localization, text provided in the real-time, photos, video calls and other digital data, to become part of the future.

A report drawn up in 2018 on the implementation of the European number 112 shows that 23 Member States have implemented alternative access to emergency services for disabled users via SMS. The reports from these countries point to certain problems following the implementation of this service. The main problem is one-way communication, which means that an SMS message can only be sent by a disabled person to the emergency number 112, and therefore, the operator of emergency numbers has no possibility to make a return contact. In other Member States, the disabled have no access to the emergency number at all, such as Poland, Italy and Spain, or the number is not available at any time of the day, e.g. the Czech Republic.

Another important element that has already been implemented throughout the European Union is the Pan-European in-vehicle emergency call system (eCall). This is a great step forward in the area of automatic emergency notification. The aim of this system is to improve safety and efficiency in road transport within the territory of the European Union. From 1 April 2018 any new car, in order to be authorised for use within the territory of the EU must be fitted with a module that detects road collisions and automatically calls for help to the scene of an emergency. The experts (emergency numbers operators, dispatchers of Emergency Ambulance Services) are cautious about this system. Some of them are of the opinion that the system heavily loads the Emergency Communication Centre, as collision results in an automatic call, even when it is not required.

Despite the implementation of new technologies for the purpose of improving the 112 service, EENA plays yet another, equally important role in the scope of the emergency notification. This platform enables the flow of information concerning the occurrence of an emergency situation between the countries throughout the European Union. According to the experts (emergency numbers operators), this function is extremely helpful. There are problems concerning coordination of the event involving neighbouring countries' services.

A special EENA's database is used to handle this type of notifications. The database ensures the exchange of information between the Rescue Notification Centres within the Community. Any citizen staying on the territory of the country covered by the European Emergency Number 112 Association, and who is in a life or health emergency, will receive direct help.

"The EENA has 19 Member States:

- Austria;
- Belgium;
- Bulgaria;
- Croatia;
- The Czech Republic;
- Estonia;
- Finland;
- Iceland;
- Ireland;
- Latvia;
- Lithuania;
- Luxembourg;

- The Netherlands;
- Poland;
- Romania;
- Slovakia;
- Sweden;
- The United Kingdom;
- Hungary" (<https://www.gov.pl/web/numer-alarmowy-112/eena-europejskie-stowarzyszenie-numeru-alarmowego-112> access on 02 July 2019).

By coordinating cooperation between emergency call centres from all Member States, the EENA plays another equally important role – it prepares reports on the activities of the emergency line, adding up the data received from each of the Member States.

However, the analysis of statistical data does not allow a clear indication of the level of public awareness of the use of emergency numbers, as data from individual Member States vary and fluctuate considerably.

3. The essence of education for Europeans

The European number 112 is an emergency number, available free-of-charge, which can be called to reach the police, fire brigade and ambulance services in all Member States of the European Union. The universal nature of this number is extremely important, especially when using the EU's freedom of movement of persons among Member States.

The information on the official EENA website shows that less than half of European citizens identify 112 as an emergency number anywhere in the EU, and 70% of them have not come across any information about the European emergency number 112 in their country. As the number of Europeans travelling to Member States increases, the awareness of the single European emergency number is now more necessary than ever. All experts (emergency number operators, experts from the Police, State and Voluntary Fire Brigades, Emergency Ambulance Service, the Tatra Volunteer Search and Rescue, Polish Armed Forces, scientists) are of the same opinion and notice large gaps in knowledge among the society about the functioning of the emergency number 112.

Education for safety should be a fundamental and lifelong learning process, from a very early age, when parents are the main teachers, to the adult life of an individual. According to experts (teachers in educational institutions), however, parents do not always realise that they are also responsible for the knowledge of education for safety and the functioning of the emergency number. Some of them also redirect the full educational responsibility in the field of safety to school facilities. This is a misconception, because the curriculum, e.g. in Poland, does not provide for some issues, while others are implemented to a very limited extent.

Education is one of the areas of life which is not subjected to uniformization. Each Member State is free to shape its own school and examination system. Education is not part of integration processes understood as the uniformization of legal regulations, which would impose the necessity of changes. This means that there is no single imposed model of education that is unitary across the whole European Union. Although the Member States are responsible for education and training systems, the European Union helps them to achieve a high-quality

education by exchanging good practice, setting goals and values, and providing funding and expertise. The EU's education and training strategy includes, inter alia, the following objectives:

- implementation of lifelong learning and learning mobility,
- promotion of equity, social cohesion and active citizenship.

Despite the full autonomy of the educational system, there are legal regulations that do not relate to the content of education, but to ensuring an equal access to education at all levels for the EU Member States' citizens.

Every child in primary school is familiarised with the emergency numbers – both the pan-European 112 emergency number and national emergency numbers (if any). Although this is only theoretical knowledge, it is sufficient for basic knowledge. It should also be noted that some experts believe, however, that the knowledge of emergency numbers should also be provided in a practical way. Adults are a completely different problem for education, as it is much more difficult to create an educational platform for them. As the research has shown, the oldest age groups have the least knowledge of emergency numbers (European Commission Special Euro barometer Report, E-Communications and Digital Single Market, 2018, p. 135.).

In 2018, calls directed to the 112 telephone number constituted 48% of all calls directed to emergency numbers. This is mainly because each country, when implementing the 112 telephone number, has had an influence on the form in which it will operate. In Denmark, Estonia, Finland, the Netherlands, Malta, Portugal, Romania and Sweden, the 112 telephone number is the only emergency number. Other countries use both the 112 telephone number and other national emergency numbers.

In Poland, emergency numbers were standardised a few decades ago and adopted the 9XY format – a.k.a. popular "nines" (Kucharczyk, Poznański, 2013, p. 18.). In other European countries, however, different emergency numbers were used. Therefore, it was at least difficult to call for help for people outside the borders of their own country.

However, regardless of the organisational structure of the 112 emergency number, the most important element in calling for help in each country is reliable and credible information about what has happened, where, how many people are affected and what services are needed to resolve the emergency (Lis, 2018, p. 93.). Therefore, it is extremely important to educate every citizen about what and how to report when calling the emergency number. It should be noted, however, that the lack of ability to communicate information about a threat is a priority and the adequate knowledge of how to react in situations that threaten human life, health, property and the environment should be possessed in order to minimise their effects.

A significant difficulty for both emergency number operators and emergency services is to determine the exact location of the person in need of help. It should be noted that all technologies implemented to clarify the place of the caller are of an ancillary nature, and the exact place must be indicated, if it is possible, by the person concerned himself/herself. It is therefore important to be able to describe one's own location because, according to reports from the UK medical service, when a caller gives their exact location, the call duration can be reduced by up to a few minutes (Technical Report Emergency Communications (EMTEL) <http://www.etsi.org/standards-search> access on 120 July 2019). According to experts (Tatra Volunteer Search and Rescue), the call duration can be reduced even more by the precise location given by the system, which automatically displays on computer screen during a telephone call. In this case, it is only important to provide information about an incident. In Poland,

the system that has been in operation for 5 years and which meets those requirements is the Ratunek [Rescue] application. However, it is used primarily in mountain areas. It has been also observed that Poland's neighbouring countries, such as the Slovak Republic, use a similar application working primarily in the mountains as well. It should be noted that this application can also be used throughout the country.

The surveys conducted in all Member States in 2017 have shown that the public awareness of the emergency number is increasing: more than six out of ten respondents (61%) would call 112 in their own country in the event of an emergency, whereas almost half of the respondents (49%) would call 112 anywhere in the E.U in the event of an emergency. Alas, 39% of citizens were unable to identify the emergency number at all (Implementation of the single European emergency number 112 – Results of the twelfth data-gathering round, 2019, p. 17-18).

Therefore, the EENA together with the European Parliament have launched a number of projects to raise public awareness of the 112 emergency number. One of these projects is a promotional campaign involving airlines and airports to raise awareness of the European emergency number among travellers. Airports and airlines have undertaken to display promotional materials, such as posters and banners, in key areas, including departure gates, information points and departure points at airports, in-flight magazines, websites and airline brochures. Similar campaigns have been applied to travel agencies and camping places (<https://eena.org/112-campaigns/>; accessed on 10 May 2019). It should be noted, however, that those efforts were largely directed at travellers, whereas the need to call for emergency services can affect anyone, regardless of age, gender or current accommodation.

Another way to promote the 112 telephone number was the creation of European 112 Day that is annually held on February 11 (11/2). Every year on that day, a number of initiatives are launched in all Member States to disseminate information on the 112 emergency number and, above all, to spread knowledge of its proper use. However, every effort should be made to raise public awareness of the use of the emergency number, not only on holidays, so that it will be used only in urgent situations that endanger life, health, property and the environment.

In conclusion, safety is important for all organisations (understood as states), including those that have a specific nature and, by their very nature, are called upon to ensure that their members are safe and have development opportunity (<https://eena.org/112-campaigns/>; accessed on: 10 May 2019). This will be possible, inter alia, by having knowledge about threats, how to handle them and where to seek help when needed. An effective response to alarm events depends not only on the knowledge, which country nationals should have, but also on technologies that assist to collect and transfer information. The success will depend on effective collaboration between the organisation's member and the systems or technologies that help save lives and health. A human being together with their knowledge and technologies should be thus treated as two separate organisms among which symbiosis must take place. Then it will be possible to talk about an increase in safety among the citizens of the European Union.

References:

- Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (Universal Service Directive).
- European Commission Special Eurobarometer Report, *E-Communications and Digital Single Market*, UE 2018.

European Emergency Number Association, Annual Report 2018, EENA 2019

European Telecommunications Standards Institute (ETSI), Technical Report Emergency Communications (EMTEL); Advanced Mobile Location for emergency calls.

European Commission, *Implementation of the single European emergency number 112 – Results of the twelfth data-gathering round*, Brussels 2019.

<https://ec.europa.eu/> access on 10 May 2019

<https://eena.org/> access on 02 July 2019

<https://www.gov.pl> access on 20 July 2019

Kaczmarczyk B., *Bezpieczeństwo i jego typologie*, Bezpieczeństwo i Technika Pożarnicza, 2013.

Kaczmarczyk B., *Bezpieczeństwo i zagrożenia w teorii oraz praktyce*, SA PSP, Cracow 2014.

Kucharczyk A., Poznański W., *System powiadamiania ratunkowego – analiza funkcjonalności*, published by "Przegląd Pożarniczy" No. 12/2013

Lis K., *Determinanty zarządzania informacją w centrum powiadamiania ratunkowego*, published by Zeszyty Naukowe PWSZ im. Witelona w Legnicy no. 28(3)/2018, Legnica 2018.

EXPERIENCED CHEMISTRY TEACHERS' SCIENCE PROCESS SKILLS (SPSs) DEVELOPMENT AND THEIR USE OF SPSs IN ACTIVITY PLANS

Sevgi AYDIN-GÜNBATAR

Department of Mathematics and Science Education
Van Yuzuncu Yil University
Turkey
sevgi.aydin45@hotmail.com

Elif Selcan ÖZTAY

Department of Elementary Education
Van Yuzuncu Yil University
Turkey
selcan.kutucu@gmail.com

Ayşegül TARKIN-ÇELİKKIRAN

Department of Mathematics and Science Education
Van Yuzuncu Yil University
Turkey
aytarkin@gmail.com

Betül EKİZ-KIRAN

Department of Mathematics and Science Education
Van Yuzuncu Yil University
Turkey
betulekiz@gmail.com

ABSTRACT

In this study, 24 experienced in-service teachers' science process skills (SPSs) development and their use of SPSs in their lesson plan through a week-long professional development (PD) supported by the Scientific and Technological Research Council of Turkey (#117B302) were studied. SPSs are important part of scientists' work, scientific literacy, science education, and problem solving. In this research, SPSs were examined under two main categories, (i) basic SPSs and (ii) integrated SPSs. Basic SPSs are prerequisite for development of integrated ones that have also two sub-categories, namely, verification type and authentic experiment design. Through the PD provided by chemistry teacher educators, participant chemistry teachers received a training that balanced both theory and application of inquiry strategy. In the PD, teachers participated in all activities and conducted all activities that are chemistry experiments based on inquiry. Moreover, during the activities they wrote hypothesis, designed experiments, controlled variables, collected and analyzed the data, and presented their conclusions to other groups. The data were collected through a with 36 multiple choice items. The test was administered as pre- and post-test. The statistical analysis of the data was performed with SPSS.23 package program. To compare and contrast the scores, paired sample t-test was run. Results revealed that there is a statistically significant difference in teachers' SPSs score in favor of post-test ($t=2.508$, $p < .05$). In the light of the results, it can be suggested that longitudinal PDs should be organized more frequently. Moreover, active participation of teachers into the activities should be provided.

INTRODUCTION

There is a growing need for people to learn how to reach and interpret scientific knowledge with changing and developing scientific and technological developments. Parallel with changing conditions in the world, both learning and teaching environments should be changed and modified in terms of 21st century learner skills such as science process skills, critical thinking, life skills etc. Within the scope of 21st century skills, to ensure learners acquire those skills, teachers should utilize instructional strategies including making brainstorming, solving a real life problem, identifying dependent/ independent variables, and designing an experiment (Finlayson, McLoughlin, Coyle, McCabe, Lovatt, & van Kampen, 2015; Köseoğlu & Bayır, 2012). The main aim should be enriching learners with critical thinking and inquiry skills through their education. At this point, science process skills (SPSs) have crucial role by giving a chance to students to produce scientific knowledge and utilize nature of science by experiencing scientific knowledge.

SPSs generally refer abilities that every individual can use in all stages of daily life in order to become a scientifically literate person, to understand and use scientific knowledge, and to improve the quality and adaptation

of social life (Bozkurt & Olgun, 2005; Işık & Nakiboğlu, 2011; Karapınar, 2016). In order to train learners with those skills and knowledge, inquiry-based approach, in which learners are active participants of knowledge acquisition and solve problems faced with everyday life, are necessary (Finlayson et al. 2015; Köseoğlu & Bayır, 2012). In order for teachers to implement effective science instruction including inquiry based approaches, they should improve their both knowledge and experience in terms of teaching and learning science via professional development programs (Cotabish, Dailey, Hughes, & Robinson, 2011).

The main purpose of the study to investigate the development of experienced chemistry teachers' SPSs and integration of SPSs into their activity design through professional development. This study aimed to address following research questions:

- Is there any effect of professional development program on experienced teachers' science process skills?
- How professional development program improve experienced teachers in terms of designing inquiry-based chemistry teaching activities?
- How experienced teachers' knowledge and opinions pertained to inquiry and inquiry-based learning change through professional development program?

LITERATURE REVIEW

SPSs and Its Categorizations

Although science process skills (SPSs) simply defined as skills that scientists use in their studies, they are utilized by everyone in order to be scientifically literate people (Harlen, 1999). There were various definitions of SPSs in the literature. For instance, Çepni, Ayas, Johnson and Turgut (1997) defined SPSs as special skills that simplify learning science, activate students, develop students' sense of responsibility in their own learning, increase the permanency of learning, as well as teach them the research methods. Gultepe (2016) defined them as "the tools that students use to investigate the world around them and to construct science concepts" (p.780). Those skills are also considered as the thinking skills that we use to process information, to think about solving problems, and formulate conclusions (Karamustafaoğlu, 2011; Tan & Temiz, 2003,). Moreover, SPSs generally refer abilities that every individual can use in all stages of daily life in order to become a scientifically literate person, to comprehend the nature of science, and to improve the quality of life (Aktamış & Ergin, 2007; Bozkurt & Olgun, 2005; Işık & Nakiboğlu, 2011; Karapınar, 2016; Saat, 2004). Although researchers discussed almost same SPSs in the literature, there are different categorizations for these skills as well as different definitions. In other words, there is no consensus on their categorizations. While some researchers categorized the SPSs in two groups as basic and integrated ones (American Association for the Advancement of Science [A.A.A.S.] 1998; Lancour, 2005, cited in Kanlı & Yağbasan, 2008), some of them grouped those under three levels as the basic processes, causal processes, and experimental processes (Çepni et al., 1997). In this current study, we adopted the first categorization that examines SPSs under two main categories, namely, basic SPSs and integrated SPSs.

Basic SPSs entail observation, classification, recording data, measurement and using numbers, time and spatial relationship, and communication. Those skills can be used in both scientific studies and daily life. On the other hand, integrated ones are more complex skills, including the use of two or more basic skills together. The latter category has two sub-categories, namely, verification type and authentic experiment design. Verification type includes skills used in the process of performing an experiment to confirm a truth. These skills are prediction, identifying variables, operational identification and interpreting data. Authentic experiment design refers the skills that individuals used while design an experiment and performing it. These skills are hypothesizing, designing experiments, changing and controlling variables, processing data and creating model, and decision making (Aslan, Ertaş-Kılıç, & Kılıç, 2016; Şen & Nakiboğlu, 2012).

Scientific Literacy, Inquiry, & Science Process Skills Development

Scientific literacy, has been the critical and ultimate educational outcome in many countries all around the world (National Research Council [NRC], 1996, Organisation for Economic Cooperation and Development [OECD], 2015). Although scholars have defined it in different ways, scientific literacy can be described as "knowledge and understanding of scientific concepts and processes required for personal decision making, participation in civic and cultural affairs, and economic productivity" (NRC, p.22). In addition to science content knowledge about scientific concepts and principles, scientific literacy concept has other facets that are nature of science (NOS) understanding, how science and its products affect the society and individuals (OECD, 2007). In order to train learners with those skills and knowledge, inquiry-based approaches in which learners are active participants of knowledge acquisition and solve problems faced with everyday life are indispensable (Finlayson et al., 2015; Köseoğlu & Bayır, 2012). In addition to that, research has reported that inquiry-based approach helps learners develop positive attitude towards science (Chatterjee, Williamson, McCann, & Peck, 2009). Recently, science

education researchers revealed that socio-scientific contexts that have a potential to support scientific literacy development especially for social and political aspects of science and its applications (Sengul, 2019).

In the literature, inquiry has been used in different ways and with different meanings, for instance, inquiry as the way of doing science and inquiry as an instructional strategy (NRC, 1996). Inquiry approach implemented in science education is useful in developing SPSs (Germann, Aram, & Burke, 1996). Developing SPSs has pivotal roles in problem solving, and learning science (Carin & Bass, 1997; Gillies & Nichols 2014), and increasing children's curiosity (Settlage & Southerland, 2007). Regarding the importance of SPSs, Settlage and Southerland (2007) stated that "[t]eaching science with too much emphasis on the content would be like teaching language arts by providing students with a few nouns but no verbs and expecting them to construct sentences" (p. 32). Hence, science education practices should include activities, projects, and experiments through which learners have a chance to develop those skills.

In the literature, many studies have been focused on K-12 learners' SPSs development. However, not many studies worked on teachers' SPSs. Teachers' SPSs understanding and integrating those skills into their lessons are vital for supporting learners' SPSs development (Dudu & Vhurumuku, 2012). Research has shown that teachers' knowledge and understanding of SPSs is limited (Shahali, Halim, Treagust, Won, & Chandrasegaran, 2017).

SPSs Development for Teachers

Teachers play a crucial role in assisting students' acquisition of SPSs. A teacher who is not properly equipped with those skills may experience difficulties in transferring SPSs to his/her students (Feyzioğlu, 2009). Therefore, science teachers are expected to develop SPSs and be able to transfer SPSs to their students (İnce-Aka, Guven & Aydogdu, 2010; Kruea-In & Buaraphan, 2014; Miles, 2010; Özer & Özkan, 2012). Numerous studies have been conducted to examine views and sufficiency of teachers, preservice teachers and students about SPSs in literature. Many research studies revealed that science teachers' and preservice teachers' SPSs were insufficient (Aydoğdu, 2006; Chabalengula, Mumba & Mbewe, 2012; Emereole, 2009; Feyzioğlu, 2009; Karşı, Şahin & Ayas, 2009; Mbewe, Chabalengula & Mumba, 2010; Pekmez, 2001; Yıldırım, Atilla, Özmen & Sözbilir, 2013). Those studies reported the fact that especially research-based activities or laboratory work related interventions such as project-based (e.g., Abdulhanung, Supasorn & Samphao, 2011; Hernawati, Amin, Irawati, Indriwati, & Aziz, 2018; Özer & Özkan, 2012), problem-based (e.g., Saputro, Irawanto, Atun & Wilujeng, 2019), and inquiry-based ones (e.g., Ateş, 2005; Budak-Bayır, 2008; Ergül et al., 2011; Irawanto, Saputro, Rohaeti & Prodjosantoso, 2019; Köksal & Berberoğlu, 2014; Kruea-In & Buaraphan, 2014; Nworgu & Otum, 2013; Şen & Sezen-Vekli, 2016) enhanced SPSs development. For instance, Şen and Sezen-Vekli (2016) conducted a study with 24 sophomore pre-service science teachers in General Biology Laboratory by using pretest and post-test quasi-experimental design. They found out the positive influences of inquiry-based teaching approach on pre-service science teachers' SPSs. Similarly, Irawanto et al. (2019) supported that inquiry-based laboratory instruction is an effective method to foster preservice teachers' SPSs. Saputro et al. (2019) conducted a quasi-experimental control group pretest-posttest design research with 48 preservice elementary teachers and revealed that the usage of problem solving instruction in the classroom promoted students' SPSs significantly. During the problem solving instruction lasting six weeks, preservice teachers required to identify the problem, devise a plan to solve the problem, carry out the plan and examine the problem solving. In another study, Hernawati et al. (2018) analyzed the effectiveness of Project-based activities on scientific process skill through a quasi-experimental research. Project based activities conducted under five steps: (1) student orientation on project issues, (2) organization of teaching and learning activities, (3) guidance for students to carry out project activities, (4) development and presentation of project results, and (5) analysis and evaluation project result. In this study, it was revealed that project based activities helped the students to reach better SPSs when compared the conventional laboratory work. In the study of Kruea-In and Buaraphan (2014), 36 secondary school science teachers were allowed to conduct experiments through a professional development workshop was designed based on social constructivist view. Assessment of SPSs of teachers by the Performance Test of Science Process Skills (PTSP) before and after the workshop indicated that the number of SPSs in which teachers showed high performance increased after attending the workshop.

Professional Development (PD)

Although different definitions of PD have been existed in the literature, we adopted Paechter's (1996) definition, that is "an activity in which the individual and the group interact to develop better models for practice which preserve the best of professional autonomy while promoting the sort of reflective culture that encourages constructive, cooperative change" (p.354). Reforms, changes, and technological developments makes PD be inseparable part of teachers' professional life, which is also related to results of changes in educational systems (Borko, 2004). In order to increase the effectiveness of reforms made and support teachers' development, PDs should have some specific characteristics, namely, focusing on a content, active participants who take active role in learning, coherence among PD- curriculum objectives and teachers' practice, long duration and recurring trainings, and collective participation (i.e., from same school, participation from the same field or grade). To

conclude, PDs are important both for updating teachers' knowledge and practice, and success of educational reforms.

METHODOLOGY

Type of the Study

In the current study mixed method design was used (Creswell & Plano Clark, 2011). Both quantitative and qualitative data were collected throughout PD to provide detailed results for 24 experienced chemistry teachers' SPSs development and their integration of SPSs into their plans.

Participants

Participants of the study were 24 (12 female and 12 male) in-service experienced chemistry teachers. They have chemistry teaching experience of at least 10 years. They were teaching chemistry at high schools in different cities of Turkey.

PD Description

The PD project was supported by the Scientific and Technological Research Council of Turkey (#117B302). During the week-long PD, in-service teachers involved in 13 different sessions led by chemistry educators. Sessions lasted 2 to 4 hours. While some of the sessions provided in-service teachers theoretical knowledge about inquiry-based teaching, others led them practice inquiry activities. Aims of the sessions and activities conducted in each session were provided in Table 1.

Table 1. Aims of the Activities Conducted in each session during the PD

Session/Activity	Aim of the activity
How do we change a traditional laboratory activity into an inquiry-based laboratory activity?	to raise awareness of chemistry teachers about inquiry-based teaching practices and to provide experience in converting a cookbook activity to an inquiry-based activity
Which one is burning? Wick or Candle?	to arouse curiosity towards science with inquiry-based chemistry teaching, to develop SPSs, to gain motivation and confidence in participating in a scientific discourse, to develop deep understanding of NOS
Problem Based Learning Applications in Chemistry	to enable chemistry teachers acquire knowledge and skills to help them apply Problem Based Learning in their lessons
Science Technology Engineering Mathematics (STEM) and Engineering Design	to give information about the development of STEM education and how it can be used in science courses
Design-based STEM	to develop inquiry skills and engineering design skills of the chemistry teachers
How do we determine the products of chemical reactions?	to enable chemistry teachers to experience an instructional process prepared by using argumentation based inquiry for teaching chemical reactions
Generating Electricity from Chemical Energy	to convert chemical energy into electrical energy with the cheapest and highest efficiency by using different variables. (In this way, participants will be able to work in groups, form a hypothesis by using their pre-knowledge of the problem, design their own hypothesis by using the tools and equipment available, and predict the results of the observations)
Applications of Concept Cartoon Activities Based on Argumentation in Organic Chemistry	to understand the importance of argumentation-based instruction in organic chemistry teaching, to understand the important points to be considered while developing activities according to Toulmin's argumentation model, to comprehend the important points to be considered in the preparation of concept cartoons

Journey to Discovery of Atmospheric Pressure	to enable teachers to examine the competing theories in the discovery of atmospheric pressure and the scientific research and reasoning process of a scientist (Torricelli)
Comparison of the Effectiveness of Antacid Tablets Produced by Different Brands	to design an experiment to compare the effectiveness of the antacid tablets produced by different brands, to determine the variables that will be worked to use inquiry approach on acid-base with guided inquiry
Computer Assisted Inquiry	to participate in research-inquiry processes by using technology-based models in a learning environment with technological tools and equipment.
Using Analogy Method to Question the Properties of Chemical Equilibrium	to embody the concept of chemical equilibrium where the forward and reverse reaction rates are equal by using simple materials (beans, paper clips, etc.) to comprehend that chemical equilibrium is not static but dynamic
Augmented Reality Applications Based on Guided Inquiry in Chemistry Teaching	to show the practical applications of chemistry activities based on guided inquiry with the applications of augmented reality

Data Sources

Science process skills test, preparation of inquiry-based chemistry teaching activity, and chemistry teachers' opinions about inquiry-based teaching were used as data sources to answer the research questions asked. Detailed information about the data sources is provided below:

a) Science Process Skills Test

In order to measure the participants' SPSs, the Science Process Skill Test that was developed by Burns, Okey and Wise (1985) and translated into Turkish by Geban, Askar and Özkan, (1992) was administered. The reliability of the Turkish version of the test was $\alpha = 0.82$. The test consists of 36 multiple-choice questions. In this test, identifying variables (12 questions), defining operationally (6 questions), stating hypothesis (9 questions), graph and interpreting data (6 questions) and designing investigations (3 questions) skills were tried to be measured.

b) Preparation of Inquiry-Based Chemistry Teaching Activity

In this PD, it was aimed to help teachers gain experience in teaching with inquiry method in their professional lives. For this purpose, the teachers were asked to prepare an inquiry-based chemistry teaching activity at the beginning and at the end of the PD in order to determine the contribution of the PD to the teachers' level of developing inquiry-based chemistry teaching activities. Teachers were free to choose the high school chemistry topic that will be the focus of the activity preparation.

c) Chemistry Teachers' Opinions about Inquiry-Based Teaching

Teachers were asked to respond some questions about inquiry-based teaching at the beginning and at the end of the PD. Examples to the questions were:

1. What is inquiry method?
2. What is the purpose of the teaching with inquiry method?
3. In your opinion, what are the advantages (strengths) and disadvantages (weaknesses) of inquiry?
4. What do you think about the applicability of the inquiry method?

Data Analysis

First, teachers' pre and post-tests were coded as true (1 point) and wrong (0 point). Then, the data were entered to SPSS package program. The comparisons of pre-test and post-test scores of Science Process Skill Test were analyzed by running t-test.

Second, inquiry activities prepared by teachers were evaluated by a rubric scale developed by Fay, Grove, Towns and Bretz (2007) (Table 2).

Table 2. Rubric for Evaluating Inquiry Levels of the Activities Developed by Teachers

Level	Problem	Method	Results
Verification (0)	Provided	Provided	Provided
Structured Inquiry (1)	Provided	Provided	Not provided
Guided Inquiry (2)	Provided	Not provided	Not provided
Open Inquiry (3)	Not provided	Not provided	Not provided

Through this scale, the inquiry levels of the activities prepared by teachers were coded as “Not provided to the student” or “Provided to the student” for problem, method and results criteria. In addition, the SPSs that are aimed to be developed through activities planned by teachers were evaluated using Table 3.

Table 3. Science Process Skills Used in the Activities Developed by Teachers

Science Process Skills	<i>Skills focused on in the pre-developed activity</i>	<i>Skills focused on in the post-developed activity</i>
Observation		
Classification		
Inference		
Prediction		
Identifying variables		
Design an experiment		
Measuring		
Data collection		
Controlling variables		
Interpreting data and formulating models		
Decision making		
Presentation		

Finally, teachers' opinions were analyzed qualitatively by the research team. Teachers' responses were analyzed by content analysis.

RESULTS

Results for the Analysis of SPSs Test (1st research question)

Data were analyzed by paired sample t-test in SPSS.23 program. Results of the study revealed that inquiry-based teaching activities provided a significant increase in the participants' science process skills test scores ($t = 2.508$, $p < .05$). Results obtained from paired sample t-test analysis are presented in Table 4.

Table 4. Results of Paired Sample t-test Analysis of the Total Scores Obtained from Pre and Post Implementation of Science Process Skills Test

		X	N	S	SD	t	p
Science Process Skills Test	Pre-test	26.13	24	3.675			
	Post-test	28.00	24	4.243	23	-2.508	.020

Science process skills test includes 5 sub-dimensions (i.e., identifying variables, operationally defining, stating hypothesis, interpreting data, and designing investigations). Table 5 shows the teachers' average scores of pre- and post-tests for each sub-dimension.

Table 5. Pre- and Post-Test Results for the Sub-dimensions of Science Process Skills Test

Identifying variables	Pre-test	6.3750	24	1.95187
	Post-test	7.6667	24	2.53097
Operationally defining	Pre-test	4.6250	24	.96965
	Post-test	5.0833	24	1.05981
Stating hypothesis	Pre-test	7.0417	24	1.36666
	Post-test	7.4167	24	1.50121
Interpreting data	Pre-test	5.3333	24	.76139
	Post-test	5.2500	24	.79400
Designing investigations	Pre-test	2.7083	24	.55003
	Post-test	2.5833	24	.65386

The scores obtained from pre- and post-tests for each sub-dimension were analyzed by paired sample t-test. It was revealed that there was a significant difference between the scores. When Table 6 was examined, it can be seen that there is a meaningful significant difference between teacher scores for the first sub-dimension, identifying variables, in favor of post-test ($t = -2.089$, $p < .05$).

Table 6. Results of Paired Sample T-Test Analysis of Teachers' Pre- and Post-Test Scores of the Sub-Dimensions of Science Process Skills Test

	X	S	t	SD	p
Identifying variables	-1.29167	3.02855	-2.089	23	.048
Operationally defining	-.45833	1.21509	-1.848	23	.078
Formulating hypothesis	-.37500	1.17260	-1.567	23	.131
Interpreting data	.08333	.82970	.492	23	.627
Designing investigations	.12500	.61237	1.000	23	.328

Results for the Analysis of Activities in Terms of Science Process Skills (2nd research question)

One of the purposes of the current PD program was providing inquiry-teaching experience which teachers can reflect in their professional lives. For this aim, at the beginning and at the end of the PD program, they were expected to prepare an inquiry-based chemistry teaching activity on any subject they wanted in order to determine the contribution of the program in terms of designing inquiry-based chemistry teaching activities. As a result of the analysis, science process skills emphasized by them are presented in Table 7.

Table 7. Science Process Skills Provided in the Activities Developed by Teachers

		Number of participants emphasized in pre-test	Number of Participants emphasized in post-test
Basic Science Process Skills	Observing	11	11
	Measuring	4	3
	Classifying	4	1
	Recording data	0	8
	Using space-time relationship	0	1
	Communicating	3	15
Integrated science process skills	Predicting	2	3
	Verification experiments	0	1
	Identifying variables	0	1
	Defining operationally	0	0
	Drawing conclusions	11	12
	Formulating hypotheses	1	0
	Design and Application of an Authentic Experiments	0	9
	Setting up experiments	0	0
	Controlling variables	0	0
	Interpreting data and formulating models	0	0
	Decision making	0	2

SPSs were examined in two main categories, namely, basic and integrated science process skills. In addition, integrated science process skills were also examined in two sub-categories, namely verification experiments and design and application of an authentic experiments (Nakiboğlu, 2015). Results were presented with graphs for Basic and Integrated Science Process Skills (Figure 1).

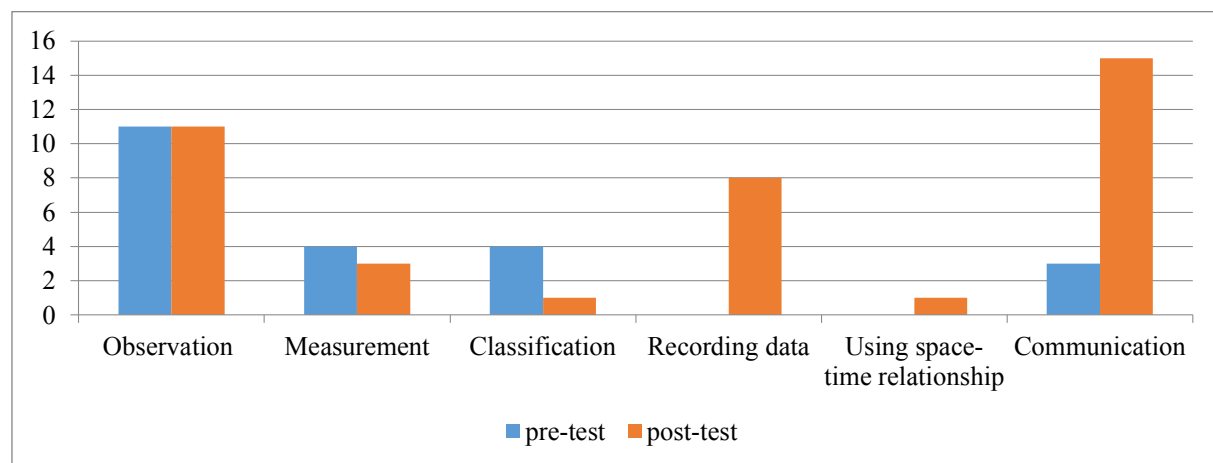


Figure 1. Basic SPSs emphasized in pre- and post-activity preparation

In the initial activities prepared by the participants, it was observed that they frequently integrated observation skill, which is one of the basic science process skills ($n = 11$) (Figure 1). In addition, measurement, classification and communication were included in the initially designed activities. Activities designed after the training included recording data and using space-time relationship SPSs, which were not included in the initially designed activities. In addition, there was a clear increase in the use of communication skills, which included sharing of the results with other groups and creating tables and graphs for sharing results, from the first to the last application. Measurement and classification skills were less involved in the post-activity preparation than were done in the first application.

Regarding the integrated SPSs, first, analysis of verification experiments, one of the sub-categories of integrated SPSs, was provided in Figure 2.

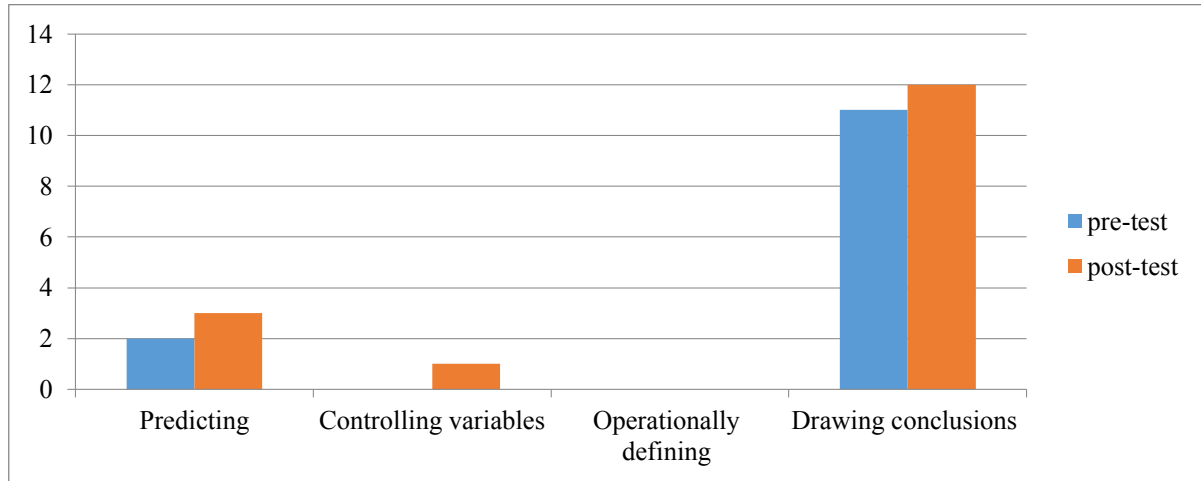


Figure 2. The level of verification experiments involved in pre- and post- designed activities

Before the PD, predicting and drawing conclusions skills were involved in the activities designed by participants. After the training, while the number of the participants integrating those two skills into the activities increased, identifying variables skill was also involved in the activities. Operationally defining skill was involved in neither the pre- nor post-application (Figure 2).

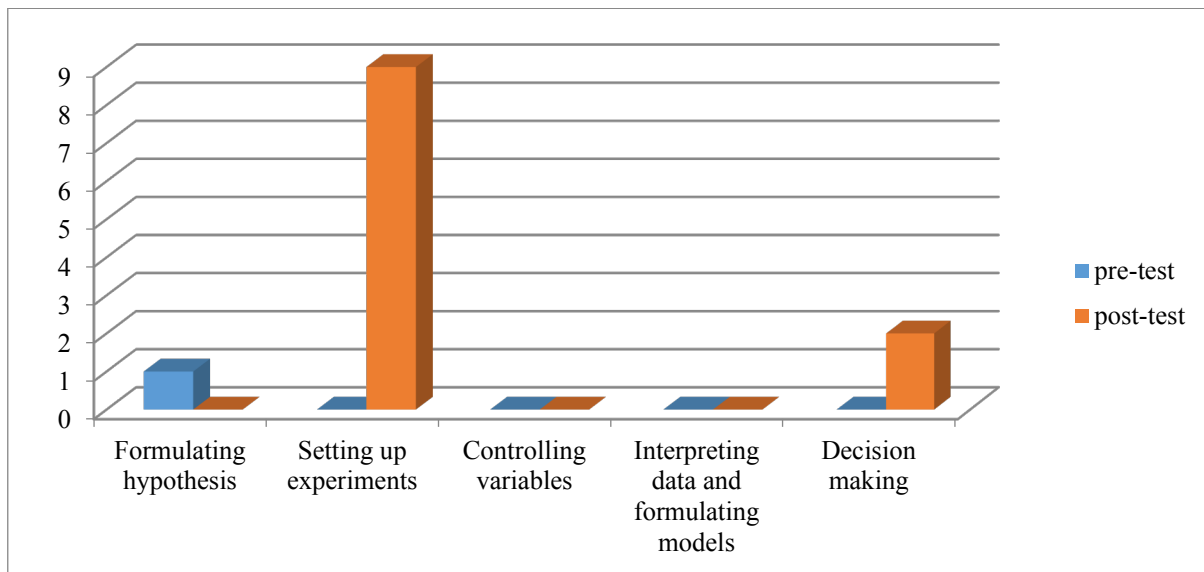


Figure 3. The level of design and application of an authentic experiments involved in the pre- and post- activities

The only science process skill involved in the initially designed activities was formulating hypothesis, which was one of the components of design and application of an authentic experiments (Figure 3). Activities designed at the end of the training involved setting up experiments ($n=9$) and decision making ($n=2$). Controlling variables and interpreting data and formulating models were not involved in the pre-or post-designed activities.

The PD training, which aimed to train participants how to teach inquiry and use SPSs in activities, a comparative analysis of the data collected in the pre- and post- activity design was conducted (Figure 4). This analysis provided an overview of basic and integrated SPSs.



Figure 4. Degrees of basic and integrated SPSs in the pre- and post- activity design

Regarding the inclusion of basic and integrated SPSs in the activities developed by teachers, there was an increase in favor of the activities developed after the training. But still there was no improvement in integrating some SPSs (e.g., operationally defining, controlling variables, and interpreting data and formulating models) (Figure 4). It was seen that at the end of the training, participants focused more on the practice of SPSs while developing activities. Especially design and application of an authentic experiments sub-category was the backbone of the implementation of this approach. Nine participants asked students to design authentic experiments instead of giving students the procedure of the experiments.

Results for the analysis of teachers' opinions pertained to inquiry and inquiry-based learning (3rd research question)

Teachers' knowledge and opinions about inquiry and inquiry-based learning were obtained both at the beginning and at the end of the training with the help of open-ended questions. The results obtained from the analysis of the data were given below as pre-test and post-test results, respectively.

Pre-test Results

The majority of participants defined inquiry as the process of learning and acquiring knowledge by questioning (n = 5), doing research (n = 8) and asking questions (n = 8). For example, teacher 1(T1) stated inquiry as "a method of learning by questioning, using scientific knowledge and doing research." T2 stated that "it is a process of accessing knowledge by asking questions about a problem, event or situation." Other expressions used to define inquiry learning were learning by doing (n=2) and doing research on why and how (n = 3). For example, T3 defined inquiry method that "enables students to reach information by thinking and experimenting." T4 stated that "it is not to give information to the students but enable them to reach the knowledge by searching for why and how."

In addition, inquiry method was evaluated as a method in which the student was active (n = 2) and away from memorization (n = 2). However, it was not clearly stated what was meant to be active and far from memorization. Analyzing data (n = 3) was the only higher level thinking skill stated as a component of the inquiry research. Furthermore, inquiry was defined in different ways by the teachers. These definitions included scientific method (e.g., T5's definition), research method (e.g., T6's definition), process (e.g., T2's definition) and learning method (e.g., T7's definition). When all the teachers' opinions about inquiry method were examined, it as seen that the definitions were general and contain many expressions that are not unique to the inquiry method. In particular, teachers defined inquiry simply as questioning, doing research, and asking questions. However, they do not give details about how to do them.

Post-test Results

The most striking part of the post-test results was that the majority of the teachers used expressions that support student-centered instruction ($n = 15$) while defining inquiry teaching. In the inquiry method, the student was defined as the person who was involved in the learning process, asks questions, investigates and thinks. For example, T8 explained student's involvement in the learning process as “a way of learning in which students respond to questions by analyzing data that they collect”, while T9 explained it as “a student-centered learning process in which students are responsible from their own learning.” In addition, as a student, being mentally active ($n = 2$) was expressed as one of the characteristics of the inquiry method. For example, T10 stated “inquiry is a learning method in which knowledge is structured through mental processes such as estimation, observation, analysis and evaluation.”

Another remarkable point was that almost all of the teachers emphasized at least one of the SPSs in defining the inquiry method after the PD. Identifying a problem or a research question ($n=10$) was the mostly stated SPS by participants. T11 explained it as “the process of collecting data with the help of a research question to attribute meaning to the data.” Formulating hypothesis ($n = 3$) was mentioned by T12 as “the sum of the processes of collecting and analyzing evidence and data in order to solve a scientific question about the everyday life.” Data collection ($n = 5$), observation ($n = 4$), analysis ($n = 4$), inference ($n = 2$), evaluation ($n = 3$) were among the SPSs used in definitions. For instance, T13 claimed that “inquiry is an innovative learning method that provides students the opportunity to do research, scientific thinking, inference, evaluation, and interpretation.” In addition, inquiry was often defined as a teaching-learning method or process by the participants. When the post-test results were examined, it as seen that participants defined inquiry as a learner-centered method that includes teaching and practice of SPSs.

DISCUSSION

Regarding the context of 21st century learning, possessing, and experiencing SPSs are considered as main purpose of learning science (Irwanto, Rohaeti & Prodjosantoso, 2018; Karsli & Şahin, 2009). First, this study is a small part of a large project that includes week-long PD offered to 24 in-service chemistry teachers. In the light of the literature that has reported the significant contribution of inquiry—based, project- and problem-based training on SPSs development, the researchers designed a PD with activities based on those strategies with a hope to give a chance to teacher to experience inquiry based activities. Regarding this point, Desimone (2009) has stated that one of the most important features of PD is active participation of teachers rather than passive listeners of presentations made by experts. In our PD context, we paid specific attention to active participation of teachers into more than ten sessions including activities that help teachers develop SPSs. To be clear, to support the teachers' SPSs development, the teacher educators let them hypothesize, control variables, collect data, analyze data, and interpret them during each session. As a result of the study, it can be concluded that the chemistry teachers have acquired and improved both basic and integrated SPSs to some extent through PD program. Although they did not know much about SPS at the beginning, at the end of the PD, test results showed increase in their SPSs. Moreover, participants could integrate more SPSs into the activities that they develop at the end of the PD. After PD program, especially at design and application of an authentic experiments sub-category, there was a remarkable improvement. In this change, sessions including inquiry-based activities that required participants to hypothesize, design an experiment, collect data, and analyze data may help them learn how to achieve those (e.g., how to write an hypothesis). Corresponding to Crawford et al., (2014) teachers do not have SPSs and know well about how to integrate SPSs. However, if they take support, they are able to achieve those. Teachers also changed their perspective from giving learners the procedure of the experiments to ask learners to design authentic experiments. At the beginning, teachers prepared an activity that included all details such as how to collect data, aim of the activity etc. However, in the post activity preparation, they preferred to give less details and asked more from learners. This revealed that PD program including active participation of teachers into inquiry based activities makes teachers obtain how to integrate those SPSs (e.g., predicting, controlling variables, drawing conclusions, recording data, controlling variable) into the activity. This result is also supports Ketpichainarong, Panijpan, and Ruenwongsa's (2010) point that training helps teachers to change their classroom view from traditional to constructivist one. Similar to previous studies (Ergül et al., 2011; Irwanto, et al., 2019; Köksal & Berberoğlu, 2014; Şen & Sezen-Vekli, 2016) the findings of this study have shown that hands-on activities incorporating inquiry based teaching to chemistry instruction improve SPSs. It is recommended that in order for the teachers to acquire SPSs, they should be directly participated in the inquiry process. However, as stated earlier, we observed low mean scores for some sub-dimensions of the test (e.g., identifying variables, stating hypothesis), which shows that in the future studies, teacher educators should pay specific attention to those sub-dimensions and provide more opportunities for teachers to identify variables and write hypothesis during PD.

Second, teachers have a vital role in learners' development of SPSs. Teachers with limited SPSs may had difficulty in transferring those skills to learners (Feyzioğlu, 2009). Hence, teachers' knowledge and experience in terms of

SPSs should be improved (Blanchard et al., 2010; Kruea-In & Buaraphan, 2014; Özer & Özkan, 2012). However, studies on SPSs development in the related literature have been focused more on pre-service teachers' (Irwanto et al., 2019; Saputro et al., 2019; Şen & Sezen-Vekli, 2016) or K-12 learners' SPSs development (Ergül et al., 2011; Kanlı & Yağbasan, 2008). Hence, more studies should be focused on in-service and experienced teachers' SPSs development and how they incorporate SPSs into their laboratory work. By doing so, as in other countries (e.g., Singapore, Australia, United States of America) (Crawford et al., 2014), through the successful use of inquiry-based strategy in Turkey we will reach the ultimate goal of teacher education that is training more qualified learners who are able to think critically, do research, and have SPSs. In other words, we will reach the goal of educating scientifically literature citizens.

Note: The PD project was supported by the Scientific and Technological Research Council of Turkey (#117B302).

REFERENCES

- Abdulhanung, D., Supasorn, S., & Samphao, A. (2011). Promoting Students' Scientific Methods and Comprehension of Acid-Base Using Cooperative Learning Accompanied with Science Projects. *Journal of Srinakharinwirot University (Sci. & Tech.)*, 3(1), 54-62.
- Aktamış, H. & Ergin, Ö. (2007). Bilimsel süreç becerileri ile bilimsel yaratıcılık arasındaki ilişkinin belirlenmesi (Investigating the relationship between science process skills and scientific creativity). *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 33, 11-23.
- American Association for the Advancement of Science. (1998). Science for all Americans. Washington, D. C.
- Aslan, S., Ertas-Kılıç, H., & Kılıç, D. (2016). Bilimsel süreç becerileri. Ankara: Pegem Akademi.
- Ateş, S. (2005). Öğretmen adaylarının değişkenleri belirleme ve kontrol etme yeteneklerinin geliştirilmesi. *Gazi Üniversitesi Gazi Eğitim Fakültesi Dergisi*, 25(1), 21-39.
- Aydoğdu, B. (2006). *İlköğretim fen ve teknoloji dersinde bilimsel süreç becerilerini etkileyen değişkenlerin belirlenmesi*. Yayınlanmamış yüksek lisans tezi. İzmir: Dokuz Eylül Üniversitesi Eğitim Bilimleri Enstitüsü.
- Blanchard, M. R., Southerland, S. A., Osborne, J. W., Sampson, V. D., Annetta, L. A., & Granger, E. M. (2010). Is inquiry possible in light of accountability?: A quantitative comparison of the relative effectiveness of guided inquiry and verification laboratory instruction. *Science Education*, 94, 577-616.
- Borko, H. (2004). Professional development and teacher learning: Mapping the terrain. *Educational Researcher*, 33(8), 3-15.
- Bozkurt, O. & Olgun, Ö. S. (2005). Fen ve teknoloji eğitiminde bilimsel süreç becerileri. M. Aydoğdu ve T. Kesercioğlu (Ed.). *İlköğretimde Fen ve Teknoloji Öğretimi (1. baskı)* içinde (s. 56-70). Ankara: Anı Yayıncılık
- Budak-Bayır, E. (2008). *Fen Müfredatlarındaki Yeni Yönelimler Işığında Öğretmen Eğitimi: Sorgulayıcı-Araştırma Odaklı Kimya Öğretimi*. Yayınlanmamış doktora tezi. Ankara: Gazi Üniversitesi Eğitim Bilimleri Enstitüsü.
- Burns, J. C., Okey, J. R. & Wise, K. C. (1985). Development of an integrated process skill test: TIPS II. *Journal of Research in Science Teaching*, 22(2), 169-177.
- Carin, A. A. & Bass, J. E. (1997). *Methods for teaching science as inquiry*. 8th edition. New Jersey: Merrill Prentice Hall.
- Chabalengula, V., Mumba, F., & Mbewe, S. (2012). How pre-service teachers, understand and perform science process skills. *Eurasia Journal of Mathematics, Science and Technology Education*, 8(3), 167-176.
- Chatterjee, S., Williamson, V. M., McCann, K., & Peck, M. L. (2009). Surveying students' attitudes and perceptions toward guided-inquiry and open-inquiry laboratories. *Journal of Chemical Education*, 86(12), 1427-1432.
- Crawford, B. A., Capps, D. K., van driel, J., Lederman, N., Lederman, J., Luft, J. & et al., (2014). *Topics and Trends in Current Science Education*, (Eds. Brugui C. Et al.) Learning to Teach Science as Inquiry: Developing an Evidence-Based Framework for Effective Teacher Professional Development. pp 193-211. Springer, Netherlands
- Creswell, J. W. & Plano Clark V. L., (2011). *Designing and conducting mixed methods research*, 2nd ed. Thousand Oaks, CA: Sage.
- Cotabish, A., Dailey, D., Hughes, G. D. & Robinson, A. (2011). The Effects of a STEM Professional Development Intervention on Elementary Teachers' Science Process Skills. *Research in The Schools*, 18(2), 16-25.
- Çepni, S., Ayas, A., Johnson, D., Turgut, F. (1997), *Fizik Öğretimi*. Ankara: YÖK/Dünya Bankası Millî Eğitimi Geliştirme Projesi Hizmet Öncesi Öğretmen Eğitimi.

- Desimone, L. (2009). Improving impact studies of teachers' professional development: Toward better conceptualizations and measures. *Educational Researcher*, 38(3), 181-199. Doi.10.3102/0013189X08331140.
- Dudu, W. T., & Vhurumuku, E. (2012). Teachers' practices of inquiry when teaching investigations: A case study. *Journal of Science Teacher Education*, 23(6), 579-600.
- Emereole, H. U. (2009). Learners' and teachers' conceptual understanding of science processes: The case of Botswana. *International Journal of Science and Mathematics Education*, 7, 1033-1056.
- Ergül, R., Şimşekli, Y., Çalış, S., Özdilek, Z., Göçmençelesi, Ş., & Şanlı, M. (2011). The effects of inquiry-based science teaching on elementary school students' science process skills and science attitudes. *Bulgarian Journal of Science & Education Policy*, 5(1), 48-68.
- Fay, M. E., Grove, N. P., Towns, M. H., & Bretz, S. L. (2007). A rubric to characterize inquiry in the undergraduate chemistry laboratory. *Chemistry Education Research and Practice*, 8(2), 212-219.
- Feyzioğlu, B. (2009). An investigation of the relationship between science process skills with efficient laboratory use and science achievement in chemistry education. *Journal of Turkish Science Education*, 6(3), 114-132.
- Finlayson, O., McLoughlin, E., Coyle, E., McCabe, D., Lovatt, J., & van Kampen, P. (2015). *SAILS inquiry and assessment units*. Eğitim Kitap Yayıncılık: Ankara.
- Geban, Ö., Aşkar, P. & Özkan, D. (1992). Effects of computer simulations and problem-solving approaches on high school students. *Journal of Educational Research*, 86(1), 5-10.
- Germann, P. J., Aram, R. & Burke, G. (1996). Identifying patterns and relationships among the responses of seventh-grade students to the science process skill of designing experiments. *Journal of Research in Science Teaching*, 33(1), 79-99.
- Gillies, R. M., & Nichols, K. (2014). How to support primary teachers' implementation of inquiry: teachers' reflections on teaching cooperative inquiry-based science. *Research in Science Education*. doi:10.1007/s11165-014-9418-x
- Gultepe, N. (2016). High School Science Teachers' Views on Science Process Skills. *International Journal of Environmental and Science Education*, 11(5), 779-800.
- Harlen, W. (1999). Purposes and procedures for assessing science process skills. *Assessment in Education: Principles, Policy & Practice*, 6(1), 129-144.
- Hernawati, D., Amin, M., Irawati, M., Indriwati, S., & Aziz, M. (2018). Integration of Project Activity to Enhance the Scientific Process Skill and Self-Efficacy in Zoology of Vertebrate Teaching and Learning. *Eurasia Journal of Mathematics, Science and Technology Education*, 14(6), 2475-2485.
- İnce-Aka, E., Güven, E., & Aydoğdu, M. (2010). Effect of Problem Solving Method on Science Process Skills and Academic Achievement. *Journal of Turkish Science Education*, 7(4), 13-25.
- Irwanto, Rohaeti, E., & Prodjosantoso, A. K. (2018c). The investigation of university students' science process skills and chemistry attitudes at the laboratory course. *Asia-Pacific Forum on Science Learning and Teaching*, 19(2), [7].
- Irwanto, Saputro, A. D., Rohaeti, E., Prodjosantoso, A. K. (2019). Using Inquiry-Based Laboratory Instruction to Improve Critical Thinking and Scientific Process Skills among Preservice Elementary Teachers. *Eurasian Journal of Educational Research*, 19(80), 151-170.
- Işık, A. ve Nakiboğlu, C. (2011). Sınıf öğretmenleri ile fen ve teknoloji dersi öğretmenlerinin bilimsel süreç becerileri ile ilgili durumlarının belirlenmesi. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi*, 11(2), 145-160.
- Kanlı, U., & Yağbasan, R. (2008). 7E modeli merkezli laboratuvar yaklaşımının öğrencilerin bilimsel süreç becerilerini geliştirmedeki yeterliliği. *Gazi Üniversitesi Gazi Eğitim Fakültesi Dergisi*, 28(1), 91-125.
- Karamustafaoğlu, S. (2011). Improving the science process skills ability of science teachers using I diagrams, *Eurasian Journal of Physics and Chemistry Education*, 3(1), 26-38.
- Karapınar, A. (2016). *Sorgulamaya dayalı öğrenme ortamının öğretmen adaylarının bilimsel süreç becerileri, sorgulama becerileri ve bilimsel düşünme yetenekleri üzerindeki etkisi*. Yayımlanmamış Yüksek Lisans Tezi. Celal Bayar Üniversitesi, Manisa.
- Karlı, F., Şahin, Ç., Ayas, A., (2009). Determining science teachers' ideas about the science process skills: A case study. *Procedia Social and Behavioral Sciences*, 1, 890-895.
- Karsli, F., & Şahin, Ç. (2009). Developing worksheet based on science process skills: Factors affecting solubility. *Asia-Pacific Forum on Science Learning and Teaching*, 10(1), [15].
- Ketpichainarong, W., Panijpan, B., & Ruenwongsa, P. (2010). Enhanced learning of biotechnology students by an inquiry-based cellulose laboratory. *International Journal of Environmental and Science Education*, 5(2), 169- 187.
- Köksal, E. A., & Berberoglu, G. (2014). The Effect of Guided-Inquiry Instruction on 6th Grade Turkish Students' Achievement, Science Process Skills, and Attitudes toward Science. *International Journal of Science Education*, 36, 66-78.

- Köseoğlu, F. & Bayır, E. (2012). Sorgulayıcı-araştırmaya dayalı analitik kimya laboratuvarlarının kimya öğretmen adaylarının kavramsal değişimlerine, bilimi ve bilim öğrenme yollarını algılamalarına etkileri. *Türk Eğitim Bilimleri Dergisi*, 10(3), 603-625.
- Kruea-In, N., & Buaraphan, K. (2014). Enhancing lower secondary school science teachers' science process skills and laboratory lesson preparation through a social constructivist-based professional development workshop. *The International Journal of Science, Mathematics, and Technology Learning*, 20(2), 43-56.
- Miles, E. (2010). *In-service Elementary Teachers' Familiarity, Interest, Conceptual Knowledge and Performance on Science Process Skills*. Master Thesis. Southern Illinois University Carbondale, USA.
- Mbewe, S., Chabalengula, V. M., & Mumba, F. (2010). Preservice teachers' familiarity, interest and conceptual understanding of science process skills. *Problems of Education in the 21st Century*, 22(22), 76-86.
- Nakiboğlu, C. (2015). Kimya Öğretiminde Bilimsel Süreç Becerileri. Ayas, A. ve Sözbilir, M (Ed.), *Kimya Öğretimi: Öğretmen eğitimcileri, öğretmenler ve öğretmen adayları için iyi uygulama örnekleri* (p.93-114). Pegem Akademi, Ankara.
- National Research Council (1996). *National Science Education Standards*. Washington, DC: National Academy Press.
- Nworgu, L. N., & Otum, V. V. (2013). Effect of guided inquiry with analogy instructional strategy on students acquisition of science process skills. *Journal Education and Practice* 4(27), 35- 40.
- Organisation for Economic Cooperation and Development [OECD]. (2007). *Assessing scientific, reading and mathematical literacy: A framework for PISA 2006*. Retrieved May 2019 2008 from https://www.oecd-ilibrary.org/education/assessing-scientific-reading-and-mathematical-literacy_9789264026407-en
- Organisation for Economic Cooperation and Development [OECD] (2015), *Education at a Glance 2015: OECD Indicators*, OECD Publishing. Retrieved May 2019 from <http://dx.doi.org/10.1787/eag-2015-en>
- Özer, D. Z., & Özkan, M. (2012). Proje tabanlı öğretimin fen bilgisi öğretmen adaylarının bilimsel süreç becerileri üzerine etkisi. *Türk Fen Eğitimi Dergisi*, 9(3), 119-130.
- Paechter, C. (1996). What do we mean by professional development? *Research in Post -Compulsory Education*, 1(3), 345-355. DOI: 10.1080/1359674960010305
- Pekmez, E. Ş. (2001, 7-8 September). Fen öğretmenlerinin bilimsel süreçler hakkındaki bilgilerinin saptanması [The determination of knowledge about science process skillsof science process skills]. Yeni Binyılın Başında Türkiye’de Fen Bilimleri Eğitimi Sempozyumu Bildiriler Kitabı, T.C. Maltepe Üniversitesi Eğitim Fakültesi, İstanbul,543-549.
- Saat, R.M, (2004). The Acquisition of Integrated Science Process Skills in a Web-based Learning Environment. *Research in Science & Technology Education*, 22(1), 23-40.
- Saputro, A. D., Irwanto, I., Atun, S., & Wilujeng, I. (2019). The Impact of Problem Solving Instruction on Academic Achievement and Science Process Skills among Prospective Elementary Teachers. *Elementary Education Online*, 18(2), 496-507.
- Settlage, J. & Southerland, S. A. (1998). *Teaching Science to Every Child Using Culture as A Starting Point*, Washington: National Academies Press.
- Şen , C., & Sezen-Vekli, G. (2016). The Impact of Inquiry Based Instruction on Science Process Skills and Self-Efficacy Perceptions of Pre-Service Science Teachers at a University Level Biology Laboratory. *Universal Journal of Educational Research*, 4(3), 603-612.
- Şen, A. Z. & Nakiboğlu, C. (2012). Ortaöğretim kimya ders kitaplarının bilimsel süreç becerileri açısından incelenmesi. *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi*, 13(3), 47-65.
- Sengul, O. (2019). Linking Scientific Literacy, Scientific Argumentation, and Democratic Citizenship. *Universal Journal of Educational Research*, 7(4), 1090-1098.
- Shahali, E. H., Halim, L., Treagust, D. F., Won, M., & Chandrasegaran, A. L. (2017). Primary school teachers' understanding of science process skills in relation to their teaching qualifications and teaching experience. *Research in Science Education*, 47(2), 257-281.
- Tan, M. & Temiz, B., K. (2003). Fen öğretiminde bilimsel süreç becerilerinin yeri ve önemi (Place and importance of science process skills in science teaching). *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, 1(13), 89-101.
- Yıldırım, M., Atilla, M. E., Özmen, H., & Sözbilir, M. (2013). Fen bilimleri öğretmen adaylarının bilimsel süreç becerilerinin geliştirilmesi hakkındaki görüşleri [The preservice science teachers' views about the developing science process skills]. *Mersin University Journal of the Faculty of Education*, 9(3), 27-40.

FAKE NEWS - PHENOMENON, RESULTS, EDUCATION

Barbara Kaczmarczyk
barbara.kaczmarczyk@awl.edu.pl

Izabela Nowicka
izabela.nowicka@awl.edu.pl

Piotr Szczepanski
piotr.szczepanski@awl.edu.pl

Marlena Dabrowska
m.dabrowska94@gmail.com

Methodology

The aim of the article was to present the phenomenon of fake news, its results and the possibilities of preventing it. An attempt was made to answer the research problem that took the form of the following questions: should fake news be treated as a new threat? What impact do they have on creating either positive or negative images of not only persons, but also phenomena? Theoretical and empirical research methods were used for preparing the article. Analysis, synthesis and inference of subject literature on safety, threats, information manipulation and education for safety have been conducted. The results of empirical studies in the form of interviews with experts, namely spokespeople, journalists and psychologists were also used.

Introduction

The increasing occurrence of threats in various domains of life and the risk of the emergence of new ones make people do what they can to care for their own safety (Kaczmarczyk, 2013, p.17). Several years ago heated discussions regarding the natural and human-caused threats were taking place (Kaczmarczyk, 2014, p.153).¹ Nowadays, we basically know what kind of response these threats require, so they should be classified as "known" or, simply speaking, "old" threats that occur relatively often. As Kozub indicated in 1999, the discussion on threats should concern the future as it will be entirely different from what we imagine (Drucker, 1999, p. 67). In today's world his predictions have become facts, and in 2019 entirely different type of threats should be discussed. First and foremost, it should be assumed that the contemporary threats are different, and the answers to them are inadequate in terms of their nature and scale, and it can be, therefore, assumed, that the answer to the new threats will require new strategic way of thinking. As many theorists point out, we keep on reacting instead of preventing and acting pre-emptively; we act separately as individuals while the challenges are complex and complicated. Time period and the scope of our thinking about not only the future, but primarily about its safety are definitely too short and limited (Kozub, in Piątek (ed.), 2006, pp. 12–13). This challenge can only be tackled through scientific exploration of security and risk issues, which, through values and adaptability possibilities linked inter alia to their fragmentation, will effectively address threats and thus ensure the highest possible level of security (Kaczmarczyk, 2014, p. 153) It should be pointed out that we are living in times in which manipulation and lie as well as lack of objective knowledge constitute an integral element of our existence. The users, who often create their own versions of the reality, are often the ones to determine what is true and what is not. One of the ways of communicating with the world is creating and distributing untrue information, known as fake news. This

phenomenon emerged in the 21st century, and, thanks to the modern technology, it spreads increasingly fast and is becoming easier and easier to be created. Never before have had people had access to such amount of information, and never before have they been attacked with messages from various sources to such an extent. Thus, it is not surprising that organizations and citizens try to benefit from these opportunities.

Media in human life

By the word „*media*” we mean television, radio, press and the Internet. The media are becoming the phenomenon of a date of revolutionary importance (Wolska-Zogota, in Horyń (ed.), 2002, p. 321). They are itself a chance to reach all citizens, regardless of age. The media play an important role in shaping attitudes and views. They have a significant impact on social life (Grzegorowski, 2013, p. 208).

Various organisations, enterprises and institutions interact with the citizens’ via media. The activity of all authorities who want to play a significant role in the contemporary world has to encompass cooperation with media which can help them create the desired image. Media also have the power to destroy it by publishing fake information, or information that is essentially true, but is presented in a non-objective way that evokes negative feelings in its recipients. Specialists are able to modify information in such a way that only selected pieces of it, aimed at evoking specific reactions, reach the audience (Grzegorowski, 2013, p. 208).

In the contemporary information society every person can share their views via media - the Internet in particular. Thus, everyone can limitlessly create their own vision of reality which is not subject to any regulations.

The traditional mass media did not offer the opportunity to interactively react to the presented contents. The approach to information transfer changed with the development of modern technologies and popularisation of access to the Internet. Development of the Internet brought numerous benefits, but also generated various challenges and threats. Fake news, which often counterbalance boring facts, are a phenomenon that emerged when publishing information became possible for all Internet users. They lack trustworthiness which should by definition be a feature of information coming from journalists who were responsible for informing the rest of the society about what was happening around the globe.

Function of the media

Mass media serve a number of functions that are carried out as a contribution to the functioning of a given society. Their tasks are related to plan activity resulting from the set objective (Kozłowska, 2006, p. 68). This means that every media coverage is published in relation to a previously set objective that has a certain purpose (Figure 1).



Fig. 1 Media release pattern

Source: own elaboration.

One of the most important function of the media is information. Nowadays, media play an enormous role - also educational and opinion-forming - in human life (Wolska-Zogota, 2002, p. 321). They constitute a platform that makes it possible to hold a public debate (Kozłowska, 2006, p. 105). They are currently the main source from which Polish people acquire knowledge (<https://businessinsider.com.pl/media/skad-polacy-czerpia-informacje-telewizje-i-serwisy-internetowe-dzieli-przepasc/8qelfcy> accessed on 05 July 2018). Both Internet and television information services are the leading sources of information used by them. Media broadcasts also perform the cultural and entertainment function (Kozłowska, 2006, p. 69, 105).

Communications, in particular those that can be encountered online, are rarely verified by experts which significantly reduces their quality. As a result, untrustworthy messages coming from the media spread erroneous information among people, and reduce the knowledge of the entire society. This fact has been confirmed by experts (spokespeople) who believe that such actions are aimed at a specific goal, for example decreasing the awareness and knowledge of the society. At this point, one should ask why such information has been published online. What did the author or authors want to achieve by that?

It is a fact that, both in the past and in the present, problems have arisen regarding the distinction between reliable messages and journalistic manipulation or even propaganda and persuasion (Kamińska-Szmaj in Krzyżanowski (ed.), Nowak (ed.), 2004, p.13). Manipulation allows for a certain amount of insincerity in the information provided, while propaganda is based on psychological background. The purpose of the message is to direct the audience's thinking in the way intended by the author. Propaganda influences the recipient's mind and will. It stimulates concrete emotions in a completely deliberated manner (Lęgiędz-Gałuszka, in Kowalczyk (ed.), Wróblewski (ed.), 2006, p. 133).

Before the emergence of the Internet, the journalists used manipulation, abusing the press law and journalistic ethics rules. Currently, every human being can become some kind of a "journalist", i.e. a person who presents the information gathered himself/herself through the mass media. According to the experts (psychologists), this situation is quite dangerous as it gives full freedom to anonymous discrediting people. It is also important that people posting the fake news remains unpunished as a rule, thus they are acting with more courage.

The Internet as the most important medium of the present day

The hierarchy of the media's importance, which serves as the main source of knowledge for Poles, has been changing over the years (<https://businessinsider.com.pl/media/skad-polacy-czerpia-informacje-telewizje-i-serwisy-internetowe-dzieli-przepasc/8qelfcy> accessed on 05 July 2019). The so-called baby boomers generation (people born between 1946 and 1964) made use of press mainly, therefore the use of books in order to supplement their knowledge is natural for them. These people act as guardians and teachers of the younger generation, the so-called Generation X (born between 1965 - 1981), having a significant influence on them and preserving tradition of cultivating the knowledge acquired through printed materials. However, it was the television which developed intensively during the Generation's X youth which they put on the first place. The youngest generations, the so-called generations Y and Z, use mainly smartphones and computers with Internet access (<http://niezalezna.pl/220981-szokujacy-raport-to-pokolenie-jest-zawsze-online#dziekujemy> accessed on 01 July 2019) (Fig. 2).

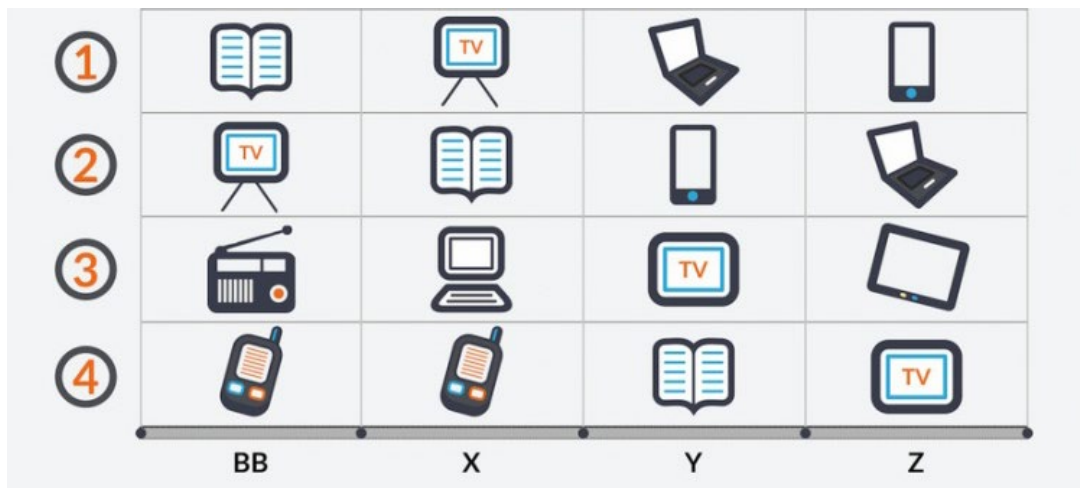


Fig. 2 Hierarchy of the media importance among different generations

Source: <http://niezalezna.pl/220981-szokujacy-raport-to-pokolenie-jest-zawsze-online#dziekujemy>; accessed on 01.06.2019.

Children and youth do not remember the world without the Internet. It is a natural platform for communication, entertainment and an inexhaustible source of information for them. Referring to the characteristics of the Internet, one can notice its significant advantage over traditional media. The Internet can be characterised by an unlimited reach and relatively low price. The interactivity of the transfer is crucial for the purpose of dissemination of messages on the network. A recipient who is allowed to participate in the transmission of information is more interested in the communication itself, and the multitude of these interested parties results in spreading the information exceptionally quickly (<https://mediaclick.pl/internet-jako-medium-komunikacyjne/> accessed on 03 July 2019).

Spreading of information in the network

Fake news

The lie in media has existed itself since the mass media was created, but the emergence of the term fake news dates back to 2016. It was then that BuzzFeed journalists were exposing an entity spreading fake news located in a small Macedonian town. More than 100 websites were registered there, disseminating false information related to the presidential elections in the United States. The authors of the texts, the headlines of which informed about Donald Trump's support for the Pope or the legal conviction of Hillary Clinton, were mainly teenagers. They earned money thanks to thousands of displays of the information. Macedonians quickly noticed that the best way to maximize the number of visits to the site is to publish links on social media, especially on Facebook. The current life of the idea of "fake news" was shaped in this way.

A survey conducted at the end of 2017 for the On Board Think Kong Group showed that as many as half of the Poles have dealt with fake news, within the six months period preceding the survey (<https://newsrm.tv/komunikat-pr/fake-news-polskim-internecie/> accessed on 03 July 2019). Among those in contact with the fake news, more than 14% disseminated this information without knowing it was false.

The fake news is a specific type of message broadcast in order to deceive the recipients or to harm individuals or institutions to whom the information relates. These messages are transmitted via media, currently mainly with usage of the network. The spectacular headline attracts the attention of a great number of people who want to participate in the process of spreading the interesting information. There are two variants of fake news. A complete news, in which false, factually contradictory information is provided, and such a news in which falsity depends on the point of view and interpretation.

Passing unverified information thoughtlessly leads to disinformation of the society, which is extremely confident in media (Fig. 3). According to the experts (psychologists), the public confidence in media is a result of lack of experience in the field of manipulation. It is relatively new phenomenon, and society is not aware of the game it is playing.



Fig. 3 Fake news features

Source: own elaboration base on <https://www.press.pl/magazyn-press/artukul/55061,krotki-przewodnik-po-fake-newsach> accessed on 02.06.2019.

Fake news effects

The social media serve as one of the main sources of information for Internet users. Nowadays, any person can be a creator of reality by sharing various types of contents on social media channels. Simultaneously, popularity of this trend causes development of a negative phenomenon which is the fake news.

The false information is not a product of the times we live in. In principle, it has always accompanied people. However, currently they reach a very wide audience thanks to new technologies and communication methods. According to the experts (journalists), technologies have made it possible that today any person can destroy or promote the other. Access to data, networks, and instant messengers is unlimited. The society also believes in "freedom of speech", it means that anyone can say anything without consequences. In fact, there are some defamation lawsuits, but it is a costly and lengthy process.

Activity in social media through the selection of specific content implies leaving specific data there. This information can be used to create a profile of a given person that contains general data, such as sex, age, race, education or profession, but also psychological data related to beliefs, personality or the level of intelligence. Such profiles can then become a tool for selecting recipients of fake contents published by bots. They automatically classify users as potentially interested in certain fake information.

The main reason for the popularity of social media as distributors of fake news is the fact that there are virtually no systems of quality and reliability control of the posted content.

For example, estimates show that 9 - 15 percent of Twitter accounts are automated. It is as many as 27-46 million accounts given the total number of 326 million users of this microblog (Status as at 11 June 2019). Twitter is a tool that is commonly used by journalists who can create a fictitious reality by promoting fake contents.

Since most social media users treat them as a reliable source of everyday information, it seems reasonable to teach people how to recognise bots on the Internet.

Because of the fact that fake news are growing in popularity, actions aimed at eliminating untrue information should be taken, for the consequences of its distribution may be severe. An example that confirms the above is the case of the American food industry giant who fell victim to fake news regarding Pepsi beverages being infected with HIV. This information caused the prices of their shares to drop, and it took months for them to become stable again, even after the information was confirmed to be untrue.

It has not been proven so far that fake news could have influenced the results of the US presidential elections of 2016 or the British referendum on leaving the European Union. However, there are numerous speculations on these issues. The phenomenon of their popularisation itself cannot be taken lightly, though. Burma, where fake news posted on Facebook were used to build up the hatred of the Buddhists towards the Muslim Rohingya minority, is a particularly dire example of it. It fostered ethnic cleansing that the Burmese army has been conducting for several years, in which several thousand Rohingya people were killed and several hundred thousand were forced to flee the country.

Social awareness and education

The phenomenon of fake news is relatively new, and not yet known sufficiently. The society is not always able to recognise such news, which is a challenge for education authorities. Currently, society considers fake news to be more of an oddity, an opportunity to make it big in the media, or play a prank on friends. There are even professional generators of fake news (Fig. 4).



Fig. 4 Fake news generator

Source: <http://dziennikbulwarowy.pl/> accessed on 04.06.2019.

Fake news should be detected more efficiently if they are to be fought. After such information has been located its influence should be skilfully managed, and it should be reported to the administrators of social media or Internet portals as "contested by an external fact verifier"

Automation of analytical processes is a tool that is used not only by the creators of fake news, but also by organisations responsible for battling the phenomenon. Artificial Intelligence detection systems are helpful in locating and eradicating fake news and bots responsible for their generation.

The administrators of social media should use the potential of analytical platforms and the machine learning technology in order to eliminate or block fake news-distributing bots. Analysis and detection of patterns contained in data as well as implementation of the machine learning methods enable identification of accounts that spread fake information. The systems analyse such data as frequency and the type of published contents, and then, using algorithms, they autonomously qualify accounts as either real or created for the purposes of distributing fake information.

The Internet users should also be cautious when it comes to selecting trustworthy information. Basic methods of filtering fictitious information consist in verification of author's credibility, control of content quality and verification of the quality of the information itself. References to other sources, citations and information whether the text has also been published on other websites are the details that should be verified.

Following these rules can minimise the risk of being manipulated by entities who want to create informational chaos in order to gain certain benefits.

The above issues should be considered in the context of education for security. Education has always been a priority. Along with skills it has been prerogatives of all citizens, which granted them additional rights. It is a continuation of activities that were undertaken in the past, and in Poland it is the successor of rules and principles of the knightly upbringing (the 10th - 15th century), preparation for defence (the 18th century), military training (the 20th century) and civil defence (the second half of the 20th century). Deliberations on education for security began in the 21st century (Kaczmarczyk, Dobrowolski, Dąbrowska, 2018, p. 137). Multiple threats are discussed as part of it. New, negative phenomena such as fake news should be incorporated in it, and people should be taught proper behaviours from the earliest years of their life. This way, the negative image of the phenomenon can be reduced.

Summary

Fake news are untruths, misrepresentations and over interpretations, mostly political. People, who are sealed in "information bubbles", mostly receive information that fits their worldview. They become radicalised and begin to believe things that they want to believe. On the basis of demand breeding supply, the recipients are often provided with ever-new pieces of information which often have nothing to do with the truth.

The borderline between real and fake news has faded. It is caused by loss of trust in the biased media, which, in turn, engage in subtle fact interpretation and practical politics. The Internet has lowered the standards of publishing by participating in the race for speed and exclusivity. News that lack credibility and are far from facts have become an effective tool in the hands of various kinds of ideologists. It depends on us and the rules we follow whether fake news will serve their purpose or merely become useless information noise.

The spread of fake information on the Internet poses a problem. However, battle against this phenomenon must take place at the level of education and teaching critical thinking.

References

Thematic publications

- Grzegorowski Z. (2013), *Służby specjalne a bezpieczeństwo państwa polskiego*, Toruń.
- Kamińska-Szmaj I. (2004), *Propaganda, perswazja, manipulacja – próba uporządkowania pojęć*, [in:] *Manipulacja w języku*, Krzyżanowski P. (ed.), Nowak P. (ed.), Lublin.
- Kaczmarczyk B. (2013), *Bezpieczeństwo i jego typologie, Bezpieczeństwo i technika przeciwpożarowa*.
- Kaczmarczyk B. (2014), *Bezpieczeństwo i zagrożenia w teorii oraz praktyce*, SGSP, Kraków.
- Kaczmarczyk B., Dobrowolski P., Dąbrowska M. (2018), *Wybrane aspekty edukacji dla bezpieczeństwa*, Adam Marszałek, Toruń.
- Kozłowska A. (2006), *Oddziaływanie mass mediów*, SGH, Warszawa.
- Lęgiędz-Gałuszka M. (2006), *Obraz terroryzmu w mediach masowych: informacja, perswazja, aksjologia*, [in:] *Oblicza współczesnego terroryzmu*, Kowalczyk K. (ed.) i Wróblewski W. (ed.), Toruń.
- Wolska-Zogota I. (2002), *Co to jest edukacja medialna?*, [in:] *Nauczyciel andragog u progu XXI wieku*, Horyń W. (ed.), Maciejewski J., UW, Wrocław.

Internet sources

1. <http://niezalezna.pl/220981-szokujacy-raport-to-pokolenie-jest-zawsze-online#dziekujemy>
2. <https://businessinsider.com.pl/media/skad-polacy-czerpia-informacje-telewizje-i-serwisy-internetowe-dzieli-przepasc/8qelfcy>
3. <https://businessinsider.com.pl/media/skad-polacy-czerpia-informacje-telewizje-i-serwisy-internetowe-dzieli-przepasc/8qelfcy>
4. <https://mediaclick.pl/internet-jako-medium-komunikacyjne/>
5. <https://newsrm.tv/komunikat-pr/fake-news-polskim-internecie/>
6. personalchallenge.pl/challenges-in-organization/generation-baby-boomers/

FOR A PHENOMENOLOGICAL TEACHING

Daniela DE LEO
University of Salento, Italy
daniela.deleo@unisalento.it

Gabriella ARMENISE
University of Salento, Italy
gabriella.armenise@unisalento.it

ABSTRACT

This contribution is proposed to review the line of phenomenological-hermeneutical research as an approach to teaching, illustrating the conceptual assumptions and theoretical perspectives based on the models of analysis of the educational relationship. These models have been verified in a three-year project about fable of Action Research addressed to the teachers of the comprehensive San Cesario-San Donato di Lecce Institute. The hermeneutic work proposed by taking the steps of the training experience carried out by recollecting it in an original way, indicates to the reader "under what conditions something (in this case the educational event) happens, and thus brings the person (in this case The educator) in front of his possibilities, so that the event can happen, in the right way, and be accepted".

INTERSUBJECTIVITY IN THE EDUCATIONAL RELATIONSHIP¹

It is an essential attribute of conscious subjectivity that it can adopt different attitudes or approaches towards the world to express suitable ideas about given phenomena.

Husserl opposes subjectivism to objectivism (Husserl, 1976). He took great interest in the temporal character of conscious acts and the manner of temporality of the intentional objects of conscious acts. Subjects engage in the direct experience of the self-givenness of the object. Their participation lies in their intentionality. Intentional relations are the necessary condition of being in the worldly experience. Intentional acts are involved in the constitution of original transcendental, including the perception of natural objects (Husserl, 2001; Husserl, 2016).

We are not a *solus ipse*, we are only imaginable as surrounded by other humans. There is a relation between my perceptual interpretation, on the one hand, and interactions between the thing and its circumstances on the other hand.

Unlike the Cartesian approach, the world must be a teleologically universal world. There must be an intersubjective structure, we are asked to free ourselves from the notion of a single being, unless as a mere abstraction which we should get rid of (Camhy, 1986).

To understand intersubjectivity and its place in human experience, we should question ourselves about its intrinsic structure that is perception, noema, noesis, protention, retention, transcendental reduction, subject, object and intersubjectivity.

Intersubjectivity is at the heart of consciousness. To demonstrate this, we could start from the philosophical attitude, radicalized by Descartes with his universal doubt. Following that line of reasoning, we could claim, 'I am consciousness'. All that is not my consciousness is transcendent, that is, as I am the only certainty, and to know what transcends me, I should 'open myself to the world'. If I were a "a monad without windows" I could not question myself on the world. That is the "*logos*", where acts and actions intertwine.

Thinking for Husserl is a form of experiencing. If a colour-blind person lived alone, he would claim that true colours are what he thinks they are, while only maintaining relationships with others gives us the possibility of adjusting our perspective to reach the most fulfilling one.

The world is basically a matter of acts in which objects appear to a consciousness, in its intersubjectivity. The world is to be intended as "objectively existent", as "*conscious acts*", that is the conscience of an entire community committed to intersubjectivity; "being in itself" has always been intersubjective (so much so that the 'I' could be other than itself, following a principle of "before" and "after"). Reason lies in "*interaction*" whereby interaction is not "empathy", that is the ability to share and understand the emotions of others; it is rather a movement towards someone else's position, a change of perspective, an interpretation of someone else's behaviour. Empathy is therefore a triad between I, the World and the Other, where knowing is always "knowledge of something", an adjustment to a world refers to a kind of unveiling of something that was there all the time but not explicitly present in consciousness.

Educators and learners "resound" in the same experience, in a space centred around "us", where "we" comes before "you"; perception and interpretation arise in this common space.

Therefore, given that the "I" is given knowledge of itself, as capable of experiencing from the inside and the outside, how can it be possible to experience Others as conscious beings, but without being able to experience them "from the inside". In other words: why are some bodies entitled to have a conscience?

A possible answer might derive from Kant's stance, the "I" could be entitled to have an 'a priori' category to which ascribe Others' experience. This categorization depends on the culture to which the 'I' belongs. Such an explanation

*Daniela De Leo, Unisalento.

suffers many limitations, as we would not know what a “man” really is, if it wasn’t for the culture of belonging. We could claim that a given man is a student, a doctor, a teacher and so on, but no definition would give a satisfactory explanation for him as a “man”, as “other”. The alter ego would be treated as a “sign”, changing the explanation according to the culture of origin.

In phenomenology, the transfer of meaning occurring through the process of pairing is a reciprocal transference; understanding the other, my own self-experience is also adapted, thereby suggesting that the mutual transfer happens at the same time.

This stratum anticipates and unites all possible historical variations of how we experience Others, and it plays a central role in phenomenology (Costa, 2015, Caputo, 2017). “Things” are subjected to “causality”, that is, the “I” is interested in those objects which “unveil”, when someone appears, and you intend it as something, the relation is not one of causation, but of “motivation,” and it is proper to speak about our purpose. Just because a subject’s awareness of another is prompted by motivation, it is not to be connected to a social connection, because society does not determine knowledge of Others, but the other way around, so much so that different society structures are characterized by different original relationships between one another.

To answer the question, “Why do we tie the “mind” to a material “body?””, Husserl suggests a sort of “mental experiment” to get to the core of someone’s else experience. This deep-structure of intentional consciousness comes to light in the course of what Husserl calls the “phenomenological reduction”, that is what is left to us when we get rid of our judgment of the natural world, of culture and society. It’s not about a “lack of intersubjectivity” – even the “I” can be other than self, according to a ‘before’ and an ‘after’ - it is rather the evidence of the crucial role of intersubjectivity, to allow for the *strata* in the life of the subject (Husserl 2016).

Husserl distinguishes between static and genetic elements of experience. Phenomenology of genesis then is the phenomenology of the original or primordial becoming in time.

Genetic phenomenology consists of a “backwards in time” route; it is not phenomenologically useful, because the task of phenomenology is to recover this life - world by uncovering the abstractive strata that have been laid over it, and which are grounded on *validity*, which is reduction to ownness. By static we understand and fulfil the need for a constitutive approach that is concerned with how something is given, the essential structures, the *primordial sphere*, where primordial means “necessary” rather than “before” everything. This *primordial sphere* “primordial reduction” – brings us in the presence of, or rather reduces the Self, in what concerns its relation to the world, to what Husserl calls the “primordial sphere”.

To find this primordial sphere, one should ask: “what kind of world would we live in if we were not able to conceive others as intentional as we are”; to understand this, we should deprive people of social objects, for example, banknotes. The meaning of a banknote is shared by the whole community. A subject unable to identify others bodily would see a paper and a signature, but we would think of it as a banknote, also because there would be no one to give it to. There are also “social feelings”, such as jealousy, hatred, envy, love. In the words of Ricoeur, ‘the solipsistic type of analysis is but a hyperbolic attempt which unveils the lack of meaningfulness of someone’s experience, deprived of their community and only related to one’s sphere of ownness’ (Ricoeur, 1975).

Such a lack of meaningfulness also means that we are not related to others just because we live in a world of meanings. Autism is an example, as its most striking feature is social disconnection. People with autism know the purpose of a cup of coffee, but they cannot attribute any intentionality, so they do not know what a person might do with it. It is a cultural world deprived of people. We can be in this world without others, hence the criticism of Heidegger’s work, who claims “*being in the world is being with*”, while the ‘autistic’ example goes in the opposite direction. Culture affects us, but it is not the reason why we ascribe intentionality to others.

If we were to imagine this primordial state, we would understand that we could not approach one another as an individual, as a person, because the idea of person itself is intersubjective. However, our *perception* would remain. Perception does not involve intersubjectivity, there is no collective intentionality, which is necessary to social understanding. Thanks to perception, the process of intersubjectivity begins with a bodily awareness. The perception of the body is not enough, though. Embodied intersubjectivity includes perceiving the same thing at the same time and an association of one’s body with that of the other, each assimilating the sense experience of the other as equivalent to their own. Husserl brings the alter ego into the sphere of one’s necessarily intersubjective experience of things (Husserl 2001, Kortoom, 2002).

Once we get to the visual perception of the body of the other, we can move from the input to the actual ascription of intentional states. What Husserl defines *passive intentional constitution* that is striving to perceive others, a *passive intentionality* because meaning is transferred onto the other in a purely passive manner. The other is indirectly “appresented” to me through their material body, through a perceived physical likeness.

Body and behaviour are not enough to ascribe an intentional state to others. The *apperceptive transposition* is possible when others are ‘appresented’ because of an analogy with my own experience. My ascription of intentional states to another being already presupposes that we share a common environment. The Other’s body is apperceived as being aware of the same things as me.

Phenomenology has received Schutz’s view, the alter ego appears in a more immediate and direct manner than my own self experience, to understand the actions of others, their whys, meanings and motives, what others are up to (Costa, 2015).

Schutz’s position is acceptable yet comprehending the intended meaning of the other self would need a prior experience

of myself as a psychophysical unity, otherwise no comparison would be possible between the two entities.

On the importance of behaviour in the process of ascribing an intentional state to others, phenomenology and behaviourism hold different views. On seeing someone acting, we also see a process of adjustment to the world, which is the evidence of their existence, and, if it wasn't for the body's differences, we would be tempted to ascribe an intentional mind even to animals. Furthermore, language is the added value capable of objectivizing and giving an understanding of human actions. Ryle, a behaviourist, claims that 'in making sense of what you say, in appreciating your jokes, in unmasking your chess-stratagems, in following your arguments and in hearing you pick holes in my arguments, I am not inferring to the workings of your mind, I am following them'. Ryle reduces the matter to the mere significance of gestures – as in autism – while Husserl considers the body in its totality, in its process of adjustment to the world, giving it logical reason, and not because, as Baron-Cohen would put it, 'we are readers of the mind by nature', capable of seeing intentionality in Others, but because the 'I' allows the content of the other's own intending to become manifest.

Recent research on mirror neurons have shown that the vision of an action directly activates motor programmes for executing similar actions. Yet that is just a way to *decode actions*. The mirror neuron system responds to human and robotic actions, but that does not mean we can ascribe an intentional state to a robot, or the other way around, we can experience others without the activation of the mirror neurons – even the chimpanzee, on the other hand, can activate mirror neurons. To experience others we need three components, body, behaviour and meaning, otherwise History, culture and society would not exist. That is the neutral, residual state. If we were not able to ascribe each of these characteristics, we would fall in the autism category, as we would not be able to see others the way we perceive them.

In education, students actively construct their knowledge of the world through experience and interaction.

The educational setting should therefore be dynamic, as learning depends heavily on:

1. The students' inner resources
2. What goes by the name of Gallese's *intentional attunement*.

The concept of scaffolding is very similar to Vygotsky's notion of the *zone of proximal development*, and it's not uncommon for the terms to be used interchangeably. Scaffolding involves helpful, structured interaction between an adult and a child with the aim of helping the child achieve a specific goal, and so does Gallese's *intentional attunement* (Gallese, 2007).

There is a relationship between the sensory-motor system and cognition. For example, motor-related areas of the brain associated with piano playing are activated, and the same is true for classical ballet dancers; hence the tendency to process information through different motor-perceptive ways.

Therefore, educators need to:

- consider that infants and toddlers use their senses to take in stimuli from the environment and respond through reflexes and motor activity; for instance, in nursery school a child might perceive the noise of a dry autumn leaf, thus associating that noise to dryness;
- help sustain natural language development by providing environments full of language development opportunities and use a perceptive language, for example, the word 'football' could be associated with a physical activity;
- set the conditions to enhance the process whereby perceptual information becomes increasingly differentiated and specific to the things in the world and to what one can do with those things. For example, in a primary or secondary school lab, setting up a real lab in the classroom, telling learners why something is going to be done.

More to the point:

- draw on the concept of the *Zone of Proximal Development* and *intentional attunement*;
- use the metaphor as a cognitive tool to facilitate the connection between perception and external stimuli;
- give opportunities for role inversions instead of replication and direct imitation of cultural experience, as imitation means to reproduce the motor sequence of a given action;
- create a purposeful and coherent organization of experiences to help students achieve the desired intersubjective attitude towards relationships;
- metacommunicate, according to Bateson, that is shifting from what you are supposed to learn (understanding, level 1) to learning about how things occur, that is deutero-learning (level 2).
- Encourage students to share their thoughts to help them reach broader concepts and generalizations, benefiting from metaphors in the instructional process (De Leo, 2008).

THE FAIRYTALE TEXT FOR THE CONSTRUCTION OF THE EDUCATIONAL RELATIONSHIP²

The goal of the educator is to improve their pupils' competence, enable them to engage in the learning process, improve their skills and apply them in the work environment. As a result, "a learning process to teach" is necessary and this implies a new theoretical system, which satisfies the requirements of a model and the theory based on that model. Every position is grounded both upon epistemological principles and the practical features related to the analysis of a given "research and action" path.

² Gabriella Armenise, Unisalento.

Clearly, educational strategies should be based upon a direction which follows the relation between theory and practice, giving a pedagogical framework for the setting of training objectives, providing education for students and future teachers, and guiding them to a specific action to be accomplished in the professional environment. It is therefore necessary to create the ideological ‘subsoil’ for the “action research” (De Leo, 2016) and to set up an effective “architecture” incorporating concepts such as “learning to learn” and “learning to become” (De Carlo, 2012). The aim, in the broader context of the European Teacher (Augenti, Amatucci, 2013) is to rethink “the teacher’s professional development” (Molinari, 2013), using the experiences and emotions of professionals as resources (De Carlo, 2012).

In this sense, an effective teaching model should be designed to give pupils both the theoretical and the practical aspects, followed by a theory based upon that learning model. This teaching model can make use of whatever activity is aimed at a better understanding of “meaning” (Armenise, 2016; De Leo, 2016). This process brings the grounds closer to our “learning to know”, then gradually “learning to think” (Piccinno, 2016), not taking for granted what has already been presented. After all, each of us should be able to find a productive and effective way in the work environment.

The educator/teacher should try to deliver contents which focus on high ethical standards, and which are appropriate to the needs of the individuals and society. We should not forget that the success of education is up to us. There is a necessity to progress in education, which calls for a common ground across different cultures on the nature of teaching; teachers’ competences can be outlined in broad paradigms, such as cooperation, the teacher as a social agent, and professional education. We should focus on the promotion of educational models, defining skills and competences in professional practice. To be fully effective in teaching, and capable of adjusting to the evolving needs of learners in a world of rapid social, cultural, economic and technological change, teachers themselves need to reflect on their own learning requirements, competences and skills in the context of their school environment, following what is established by European standards. Teaching should adjust to the most recent European guidelines, with a view to strengthening skills related to citizenship, life, career, personal and social responsibility in modern European democracies. What is relevant for the educator in a hermeneutical perspective is to shape an effective educational relationship, with European guidelines always in the back of their minds. Indeed, cross-cultural views of teaching and learning seem to highlight the need for a systemic, context-bound perspective of teachers’ competence development and expertise. The relation between education, didactics and hermeneutics should be considered, shortening the distance between those disciplines, through an effective intercultural process. It would be a matter of openness to cultural development within the frame of an educational setting while participatory action research and action learning is a vehicle for the development of teachers’ intercultural competence.

The aim is to train teachers in an intercultural methodology using fables and fairy-tales as these have been proven to be an educational tool with great intercultural power in our multicultural society. When teaching methodology involves emotions, the result is effective, and the distance between pupil and educator is minimized, thanks to the fantastic world of stories. Through the wisdom of tradition, the teacher can focus on what the future holds, by having students choose to retell in writing one of the tales they have previously read or heard in their own words, focusing on the moral of the story. When children learn about other cultural traditions, it broadens their view of their own world – they also learn to think critically about the lessons/morals of a variety of fables, supporting possible interest in future subjects. One need only think of the scientific, humanistic and artistic fields. Every text might appear simple, even banal, but these are wise stories infused with meaning and symbols which should be investigated further. For instance, the struggle between good and evil is a recurrent theme in fairy tales all around the world, in every step of life’s development, and in popular culture. Narrative is a useful approach towards enhancing student learning and engagement. Tools and knowledge are typically conveyed to young children through routine family life and social practices so that the children internalize the interpretations and gradually develop and reconstruct their own moral code. This gives them a better understanding of themselves, learning about their own needs and fears, following the path traced by enchantment and magic, but never losing touch with reality.

Once the educational activity has been established, we should focus on “learning to read”, recognizing the object of our analysis, and how individuals act (young and adults, perhaps already in the work environment, not necessarily in the field of education), in the ongoing frame of European lifelong learning (Dozza, Ulivieri, 2016). It is in this context that the recipients of the learning process should be given the opportunity to challenge themselves, in full compliance with the criteria for analysis and suggested educational strategies for lifelong learning, devised following the lifelong education model, possibly in line with their personal experience. The entire educational process should be devised to help students and future teachers achieve the target, which is “learning to educate” (Agostinotto, 2013), and above all “learning to become” (De Carlo, 2012), thus working to promote activities of “education and self-education” and carrying out certification and competence assessment (formal, non-formal and informal).

A module of Creative Writing Literature for Children arises from the need to introduce students to specific issues about writing and reading of contemporary children’s fiction and to give them practical experience of writing for a wide age range of children and young people. The rationale underlying a Creative Writing module within a Childhood Literature course springs from the need to make children aware of the content of what they are reading - children learn and create their mother tongue not by sitting at their desks doing pencil and paper tasks in isolation from their peers, or drilling structures out of context, but by interacting with and manipulating language and by engaging in meaningful use, “creating writing” through “animation” (Rodia, 2011, p. 9).

Each module should be designed to develop students’ understanding of the major features of short stories, fables and fairy tales, their language skills, cultural awareness, critical thinking skills, creativity and a willingness to produce work collectively. Special attention should be given to the relationship between graphic sign and meaning inferred, and

to the preparatory stages which lead to the writing or rewriting of a concept. Subject and content are connected to meaningful reality within the recipient's experience, leading to "opportunities of meaning" then to "building new realms of thought" (De Leo, 2016).

Writing or rewriting fantasy stories should always happen in the light of contemporary views on teaching practice and communication with a child placed, play based approach. At the same time, the teacher is an active observer who gives support and stimulates the child to reach his highest developmental potential, given his visual perceptual skills and what is recommended in textbooks. This is a less conformist and less binding methodological approach which, should occasion rise, can be revisited.

This "re-evaluation" needs to follow a different coordination of gestures, thought and visual perceptions. Step-by-step activities might be helpful, characterized by "writing and fantasizing" (Rodia, 2011). To give some examples, through composition and re-composition games, the student can freely compose sentences corresponding to the teacher's input using key words – which should be recognized – and/or text insertion questions – pupils are given an example sentence and must choose the best place to put the sentence in the reading passage.

In a Creative Writing workshop at academic level, students develop their creative writing skills, including in-depth understanding of structure, style, genre, etc. as well as feedback skills. The module also gives students the chance to lead a creative writing workshop for children, as individuals or in a group. Those targets could be summarized as follows: 1) learning to handle documentary sources; 2) understanding research tools and methodologies in the field; 3) improving the learner/teacher relationship. In the later part of the course, which concerns creative writing workshops with children, students will develop skills related to the teaching of creative writing. The academic dimension of the section, completely integrated throughout, helps them develop communication, research and essay-writing skills as well as methodical and critical abilities.

More specifically, in the workshop activities, and under the guidance of the trainer, students will try and choose a list of situations which stimulate their imagination. Students will try and create a set of sentences to start from (e.g.: The boy was waiting to be rescued; The wolf was struck by the prince's spear; The old lady was helped by her granddaughter, and so on). Then they can break the sentences down trying to detect the subject, the action, the characters, the moods.

Pupils might create a pack of cards to combine and invent new stories, then offer the activity to their classmates – some pictures related to a character, others to a situation. Students might also choose to express characters and actions through symbols. This is a more complex task, but it is necessary to work on symbols, their meanings and their negotiation (AA. VV., 2016). Pupils combine different themes taken at random, creating new stories to tell, so that children are involved creatively, and able to invent new stories again. This final procedural step results in effective performance by creatively involving groups of children in a classroom, inventing and rewriting stories from classic fairy tales. The writing teacher sets about the business of gradually developing the children's repertoire as writers.

The educator should submit step-by-step activities and drills, to encourage pupils to approach the world of imagination – reading stories, for instance. Moreover, pupils should be helped to understand the conventional image of the sign, which needs to be creatively "re-written", always with a different technique, in the light of ongoing cultural and social transformations.

An approach to the fantastic dimension should always start with the delivery of initial contents, and "alternative routes" should offer changes and transformations, always considering the educational profiles and the interests of the pupils. To facilitate the task, participants are sometimes asked to take part in working groups specially designed by the educator. As far as contents are concerned, some practical examples are as follows: 1) epistemology of creative writing; 2) production of a narrative text (but also a fable or a fairy tale), starting from given elements and making possible changes within the space of "creative writing" in the light of Rodari's theory of the fantastic, that is the combination "Me and the fairy tales"; 3) the production of textbooks through addition and subtraction; 4) the production of a text as a consequence of different stories intertwined; 5) the production of texts taking into account the different points of view; 6) the production of a text changing the original style and using figures of speech; 7) the production of joint or collective texts; 8) writing new stories, drawing inspiration from "misleading historical background"; 9) writing a realistic story; 10) writing stories about a dream, a memory, an intuition (Rodia, 2011).

Classrooms should be "activity-based", keeping in mind the possible development of new competences – latent or manifest - using best practices in the classroom while positively impacting students by providing motivation to learn and promoting success in a global world. It is a matter of devising an experimental "open system" which is highly structured and builds competences, rewriting content, which might reveal other, unprecedented dimensions (De Carlo, 2012; De Leo, 2016).

Teaching methods should foster deep approaches to study by encouraging students to take personal initiative in the performance of their task. The learning environment should encourage experimentation, as children need to be well motivated, to enhance theory and critical thinking skills. It is a matter of devising a substrate of fixed competencies focusing on the educational paths that foster or expand intellectual skills. It is necessary to understand what knowledge is about – it is a patchwork (a set) made of many pieces (the processes) characterized by different strategies, and which help the individual relate to the different "educational paths".

Learning Programs in Italy are currently focused on acquiring skills and competences. Since 1985, The new curriculum has started to consider the plurality which characterizes human knowledge, and the different paths to follow. Pluralism is one of the greatest challenges in education. We should consider that the current educational syllabus is affected by social transformations and global cultural changes, as well as by information technology, a falling birth rate, and a much longer

educational pathway, starting at the age of three and ending at University. It is of course important that pupils develop various types of thinking, e.g. mathematical, musical, scientific, historical, while teachers are asked to present the learning contents of reality in a different style. A cross-disciplinary approach between different subjects becomes important. The Italian educational pathway, characterized by a core curriculum which considers educational action and encompasses the three levels (from three to fourteen, covering pre-school, primary school and high school) simplifies the transition between different levels of education. Physical and psychosocial growth during early childhood during this formative phase of life needs teachers open to dialogue and discussion, ready to provide effective research tools to encourage mutual listening and the open, constructive exchange of ideas, essential for continual improvement. Hence the importance of workshops devoted to reading fairy tales and fables, created with the intention of promoting reading as a sheer “personal pleasure”, while educators and pupils, leave their social role aside to become mere individuals and recognize literature’s intrinsic “value in use” (Bruno, 2018, pp. 34-36). In line with the government’s policy, schools should be inspired and guided by a welcoming dialogue, toward a specific goal, namely promoting young people’s autonomy, identity and active citizenship (Bruno, 2018, p. 36; Tonelli, 2013, p. 87). Fables can effectively motivate students to learn both in pre-schools and in primary school. Therefore, the logical consequence is promoting training courses on fables and fairy tales for teachers (AA. VV. 1980; AA. VV. 1986; Rodia, 2012).

REFERENCES

- AA. VV. (1980), *Tutto è fiaba*. Milano: Emme.
- A. VV. (1986), *La fiaba: modelli interpretativi e possibilità applicative in pedagogia, psicologia e sociologia*, Atti del convegno. Torino: Ed. Proing.
- AA. VV. (2016), *Leggere senza stereotipi. Percorsi educativi 0-6 anni per figurarsi il futuro*. Città di Castello: Settenove Edizioni.
- Agostinetto, L. (2013), *Educare. Epistemologia pedagogica, logica formative e pratica educativa*. Lecce: Pensa Multimedia.
- Armenise, G. (2016), The fable as a relational Key (pp. 860-869). In *TOJET*, Special Issue INTE 2016, December 2016.
- Bruno R. T. (2018), *Insegnare con la letteratura fiabesca. Introduzione teorica e applicazione pratica*. Monte San Vito (AN): Raffaello.
- Bruner, J.S. (1990), *Acts of meaning*, Mass: Harvard University Press Cambridge.
- Camhy D. (1986), Philosophy for Children: A Research Project for further mental and personality development of primary and secondary school pupil (pp. 18-26). In *Thinking. The Journal of Philosophy for Children. First Mountain Foundation*, Vol. VII, 4.
- Caputo A. (2017), Un insegnamento filosofico per competenze e competente? La didattica della filosofia nell’Università. Alcune proposte (pp. 224-238). In *Self-Portrait. Images of Self between Past and Present us - «Logoi»*, Mimesis, n. III, 8.
- Costa V. (2015), *Fenomenologia dell’educazione e della formazione*. Roma: La Scuola.
- De Carlo E. (A cura di) (2012), *Competenze e biografie in azione. Proposte operativo-didattiche di Lifelong Learning nelle organizzazioni complesse*. Milano: Franco Angeli.
- De Leo D. (2008), *La relazione percettiva*. Milano: Mimesis.
- De Leo D. (2016), *Il compito didattico: costruzione di senso*. Roma: Carocci.
- Dozza L, Ulivieri S. (A cura di) (2016), *L’educazione permanente a partire dalle prime età della vita*, Milano: Franco Angeli.
- Figal G.(2006), *Gegenständlichkeit, Das Hermeneutische und die Philosophie*, Tübingen: Mohr Siebeck Verlag.
- Gallese, V. (2007), Intentional attunement: embodied simulation and its role in social cognition (pp. 285-319). In *Psychoanalysis and Neurosciences*.
- Goodman N. (1988), *Ways of World-making*, Library of Congress Catalog.
- Heidegger M. (1992), *Die Grundprobleme der Phänomenologie*, Frankfurt: Felix Meiner Verlag.
- Husserl E., (1976) *Die Krisis der europäischen Wissenschaften und die transzendente Phänomenologie*. Eine Einleitung in die phänomenologische Philosophie, Walter Biemel. The Hague, Netherlands: Martinus Nijhoff.
- Husserl E. (2001), *Die Bernauer Manuskripte über das Zeitbewusstsein (1917/1918)* (Husserliana, Bd XXXIII), ed. Rudolf Bernet e Dieter Lohmar, Dordrecht: Kluwer Academic Publishers.
- Husserl E. (2016), *Die C-Manuskripte (1929-1934)* (Husserliana Bd X), ed. Dieter Lohmar, Dordrecht: Springer.
- Kortoom T. (2002), *Phenomenology of Time. Edmund Husserl’s Analysis of Time- Consciousness*, Dordrecht: Kluwer.
- Molinari L. (A cura di) (2013), *La professione docente in dimensione europea*. Roma: Anicia.
- Novak J. D., Gowin D. B. (1984), *Learning How to Learn*. Cambridge: University Press.
- Piccinno, M. (2015), *Imparare a conoscere per imparare a pensare. Fondamenti epistemici e approcci metodologici per l’azione didattica*. Lecce: Pensa Multimedia.
- Rodari G. (2013), *Grammatica della fantasia*. Torino: Einaudi.
- Rodia C. & Rodia A. (2011), *Scrivere fantasticando*. Taranto: Artebaria Srl.
- Rodia C. & Rodia A. (2012), *L’evoluzione del meraviglioso. Dal mito alla fiaba moderna*, Napoli: Liguori Editore.
- Ricœur P. (1975), *La Métaphore vive*, Paris: Editions du Seuil.
- Sanford A. J. (1987), *The Mind of Man. Models of Human Understanding*, London: Harvester Wheatsheaf.

Tonelli N. (A cura di), Per una letteratura delle competenze (pp.87 e ss.). In *I quaderni della ricerca*, n. 6, Torino: Loescher.

INTRODUCTION TO ALGORITHMIC BASED DATA MANAGEMENT IN SPREADSHEET ENVIRONMENT

Katalin SEBESTYÉN, Gábor CSAPÓ

University of Debrecen, Doctoral School of Informatics, Hungary
{sebestyen.katalin, csapo.gabor}@inf.unideb.hu

Mária CSERNOCH

University of Debrecen, Faculty of Informatics, Hungary
csernoch.maria@inf.unideb.hu

ABSTRACT

Teaching spreadsheet management in ICT education is a widely accepted topic in frame curricula and plays an important role in everyday life as well. Working with data and data organized into spreadsheet tables are common practices and requirements. Therefore, teaching this topic with the most efficient methods, that is, creating schemata and building up long-lasting knowledge, is in interest of all parties involved: students, parents, teachers, and future employees and employers as well.

Sprego (Spreadsheet Lego) is a programming- and schema-based methodology that teaches spreadsheet management. It focuses on general purpose spreadsheet functions and basic algorithm-creation, while works with authentic data. Previous research and studies confirm that students learning with this method acquire long-lasting knowledge and score significantly higher on tests compared to groups who learned with traditional, problem specific surface approach methods. Furthermore, Sprego is not limited to teaching spreadsheet management, but is also suitable to prepare and introduce other algorithm- and data-heavy topics, like programming and database management. Considering the tools supporting the Sprego methodology, various unplugged and semi-unplugged tools have been invented to make the learning processes more productive, such as origami boats, team vests, 3D-printed doll sets, a 2D web/Android application, a 3D desktop application, and a virtual collaboration space.

In order to observe the acceptance and effectiveness of the Sprego methodology and its accompanying tools in K-12 education, we held a workshop for students in a bilingual school for various age groups from grade-6 to grade-12 classes. The workshop was administered for a restricted time which consisted of 6 classes a day for 2 days. We introduced Sprego to the students and solved tasks requiring algorithms for string operations, conditional calculations, and linear searches. The classes were supported with various unplugged and semi-unplugged tools with keen attention for unplugged activities in a traditional (computer-free) classroom. We found that despite the limited time frame, the students who paid attention and followed the instructions of the teachers were able to complete all the prepared tasks, and further, more complex ones on their own. We can conclude, based on our observations and interviews that the use of unplugged and semi-unplugged tools had a notable positive effect on building algorithms and schemata-construction, which would serve fast thinking and consequently reliable, effective, and software/version independent computer problem-solving in spreadsheet environments.

Keywords: Sprego, spreadsheet management, ICT education, unplugged, semi-unplugged

INTRODUCTION

Handling data, especially in the form of spreadsheets is a common practice and requirement in our everyday life. Students first encounter spreadsheets during their junior high school years in Hungary (Kerettanternv, 2012), when they learn the basics of spreadsheet management. Throughout their further studies, students build upon this knowledge and work with various spreadsheet management functions and datasets. According to the requirements of the central frame curricula, by the end of their secondary education, students reach a level of knowledge upon which they can build on effectively. Reaching the highest possible levels of spreadsheet management skills in K-12 education is important regarding multiple aspects. In the information society, end-users encounter situations and data which, lacking programming knowledge, are only manageable using spreadsheets. Furthermore, nowadays it is hard to find jobs where handling data and spreadsheets can be avoided.

However, according to the results of prior researches, students who complete secondary education lack the required level of spreadsheet management, algorithmic and computational thinking skills (Biró & Csernoch, 2013; Csernoch et al., 2014, 2015; Panko & Port, 2013; Wing, 2006) Therefore, these students cannot be considered as conscious users of the spreadsheets and the data which they work with. End-users mainly use surface approaches, relying on the built-in problem-specific functions of these software, without understanding the algorithms in the background. This approach does not evoke routine fast thinking and analyzing slow thinking (Csernoch, 2017; Kahneman, 2011). Additionally, it carries potential risks regarding wasted resources (Csernoch, 2015; Kadijevich, 2013; Panko, 2008; 2013) and financial damages (Ben-Ari, 1999; EuSpRiG Horror Stories, 2019). These problems originate from how teachers of informatics and computer sciences teach spreadsheet management. Teachers

heavily rely on traditional approaches for introducing students to this topic, and also focus on the use of problem-specific functions and other surface or wizard-based functionalities of the environments (Csernoch & Biró, 2016). This method is not suitable to teach and develop knowledge about data-analyzation, -management and algorithm-construction. To solve this problem in ICT (Information and Communications Technology) education, the use of a novel approach is required. In the following section, we introduce a methodology that serves this purpose. Considering the low number of ICT classes available in the schools of Hungary (NAT, 2012; Kerettantern, 2012) it is important to teach the spreadsheet management topic as efficiently as possible. In the experience detailed in the present paper, our goal was to introduce students to this topic using the Sprego (Spreadsheet Lego) approach during a 2-day-long workshop. We were aware that in this short time no method or teacher could cover the whole topic of spreadsheeting, therefore we focused on introducing students to algorithm-based data management in spreadsheet environment.

SPREGO

Sprego is an algorithm-focused, high mathability (Baranyi & Gilányi, 2013; Biró & Csernoch, 2015a, 2015b) methodology (Csernoch, 2014) for developing the students' computational thinking and algorithmic skills using spreadsheet programs as non-traditional programming environments. Sprego is software and platform independent with a heavy focus on algorithm-based teaching methods. It provides a more effective alternative compared to the widely used traditional surface approaches (Csernoch & Biró, 2015, 2016). The method builds on a small number of general-purpose functions (Table 1), and it facilitates schemata construction through building and coding algorithms and composite array formulas relying on this function group. This approach emphasizes the concept-based and schemata-centric problem-solving practice (Kahneman, 2011; Sweller et al., 2011; Pólya, 1954). In contrast with the problem-solving processes observable in traditional methodologies, Sprego clarifies the problem, which is followed by the building of the algorithm, then the coding takes place in a simplified functional language, and in the last step there are discussion and debugging. This process follows Pólya's 4-step problem-solving strategy (Pólya, 1954), as well as the application of slow thinking (Kahneman, 2011).

Sprego text	Sprego number	Sprego pro
LEFT()	MIN()	IF()
RIGHT()	MAX()	INDEX()
LEN()	SUM()	MATCH()
SEARCH()	AVERAGE()	ISERROR()

Table 1: The Sprego general purpose functions separated into 3 categories.

As opposed to the approach present in the Hungarian curricula (NAT, 2012; Kerettantern, 2012) and in the official textbook (Dancsó & Korom, 2013), the Sprego methodology works with real-life tasks and problems. Students solve these problems using authentic sources and datasets (tables). These tables are downloaded and converted from webtables available on the internet, thus providing sources and practices in real-life data management (Csernoch & Dani, 2017). These sources motivate students as they can work on data which they are familiar with, while it also avoids the unnecessary practice of typing tables.

The methodology realizes knowledge-transfer between other subjects and other topics of ICT education as well. Sprego is suitable to teach not only the topic of spreadsheet management, but also database-management and programming without leaving the work environment they are familiar with (Káta & Osztian & Vekov, 2015; Shams & Seitz, 2008). More detailed information on the methodology and its effectiveness can be found in our prior work (Biró & Csernoch, 2015, 2016, 2017; Csapó & Sebestyén, 2019; Csernoch & Biró, 2015, 2016, 2017; Sebestyén & Csapó & Csernoch, 2019).

Unplugged tools

The learning processes are supported with various unplugged (Biró & Csernoch, 2016) and semi-unplugged tools (Biró & Csernoch, 2017; Csapó & Sebestyén, 2017; Gulácsi & Dienes, 2018; Sebestyén & Csapó, 2019) developed for Sprego. Regarding the group of unplugged tools, the method uses 3D printed matryoshka dolls (Figure 1), origami boats folded in classes (Figure 2), and visibility vests to represent the logic behind building the algorithms and the composite array formulas. The main purpose of these tools is that by their physical properties they symbolize the multilevel functions and the values passing between levels.

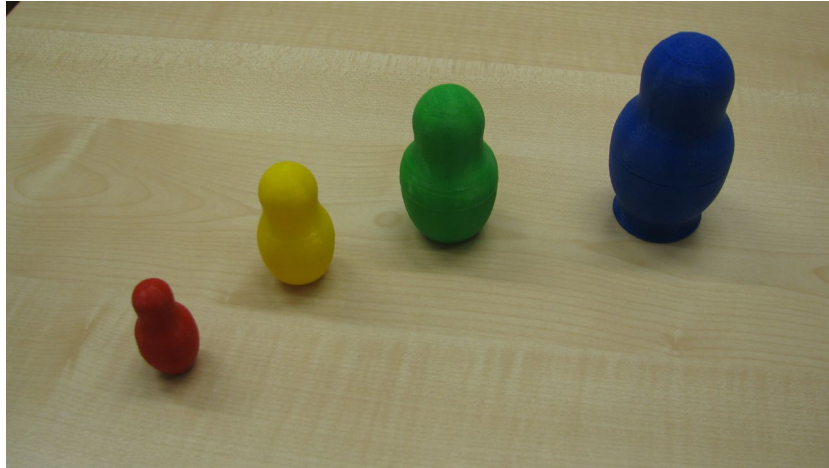


Figure 1: A 3D printed matryoshka doll set used in Sprego.

The use of unplugged tools follows on the principle that ICT education does not necessarily happen with computers (Bell & Newton, 2013). Beyond the purpose of unplugged tools – aiding the progression with Sprego – they also serve a key role in helping students understand the steps of problem-solving without computers and supporting the development of long-term knowledge. The physical properties of these items stimulate multi-sensory organs which increase the motivation of the students and the effectiveness of the classes (Kátai & Osztian, 2015; Shams & Seitz, 2008).

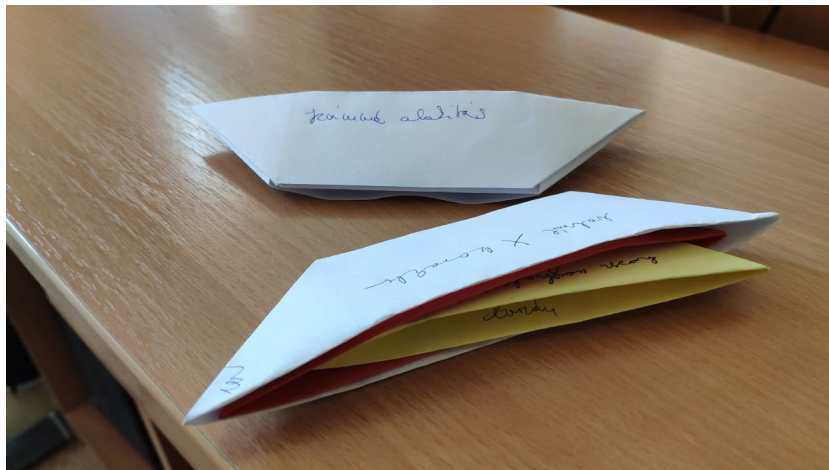


Figure 2: Folded origami boat sets for Sprego unplugged work.

Semi-unplugged tools

The algorithm visualization programs developed for Sprego (Csapó & Sebestyén, 2017; Gulácsi & Dienes, 2018; Skemp, 1971) represent the most common spreadsheet problems the students encounter and solve during classes. These applications present the problems in authentic scenarios, simulating real-life situations with a colorful environment (Figure 3). Currently, the following problems are implemented:

- Conditional counting based on equality: How many dolls have the same color?
- Conditional counting based on inequality: How many dolls can sit on the Ferris wheel? (Figure 3)
- Linear search: In which house does the doll live?

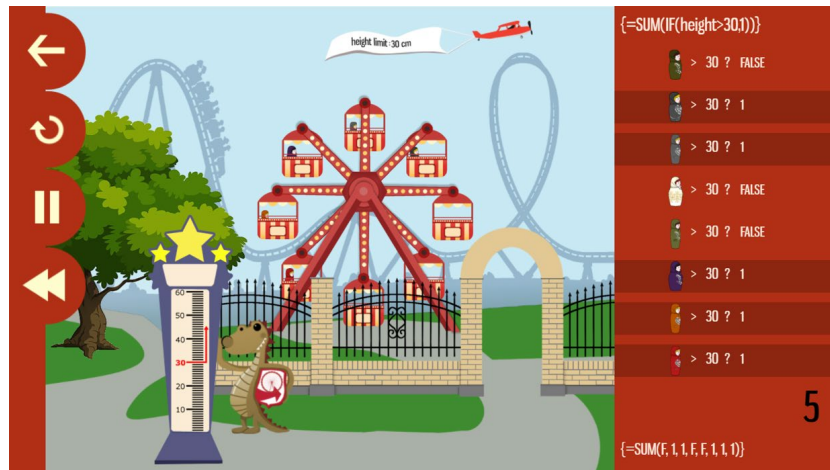


Figure 3: The conditional counting presentation based on inequality in the Sprego 2D application.

The applications also include a formula evaluator which guides students through the steps of the evaluation process. In this panel (Figure 3, right column) the steps of the algorithm with their relevant data are presented following the simple animation played in the middle of the screen. During the workshop we used both Sprego applications of which the 2D version is publicly available in English and Hungarian languages for the web and for Android devices (Csapó & Sebestyén, 2019).

In the group of semi-unplugged tools, the methodology also has a virtual collaboration space developed for self-learning (Csapó, 2017, 2018). The goal of this collaboration space is to provide students with all the necessary information, tasks, and guidance for completing and learning the spreadsheet management topic with Sprego. Although this space is part of the wide array of tools developed for Sprego, it was not used in our workshop due to infrastructural limitations.

THE STUDY

Digital Theme Week

In Hungary, every year the Digital Theme Week (Digitális Témahét, 2019) event is organized for elementary and high schools. The goal of this event is to promote and spread methodologies of digital pedagogy in education. The organizers share several ideas, themes, and sample projects with guidance purposes for the possible applicants. The schools who join the Digital Theme Week can register their own programs, choose from a pre-created set of programs or attend the programs organized by the partners of the Digital Theme Week. The general approach and requirements towards these programs are that they have to support new ideas and plans that allow learning to progress in the area of digital education.

In this year, some of the most popular themes were the escape room with special quizzes in the topic of informatics and problem solving with coding. During this week, the participating schools follow an irregular class schedule compared to traditional school days with accompanying projects focused on ICT.

Partners and participants

We were invited to teach Sprego lessons in a bilingual school in Budapest (Szlovák Tanítási Nyelvű Óvoda, Általános Iskola, Gimnázium és Diákotthon) (Hipik, 2019). Due to the Digital Theme Week, the timetables of the classes were changed, which made it possible for students from grades 6–12 to attend our lessons. It is worth noting that we were invited prior to the aforementioned occasion to an elementary school in Ajka (Ajakai Bródy Imre Gimnázium és Alapfokú Művészeti Iskola). However, the details of that experience are beyond the scope of the present paper.

The students in our workshop were separated by age groups, although not as strictly as regular classes do. The youngest group which attended the workshop consisted of grade-6 and 7 students, who had no prior knowledge in the topic. In contrast, the students in the higher age groups have learned spreadsheet management before, using traditional approaches. Therefore, these students attended the workshop with a fragmented and unreliable knowledge structure.

The program

We spent two days teaching Sprego, during which we held 6–6 lessons for the students on each day. As we pointed out in the Introduction section, this number of classes is not enough to cover the spreadsheet management topic. However, it is enough to develop a reliable basic knowledge in spreadsheeting. In regular classes, the students learn spreadsheet management for 1 or 2 lessons a week – depending on the schedule of the school and the curricula

(Kerettanterv, 2012) – for months. Therefore, the goal of the workshop was not to cover the complete topic, instead we focused on the algorithmic and programming aspects of spreadsheeting. The students solved data handling problems through algorithm-planning and construction using the following authentic tables:

- 100 tallest buildings in the world (Council on Tall Buildings und Urban Habitat, 2016),
- Top 250 Hungarian youtubers (SocialBlade, 2019),
- Top 250 movies based on the ratings of IMDB (Internet Movie Database) (IMDB, 2012),
- The list of countries in the world (Worldometers, 2019).

The students' work was supported by unplugged (origami boats folded at the scene, visibility vests, classroom games, students' drawings) and semi-unplugged tools (Sprego applications).

During the workshop we separated the students into two main groups (groups A and B) in which the classes were held simultaneously in a 3–3/day assignment. In group A the students started with the unplugged session in a traditional classroom where only the teacher's computer was present. The participants were guided through the steps of the Sprego algorithms making them take part in the process physically. This approach ensured the involvement of each student in the learning process through multi-sensory stimuli (Figure 4). The other group of students (group B) was divided into 2 subgroups – based on the number of available computers in each classroom – and started solving the problems using computers and spreadsheet management environments. The progress was aided by (similarly to group A) unplugged origami boats and additionally, with the use of the Sprego applications. After the first session of three classes, the students switched places and took part in both types of classes during the workshop. Considering the number of teachers, all groups worked with a differing number of teachers who besides providing instruction and guidance, checked and corrected the students' work in the process. The unplugged sessions were guided by one teacher, while in the computer rooms 2 or 3 teachers (based on the classroom) were present.



Figure 4: The students taking part in the unplugged session, playing along the algorithm of the linear search.

The groups solved problems with Sprego in the following categories:

- String operations: Separating constant and varying number of characters from a field.
- Conditional counting: Calculating the number of records based on a yes-no question.
- Conditional calculation: Calculating the sum and average of data selected by a yes-no question.

- Linear search: Finding the index of the value in demand and returning a value from a different field using that index number.

During the workshop we provided students with all the necessary methodological tools for individual work. The guided lessons were based on the coaching approach, requiring students to actively participate in the discussion of the problem solving.

At the end of the workshop, the students took part in a playful competitive Kahoot (Kahoot!, 2019) game regarding the knowledge items they had worked with in the course of 2 days. The winners of this game were rewarded in each group. As another motivational factor, the students earned Sprego Money for high activity in the classes and correct solutions during the 2 days, which they could exchange for good grades at their ICT teachers.

Regarding the students' feedback we received, almost half of the students had no prior knowledge in spreadsheet management before they took part in our workshop. The participants claimed that they understood the process of working with Sprego and building algorithms with it. Furthermore, most of them found the workshop and what they learned useful and stated that they would participate in a similar event.

CONCLUSIONS

Our experiences and observations showed that students who paid attention and followed the instruction of the teachers were able to complete all the prepared tasks regardless of the narrow time frame. The students enjoyed the unusual ICT classes and the work with unplugged tools in both groups A and B. The use of unplugged and semi-unplugged tools had a notable positive effect on building algorithms and schema-construction, as the problem-solving using computers were more effective after the computer-free unplugged classes.

In the present paper, we introduced one of the Sprego workshops – along with the feedback of the students and our observations – we held during the Digital Theme Week 2019 event. We found that the use of unplugged and semi-unplugged tools had a notable positive effect on the participants' understanding and on the algorithm construction process. This shows that the use of unplugged tools in ICT education is worth focusing on and that future research is advised on the development of such tools and on the effectiveness of this practice. The statistical analyses on the effectiveness of the Sprego unplugged tools are currently underway and results are expected in the near future. Further development of the Sprego applications is also in progress to make them available for self-learning as well.

ACKNOWLEDGEMENT

This work was supported by the construction EFOP-3.6.3-VEKOP-16-2017-00002. The project was supported by the European Union, co-financed by the European Social Fund.

REFERENCES

- Baranyi, P. and Gilanyi, A. (2013). Mathability: emulating and enhancing human mathematical capabilities. 4th IEEE International Conference on Cognitive Infocommunications, (pp.555–558).
- Bell, T. & Newton, H. (2013). Unplugging Computer Science. Djordje M. Kadijevich, Charoula Angeli, and Carsten Schulte (Eds.) Improving Computer Science Education. Routledge.
- Ben-Ari, M. (1999). Bricolage Forever!. PPIG 1999, 11th Annual Workshop, University of Leeds: Computer-Based Learning Unit, UK, 5–7 January, 1999. Retrieved on 01 December 2016 from <http://www.ppig.org/papers/11th-benari.pdf>.
- Biró, P. & Csernoch, M. (2013). The algorithmic skills of first-year undergraduate students. In Hungarian Elsőéves informatikushallgatók algoritmizáló készségei. XXIII. Nemzetközi Számítástechnika és Oktatás Konferencia - SzámOkt 2013, EMT, (pp.154–159)
- Biró, P., Csernoch, M., Máth, J., and Abari, K. (2015). Measuring the level of algorithmic skills at the end of secondary education in Hungary. Procedia - Social And Behavioral Sciences, 176, 876–883
- Biró, P., Csernoch, M. (2015a). The mathability of computer problem solving approaches. 6th IEEE International Conference on Cognitive Infocommunications, 111–114. <http://doi.org/10.1109/CogInfoCom.2015.7390574>
- Biró, P., Csernoch, M. (2015b). The mathability of spreadsheet tools. 6th IEEE International Conference on Cognitive Infocommunications, CogInfoCom, 105–110. <http://doi.org/10.1109/CogInfoCom.2015.7390573>, 2015b.
- Biró, P., Csernoch, M. (2016). Unplugged tools for building algorithms with Sprego. International Conference on Education and New Development. Lisbon, Portugal

- Biró, P., Csernoch, M. (2017). Semi-unplugged tools for building algorithms with Sprego. International Conference on New Horizons in Education. Berlin, 2017.
- Council on Tall Buildings and Urban Habitat (2016). 100 Tallest Completed Buildings in the World, 2016. Retrieved on 05 May 2016 from <http://www.skyscrapercenter.com/buildings>.
- Csapó, G., Sebestyén, K. (2017). Educational Software for the Sprego Method. The Turkish Online Journal of Educational Technology, INTE 2017 October, 986–999, 2017. Retrieved on 10 May 2019 from http://www.tojet.net/special/2017_10_1.pdf.
- Csapó, G., Sebestyén, K. (2019). Sprego - The official Sprego application. Retrieved on 10 May 2019 from <https://play.google.com/store/apps/details?id=hu.sprego.oktatoprogram>
- Csapó, G. (2017). Sprego Virtual Collaboration Space. 8th IEEE International Conference on Cognitive Infocommunications, CogInfoCom, 2017. pp. 137–142. <http://ieeexplore.ieee.org/document/8268230/> Accessed 31 January 2018, <http://doi.org/10.1109/CogInfoCom.2017.8268230>.
- Csapó, G. (2017). Sprego Virtual Collaboration Space: Improvement Guidelines for the MaxWhere Seminar System. 8th IEEE International Conference on Cognitive Infocommunications, CogInfoCom, 2017. pp. 143–144. <http://ieeexplore.ieee.org/document/8268231/> Accessed 31 January 2018, <http://doi.org/10.1109/CogInfoCom.2017.8268231>.
- Csernoch, M. (2014). Programozás táblázatkezelő függvényekkel – Sprego. Műszaki Könyvkiadó, Budapest
- Csernoch, M. (2017). Thinking Fast and Slow in Computer Problem Solving. Journal of Software Engineering and Applications, 10(1), 2017. Retrieved on 17 May 2019 from http://file.scirp.org/pdf/JSE_2017012315324696.pdf.
- Csernoch, M., Biró, P., Abari, K., and Máth, J. (2014). Programming-oriented spreadsheet functions. In Hungarian: Programozásorientált táblázatkezelői függvények. XIV. Országos Neveléstudományi Konferencia. Debrecen, Hungary
- Csernoch, M., Biró, P. (2015). Wasting Human and Computer Resources. International Journal of Social, Education, Economics and Management Engineering, 2015, 9(2), pp. 573–581.
- Csernoch, M., Biró, P., Máth, J., and Abari, K. (2015). Testing Algorithmic Skills in Traditional and Non-Traditional Programming Environments. Informatics in Education, 14(2), 175–197. <http://doi.org/10.15388/infedu.2015.11>
- Csernoch, M., Biró, P. (2016a). Sprego Programming. Spreadsheets in Education (eJSiE), 8(1), 2015. Retrieved on 21 July 2016 from <http://epublications.bond.edu.au/ejsie/vol8/iss1/4>.
- Csernoch, M., Biró, P. (2016b). Teaching methods are erroneous: approaches which lead to erroneous end-user computing. European Spreadsheet Risk Interest Group Conference, EuSpRIG2016, 2016, London. Retrieved on 21 July 2019 from <http://www.eusprig.org/mcsernoch-2016.pdf>
- Csernoch, M., Biró, P. (2017). Edu-Edition Spreadsheet Competency Framework, Proceedings of the EuSpRIG 2017 Conference "Spreadsheet Risk Management". Imperial College, London, 121–136. ISBN: 978-1-905404-54-4
- Csernoch, M., Dani, E. (2017). Data-structure validator: an application of the HY-DE model. 8th IEEE International Conference on Cognitive Infocommunications, CogInfoCom, pp. 197–202.
- Dancsó, T., Korom, P. (2013). Informatics 9-10. for high-schools, Informatika 9-10. a gimnáziumok számára, Nemzedékek Tudása, Budapest
- Digitális Témahét (2019). Retrieved on 12 July 2019 <http://digitalistemahet.hu/>
- EuSpRIG Horror Stories (2019). EuSpRiG, Retrieved on 20 June 2019 from <http://www.eusprig.org/horror-stories.htm>
- Gulácsi, Á., Dienes, N. (2018). 3D Software Environment for Educational Sprego Programming. The Turkish Online Journal of Educational Technology, INTE 2018 november (2), 837–844, 2018. Retrieved on 12 May 2019 from http://www.tojet.net/special/2018_12_3.pdf.
- Hipik, A. (2019). Digital Theme Week 2019. In Hungarian: Digitális Témahét 2019. Retrieved on 20. august 2019 from <http://szlovak-bp.sulinet.hu/2019/04/13/digitalis-temahet-2019-2/>.
- IMDB (2012). IMDb Charts. Top Rated Movies. Top 250 as rated by IMDb Users, 2012. Retrieved on 20 June 2012 from <http://www.imdb.com/chart/top>.

- Kadijevich, D. M. (2013). Learning about spreadsheets, Improving Computer Science Education. Routledge, New York
- Kahneman, D. (2011). Thinking, Fast and Slow. Farrar, Straus and Giroux, New York
- Kahoot! (2019). Retrieved on 15 June 2019 from <https://kahoot.com>
- Kátai, Z., Osztian, E., Vekov, G. K. (2015). Promoting computational thinking by artistically enhanced algorithm visualization. INFODIDACT 2015: Informatika Szakmódszertani Konferencia. <https://people.inf.elte.hu/szlavi/InfoDidact16/Manuscripts/KZOEVGK.pdf> Accessed 12 January 2019.
- Kerettanterv (2012). Central curriculum framework for year 9-12 students. In Hungarian Kerettanterv a gimnáziumok 9-12. évfolyama számára. Oktatókutató és Fejlesztő Intézet. Retrieved November 09, 2016 from http://kerettanterv.ofi.hu/03_melleklet_9-12/index_4_gimn.html.
- NAT 2012 (2012). 110/2012. (VI. 4.) Korm. rendelete a Nemzeti alaptanterv kiadásáról, bevezetéséről és alkalmazásáról. Retrieved 12/06/2018 from http://ofi.hu/sites/default/files/attachments/mk_nat_20121.pdf
- Panko, R. R. (2008). What We Know About Spreadsheet Errors. Journal of End User Computing's. Special issue on Scaling Up End User Development. (10)2 (2008) 15–21
- Panko, R., Port, D. (2013). End User Computing: The Dark Matter (and Dark Energy) of Corporate It. Journal of Organizational and End User Computing, 25 (3), pp. 1–19
- Pólya, G. (1954). How To Solve It. A New Aspect of Mathematical Method. Second edition (1957) Princeton University Press, Princeton, New Jersey (1954)
- Sebestyén, K., Csapó, G, and Csernoch, M. (2018). Visualising Sprego Inequality Problems With 2D Representations. The Turkish Online Journal of Educational Technology, INTE 2018 november (2), 888–898, 2018. Retrieved on 12 May 2019 from http://www.tojet.net/special/2018_12_3.pdf.
- Shams, L., Seitz, A. R. (2008). Benefits of multisensory learning. Trends in cognitive sciences, 2008, 12(11), pp. 411–417.
- Skemp, R. R. (1971). The Psychology of Learning Mathematics. Lawrence Erlbaum Associates, New Jersey
- SocialBlade (2019). Top 250 Youtubers in Hungary Sorted by SB Rank, 2019. Retrieved on 06 May 2019 from <https://socialblade.com/youtube/top/country/hu>.
- Sweller, J, Ayres, P, and Kalyuga, S. (2011). Cognitive Load Theory, Explorations in the Learning Sciences, Instructional Systems and Performance Technologies. Springer, New York
- Wing, J. M. (2006). Computational Thinking. Communications of the ACM, March 2006/Vol. 49, No. 3, 33–35, 2006.
- Worldometers (2019). Alphabetical list of countries, 2019. Retrieved on 06 June 2019 from <https://www.worldometers.info/geography/alphabetical-list-of-countries/>

INVESTIGATION OF HEALTHY LIFE PERCEPTION AFTER ANATOMY LABORATORIES IN MEDICAL FACULTY STUDENTS

Ismail SIVRI

Anatomy Department, Kocaeli University School of Medicine, Kocaeli, Turkey
ismailsivri@gmail.com

Ayla TEKİN ORHA

Department of Anatomy, Kocaeli University School of Medicine, Kocaeli, Turkey
aylatekin@hotmail.com

Tuncay COLAK

Department of Anatomy, Kocaeli University School of Medicine, Kocaeli, Turkey
tuncaycolak@live.com

Belgin BAMAC

Department of Anatomy, Kocaeli University School of Medicine, Kocaeli, Turkey
bbamac@hotmail.com

Serap COLAK

Faculty of Sport Sciences, Kocaeli University, Kocaeli, Turkey
srpclk@gmail.com

ABSTRACT

University education period is an important stage in the formation of the individual's personality. During this period, physical, mental and spiritual changes can be experienced. In this period, perceptions of healthy lifestyle are shaped. Perceptions of a healthy lifestyle include all behaviors that affect an individual's health.

Anatomy is one of the most intensive basic courses in medical education. Within the scope of Anatomy Laboratory courses in medical faculties, students learn by seeing and touching the cadaver for the first time. This may change the lifestyle and human life perspective of Medical Faculty students. Conversely, the perception of healthy life of other faculty students who have never seen dead or corpses in their lives may be different.

The aim of the study was to compare the perceptions of health promoting lifestyle profiles of the medical students who saw cadaver in the Anatomy Laboratories before and the students of the Faculty of Sport Sciences who didn't see any dead.

59 students ($20,24 \pm 1,25$ years) from Kocaeli University Faculty of Medicine and 51 students ($22,42 \pm 2,97$ years) from the Faculty of Sport Sciences were administered the Health Promoting Lifestyle Profile-II questionnaire. The data obtained from 62 male and 48 female students were collected and necessary statistical analyzes were performed.

Accordingly, in the health responsibility, physical activity, and spiritual development sub-groups, the students of the Faculty of Sport Sciences had significantly higher scores. ($p < 0.05$, $p < 0.01$, $p < 0.05$, respectively). There was no significant difference in total score and other subgroup scores due to faculty. When gender-based comparisons were made, it was observed that female students (21 ± 3.56 points) scored significantly higher than male students (18 ± 3.46 points) in the stress management subgroup ($p < 0.05$). No significant difference was found in gender-related analysis of total score and other subgroup scores. ($p > 0.05$)

Faculty of Medicine is one of the departments with intensive course load. This situation may cause students to spend less time and pay less attention to the elements of healthy lifestyle. In addition, it can be said that having seen cadaver has a negative effect on the scores of health responsibility subgroup. Continuously seeing cadaver and dead may have been effective in this perception of the students of the Faculty of Medicine. In order to overcome this, the medical students are required to take Sports and Social courses and be directed to these fields. We believe that adoption of healthy lifestyle behaviors will provide physical, social and spiritual benefits to the youth in the university period.

Keywords: Health promoting lifestyle profile, Medical Students, Health responsibility

INTRODUCTION

Health promoting lifestyle includes all behaviors that affect an individual's health. (Tanrıverdi et al. 2009) Healthy lifestyle behaviors include subgroups such as adequate and regular exercise, balanced nutrition, health responsibility, and stress management (Simnett, 1985). These behaviors are of great importance in preventing chronic diseases and improving the quality of life in the presence of chronic diseases. (Cindaş, 2001) It is observed that the first step of developing health promoting lifestyle profile (HPLP) has been taken in the family and society, and then it has been modified by education (Yalçınkaya et al., 2007).

Within the scope of the United States National Health Objectives, it is aimed to bring individuals in a healthy lifestyle and thus reduce national health expenditures. (Secretary's Advisory Committee Report on Approaches to Healthy People 2030, 2017; Akkuş et al., 2019) In this sense, it is necessary to promote the healthy lifestyle behaviors of all community members, especially children and young people.

The Faculty of Medicine is one of the departments with a long and intensive education program. Anatomy is the oldest branch of medicine that examines the body's normal shape, structure, organs and functions. Practical courses are as important as theoretical courses in anatomy. Within the scope of anatomy laboratories, students learn anatomy of human by touching and looking the cadaver. (Tuygar et al., 2015) This may lead to changes in their perceptions of healthy lifestyle and psychological status.

In this study, we aimed to compare the health promoting lifestyle profiles of medical students who saw cadaver before and students of Faculty of Sport Sciences who did not see any cadavers or corpses.

MATERIAL-METHOD

Health Promoting Lifestyle Profile - II

HPLP scale was developed by Walker et al. (1987). The scale was reviewed in 1996, and the revised version was named HPLP Scale II. Bahar et al. (2008) conducted the Turkish validity and reliability study of the scale. The scale consists of 6 subgroups and 52 questions. These are health responsibility, physical activity, nutrition, spiritual development, interpersonal relationships and stress management subgroups. The scale has a 4-point Likert-type response category: "1" Never, "2" Sometimes, "3" Often, "4" Regularly. The score obtained from the total scale represents the HPLP score. The lowest score on the HPLP scale was 52 and the highest score was 208.

Spiritual development sub-group determines the individual's life goals, self-realization ability, knowledge and satisfaction level. The health responsibility subgroup reveals the level of responsibility on the individual's health and the level of participation in his / her health. The physical activity subgroup indicates the level of achievement of the physical activities of the individual which is a part of a healthy life. The nutrition subgroup determines the individual's selection and regulation of food and changes in food selection. Interpersonal relations subgroup reveals the level of communication with social environment and maintaining this communication. The stress management sub-group determines the individual's awareness of stress sources and stress control mechanisms.

Statistical analysis

Statistical analysis of the total score and subgroup scores obtained from the questionnaire was performed by IBM SPSS v20 (Chicago, IL, USA) program. Descriptive statistics (mean, standard deviation), normal distribution suitability test (Kolmogorov-Smirnov test), comparison tests (Student-t test, Mann-Whitney-U test) were performed.

RESULTS

Table – 1: Descriptive Statistics of the Groups

	Faculty of Medicine	Faculty of Sports Science
N	59 (25 erkek, 34 kız)	51 (37 erkek, 14 kız)
Age	20,24 ± 1,25	22,42 ± 2,97

59 Tıp Fakültesi öğrencisi ($20,24 \pm 1,25$) ve 51 Spor Bilimleri Fakültesi öğrencisi ($22,42 \pm 2,97$) çalışmanın örneklemini oluşturmaktadır. 25 erkek ve 34 kız öğrenciden oluşan Tıp Fakültesi öğrencisi ile 37 erkek ve 14 kız öğrenciden oluşan Spor Bilimleri Fakültesi öğrencisinin toplam skorları ve alt grup skorları karşılaştırılmıştır.

59 students (20.24 ± 1.25) and 51 students (22.42 ± 2.97) participated in this study. The total scores and subgroup scores of the students of the Faculty of Medicine consisting of 25 boys and 34 girls and the students of the Faculty of Sports Sciences consisting of 37 boys and 14 girls were compared.

Table – 2 : Comparison of subgroup and total scores by faculty

	Faculty of Medicine	Faculty of Sports Science	p
Health Responsibility*	$19 \pm 4,77$	$21,31 \pm 5,09$	$p < 0,05^*$
Physical Activity **	$17,86 \pm 4,56$	$20,96 \pm 5,36$	$p < 0,01^{**}$
Spiritual Growth*	$25,36 \pm 4,09$	$27,18 \pm 5,23$	$p < 0,05^*$
Nutrition	$21,46 \pm 4,26$	$20,29 \pm 4,03$	$p > 0,05$
Interpersonal Relations	$25,27 \pm 4,41$	$25,76 \pm 4,70$	$p > 0,05$
Stress Management	$19,71 \pm 3,68$	$20,47 \pm 3,67$	$p > 0,05$
Total Score	$127,58 \pm 18,32$	$132,73 \pm 23,72$	$p > 0,05$

Table – 3 : Comparison of the scores of male students by the faculty

	Faculty of Medicine (n:25)	Faculty of Sports Science (n:37)	p
Health Responsibility	$17,64 \pm 5,7$	$20,68 \pm 5,46$	$p < 0,05^*$
Physical Activity	$17,48 \pm 4,29$	$21,30 \pm 5,7$	$p < 0,01^{**}$

Table – 4 : Comparison of the scores of female students by the faculty

	Faculty of Medicine (n:34)	Faculty of Sports Science (n:14)	p
Health Responsibility	$20,06 \pm 3,77$	$23 \pm 3,62$	$p < 0,05^*$

When the total scores of the Health Promoting Lifestyle Profile were compared according to the faculty, no significant difference was found. However, it was observed that the students of the Faculty of Sport Sciences had higher scores on average. It was found that the students of the Faculty of Sport Sciences had significantly higher scores in the Health Responsibility, Physical Activity and Spiritual Development subgroups than the students of the Faculty of Medicine. ($p < 0.05$, $p < 0.01$ and $p < 0.05$, respectively)

In the statistical analysis by gender, it was found that the male students of the Faculty of Sport Sciences had significantly higher scores in physical activity and health responsibility subgroups ($p < 0.01$ and $p < 0.05$). It was also determined that the female students of the Faculty of Sport Sciences had significantly higher scores than the scores of female medical students of in the Health Responsibility subgroup ($p < 0.05$).

DISCUSSION

When the statistical analyzes of the study were evaluated, it was seen that the medical students who had seen cadavers before had lower scores than the Faculty of Sports Sciences students who hadn't seen cadaver or corpse before in all subgroups and total scores except the nutrition subgroup. The most prominent subgroup is Physical activity. When the gender-related analyzes were examined, it was observed that the difference between the male medical students and the male students of the Faculty of Sport Sciences was higher than that of female students in terms of physical activity.

When the other studies in the literature are examined, the fact that the physical activity subgroup score is generally low shows the necessity of encouraging studies on this subject. (Cürçani et al. (2010), Özkan & Yılmaz (2008), Choi

Hui (2002)) Physical inactivity ranks 4th among global mortality risk factors. Overweight and obesity account for 5% of global deaths. The World Health Organization recommends that sports that involve at least 150 minutes of mid-level or 75 minutes of heavy physical activity per week in the 18-64 age range. Physical activity is known to reduce the risk of coronary heart disease, high blood pressure, stroke, type 2 diabetes, metabolic syndrome, colon and breast cancer, depression, hip fracture and vertebral fracture, regardless of gender (WHO, 2010). In the light of this information, physical inactivity should be considered as a global problem and precautions should be taken to encourage physical activity.

Another subgroup that attracted attention in our study is health responsibility. A health staff is also expected to have the necessary sensitivity for his/her own health. However, it is thought-provoking that the students of the Faculty of Medicine who chose to be a physician had significantly lower health responsibility scores without gender discrimination. Pender et al. (1990) stated that the greatest factor in the development and implementation of healthy lifestyle behaviors was the person's health level perception. Therefore, people who perceive themselves as healthy people are more likely to apply healthy lifestyle behaviors. (Pender et al., 1990; Ardic & Taskin, 2018). Many sociocultural and economic factors may cause this situation. It is thought that having an intensive course load and having seen a cadaver in the medical faculty may have effect. In order to reduce this effect, elective courses were included in Kocaeli University Faculty of Medicine education program as of 2017-2018.

Özenoğlu et al. (2018) found that physical activity was the lowest subgroup score of 421 students studying in the 1st and 4th grade of the Faculty of Medicine and Nutrition and Dietetics, Midwifery and Nursing departments. In our study, while the lowest subgroup score of the students of the Faculty of Sport Sciences was Nutrition, the lowest subgroup score of the medical students was physical activity.

CONCLUSION

In our study, it was observed that the students of the Faculty of Medicine had lower scores from the students of the Faculty of Sport Sciences in physical activity and health responsibility groups significantly. The reason for this was thought to be that the students had a high course density and that they had seen the cadaver. Physical inactivity is known to increase the risk of many diseases. We think that every health personnel should pay as much attention to their health as any other individual. It should be remembered that gaining healthy lifestyle behaviors will benefit not only the youth but also the individual at any age. These behaviors will also reduce the health expenditures globally.

REFERENCES

- 1- Özenoğlu, A., Yalnız, T., & Uzdil, Z. (2018). The Effect Of Health Education On Nutritional Status And Healthy Lifestyle Behavior Among University Students. *Acıbadem Üniversitesi Sağlık Bilimleri Dergisi*, 9(3).
- 2- WHO - Global recommendations on physical activity for health (2010) (https://apps.who.int/iris/bitstream/handle/10665/44399/9789241599979_eng.pdf;jsessionid=DFC33282C1776AE1FBDD01ACCC1A361B?sequence=1) Accessed on 29/07/2019
- 3- Tuygar, Ş., Kuş, İ., Saygılı, Ö., Özcan, E., & Gülcen, B. (2015). Tıp fakültesi öğrencilerinin anatomi eğitimine yönelik memnuniyet düzeyleri ve ilgili değişkenlerin incelenmesi. *Tıp Eğitimi Dünyası*, 14(42), 5-14.
- 4- Yalçınkaya, M., Özer, F. G., & Karamanoğlu, A. Y. (2007). Sağlık çalışanlarında sağlıklı yaşam biçimi davranışlarının değerlendirilmesi. *TSK Koruyucu Hekimlik Bülteni*, 6(6), 409-420.
- 5- Tanrıverdi, G., Seviğ, Ü., Bayat, M., & Birkök, M. C. (2009). Hemşirelik bakımında kültürel özellikler tanımlama rehberi. *Uluslararası İnsan Bilimleri Dergisi*, 6(1), 793- 806.
- 6- Simnett, I. (1985). Promoting health: a practical guide to health education. Wiley.
- 7- Bahar, Z., Beşer, A., Gördes, N., Ersin, F., & Kışsal, A. (2008). Sağlıklı yaşam biçimi davranışları ölçeği II'nin geçerlik ve güvenirlik çalışması. *Cumhuriyet Üniversitesi Hemşirelik Yüksekokulu Dergisi*, 12(1), 1-13.
- 8- Cindaş, A. (2001). Yaşlılarda egzersiz uygulamasının genel ilkeleri. *Turkish Journal of Geriatrics*, 4(2), 77-84.
- 9- Walker, S. N., Sechrist, K. R., & Pender, N. J. (1987). The health-promoting lifestyle profile: development and psychometric characteristics. *Nursing research*.
- 10- Secretary's Advisory Committee on National Health Promotion and Disease Prevention Objectives for 2030: Recommendations for an Approach to Healthy People 2030

- (https://www.healthypeople.gov/sites/default/files/Full%20Committee%20Report%20to%20Secretary%205-9-2017_0.pdf [accessed on 31.07.2019].
- 11- Akkuş, Y., Türk, R., & Akkuş Aydemir, A. (2019). Evaluating the relationship between healthy life style behaviours and social appearance anxiety. *Journal of Health Science and Profession*, 6(1), 120-126.
 - 12- Cürçani, M., Tan, M., & Özdelikara, A. (2010). Hemşirelerin Sağlıklı Yaşam Biçimi Davranışları ve Etkileyen Faktörlerin Belirlenmesi. *TAF Preventive Medicine Bulletin*, 9(5).
 - 13- Özkan S, Yılmaz E. Hastanede çalışan hemşirelerin sağlıklı yaşam biçimi davranışları. *Fırat Sağlık Hizmetleri Dergisi*. 2008; 3(7): 89- 104. 18.
 - 14- Choi Hui WH. The health-promoting lifestyles of undergraduate nurses in hong kong. *Journal of Professional Nursing*. March-April 2002; 18(2): 101-111.
 - 15- Pender, N. J., Walker, S. N., Sechrist, K. R., & Frank-Stromborg, M. (1990). Predicting health-promoting lifestyles in the workplace. *Nursing research*. (https://journals.lww.com/nursingresearchonline/Abstract/1990/11000/Predicting_Health_Promoting_%20Lifestyles_in_the.2.aspx) Accessed on : 15/08/2019
 - 16- Ardiç, C., & Taskin, N. (2018). Tıp Fakültesi Öğrencilerinde Sağlıklı Yaşam Biçimi Davranışlarının Değerlendirilmesi/An Evaluation of Healthy Lifestyle Behaviors of Medical School Students. *Bezmialem Science*, 6(3), 191-196.

INVESTIGATION OF LIFE SATISFACTION OF UNIVERSITY STUDENTS ACCORDING TO VARIOUS VARIABLES

Asc.Prof. Dr. Murat GÖKALP
Ondokuz Mayıs Üniversitesi, Samsun Eğitim Fakültesi
gokalpm@yahoo.com

Dr. Temel TOPAL
Giresun Üniversitesi, Eğitim Fakültesi
temel.topal@giresun.edu.tr

ABSTRACT

Life Satisfaction is an important element of an individual's sense of well-being in general. University students have problems with life satisfaction from time to time. University years are a period in which students try their adult roles, prepare for working life and idealize their values more. The aim of this study is to examine the life satisfaction levels of university students according to gender, class, place of residence, income level, number of siblings, education level of parents and whether or not parents are alive. The research was carried out with 550 students in Kyrgyzstan-Turkey Manas University's various faculties of the ongoing 229 male, 321 female and in 2017-2018 academic year. To determine the level of life satisfaction of students developed by Diener, Emmons, Laresen and Griffin (1985) in order to The Life Satisfaction Scale adapted to Turkish by Köker (1985) and the Personal Information Form developed by the researcher were used to obtain information about independent variables. According to the results of the research, life satisfaction levels of university students vary according to income levels and place variables. Results in accordance with the findings and recommendations were made.

Keywords: Life Satisfaction, Shelter, Satisfaction Areas, University Student

INTRODUCTION

Satisfaction with Life is an important element of the individual's well-being in general. One of the sections of society where life satisfaction is important, reflecting the perception and evaluations of the individual's life, is university students. University years are a period in which students try their adult roles, prepare for working life and more idealize the values of their lives.

Throughout history, how many people find their lives meaningful about how to get satisfaction in life on this issue, many philosophers, in recent history has revealed many views on the subject of psychology. The concept of life satisfaction was first introduced by Neugarten in 1961 and later led to many researches. The concept of satisfaction in life satisfaction; expectations, requirements, requests and wishes are met (Özer and Karabulut, 2003: 72).

Life satisfaction is the result obtained from the comparison of what one wants and what he / she gets in life according to Neugarten (Onur, 1997: 368). Diener, Emmons, Larsen, and Griffin (1985); They defined life satisfaction as a positive evaluation of an individual's whole life in accordance with the criteria determined by an individual. According to Pavot and Diener (1993), life satisfaction is the cognitive component of subjective well-being, and it is the appraisal of one's life as a result of comparisons between the individual's perception of living conditions and the criteria he imposes on himself (cited in: Chechen, 2007: 181).

In 1973, psychology thesis abstracts were used in the same sense with happiness for life satisfaction; In 1974, the majority of articles subject to subjective well-being a Social Indicators Research 'magazine was published. In this research, subjective well-being was used in the same sense as life satisfaction (Özer, p.28,2001).

When life satisfaction is said, it should be understood that satisfaction is not related to a certain situation, but overall satisfaction in all life (Vara, 1999; Avşaroğlu et al., 2005). Life satisfaction is the emotional response or attitude of a person to his / her life in work, leisure and other time periods (Köker, 1991).

Life satisfaction includes individuals' lives and all aspects of their lives. Happiness, morale and so on. expresses the state of being good from different angles such as (Neugarten et al., 1961). Life satisfaction is one of the most important factors affecting the individual's mental health and social relations.

The concepts of subjective well-being and life satisfaction have been stated by many scientists and researchers as the main goals of life. Subjective well-being is very much related to how an individual evaluates his / her life. It has been shown that the harmony or incompatibility between the goals of the individual and the extent to which he / she can achieve these goals is a determining factor in achieving happiness (Rask et al., 2002).

The concept of subjective well-being consists of two main elements: the first element describes the cognitive aspect and the second element describes the emotional aspect. Dorahy et al. In their study in 2000, they suggested that cognitive element determines the perception of life satisfaction. In addition, Rask et al., 2002, the emotional element includes positive and negative affect states. Subjective well-being is a positive evaluation of one's life. Buddha positive affect, satisfaction, dedication, attachment and meaning of life together (Diener and Seligman 2004).

There are many theories that suggest that subjective well-being is the result of comparisons between some standards and real conditions. If the actual situation exceeds the established standard, happiness will occur. Given satisfaction, such comparisons can be made consciously. However, in the case of emotions, the comparison of standards with emotions is made unconscious or unconscious. Judicial theories determine what kind of events are positive or negative; they can foresee the amount of emotion that events will reveal (Şahin, 2008: 24). Accordingly, the difference between the conditions in the individual's life and the evaluation of these conditions by the individual is important. The standards used by the individual in judicial theories are important. In these comparisons, satisfaction occurs according to what the individual feels from the individual he / she compares. Such social comparisons affect mental health (Köker, 1991: 85).

Subjective well-being studies include how and why people evaluate their personal lives as positive. These studies include concepts such as life satisfaction, positive emotions, happiness and morale (Özgen, 2012). In general, many ways to improve the quality of life and satisfaction with life have been investigated. Developments in the field of medicine, occupations such as meditation, technological inventions used in daily life can increase the happiness of people, and make them feel better (Sarıcaoğlu, 2011). Life satisfaction, which constitutes the cognitive part of subjective well-being, shows the general satisfaction of the individual towards his / her own life. Life satisfaction, which covers the whole of an individual's life, is the result of comparing the actual situation with its expectations. In other words, life satisfaction is obtained as a result of the comparison of what one wants and what they have (Özgen, 2012).

The more one feels the deprivation of a requirement and the harder it works to satisfy it, the happier the moment it satisfies it. Thus, the deprivation and pain initially created by a need leads to a sense of ownership and pleasure later created by the need. Today, individuals are faced with a life full of challenges that make themselves felt in every field. These strains can disrupt the psychological balance of the individual, revealing the energy necessary for the continuation of life on the one hand, while leaving the individual helpless, vulnerable and weak with a paradox that can destroy all energy.

Life satisfaction generally includes the whole life of a person and all aspects of this life. It is also defined as change such as happiness and morale (Koçoğlu, 2006). Life satisfaction is defined as the satisfaction that an individual receives in his or her life (Özdevecioğlu, 2003). According to Diener (1984), life satisfaction includes satisfaction from life, desire to change life, satisfaction from the past, satisfaction from the future, and the views of that person's relatives about that person. Satisfaction areas can be work, family, leisure, health, money, self and close environment. In this context, the concept of life satisfaction is one of the most important goals in the life of the individual, and it is also of great interest to researchers.

The number of studies related to satisfaction in the field of psychology has increased significantly in recent years. Studies examining the importance and satisfaction of human life are indispensable for psychology. It is to give meaning to the life of individuals, which makes life satisfaction come to the forefront. Life satisfaction is defined as the positive evaluation of an individual's whole life in accordance with the criteria determined by him / her. Life satisfaction is seen as the cognitive component of subjective well-being and includes comparisons between the criteria imposed on the individual and his / her perception of living conditions, and thus his / her appraisal about his / her own life. (Dingiltepe2009).

When life satisfaction is mentioned, it should be understood that the satisfaction of a certain situation is not the satisfaction of the whole life in general. Life satisfaction is the emotional response or attitude of a person to life in work, leisure and other time periods. Life satisfaction includes individuals' lives and all aspects of their lives. Happiness, morale, satisfaction, etc. expresses the state of being good from different angles such as. Life satisfaction is one of the most important factors that affect the mental health and social relations of the individual (Aydiner 2011).

When life satisfaction is said, it is not satisfaction about a particular situation, but satisfaction in all experiences in general. Happiness, morale and so on. expresses the state of being good in various aspects such as (Vara, 1999; Ozer and Karabulut, 2003). In daily relationships, positive emotions dominate negative emotions (Aksaray, Yildiz and Ergun, 1998).

Life satisfaction is defined as the positive evaluation of an individual's whole life in accordance with the criteria determined by an individual (Diener, Emmons, Larsen and Griffin, 1985; Veenhoven, 1996).

Life satisfaction is the cognitive component of subjective well-being and includes comparisons between the criteria imposed on the individual and his / her perception of living conditions, and thus his / her appraisal about his / her life (Deniz, 2006; Pavot & Diener, 1993).

The importance of subjective well-being shows that it is directly related to individual and social value systems as it increases deep, meaningful relationships and productivity, quality of life and creates positive effects on psychological and physical health. Diener (1984), who is a name in the nursing home in the relationship between physical activity and life satisfaction of the elderly examined the findings obtained; revealed a strong relationship with health life satisfaction. Research has shown that subjective well-being is determined by many factors such as life goals, personality traits, income level, and obstacles in life (Rask et al. 2002).

Life satisfaction, which encompasses the whole of life, is an important indicator of how a person is in mental health. Various obstacles, difficulties, conflicts and sudden negative changes that may occur in life may cause a decrease in the level of life satisfaction (Demirel & Canat, 2004: 6).

If a person expresses satisfaction with his / her life, he / she often experiences positive emotions and rarely negative emotions, and we can say that his / her subjective well-being level is high (Diener and Lucas 1999).

Experimental findings indicate that individuals with high levels of subjective well-being exhibit less symptoms of mental discomfort, function more positively in the social environment, have stronger interpersonal relationships, an optimal health-oriented lifestyle, and a more harmonious temperament, as well as cognitive styles that provide more personal development. (Diener 1984, 1994, 2000; Diener, Suh, Lucas and Smith 1999; Lyubomirsky, Sheldon and Schkade 2005; Pressman and Cohen 2005).

Many variables including experiential, psychological, cognitive, motivational, personality-related, cultural, contextual, and demographic factors can be associated with subjective well-being (Argyle 1999; DeNeve and Cooper 1998; Diener 1984, 1994; Diener et al. 1999).

According to Shmotkin (2005), subjective well-being forms offer alternative ways of adapting to changes, deficiencies in personal resources and threatening living conditions. High subjective well-being is the determinant of an individual's optimal functioning (Keyes 2005; Ryan and Deci 2001) and is considered an important individual and social goal (Diener 2000; Seligman 2000).

Veenhoven (1996) defines life satisfaction as the degree of positive development of the whole quality of life as a whole, while the determinants of life satisfaction are changes in life (quality of society, place in society, personal abilities), course of life events, experience (function of pleasure experience, love). It also refers to the relationship between the satisfaction of life and the satisfaction of life, the inner production of emotions, the capacity of enjoyment, the inner progress of development (calculating or inferring, the meanings at the basis of emotions, the differences in the development of the living space and the whole).

Life satisfaction is defined as the positive evaluation of an individual's whole life in accordance with the criteria determined by an individual. Studies on life satisfaction show that gender, race, and income have almost no effect on predicting life satisfaction and happiness, and that psychological variables, for example, personal tendencies, close relationships, and culture have more impact on explaining life satisfaction. (Chechen, 2008).

It is frequently stated that individuals who share the opinion that life is a meaning and direction are individuals with optimal life satisfaction. Life satisfaction, defined in a very simple and clear way, does not seem to be such an easily understandable concept. As a result, one's happiness is an event involving all areas of life. Accordingly, employees will generally be satisfied, or they will not be satisfied in the whole of life. Thus, it is not possible to distinguish the satisfaction from work from life satisfaction, which includes all of the living spaces (Keser, 2005).

Life satisfaction assesses how satisfied people are with their lives in general. The scale does not measure satisfaction for certain living areas such as financial status, health or success, but it allows them to think about all these areas in general and to sort and respond to their own way of life (Güler, Emeç, 2006).

Satisfaction, fulfillment of people's expectations, needs, desires and desires or hunger in the organism, thirst sexuality and so on. basic biological needs, such as curiosity, love, proximity, success, and so on. It is defined as the restoration of the balance state as a result of the elimination of spiritual needs. Life satisfaction is defined as the positive evaluation of an individual's whole life in accordance with the criteria determined by an individual. In other words, life satisfaction is a result of comparing people's expectations with their real situations. Life satisfaction includes individuals' lives and all aspects of their lives. Life satisfaction does not mean the satisfaction of individuals regarding a certain situation, a certain process, but the satisfaction of all their lives in general. Life satisfaction is related to age, gender, working and working conditions, education level, religion, race income level, marriage and family life, social life, personality traits, environment, biological factors (Dilmaç, Ekşi.2001).

There are also writers who do not believe in the concept of life satisfaction and think that one will never experience satisfaction in his life. Schopenhaur (2010) also supports this view, which describes that every desire spreads in many new desires, but states that satisfaction can only be achieved by going beyond all desires.

Satisfaction is the fulfillment of expectations, requirements, wishes and wishes. "Satisfaction with life" is the situation or result obtained by comparing a person's expectations (what he wants) to what he has (what he has). In other words, it expresses the result of comparing one's expectations with the real situation (Özer, Karabulut and Özsoy, 2003).

As a study of subjects from seventeen different countries showed (Diener, 2000), the vast majority of university students place more emphasis on life satisfaction and happiness than money. Some researches indicate that university students with high life satisfaction take more responsibility for their different roles, that they have more satisfaction in romantic relationships, school and family areas, less stress (Bailey and Miller, 1998) and less emotional loneliness (Chechen, 2007). show that they live. In some other studies conducted on university students, there is a positive relationship between life satisfaction and self-esteem (Yetim, 2003); life satisfaction was negatively related to depression, hopelessness, state and trait anxiety (Gündoğar et al., 2007). Therefore, it can be said that the increase in life satisfaction in university students plays a significant role in the realization of positive psychological health.

In this theory, a person's typical thoughts about the future affect their life and thus their subjective well-being. According to this theory, optimism is a tendency that a person has generalized to expect positive results in his or

her life. If a person expects positive results, he / she works for his / her goals. However, if one expects failure, he does not make an effort to achieve his goals (Cha, 2003).

Various research results indicate that subjective well-being and optimism have a positive relationship. Aydın and Tezer (1991) found that as optimism increases, general health status of individuals improves and optimistic students are more successful in academic field.

In some studies examining the life satisfaction of university students, the level of life satisfaction of girls is significantly higher than that of boys when the general life satisfaction is examined by gender. (Uz Baş, 2011; Tuzgöl Dost, 2007) or did not change according to gender (Bailey and Miller, 1998; Gündoğar et al., 2007; Tümkaya, 2011; Zullig, Huebner and Pun, 2009) were obtained. These findings, in Turkey Koker's (1991) findings of his research on adolescents and Cenkseven and Akbas (2007) is in line with the findings of university students. Most studies on different age groups indicate that there is no significant relationship between life satisfaction and gender (Fugl-Meyer, Melin and Fugl-Meyer, 2002; Hampton and Marshall, 2000; Hintikka, 2001; Katja, Paivi, Marja-Terttu) and Pekka, 2002). According to Diener (1984), biosocial variables such as gender and age are among the factors that affect subjective well-being, but Diener and Diener (1996) suggest that socio-economic status has relatively stronger relationships with subjective well-being by age and The strongest socio-structural Pamukkale University Faculty of Education Magazine Year 2007 (2) 22. Issue 140 predictors income.

Organizations such as the Pew Foundation and the World Value Survey monitor data on life satisfaction in many countries and are used to develop social policies. When the data obtained are examined, it is noteworthy that these data generally include developed societies with high welfare level. There is not enough data about life satisfaction in African countries and other developing countries (Gündoğar, Gül, Demirci, Uskun, 2007).

As we have seen, it is very difficult to define life satisfaction with the help of various scales, because life is already wide enough to cover everything. In order to get rid of this confusion, it is preferred to measure life satisfaction with the help of global life satisfaction questions. However, many studies aim to define the element structure of life satisfaction by examining the effects of variables such as being married, self-confidence, control area, age, gender, and health on life satisfaction. (Dikmen, 1995).

Life Satisfaction; Life satisfaction is defined as the positive evaluation of an individual's whole life in accordance with the criteria determined by an individual (Diener, Emmons, Larsen and Griffin, 1985).

Subjective well-being is often used instead of life satisfaction. However, subjective well-being is a concept with a wider content including life satisfaction. Subjective well-being criteria include life satisfaction (Keser, 2003: 122). Subjective well-being constitutes the cognitive part of the concept of life satisfaction, the person's perceptions of living conditions and their own criteria to compare the value of life includes the appraisal (Deniz, 2006; Selçukoğlu, 2001).

According to the orphan, subjective well-being includes the meaning of an individual's evaluation of his / her life from a point of view. Evaluating the life of the individual; their reactions and judgments constitute the subjective well-being of the individual. There are three dimensions to the individual's self-assessment. However, it has been suggested that they will be classified in a general dimension related to each other. These are positive emotion, negative emotion and life satisfaction. The pleasures, joys and pleasant emotions experienced in the positive emotion dimension; In the negative emotion dimension, it was determined that the lack of unpleasant, bad and painful emotions was important for goodness. Life satisfaction includes cognitive judgments and evaluations related to general life (Yetim, 2001: 135-138).

While life satisfaction is based on the recent and direct events of the individual, in other words, while trying to determine how satisfying the life he is living in, happiness is handled in relation to future actions. Thus, the concept of life satisfaction is a more concrete concept than the concept of happiness. The concept of happiness is always expected to reach a certain goal in the form of a result (Keser, 2003: 124).

As a result, the concept of life satisfaction can be confused with other concepts to be fully defined along with its elements. Therefore, in our study, we will try to define the concept of life satisfaction on the basis of general life satisfaction, not on the basis of the scale, but on the basis of the individual's positions of life with different roles (work, home hayab, leisure etc.).

METHOD

Method of research

In this study, descriptive research methods were selected. General screening models are scanning arrangements made on a whole, a group, sample or sample to be taken from the universe in order to reach a general judgment about the universe in a universe consisting of many elements (Karasar, 2010; 79). Relational survey model, literature survey, descriptive method, survey technique, analysis, synthesis and comparison method were used. SPSS 16.00 package program was used in the analysis of the data obtained by the survey technique.

Population and sample of the research

The study population in the 2016-2017 academic year, Kyrgyzstan-Turkey Manas University, 550 students constitute ongoing in various faculties. In addition, the class status of the students was taken into consideration in the sample selection and the preparatory class was included. The students who form the sample of the research were randomly selected from the classes on the day of the survey and disproportionately selected by easy sampling method.

Table 1. Working Group Frequency and Percentages

Faculty	Frequency	Percent
Literature	142	25,8
Communication	107	19,5
Economy	114	20,7
Fine Arts	62	11,3
Science	83	15,1
Other	42	7,6
Gender		
Girl	321	58,4
Male	229	41,6
Class		
Preparatory class	95	17,3
First class	118	21,5
Second class	108	19,6
Third Class	104	18,9
FourthClass	125	22,7
Location		
I'm living with my family	193	35,1
I live in the dorms	167	30,4
I live at home with friends	114	20,7
Other	76	13,8
Income		
Less than 10000 Som	119	21,6
Between 10-15 Thousand Som	141	25,6
Between 15-20 Thousand Som	135	24,5
More Than 20 Thousand Som	155	28,2
Number of siblings		
No sister	30	5,5
1 Brother	55	10,0
2 siblings	105	19,1

3 Brothers	144	26,2
Brother 4 and up	216	39,3
Mother Education		
Primary school	32	5,8
Middle School	63	11,5
High school	167	30,4
University	288	52,4
Father Education		
Primary school	30	5,5
Middle School	63	11,5
High school	164	29,8
University	293	53,3
Parents Right Status		
Mother Father Right	442	80,4
No parents	2	,4
Mother Right Father None	43	7,8
Father Right Mother None	16	2,9
Parents Separated Divorced	47	8,5

According to Table 1: The percentage of 142 students in the Faculty of Literature is 25.8, the percentage of 107 students in the Faculty of Communication is 19.5, the percentage of 114 students in the Faculty of Economics is 20.7, the percentage of 62 students in the Faculty of Fine Arts is 11.3, the percentage of 83 students in the Faculty of Science is 15.1, the percentage of 42 students in other faculties is 7.6. According to gender: 321 percent of female students 58.4, male students 229 percent 41.6, According to class: 95 percent of students in preparatory class 17.3, 118 percent of first class students 21.5, 108 percent of second class students 19.6, third class 104 students 18.9 percent, fourth grade 125 students 22.7 percent, based on where I live: with my family 193 percent of students 35.1, staying in dormitories 167 percent of students 30.4, living with friends at home 114 percent of students 20.7, other 76 percent of students 13.8, Family income level: Less than 10000 som 119 percent of students 21.6, 10- Percentage of 141 students from 15 thousand som 25.6, Percentage of students from 15-20 thousand som 24.5, Percentage of students from more than 20 thousand som 155 28.2, Number of siblings: no siblings 30 percent of students 5.5, one brother 55 students 10.0 percent, two siblings 105 the percentage of students is 19.1, the percentage of three brothers is 144, the percentage of students is 26.2 39.3, Mother education level: 32 percent of primary school students 5.8, secondary school 63 percent of students 11.5, high school 167 percent of students 30.4, university 288 percent of students 52.4, Father education level: 30 percent of primary school students 5.5, 11.5 percent of secondary school 63 students, high school 164 student percentage 29.8, university 293 student percentage 53.3, according to parental right status: parent right 442 student percentage 80.4, no parent 2 student percentage .4, no parent right student 43 student percentage 7.8, no parent right mother 16 student the percentage of 2.9, the divorce of the parents divorced 47 percent of 8.5 students.

IMPORTANCE OF RESEARCH

Spiritual well-being of university students is of particular importance to society. According to Moller (1996), the future prosperity of a nation depends on the well-being of students. In particular, the interest shown to the situation of students with leadership personality is an investment for the future of the country. Life satisfaction is one of the concepts that have taken place in our lives since the existence of humanity. Life satisfaction is the cognitive component of subjective well-being and includes appraisal of an individual's life. Factors that make life worth living have been the subject of curiosity since ancient times and it is stated that the real source of a life worth living is that the individual is satisfied with his life.

Problem Sentence

In recent years, there has been an increase in students' research on the concept of life satisfaction. Life satisfaction is a positive evaluation of an individual's whole life in accordance with the criteria determined by him / her. Life satisfaction is defined as the general cognitive evaluations of the individual about whether he / she is satisfied with his / her own life or in terms of certain living areas such as family, friends and living environment. Accordingly, individuals with high levels of subjective well-being have more life satisfaction and positive emotions are experienced more than negative emotions. What the meaning given to the lives of university students is a problem that the research seeks answers. Quality of life satisfaction is an important issue for university students as in all age groups. It is inevitable that there will be a change in the quality of life of young people who move away from their homes and families and start living in another environment for university education. Most of the students who win the university earn a school in a city different from where they live. This requires students to adapt to a new life and leads to significant changes in the lives of many young people and bio psychosocial problems. Life satisfaction is one of the most important determinants of the general sense of well-being and quality of life and includes the judgment of quality of life and well-being based on the qualities of the individual. In other words, it is a cognitive assessment based on individual's judgment of his / her own life according to various criteria. Life satisfaction includes various aspects of life in general; age, gender, health, work life, economic situation, education level, place of residence, social support and environmental conditions. The most important and first problem faced by students in university life is the "housing" problem. The majority of university students stay at home or in a dormitory during their education, apart from their families. Dormitories are usually large buildings with a large number of students and are generally preferred by most students in that they are close to the campus, provide a more relaxed environment than the home, and offer the opportunity to socialize with students. However, the increasing number of universities, increasing the student capacity and inadequate student dormitory capacities in recent years increase the academic and social problems of university students along with the housing problem. The most viable alternative to a dormitory for students is renting a house with one or more friends. Leaving home and family that they are accustomed to, changing the living environment and starting living together with people they do not know are important changes that may affect the physical, mental and social lives of students. Living in suitable environments, having adequate conditions and meeting the physical, mental and social needs of the students will increase their life satisfaction. Leaving home and family that they are accustomed to, changing the living environment and starting living together with people they do not know are important changes that may affect the physical, mental and social lives of students. Living in suitable environments, having adequate conditions and meeting the physical, mental and social needs of the students will increase their life satisfaction. Do university students have a statistically significant difference according to their place of residence and sub-dimensions, according to their gender, class level, faculty, family income level?

Sub Problems

Kyrgyzstan-Turkey Manas University student of life satisfaction:

Does it vary according to the place of residence, gender, class level, family income level, number of siblings, parental education status, whether the parents are alive or not, and the faculty they study?

limitations

The sample of the study is limited to KTMU students studying in the 2016-2017 academic year. The Satisfaction Scale of Life Satisfaction Scale .

Data collection tool

Two data collection tools were used in this study. Life Satisfaction Scale was developed by Diener, Emmons, Laresen and Griffin (1985); Adaptation to Turkish was performed by Köker (1991). The scale consists of five items related to life satisfaction. Each item is answered according to a 7-graded response system (1: not at all suitable - 7: very appropriate). The scale, which aims to measure general life satisfaction, is suitable for all ages from adolescents to adults. The translation of the scale into Turkish and the validity study of the scale with the

“superficial validity” technique was conducted by Köker (1991). The data on the independent variables of the study were obtained by the Personal Information Form prepared by the researcher.

Data Collection and Analysis

The data obtained from the study were analyzed using SPSS (Statistical Package for Social Sciences) Windows 16.0 program. Descriptive statistical methods (number, percentage, mean, standard deviation, one-way analysis of variance and LSD) were used to evaluate the data. Life satisfaction scale is normally distributed.

Reliability / Validity of the Scale

The students ($n = 550$); The mean score of the scale was 23.81, the standard deviation was 7.12, and the internal consistency of the scale. 84 and item-total correlation of items was found to range between .57 and .64. Validity: The Confirmatory Factor Analysis revealed that the scale consisted of one factor and the fit indices were sufficient. The Confirmatory Factor Analysis, which includes multiple group comparisons, showed that the theoretical structure of the scale was the same (constant) for each sample. Simultaneous validity and discriminant validity of the scale were observed to be sufficient. There was a significant relationship between total score and life satisfaction, and variables of similar structures (eg self-esteem, positive mood, etc.). In terms of discriminant validity, the relationship between life satisfaction and the desire to self-censor with a structure different from life satisfaction is meaningless. The scale includes a metric metric that changes from "(1) I strongly disagree to" (7) I completely agree. The scale can be applied to all individuals over the age of 16 years. The scores obtained from the scale vary between 7 and 35. As the score obtained from the scale increases, life satisfaction increases.

Life Satisfaction Scale

Diener, Griffin, Larsen and Emmons (1985) was developed to determine the satisfaction of life. The scale consists of 5 items. Each of the five items has 7 different answer options. Each item is scored between 1 and 7 and 5 to 35 points are obtained from the whole scale. The low score obtained from the scale is accepted as an indicator of low life satisfaction. A high score is also considered as a high level of life satisfaction. The scale was adapted to Turkish by Köker (1991) and the reliability coefficient was found to be 0.85 with test-retest method. In this study, the Cronbach alpha coefficient for the reliability of the scale was calculated as .85. Validity and reliability of the scale was made by Sultan Çamur Karataş in 1988. (Yılmaz, Sayıl, 1996).

RESULTS

In this section, the frequency distributions of demographic information defining the sample, such as gender, age, faculty and department, are given. Descriptive statistics of the scores obtained from the Satisfaction with Life Scale, findings of statistical analyzes and interpretations of the analyzes were included.

Table 2. Frequency and% Data of Life Satisfaction Scale of University Students by Location

		Strongly disagree	Disagree	Slightly disagree	Neither agree nor disagree	Very little agree	Agree	Strongly agree
I have an ideal life in many ways.	n	34	91	97	65	70	155	38
	%	6,2	6,5	17,6	11,8	2,7	28,2	6,9
My living conditions are excellent	n	29	80	99	74	75	139	54
	%	5,3	14,5	18,0	13,5	3,6	25,3	9,8
My life satisfies me	n	25	76	92	98	70	138	51
	%	4,5	13,8	16,7	17,8	2,7	5,1	9,3
So far, I have achieved the important things I want in life	n	25	69	98	87	96	122	53
	%	4,5	12,5	17,8	15,8	7,5	2,2	9,6
If I had the chance to live my life again, I wouldn't change anything.	n	67	87	84	70	87	102	53
	%	12,2	15,8	5,3	12,7	5,8	8,5	9,6

Table 3. Data of Life Satisfaction Scale of University Students by Location

Items	N	Lowest possible score	Highest possible score	Average	Standard deviation
I have an ideal life in many ways.	550	1,00	7,00	4,2055	1,79849
My living conditions are excellent	550	1,00	7,00	4,3073	1,78287
My life satisfies me	550	1,00	7,00	4,3273	1,72999
So far, I have achieved the important things I want in life	550	1,00	7,00	4,3418	1,70488
If I had the chance to live my life again, I wouldn't change anything.	550	1,00	7,00	3,9836	1,91193

According to the data in Table 3 I have a life close to ideal in many ways the lowest score can be taken 1, the highest score can be 7, average 4, 2055, standard deviation is 1,79849.

Im My living conditions are excellent the lowest score is 1, the highest score is 7, average 4, 3073, standard deviation is 1, 78287.

Im My life satisfies me the lowest score is 1, the highest score is 7, average 4, 3273, standard deviation is 1, 72999.

'So far, I have achieved the important things I want in life the lowest score can be taken 1, the highest score can be 7, average 4, 3418, standard deviation 1, 70488.

If I had the chance to live my life again, I wouldn't change anything the lowest score is 1, the highest score is 7, the average is 3.9836, the standard deviation is 1, 91193.

Table 4. One-way ANOVA Findings of University Students' Satisfaction with Life Scale

Place of Residence	Sum of Squares	D.F.	Mean Square	F	Signification
Between Groups	2583,485	3	861,162	21,415	, 000 p<0.000 meaningful
Within Groups	21956,459	546	40,213		
Total	24539,944	549			

According to Table 4, it is seen that there are significant differences according to the findings of one-way analysis of variance in order to see whether there is a difference in the opinions of university students about life satisfaction according to their accommodation. (p <0.000 significant).

Table 5. LSD (Least Significant Difference) Test Findings Related to Life Satisfaction Scale of University Students

Money Spent in a Month	Difference Between Means		Importance of Level
I'm living with my family	I live in the dorms	5,21051	p<0.05
I'm living with my family	Living at home with friends	3,74166	p<0.05
I'm living with my family	Other	2,85131	p<0.05
I live in the dorms	Other	2,35920	p<0.05

DF.549.

According to the data in Table 5, there are differences between the LSD findings of üniversite I live with my family and stay in the dormitory "between ,2 5,21051, I live with my family I live with my friends , 74 166. In favor of living with my family, living with my family-other "in favor of living with my family of 2,85131 staying in dormitory – other", there was a difference between 2,35920 in favor of living with my family. (P <0.05).

Table 6. One-Way Variance Analysis Findings of Life Satisfaction Scale According to Income Levels of University Students

Residence	Sum of Squares	D.F.	Mean Square	F	Signification
Between Groups	935,597	3	311,866	7,214	, 000 p<0.000 meaningful
Within Groups	23604,346	546	43,231		
Total	24539,944	549			

According to Table 6, it is seen that there are significant differences according to the findings of one-way analysis of variance regarding whether there is a difference in the opinions of university students about life satisfaction according to their income levels ($p < 0.000$ significant).

Table 7. LSD (Least Significant Difference) Test Findings Related to Life Satisfaction Scale According to Income Levels of University Students

Income		Difference Between Means	Importance of Level
less than 10000	Between 10-15000 Som	-1,75600	$p < 0.05$
less than 10000	Between 15-20000 Som	-2,31298*	$p < 0.05$
More than 10000	More than 20000 Som	-3,68430*	$p < 0.05$
Between 10-15000	More than 20000 Som	-1,92830	$p < 0.05$

According to the data in Table 7, there is a difference between the LSD findings regarding whether there is a difference in the opinions of university students about their life satisfaction or not. -20 thousand som "-2,31298 * 15-20 thousand som in favor," Less than 10000 som more than 20 thousand som "-3,68430 * In favor of more than 20 thousand som," 10-15 thousand som between 20 thousand more than som 1.92830 In favor of more than 20 thousand som, "" was found. ($P < 0.05$).

CONCLUSION AND SUGGESTIONS

Result

In this section, the results of the research are given. However, based on the results of the research, suggestions were given to the employees in the field and to the researchers who may work on this subject in the future. The research is limited to the data obtained from the Personal Information Form and the Satisfaction with Life Scale.

The difference between living with my family and living in a dormitory, in favor of living with my family was observed between the opinions of university students regarding their life satisfaction. There was a difference between "living with my family- living with my friends leh, in favor of living with my family, living with my family-other,, in favor of living with my family, orum staying in the dorm – other –, in favor of living with my family.

According to the findings of whether there is a difference in life satisfaction according to the income of university students, between az 10000 som less than 10-15 thousand som "between 10-15 thousand som among," Less than 10000 som between 15-20 thousand som "between 15-20 thousand som in favor of som less than 10000 som more than 20 thousand som "in favor of more than 20 thousand som," 10-15 thousand som more than 20 thousand som "in favor of more than 20 thousand som,"

'In many ways I have a life close to ideal', 'My living conditions are excellent', 'My life satisfies me', 'Until now, I have achieved the important things I want in life', 'If I had the chance to live my life again, I would hardly change anything' average of those who were found to be high.

SUGGESTIONS

In future researches, it is thought that measuring the characteristics to be measured with different measurement tools and expanding the questions in the Personal Information Form will be beneficial for the validity and reliability of the research.

When the results of the research are considered, it is thought that the life satisfaction of the individuals is generally high and in this sense, the application of the study in larger and different sample groups will increase the measurability and generalizability of the research results.

In the future research, it is considered that the number of female and male students to be sampled is equal to be carried out with samples from different universities and / or different age groups and it will be beneficial for the reliability and efficiency of the research.

REFERENCES

- Addison, Rosemary and Brundrett, Mark (2008), "Motivation and Demotivation of Teachers in Primary Schools: The Challenge of Change", Education 3-13: International Journal of Primary, Elementary and Early Years Education, 36 (1), 79-94.
- AlFahad, H. S. A. and Alqahtani, A., The Relationship between School Principals' Leadership Styles and Teachers' Achievement Motivation, Proceedings of 3rd Asia-Pacific Business Research Conference 25 - 26 February 2013, Kuala Lumpur, Malaysia.
- Alkan, C.; Kurt, M. (1997). "Özel Öğretim Yöntemleri" 2. Baskı, Ankara.
- Argon, T. (2004). "İnsan Kaynakları Yönetimi". Nobel Yayın Dağıtım. Ankara:
- Aslan, H. ve Baytekin, O., F. (2004). İlköğretim Okul Müdürleri İçin Eğitim Liderliği Standartlarının Araştırılması, XIII. Ulusal Eğitim Bilimleri Kurultayı, İnönü Üniversitesi, Eğitim Fakültesi, Malatya.
- Burcu Aydiner, B. (2011). "Üniversite öğrencilerinin yaşam amaçlarının alt boyutlarının genel öz-yeterlik yaşam doyumu ve çeşitli değişkenlere göre incelenmesi" Yüksek Lisans Tezi
- Can Sünbül, E. (2016). "Üniversite öğrencilerinin öz-duyarlık ve yaşam doyumu düzeylerinin olumlu sosyal davranış eğilimlerini yordayıcı rolünün incelenmesi" Yüksek Lisans Tezi, Gaziosmanpaşa Üniversitesi, Eğitim Bilimleri Enstitüsü, Eğitim Bilimleri Anabilim Dalı, Rehberlik ve Psikolojik Danışma Bilim Dalı
- Çivitci, A. (2012). "Üniversite öğrencilerinde genel yaşam doyumu ve psikolojik ihtiyaçlar arasındaki ilişkiler" Çukurova Üniversitesi, Sosyal Bilimler Enstitüsü Dergisi
- Demir Güdül, M. (2015). "Üniversite öğrencilerinin akademik motivasyon profillerinin psikolojik ihtiyaç doyumu, akademik erteleme ve yaşam doyumu ile ilişkisi" Doktora Tezi
- Demir Güdül, M. (2015). "Psikolojik ihtiyaç doyumu, akademik erteleme ve yaşam doyumu ile ilişkisi" Doktora Tezi
- Gülcan, A. (2014). "Genç yetişkinlerde iyimserliğin mutluluk ve yaşam doyumu üzerindeki etkisinin incelenmesi" Yüksek Lisans Tezi
- Güler, K. (2015). "Beden imajının üniversite öğrencilerinde yaşam doyumu ve umutsuzluk üzerine etkisi" Beykent Üniversitesi, Sosyal Bilimler Enstitüsü, Psikoloji Anabilim Dalı, Klinik Psikoloji Bilim Dalı
- Gümüştən, D. (2013). "Algılanan ekonomik güçlük ile benlik saygısı ve yaşam doyumu arasındaki bağlantıda anne-ergen ilişkilerinin aracı rolü" Yüksek Lisans Tezi
- Gündoğar, D.; Sallan Gül, S. (2007). "Üniversite öğrencilerinde yaşam doyumu yordayan etkenlerin incelenmesi".
- Güven, P. (2015). "Üniversite öğrencilerinde yaşamın amacı ve anlamı ile yaşam doyumu ve yakın ilişkiler" Yüksek Lisans Tezi

- Karabacak, M. (2016). “Üniversite öğrencilerinin barınma yeri tercihleri”.
- Kivilcim, P. (2014). “Öğretmenlerde iş doyumu, özyeterlik inancı ve yaşam doyumu ilişkisinin karşılaştırılması” Toros Üniversitesi, Sosyal Bilimler Enstitüsü, Psikoloji Anabilim Dalı, Yüksek Lisans Tezi
- Kubilay Özel, N.(2015). “İş doyumu ve yaşam doyumu arasındaki ilişkinin demografik değişkenler açısından incelenmesi: Konaklama işletmelerinde bir araştırma” Türk Hava Kurumu Üniversitesi, Sosyal Bilimler Enstitüsü, İşletme Anabilim Dalı, İşletme Bilim Dalı, Yüksek Lisans Tezi
- Kümbül Güler, B. (2006). “Yaşam memnuniyeti ve akademik başarıda iyimserlik etkisi”• *D.E.Ü.İ.İ.B.F. Dergisi*
- Özbek, M. (2016). “Evli bireylerde yaşam doyumu ve psikolojik iyi oluşlarının çeşitli değişkenlerle incelenmesi”, Nişantaşı Üniversitesi, Sosyal Bilimler Enstitüsü, Psikoloji Anabilim Dalı, Psikoloji Bilim Dalı, Yüksek Lisans Tezi
- Özgür, G.; Gümüş, A. (2010). “Evde ve yurttan kalan üniversite öğrencilerinde yaşam doyumu”.
- Ünal, A. (2015). “İş doyumu, yaşam doyumu ve yaşam anlamı değişkenlerinin ilköğretim ve ortaokul öğretmenlerinin mesleki bağlılıkları üzerine etkisi” Ondokuz Mayıs Üniversitesi, Eğitim Bilimleri Enstitüsü, Eğitim Bilimleri Anabilim Dalı, Yüksek Lisans Tezi
- Soydan, Z. (2015). “Üniversite öğrencilerinin internet bağımlılığı ile depresyon ve yaşam doyumu arasındaki ilişki” Haliç Üniversitesi, Sosyal Bilimler Enstitüsü, Psikoloji Anabilim Dalı, Uygulamalı Psikoloji Bilim Dalı, Yüksek Lisans Tezi
- Söylemez, A. (2016). “Manevi zekanın yaşamın anlamı ve yaşam doyumunun yordayıcısı olarak incelenmesi”, Sakarya Üniversitesi Eğitim ve Öğretim Yönetmeliği, Eğitim Bilimleri EABD Eğitimde Psikolojik Hizmetler Bilim Dalı, Yüksek Lisans Tezi
- Rezan Çeçen, A. (2008). “Üniversite öğrencilerinde yaşam doyumunu yordamada bireysel bütünlük (tutarlılık) duygusu, aile bütünlük duygusu ve benlik saygısı” Eğitimde Kuram ve Uygulama Journal
- Tuzgöl, M. (2007). “Üniversite öğrencilerinin yaşam doyumunun bazı değişkenlere göre incelenmesi” Pamukkale Üniversitesi, Eğitim Fakültesi Dergisi
- Yıldız Yüksek, E. (2016). “Öğretmenlerin meslek etik ilkelerine uygun davranma algılarının işyabancılaşma - yaşam doyumu ve bazı değişkenler açısından incelenmesi” Yüksek Lisans Tezi, Ahi Evran Üniversitesi, Sosyal Bilimler Enstitüsü
- YavuzÇ. (2006). Rehberlik ve Psikolojik Danışmanlık Öğrencilerinde Öznel İyi Olma Hali, Psikiyatrik Belirtiler Ve Bazı Kişilik Özellikleri: Karşılaştırmalı Bir Çalışma. Yüksek Lisans Tezi, İstanbul Üniversitesi sosyal Bilimler Enstitüsü, İstanbul.
- Özer, M. ve Karabulut, Ö. Özsoy (2003). Yaşlılarda yaşam doyumu. Geriatri Dergisi
- Keser, A. (2005). İş Doyumu Ve Yaşam Doyumu İlişkisi: Otomotiv Sektöründe Bir Uygulama. Çalışma ve Toplum.
- Keser, A. (2003). Çalışmanın Anlamı, İnsan Yaşamındaki Yeri ve Yaşam Doyumu Üzerine Bir Uygulama. Doktora tezi, Uludağ Üniversitesi Sosyal Bilimler Enstitüsü, Bursa

INVESTIGATION OF REASONS FOR NATIONAL SWIMMERS TO QUIT SPORTS IN EARLY STAGE OF THEIR LIVES

Mehmet YARGICI

Faculty of Sport Sciences, Kocaeli University, Kocaeli, Turkey
mehmetyargici@gmail.com

Serap COLAK

Sports Management Department, Faculty of Sport Sciences, Kocaeli University, Kocaeli, Turkey
srpclk@gmail.com

Mehmet Deniz YENER

Anatomy Department, School of Medicine, Kocaeli University, Kocaeli, Turkey
m.denizyener@hotmail.com

Enis COLAK

Recreation Department, Faculty of Sport Sciences, Kocaeli University, Kocaeli, Turkey
eniscolak79@gmail.com

Murat SON

Coaching Training Department, Faculty of Sport Sciences, Kocaeli University, Kocaeli, Turkey
muratson1979@hotmail.com

Ismail SIVRI

Anatomy Department, School of Medicine, Kocaeli University, Kocaeli, Turkey
ismailsivri@gmail.com

ABSTRACT

Swimming which is considered to be one of the most important olympic sports branches is a costly sport type that is made in many different categories and requires intense training effort. The purpose of our study is to determine the causes of dropping sports at early stage and to distinguish them statistically different categories.

A total of 61 (age: $24,62 \pm 2,230$) national athletes which 31 males and 30 female athletes participated in the study in their own categories. The questionnaire consists of 7 categories and 32 sub-questions except gender, age, height, weight, sport age, age of dropping sports, current job and education status. The survey categories consist of opposing events, training and competition environment, motivation, economic, personal effects, failure and other titles.

When evaluated in terms of gender, there was no statistically significant difference between the answers given to sport quit survey (SQS) questions ($p > 0,05$). When the answers to questions in SQS are compared in terms of students and other occupational groups; a statistically significant difference was found between the two questions in the category of sundry events and in the category of the training and competition environment. ($P < 0.05$). When the answers to the questions in SQS were compared in terms of ages of the athletes, statistically significant difference was found in two questions in the "training and competition environment" category, one question in the category of "influence of persons" and one question in the "other causes" category ($P < 0.05$). When the answers to SQS questions are compared in terms of age of sport dropout; a statistically significant difference was found in one answer in the category of "sundry events" category, one answer in the category of "economic problems", also one answer in the both categories of "influence of persons" and "other effects" ($P < 0.05$).

It is an important question for our country and sport community that leave the sport rather than to develop the high sports capabilities that the national swimmers are get-ting from a difficult path. As a result, the loss of competent athletes in the sport branch can bring economic and human losses. The identification of these talent losses and the SQS and the prevention of losses can contribute to the development of the sports branch and the acquisition of successful athletes.

Keywords: Sport, Swimming, National Sports, Sports Quit.

INTRODUCTION

At the present time; the impact of sports on society and society on sports has reached very high dimensions (Bean, 2014). Many people interpret the concept of "sports" based on their own experiences. According to most people; sports means health and entertainment, while for others it is a professional job and work (coach, player), and for others it is an employment areas (sports clubs, federations) (Graham, 2013; Huertas, 2019). In order to provide a better understanding of the concept of sport, the issue should be evaluated in social conditions. Achieving a high level of success in accordance with professional goals in sports and achieving high performance in terms of athletes

are ensured through psychological and physiological efforts and disciplined trainings carried out for many years (Gould, 2008). However, both anthropometric and appropriate talented athletes should be selected using the right age and professional criteria and should be run with systematic and goal-oriented methodological trainings (Pensgaard, 2003; Opstoel, 2015). Sport, which can also be considered as an industry, involves a very costly and labor-intensive process for clubs and athletes (Wall, 2007).

Swimming can be defined as the individuals who travel a certain distance in water with sequential and coordinated movements. Swimming, which is one of the leading branches of Olympic sports, is a sport that is organized in many different categories and requires intensive training with special abilities (Johnson, 2003). Many variables affect the success rate during races of different techniques and distances. Achieving success and reaching the national athletes category are the main goals for the athlete (Strzata, 2007). Early education and motivation are the determining factors in achieving these goals.

There are several factors that have been cited as reasons for quitting sports (Delorme, 2010). Although there are a wide variety of reasons, similar concerns and causes are cited as the main reasons. The main topics frequently encountered among these reasons are occupational reasons, financial concerns, educational life, lack of motivation, age factor, environmental and social pressures (Hassan, 2017; Brooks, 2018). These effects vary according to the structure of the country and society (the popularity of sports in the society is variable). The loss of athletes obtained through regular and disciplined studies for long years creates losses both for the athletes and the sports industry (Lan, 2019). Determining the reasons for the discontinuation of elite athletes and taking the necessary measures is important in preventing these losses.

International sports teams have some psychological factors that may be beneficial for the athlete and the team (Bronikowska, 2019). By paying attention to these precautions, it can be prevented to quit sport at earlier and the most productive ages. A number of measures that may be important for the performance and efficiency of athletes can be listed. Factors that may affect the sports activities of athletes; team, coach, environmental and social factors (Strauch, 2019). Analyzing the athlete's future and the needs of the team and creating cause / precautionary items is very important (Pensgaard, 2003).

Furthermore, Instead of improving the high sports ability acquired by national swimmers, quitting this sport branch caused any inconveniences. At the beginning of these drawbacks, the loss of competent athletes of the sports branch can lead to economic and human losses (Kutcher, 2013). The multi-faceted determination of the causes of these talent losses may pave the way for the development of sports branch and winning successful athletes.

The aim of our study is to determine the reasons for quitting swimming, who have been trained with intensive efforts and endured the material / spiritual burdens and reached the national athletes category at early ages, and to find and categorize the reasons within themselves by using statistical methods.

MATERIAL-METHOD

In our study, the questionnaire method was used as a data collection tool from national swimmers to investigate the reasons of quitting sports of swimmers in early stage of their lives. The study was conducted in Kocaeli University. The questionnaire developed by Pehlivan et al., (2013) was used and rearranged and categorized using this questionnaire (SQS; Sport Quit Survey). Volunteer individuals under the age of 30 who participated in the study were professional swimmers and reached to the level of national athletes but quit sports. A total of 61 (age: 24 ± 2) national athletes which 31 males and 30 female athletes participated in the study in their own categories. In our study; as a method of collecting data was used questionnaire about causes of swimmers to quit sport at early age. The questionnaire consists of 7 categories and 32 sub-questions except gender, age, height, weight, sport age, age of dropping sports, current job and education status [Table-1]. The survey categories consist of opposing events, training and competition environment, motivation, economic, personal effects, failure and other titles. Statistical analysis of the total score and subgroup scores obtained from the questionnaire was performed by IBM SPSS v20 (Chicago, IL, USA) program.

Table 1: Questionnaire of reasons to quit swimming.

Gender: Age: Height: Weight : Age of sport: Age of quit sport:
Current Job: Education status:

<u>1. Personal Events</u>		<u>2. Training and Competition Environment</u>
Preparing for exams		Field problem with training
Attendance, failure		Coach's bias
Injury and disease		Inability to get along with the coach
Go regularly training in difficult conditions		No opportunity for success in the team
Missing social activities due to sports		Intra-team conflict, mismatch
Family relocation		Increased competition stress
		Excessive pressure to win
		Extreme discipline
		Coach's hard reactions
<u>3. Motivation Loss</u>		<u>4. Economic</u>
Reduction in interest and desire		Financial gain
Indifference of club management		Lack of rewards and incentives
Willingness to participate in activities other than sports		Financial inadequacy of the club
		Cessation of earnings from sports
<u>5. Impact of Persons</u>		<u>6. Failure</u>
Decrease in family support		Reduction in performance, failure in the game
Coach's indifference		Failure to accept failure
Absence of friends from sports		Low ability perception
Decreased family belief in sports		
Stay apart from friends		
Sexual harassment of the coach		
<u>7. Other reasons</u>		

RESULTS

When evaluated in terms of gender, there was no statistically significant difference between the answers given to Sport Quit Survey (SQS) questions ($p > 0.05$). Only significant differences are shown in the tables provided. As mentioned earlier, different societies show the reasons for quitting sports according to different factors (Wall et al., 2007). Considering the occupational status of the athletes in our study, statistically significant differences were obtained in the answers given ($p < 0.05$). When the answers to questions in SQS are compared in terms of students and other occupational groups; a statistically significant difference was found between the two questions in the category of sundry events and in the category of the training and competition environment. ($P < 0.05$). In these two groups divided as students and other occupations; 47.5% ($n = 29$) of those who stated that there is no increasing competition stress as the reason for quitting sports were students and 37.7% ($n = 23$) of them were athletes belonging to other occupational groups. According to these results, increasing stress in competitions was shown

as the reason of quitting sports and there was a significant difference between students and other occupational groups.

Table 2: Statistics and P values of the responses of athletes participating in the research to SQS according to occupations.

	No		Yes		X ²	P
	Student	Others	Student	Others		
Attendance, failure	11(%18)	22(%36,1)	19(%31,1)	9(%14,8)	7,224	0,007
Increased competition stress	29(%47,5)	23(%37,7)	1(%1,6)	8(%13,1)	6,122	0,026
Excessive pressure to win	26(%42,6)	19(%31,1)	4(%6,6)	12(%19,7)	5,074	0,024

Age factor is mentioned as an important reason among the reasons for quitting sports. In addition, there are differences between the athletes who quit sports at an early age and the athletes who quit at a later age in terms of the reasons for quitting (Vella, 2014). In our study, when we examine the answers given to the categories that we formed in terms of researching the reasons for quitting sports, there are statistically significant differences according to age factor. When we divide the athletes into two different groups under 24 years (including 24 years) and older than 24 years, differences are observed in the data obtained. When the answers to the questions in SQS were compared in terms of ages of the athletes, statistically significant difference was found in two questions in the "training and competition environment" category, one question in the category of "influence of persons" and one question in the "other causes" category ($P < 0.05$). Young ages are the most common age ranges for starting and quitting sports (Molinero, 2003). We think that the reasons for dropping out sports identified in the studies may reveal important data that may be effective in determining the reasons for quitting sports and the problems of adult athletes who have become national.

Table 3: The statistics and P values of the responses of the participants to the SQS as two groups; 24> and 24 ≤

	No		Yes		X ²	P
	≤24	>24	≤24	>24		
Preparing for exams	5(%8,2)	12(%19,7)	27(%44,3)	17(%27,9)	5,020	0,025
Increased competition stress	32(%52,5)	20(%32,8)	-	9(%14,8)	11,650	0,001
Excessive pressure to win	27(%44,3)	18(%29,5)	5(%8,2)	11(%18)	3,912	0,048
Stay apart from friends	21(%34,4)	26(%42,6)	11(%18)	3(%4,9)	4,968	0,026

When the answers to SQS questions are compared in terms of age of sport dropout; a statistically significant difference was found in one answer in the category of "sundry events" category, one answer in the category of "economic problems", also one answer in the both categories of "influence of persons" and "other effects" ($P < 0.05$).

DISCUSSION

There are several factors that have been cited as reasons for quitting sports (Molinero, 2003; Thomas, 2008). Training of elite athletes in all sports branches, especially Olympic sports, involves a very costly and labor-intensive process (Lan, 2019). Research and determination of the reasons for quitting sports, especially for athletes who have reached the level to compete in national categories, can contribute to the prevention of the factors that cause the players to quit the sport in their most productive periods (Salo, 2008). In our study, similar and different reasons with the literature were determined as the reason for quitting sports. We think that the reasons for this variable are based on society and economic differences.

In the study, as a national athlete in our country, we aimed to determine the reasons for swimmers to quit sports, and for this purpose, we asked them questions that could be divided into 7 main categories and presented as reasons

for quitting sports. Among these categories; individual reasons, training and competition environment, loss of motivation, economic reasons, impact of people, factors of failure and other causes. There are more than one sub-question in each category. While some of the data obtained are consistent with the literature surveys, some of them constitute the reasons that we think may vary between societies (Barber, 2009; Delorme, 2010).

Reasons for quitting sports may vary in various regions and cultures (Monteiro, 2017). The reason for this is the importance of the societies' views on sports. However, the reasons for quitting sports may vary among sports branches (Kanters, 2008; Dorsch, 2009). As it is known, the most popular sports are football and basketball. At the same time, this understanding of popularity may change due to inter-communal culture and life differences (Eime, 2016). For example; other sports such as baseball and ice hockey can find a wider audience in western societies. When we consider sports as a continuously developing industrial area, we see that occupational and economic concerns take the first place among the reasons for quitting sports (Cabane, 2015). As mentioned in the literature, besides being an Olympic branch, it can be said that the level of popularity in the society is directly proportional to the economic gain obtained from sports branch (Bond, 2001; Johnson, 2003). Swimming is not as popular as football, basketball, volleyball and motor sports in our country. This assumption can be reached from the public watched rates of the athletes. As an Olympic sport, swimming requires regular training for years in terms of physical and anatomical development.

In our study; considering the occupational status of the athletes, statistically significant differences were obtained in the answers given. When the participants were divided into students and other occupational groups, statistically significant differences were found in the “increasing competition stress” and “winning pressure” options in the training and competition environment category. In these two groups divided as students and other professions, the number of those who said “No” to the question of whether there is increasing competition stress as the reason for quitting sports was found to be higher in the group of students compared to other occupational groups. In the same way; Among the reasons for quitting sports, the number of those who answered “No” to the question of whether there is competition stress was determined to be less in the student group compared to other occupational groups. According to these results, increased stress in competitions was shown as the reason of quitting sports and there was a significant difference between students and other occupational groups. At the same time, there are differences in occupational/age criteria and difficulty categories that athletes specify.

Likewise, the extreme importance of gaining can be cited as one of the reasons that create a lot of stress for athletes. This pressure element faced by the athletes is again considered as an important factor in quitting the sport (Barbosa, 2011; Sánchez, 2019). In this context, among the questions we asked to the athletes, there were statistically significant differences between the answers given by students and other occupational groups to the question, “Is there any pressure to give excessive importance to winning?”. 6.6% (N=4) of the participants who showed the pressure against winning as the reason for quitting sports were students; 19.7% (N=12) is of athletes from other occupational groups. 42.6% (N=26) of those who said that there is no pressure against winning, were students and 31.1% (N=19) are athletes with other occupational groups.

In our study, it was observed that professions and ages had significant effects on the reasons for quitting sports. These reasons are manifested by a wide range of factors. In literature reviews; Considering the reasons for quitting sports and occupation, it has a significant effect in other studies (Ryska, 2002; Thomas, 2008). In the another study, on the reasons and rates of quitting sports among Norwegian athletes; it is stated that business environment, soldiering, marriage and family are effective factors in quitting sports (Enoksen, 2011). In another literature study; the effect of age on the reasons for quitting sports is emphasized. In the study conducted with a large group of participants, French basketball athletes in their research on the reasons for quitting sports according to age groups stated that starting sports at an early age is effective. In this study, the results obtained from 44.498 men and 30.147 women basketball players were interpreted. According to this, It is stated that age has important effects on quitting sports and effects of age criteria should be examined (Delorme, 2010).

There was no significant difference in the results of the questionnaire when gender was evaluated. As mentioned earlier, different societies show the reasons for quitting sports according to different factors göstermektedir (Sorrain et al., 2002). In another study on the reasons quitting sports of Spanish athletes; dislike coach, failure to achieve awareness and failure to form a team environment reported that effective. In the study, 269 male and 292 female athletes differed according to the participant gender and different answers were obtained according to the competition level. According to the results of the research; while male athletes stated that they were more affected by external factors than women and the reasons for quitting sports were shaped in this state, it was seen that women had a much more participatory structure (Molinero, 2003).

The data obtained from such studies include determinations on the problems experienced by professional athletes during their sporting activities and are also important for the measures to be taken in this regard. A detailed

determination of the reasons for quitting sport can provide a means of identifying the measures to be taken to prevent disruption of sporting activities, which are considered to be an industry.

CONCLUSION

It is an important question for our country and sport community that quit sport rather than to develop the high sports capabilities that the national swimmers are getting from a difficult path. As a result, the loss of competent athletes in the sport branch can bring economic and human losses. The identification of these talent losses and the SQS and the prevention of losses can contribute to the development of the sports branch and the acquisition of successful athletes. Adolescence is the most common age range for starting and quitting sports. We think that the reasons for quitting sport identified in such studies, the determination of the reasons for quitting sports among national athlete and the solution of the problems can reveal very important data. The training of elite athletes in all sports branches, especially Olympic sports, involves a very costly and labor-intensive process. In particular, investigating and determining the reasons for the dropout of athletes who have reached the level to compete in national categories may contribute to taking measures against the factors that cause athletes to stop sporting in their most productive periods.

REFERENCES

- Enoksen, E. (2011). Drop-out Rate and Drop-Out Reasons Among Promising Norwegian Track and Field Athletes. *Scandinavian Sport Studies*, 43.
- Bond WJ. (2001). The provision of sport psychology services during competition tours. In G. Tenenbaum (Ed) *The Practice of Sport Psychology*. Montganton: Fitnes International Technology Inc.217-230.
- Fredericson M, Gauvin J, Johnson JN. (2003). Swimming Biomechanics and Injury Prevention New Stroke Techniques and Medical Considerations, *The Physician And Sports Medicine*, January, 31:1
- Barbosa T M, Costa M J, Silva A J. (2011). ve diğ. Biomechanics Of Competitive Swimming Strokes, *Biomechanics İn Applications*, September,; ISBN 978-953- 307-969-1.
- Ryska, T.A., Hohensee, D. (2002). Participation Motives in Predicting Sport Dropout Among Australian Youth Gymnasts. *North American Journal of Psychology*,199.
- Sorrazin, P., Vallerand, R., Guillet, E., Pelletier, L., Cury, F. (2002). Motivation and Droupout in Female Handballers, a 21-month prospective study. *European Journal of Social Psychology*, 395.
- Thomas, J.F., Jean, C., Deakin, J. (2008). Exemining Adolescent Sport Droupout and Prolenged Engagement from a Developmental Perspective. *Journal of Applied Sport Psychology*, 318.
- Wall,M., Cote,T. (2007). Developmental Activities that Lead to Dropout and İvestment in Sport. *Physical Education and Sport Pedagogy*, Kingston, 20;77.
- Delorme, N., Chalabaev, A., Raspaud, M. (2010). Relative Age is Associated with Sport Dro-pout:Evidence from Youth Categories of French Basketball. *Scandinavian Journal of Medicine&Science Sports*, 10:9.
- Molinero,O. (2003). Dropout Reasons in Young Spanish Athletes. Relationship to Gender, lype of Sport and Level of Competition. *Journal of Sport Behavior*, 255.
- Pensgaard, A.M. & Duda, J.L. (2003). The interplay between emotions, coping, and the performance of Olympic-level athletes., *The Sport Psychologist*, 17, 253-267.
- Salo D., Riewald A.S. (2008). Complete Conditioning for Swimming, *Human Kinetics*, 6:198-199.
- Johnson J.N., Gauvin J., Fredericson M. (2003). Swimming Biomechanics and Injury Prevention New Stroke Techniques and Medical Considerations, *The Physician And Sports Medicine*, 31:1.
- Strzata M., Tyka A., Krezatek P. (2007). Physical Endurance and Swimming Technique in 400 Metre Front Crawl Race, *Journal of Human Kinetics*, 18:73,86.
- Huertas F, Ballester R. (2019). Gines HJ, Hamidi AK, Moratal C, Lupiáñez J., Relative Age Effect in the Sport Environment. Role of Physical Fitness and Cognitive Function in Youth Soccer Players. *Int J Environ Res Public Health*. 8;16(16).

- Pehlivan Z. (2013). The Reason of Dropout and Continuation to Sports of The Participant of Interscholls sports Com-petitions” Hacettepe Journal of Sport Sciences, 24-3, 209-225.
- Corliss N. Bean, Michelle Fortier, Courtney Post, Karam Chima. (2014). Understanding How Organized Youth Sport May Be Harming Individual Players within the Family Unit: A Literature Review, *Int J Environ Res Public Health*. 11(10): 10226–10268.
- Kanters M., Bocarro J., Casper J. (2008). Supported or pressured? An examination of agreement among parents and children on parent's role in youth sports., *J. Sport Behav*. 31:64–80.
- Dorsch T.E., Smith A.L. (2009). McDonough M.H., Parents’ perceptions of child-to-parent socialization in organized youth sport., *J. Sport Exercise Psychol*. 31:444–468.
- Barber H., Sukhi H., White S.A. (1999). Competitive anxiety in youth sport participants., *J. Sport Behav*. 22:1–10.
- Graham R, Rivara FP, Ford MA. (2013). Spicer CM, Institute of Medicine Sports-Related Concussions in Youth: Improving the Science, Changing the Culture., Institute of Medicine; Washington, DC, USA.
- Kutcher J.S., McCrory P. (2013). Davis G., Ptito A., Meeuwisse W.H., Broglio S.P., What evidence exists for new strategies or technologies in the diagnosis of sports concussion and assessment of recovery?, *Brit. J. Sport. Med*. 47:299–303.
- Gould D.R., Carson S. (2008). Life skills development through sport: Current status and future directions. *Int. Rev. Sport Excer. Psychol*. 1:58–78.
- Katrijn Opstoel, Johan Pion, Marije Elferink-Gemser, Esther Hartman, Bas Willemse, Renaat Philippaerts, Chris Visscher, Matthieu Lenoir. (2015). Anthropometric Characteristics, Physical Fitness and Motor Coordination of 9 to 11 Year Old Children Participating in a Wide Range of Sports, *PLoS One*. 10(5).
- Ulrich Georg Strauch, Hagen Wäsche, Darko Jekauc. (2019). Coach Competences to Induce Positive Affective Reactions in Sport and Exercise-A Qualitative Study., *Sports (Basel)*. Jan; 7(1): 16.
- Diogo Monteiro, Luis Cid, Daniel Almeida Marinho, João Moutão, Anabela Vitorino, Teresa Bento. (2017). Determinants and Reasons for Dropout in Swimming-Systematic Review, *Sports (Basel)*. Sep; 5(3): 50.
- Qing Lan, Chunxiang Liu, Shuang Ling. (2019). Research on Measurement of Symbiosis Degree Between National Fitness and the Sports Industry from the Perspective of Collaborative Development, *Int J Environ Res Public Health*. 16(12): 2191.
- M. Alison Brooks, Eric G. Post, Stephanie M. (2018). Trigsted, Daniel A. Schaefer, Daniel M. Wichman, Andrew M. Watson, Timothy A. McGuine, David R. Bell, Knowledge, Attitudes, and Beliefs of Youth Club Athletes Toward Sport Specialization and Sport Participation, *Orthop J Sports Med*. 6(5).
- Abdul-Rahman Hassan, Michael Huen Sum Lam, Susanna Ku, William Ho Cheung Li, Ka Yiu Lee, Eva Ho, Stuart W. Flint, Anthony Siu Wo Wong. (2017). The reasons of dropout of sport in Hong Kong school athletes, *Health Psychol Res*. 16; 5(1): 6766.
- Małgorzata Bronikowska, Agata Korcz, Jana Krzysztozek, Michał Bronikowski. (2019). How Years of Sport Training Influence the Level of Moral Competences of Physical Education and Sport Students, *Biomed Res Int.*; 4313451.
- Stewart A Vella, Dylan P Cliff, Anthony D Okely. (2014). Socio-ecological predictors of participation and dropout in organised sports during childhood, *Int J Behav Nutr Phys Act*. 11: 62.
- Rochelle M. Eime, Jack T. Harvey, Melanie J. Charity, Meghan M. Casey, Hans Westerbeek, Warren R. Payne. (2016). Age profiles of sport participants, *BMC Sports Sci Med Rehabil*. 8: 6.
- Charlotte Cabane, Andrew E. Clark. (2015). Childhood Sporting Activities and Adult Labour-Market Outcomes, *Ann Econ Stat*. 119-120: 123–148.
- Manuel Castro-Sánchez, Félix Zurita-Ortega, José Luis Ubago-Jiménez, Gabriel González-Valero, Eduardo García-Mármo, Ramón Chacón-Cuberos. (2019). Relationships between Anxiety, Emotional Intelligence, and Motivational Climate among Adolescent Football Players, *Sports (Basel)*. 7(2): 34.

LIFE-SAVING TECHNOLOGIES IN THE MOUNTAINS – THE ISSUE OF MODERN SOLUTIONS AND EDUCATION OF THE SOCIETY

Barbara Kaczmarczyk

General Tadeusz Kościuszko Military University of Land Forces

barbara.kaczmarczyk@awl.edu.pl

Andrzej Demkowicz

General Tadeusz Kościuszko Military University of Land Forces

andrzej.demkowicz@awl.edu.pl

INTRODUCTION

According to statistical data, more and more tourists visit the mountains every year. As a result, an increasing number of accidents are recorded. It should be indicated that this is due to numerous causes, therefore the authors undertook the effort to solve the research problem, which is the answer to the question: To what extent and how can technologies support the work of rescuers, whose task is to save human life and health?

LAND CHARACTERISTICS

Consideration should start with the characteristics of the land where life-saving and health-enhancing technologies are used. The region of the Karkonosze Mountains on the Polish side of the border with the Czech Republic attracts over 2 million tourists every year. The Karkonosze Mountains are of alpine character which is featured by a high altitude with high rainfall, high temperature fluctuations and violent winds, where the weather conditions change rapidly and often surprisingly for unprepared and unaware tourists. The Karkonoski Park Narodowy (KPN), which covers most of the Karkonosze Mountains, has been visited in 2015 by – 733,703 tourists, in 2016 – 852,972, 2017 – 839,673, 2018 – 949,534 (Data obtained from Karkonoski Park Narodowy (Eng. the Karkonosze National Park) on the basis of sold entrance tickets). Since 2016, there has been a significant increase in visits to KPN, which is probably related to the government's social programme supporting families. The area of KPN includes over 100 km of tourist trails, including bicycle and horse riding trails. The sleeping accommodations consists of 10 mountain hostels and several huts (Protection plan for Karkonoski Park Narodowy with the seat in the Jelenia Góra and part of the special area of conservation of Karkonosze habitats (area code: plh020006), part of the special area of conservation of Stawy Sobieszowskie (area code: plh020044) and part of the special protection area of Karkonosze birds (area code: plb020007) covering the borders of the park). It is the largest number of hostels located in the national park in Poland.

When analysing the tourist traffic in individual national parks, the density of tourist trails should be considered, measured as a quotient of the length of tourist trails and the total area of the national park. For KPN it amounted to 2.107 2,108 in 2016-2012 and 2,115 from 2014 onwards. In order to measure the tourist traffic in national parks, the so-called tourist traffic intensity index is used, which is a quotient of the number of tourists and the length of tourist trails. This index for the Karkonoski Park Narodowy in the years 2006-2012 amounted to 17,007 persons per km, whereas in 2013 it was lower and amounted to 16,949 persons per km (Wąsik, 2017, p. 134-135). Despite the increase in the number of tourists in national parks observed every year, the index had a decreasing tendency for the Karkonoski Park Narodowy which is related to the development of the network of tourist trails.

However, given the index representing the number of tourists per 1 ha of the park, it should be noted that its highest values were also recorded in the Karkonoski Park Narodowy (358 persons per 1 ha). The above indexes indirectly indicate potential conditions for accidents related to excessive number of tourists staying on the tourist

trail at the same time, which has a direct impact on the need to ensure safety in this area(Nitkiewicz-Jankowska, 2012, p. 519-520).

Among the visitors to the Karkonosze at the beginning of the 21st century, who planned to stay there for leisure (62% of the total number of respondents), the most preferred was to stay in the area for four days (25%) and three days (22%), most often during the so-called long weekends and holidays. A one-day visit represents only 19% of tourists, mainly from nearby towns. Among 38% of respondents who planned their stay in weeks, they planned it mainly during the holiday season. The majority of respondents are people with secondary education (52%). Higher education is held by 41% of respondents, while only 7% of tourists have a basic and vocational education. Thus, people visiting mountains should have perceptions of potential threats in the mountains and the ability to predict them (Wieniawska, 2003, p. 537-544)

Among those who came to the Karkonosze Mountains, a 3-day stay in the Karkonosze dominated, of which 37% – 3–4 days, and 30% – longer than 4 days. Two-day stay prevailed among 25 percent of respondents, and every tenth tourist declared a one-day stay without accommodation. The most frequently mentioned attractions in the vicinity of Karpacz and Szklarska Poreba were at the same time the most popular facilities and places located in the top parts of the mountains. For Karpacz, 90% of respondents indicated Śnieżka – the highest point of the Karkonosze Mountains (Rogowski, 2015. p. 155-156). In 2015, 458,576 entries to Śnieżka and 852,325 crossings were recorded, interpreted as the actual tourist traffic load. The highest load (56%) occurred during the summer (480,008), lower (20%) during the spring (173,839) and autumn (16%; 140,013), while the lowest (7%) during the winter (58,465). In May, the highest maximum number of daily entrances was observed, amounting to about 7,000, which is a result of the long weekend in May (national holidays). Assuming that entries took place only during the day, an average number of entries of 464 persons per hour and about 8 persons per minute can be identified (Rogowski, 2018, p. 110-115). There is no doubt that the Karkonosze Mountains are mountains that are frequently visited by tourists. It is usually a short 2-3-day break in mountain resorts, which aim is to quickly reach the highest parts of the mountains (Śnieżka, Śnieżne Kotły) without any special training or equipment. This is usually done by using a ski lift to save time. The misleading height of the mountains, easy access, the desire to quickly gain attractive points located in the highest parts of the mountains under the pressure of a short stay and lack of knowledge about the variability of weather conditions cause that the seemingly easy and pleasant trip turns into a rescue operation.

In the years 2013 – 2018 the number of rescue incidents of the Karkonosze Mountain Volunteer Rescue Service increased significantly from 381 to 515. GPR operation statistics do not include ski accidents in organized ski areas. The most common causes of calling the rescue services in the Karkonosze Mountains include confusion caused by exhaustion, limb injuries (sprains, dislocations, frostbite), injuries during sports and recreation activities, diseases (cardiological problems, diabetes), viper bites, heatstroke or hypothermia (Information obtained during the interview with Karkonosze Mountain Volunteer Search and Rescue (GPR)).

Table. Data concerning rescue intervention in the Karkonosze Mountains.

Year	Number of rescue incidents	Number of operations and search expeditions	Fatal accidents
2013	381	330	1
2014	242	200	3
2015	413	318	2
2016	473	372	-
2017	529	461	4
2018	515	457	5

Source: Statistical data obtained from the Karkonosze Mountain Volunteer Search and Rescue (GOPR).

CASE STUDY

On 10 June 2015 at 12:49 a.m. a rescuer on duty in the GOPR Headquarters in Jelenia Góra received a report about an incident in the area of an radio mast on the top of the Śnieżne Kotły. From the interview conducted by the rescuer who was a dispatcher, the injured person was a thirteen-year-old German citizen, who had a significant cardiologic disorder and felt strong dyspnoea. Two rescue teams were dispatched to the scene of the event. One by road and the other by air, using a Police helicopter, which at that time was operating in this area. Due to the deteriorating condition of the injured person, the Medical Air Rescue team (Lotnicze Pogotowie Ratunkowe LPR)– HEMS from Wrocław was also to the scene of the event. About 20 minutes after the call, the first rescue team arrived at the place. The team dismounted from the helicopter and secured the victim until the arrival of the LPR-HEMS specialist rescue helicopter.

On 06 June 2015 at 3:47 pm GOPR Headquarters in Jelenia Góra received a report of an accident on the green trail between Mokre Rozdroże and Śnieżne Kotły. The GOPR Rescue Team from Szklarska Poreba went to the scene of the event. Due to the difficult mountain terrain, the HEMS-LPR helicopter was deployed. The second rescue team started to prepare the helicopter at the airport for the evacuation operations using rope techniques. After arriving at the scene of the event, the rescuers provided qualified first aid and prepared the injured person for evacuation on stretchers, which after 8 minutes was undertaken by the helicopter of the Medical Air Rescue using a climbing technique of the so-called long rope. Then, the injured person was transported by helicopter to the hospital in Jelenia Góra.

On 12 March 2016, in the evening hours, GOPR rescuers conducted search and rescue operations for two tourists on the Czarny Grzbiet at the foot of Śnieżka Mountain. The tourists, using navigation in their mobile phones, turned off the trail and lost their way on the main ridge of the Karkonosze Mountains. After dark, the rescuers managed to precisely trace them using the "Ratunek" (Rescue) application in their mobile phones and get them back safely from the mountains using telephone communication. 20 GOPR rescuers were involved in the operation, which took 5 hours.

THE RATUNEK APPLICATION – NEW TECHNOLOGY (NEW SOLUTIONS)

For a few years now, an increased intensity of people staying in the Polish mountains has been observed. The statistics show there is also more and more accidents in the mountains. This is due to many reasons, but mainly to a lack of knowledge about the mountains in which tourists are staying and a lack of skills needed for mountain

trips. If a negative event or accident occurs, the most important thing is to provide information about where the injured person is and what happened. On this basis, the rescuers will know what kind of forces and resources are needed to help the injured persons. According to expert reports (TOPR (Tatra Volunteer Search and Rescue) and GOPR rescuers) it often happens that tourists do not have the sense of direction, do not know how to assess the risk with changing weather, do not know how to behave in an emergency situation, are not properly prepared for hiking in the mountains. It should also be noted that tourists usually know the emergency number for emergency services in the mountains, however, the problem lies in the accuracy of information transmission. Due to the fact that many cases of incompetent transmission of information have been reported, particularly concerning incorrect locations, measures have been taken to eliminate such problems. It was necessary to find out what needs to be done to change the current state of the situation. Of course, the basic issue is to educate the society, however, it is a necessary but long process. Therefore, a technological solution has been developed in order to support the identification of the injured person's location. This solution is the RATUNEK application, which has been positively assessed by GOPR and TOPR and has become a part of the rescue system used by the above-mentioned services.

This application is free of charge, very easy to use and, above all, increases safety in the mountains. This solution increases the safety of people in the mountains. The design of this tool is well thought-out and eliminates many problems that may occur when using the emergency notification system operating in Poland. The above issues will be discussed later in this article. Consideration should begin with an answer to the question: Why is it worth to have the application installed in your phone?

The most important reason is the possibility of a quick and accurate location of the injured person. The application is integrated with the emergency number. Operating this tool consists of selecting the application on your phone, then selecting the "MOUNTAIN" option and pressing it 3 times. The question arises: *Why 3 times?* It is protection against uncontrolled selection of the application, which prevents blocking of the emergency line. Mobile phone companies do not offer such protection, which leads to the situation where around 40% of 112 calls are not related to any emergency, but for example constitute the so called "dead calls". As a consequence, the emergency line is blocked, which unreasonably burdens the rescue notification system, and thus reduces the level of rapid response of rescue teams. Another important issue concerning the application is the fact that after selecting the "MOUNTAIN" option 3 times, the phone sends data about the location of the caller with the accuracy of 3 meters. There is no need for verbal contact, the location is provided by a text message. If the injured person cannot make verbal contact, then it is possible to make contact by text message. In the field research conducted in the mountains, it was observed that the location is given with an accuracy of a few metres, which, according to experts, is sufficient to quickly find the person sending the message.

The application is available in Polish mountains (from the Sudetes to the Bieszczady Mountains), it also works in border areas provided that the phone is roaming mode. If a person uses roaming while staying on the territory of the Republic of Poland and calls for help by means of an application, the help will be provided by the Polish rescue services, and if the person is staying on the territory of a neighboring country, then the rescuers of the neighboring country will forward the notification to the Polish rescuers. Consideration should also be given to the situation where there will be no reception or the reception will be impaired, then the phone will still try to send the message. It should be remembered, however, that the rescue operation will be started when a conversation or communication takes place via text message exchange. The prerequisite for the operation of the application is to

enable GPS, which will be asked by the system every time. It is also worth remembering to charge the battery before going to the mountains, which is a necessary and basic condition for the Ratunek application to work and, consequently, to increase the safety in the mountains. If a connection is made, a text message is sent to the rescuers with the following information: location (coordinates), percentage of battery charge, medical record book.

A medical record book allows you to include all the important information that a medical rescue worker should know. It significantly shortens the time of interviewing the injured person or, in case of lack of verbal capabilities, provides the rescuers with information. Only medical rescue workers know the data included in the medical record book, at the moment of connection.

The application can be installed on mobile phones. Every tourist should ensure that their phone is equipped with this application. However, if it happens that the tourist does not have the Ratunek application installed in their phone, it is possible to install it in the mountains. Often when GOPR and TOPR rescuers cannot obtain information from the injured person regarding their location, they send them a link to download the Ratunek application via text message and ask for its installation. One of the most important issues is the fact that the downloaded file is small in size so that despite the low battery and low temperatures it is possible to download and install it within a few minutes. According to information from mountain rescuers, they quite frequently send a link to the injured person, who download the file without any problems and install it on their mobile phone. Then, just as often, they manage to help them get off the mountain without sending a rescue team into the field. The rescuers know the mountains area very well. If they also know the exact location of the injured person, which is possible with the help of the Ratunek application, in principle, numerous operations of this type are successful. This is also possible because the Ratunek application allows for tracking people who are moving and who are being escorted from the mountains. Experts rate this type of technological support very high.

So far, the considerations have been carried out in relation to the group of healthy people. The Ratunek application also provides assistance for deaf people. Experts say, however, that usually when people with disabilities walk in the mountains, are usually accompanied by carers. However, this does not change the fact that it is also necessary to provide for a situation where a person with disabilities can receive help, e.g. the carer will not be able to call for help for various reasons.

In conclusion, the Ratunek application is an application that solves various problems appearing in the mountains. It made it possible to provide help to many injured persons in a short time by telephone. It provided an additional opportunity to dispose of GOPR or TOPR forces and resources. The features offered by the Ratunek application include: quick localization with an accuracy of 3m, knowledge about the injured person (medical record book), maintaining constant contact with the injured person, information about the battery status, sending text messages to the injured person, sending a link to download the application via text message.

EDUCATION OF THE SOCIETY

Behavioral education in the mountains is not provided in schools within the developed curriculum. Education in this field is provided by the Mountain Volunteer Search and Rescue. It is implemented in different age groups and at different levels of advancement. With regard to children, GOPR rescuers provide knowledge about safety in the mountains through talks with elements of short exercises. However, such classes take place at the request of the headmasters of educational institutions or class teachers. In most cases, children living in mountain areas are the main beneficiaries of these activities. It should be emphasized that there is a great interest in this type of issues in these regions. The situation is different with regard to children who live further away from the mountains. There

is little interest in education in this area. This may be due to many reasons, one of them may be e.g. distance, lack of access to the GOPR headquarters, lack of possibility for rescuers to come to school, lack of willingness to conduct classes in this area. In the opinion of experts, the issues of mountain behavior should be taught in primary school. Every child should have knowledge of how to prepare for mountain walking and how to behave in an emergency situation. As statistical data and various cases show, people from all regions of Poland, including children, travel to the mountains. It should therefore be recognized that the mountains are not an area exploited only by tourists living around them.

Therefore, it is important to know what can save lives in the mountains, including: weather, equipment, clothing, food and drink, map, reason in the mountains. An important skill is also field orientation and technological support in the form of the Ratunek application. With regard to the latter element, it should be noted that there are many promotional campaigns for this application, yet it still cannot be said that it is widely known among tourists who often spend their holidays in the mountains.

CONCLUSIONS

In the conclusion of the content of the article it should be noted that safety in the mountains depends primarily on the skills of behavior in the mountains. This skill consists of knowledge and experience. Despite the above, it is also important to have applications that help to navigate the place where the tourist (injured person) is located. Such an application, which is accepted by the services providing aid in the mountains, is the Ratunek application. Mountain and Tatra Volunteer Search and Rescue rescuers after five years of using it assess it as very helpful in saving lives and human health.

REFERENCES

- Barski M., Wyprawa ratunkowa w rejonie Śnieżnych Kotłów, www.gopr.org/news/kronika accessed on 13 June 2019.
- Dejnarowicz M., Wypadek turystyczny na zielonym szlaku w rejonie Śnieżnych Kotłów, www.gopr.org/news/kronika accessed on 13 June 2019.
- <https://bip.kpnmb.pl/public> accessed on 13 June 2019
- Kaczmarczyk B., Bezpieczeństwo i zagrożenia w teorii oraz praktyce, SA PSP, Kraków 2014.
- Nitkiewicz-Jankowska A., *Oferta turystyczna parków narodowych jako ważny czynnik rozwoju krajowego ruchu turystycznego*, Ekonomiczne Problemy Usług, nr 84, 2012.
- Rogowski M., *Czasoprzestrzenny rozkład ruchu turystycznego na szczycie Śnieżki w 2015 roku*, Prace Geograficzne, nr 154, 2018, Wydawnictwo Uniwersytetu Jagiellońskiego.
- Rogowski M., *Preferencje turystów w polskich Karkonoszach jako podstawa tworzenia produktu turystycznego obszaru* in Rozprawy Naukowe Akademii Wychowania Fizycznego we Wrocławiu 2015.
- Wąsik Ż., *Developement of tourism in national parks in the years 2006–2015*, Zeszyty Naukowe. Turystyka i Rekreacja, 2017.
- Wieniawska B., *Socjologiczna analiza ruchu turystycznego na terenie Karkonoskiego Parku Narodowego*, In: Śtursa J., Mazurskik. R., Paluckia. & Potocka J. (eds.), *Geoeekologiccképroblémy Krkonoš. Sborn. Mez. Věd. Konf.*, November 2003, Szklarska Poręba. Opera Corcontica.
- Wójcik J., *Akcja GOPR-u w Karkonoszach. 7 osób uratowanych w rejonie Śnieżki*, <https://gazetawroclawska.pl/> accessed on 13 June 2019.

MATHEMATICAL MODELING OF PARABOLAS: EXAMPLES FROM ARCHITECTS

Tuba ADA,
Anadolu Üniversitesi,
tyuzugul@anadolu.edu.tr

Aytaç KURTULUŞ,
Eskişehir Osmangazi Üniversitesi,
agunaydi@ogu.edu.tr

ABSTRACT

Conic sections are curves with a cone and a plane intersection. These curves can be seen many places in daily life. One of these curves is parabola curve. The most common uses of these curves in real life is architecture. In this study, mathematical modeling studies in architectural works were carried out in the analytical examination of the parabola concept to the secondary school mathematics teacher candidates. The purpose of this application is to enable individuals to learn what they have learned in different situations, to understand and interpret the modeling process, and to manage the process. At the end of the subject narration to the teacher candidates, it was asked to examine the construction of an architecture containing parabolas, to find their equations and to create a model. In this process, researchers worked as guides. With the evaluations made in this process, it was ensured that the existing deficiencies and misconceptions of the students were identified and eliminated and effective learning was realized. During the course of the application, it was observed that students use active mental abilities such as inquiry, creativity, problem solving, active and in-depth participation.

INTRODUCTION

Geometric curves and shapes can be seen in everyday life. These shapes are often regular or irregular, convex or concave polygons, as well as various curves. The best known geometric curves are the conic section curves obtained section from a plane of a double cone (Leapard & Caniglia, 2005; Duren, 1997). One of these curves is parabola curve (see Figure1).

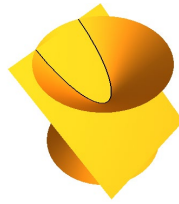


Figure 1. The intersection of a plane with a double cone is parabola

The most common uses of the parabola in real life is architecture. When the architectural structures are examined, parabola curve is used in both historical buildings and modern buildings. In Figure1, Çifte Bridge in Artvin, Turkey built in 18th century. These bridges are still used.



Figure 2. Historical bridges with parabola curve

In Figure 3, eco building in Kent, England can be given as an example of a modern building with a parabola curve modern building.



Figure 3. Modern building with parabola curve

According to Ada, Kurtuluş & Yanik (2015, p. 282), the real life activities provided the student with the opportunity to observe and practise the concept of a parabola in Euclidean geometry. In this study, mathematical modeling studies in architectural works were carried out in the analytical examination of the parabola concept to the secondary school mathematics teacher candidates.

METHODOLOGY

The purpose of this study is to enable individuals to learn what they have learned in different situations, to understand and interpret the modeling process, and to control the process. At the end of the subject to the teacher candidates, it was asked to examine the construction of an architecture containing parabolas, to find their equations and to create a model. In this process, researchers worked as guides. This study is a qualitative case study that examines the process of mathematical modeling of parabola with artistic examples from architecture in analytical analysis of parabola. Qualitative research results do not describe a specific situation and make generalizations (Büyüköztürk et al., 2013).

Participants

Purposeful sampling method was used to determine the study group. In the purposeful sampling, depending on the purpose of the study, it was aimed to conduct in-depth research by selecting participants at different levels in terms of information-rich knowledge level. For this purpose, 15 prospective teachers who took Analytical Geometry I course in elementary mathematics teaching program in a public university were studied.

Application process

The application process of the study consists of four stages (see Figure 4). In the first stage, the subject of analytical examination of the parabola was given to the prospective teachers together with the examples in the textbook depending on the course content of Analytical Geometry. Secondly, mathematical modeling of parabola with artistic examples from architecture was conducted to evaluate prospective teachers at the end of the subject. The aim of the activity is to determine the learning deficiencies of the prospective teachers in the analytical examination of the parabola. In the third stage, the problems and solutions that the participants create mathematical modeling of parabola with artistic examples from the architecture were analyzed. Finally, as a result of the analysis, the learning deficiencies of the participants were identified and shared with them.

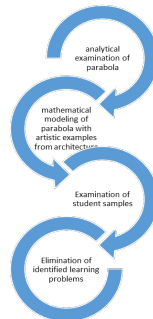


Figure 4. The application process

In this section, examples of mathematical modeling of parabolas in architecture created by prospective teachers were given with direct quotations. In Figure 4 was given model of the participant with code 1.

FINDINGS

When the problems and solutions that the participants create mathematical modeling of parabola with artistic

examples from the architecture were analyzed, findings are presented under the headings “Content of problems posed by students” and “Content of the architectural structure chosen by the students” (see Table1 and Table 2).

Table 1: Content of problems posed by students

Content of problems	Participants	Frequency(f)
Determination of the status of three different parabola	2, 5, 7, 10, 12	5
Forming the equation by determining the cutting points of the axes in the coordinate system of the parabola	1, 4, 9	3
Writing the equation by using the positions of the parabola in the image in the coordinate system and the determined peak point	3, 6, 8, 11	4
Determination of equations of non-intersecting parabola	2, 9, 12, 14, 15	5
Using a centralyl parabola	1, 2, 4, 6, 8, 9, 11, 12, 13, 14, 15	11
Using a non-centralyl parabola	3, 5, 7, 10	4

In Table 1, 6 themes were identified when the problems posed by the students were examined. Eleven of the participants used centralyl parabola and 4 of them used non-centralyl parabola. While five of participants identified 3 different parabola, others have posed problems involving only one or two parabola.

Table 2: Content of the architectural structure chosen by the students

Content of architectural structure	Participants	Frequency(f)
Considering the infinite curve in finite case	1, 3, 6, 8,13	5
3-dimensional shape selection	2, 3,7,10,11,12,14,15	8
Boundary curve of 3D object on paper	1, 2, 3, 4, 7,8, 9, 11,12,13, 14, 15	12
Two-dimensional curve selection of the shape	4, 5	2

In Table 2, four themes were identified when the architectural structure chosen by the students were examined. 12 of the participants received boundary curve of 3D object on paper. 8 of the participants selected the 3-dimensional shape and 2 of them selected two-dimensional curve of the shape.

In this section, examples of mathematical modeling of parabolas in architecture created by prospective teachers were given with direct quotations. In Figure 5 was given model of the participant with code 1.

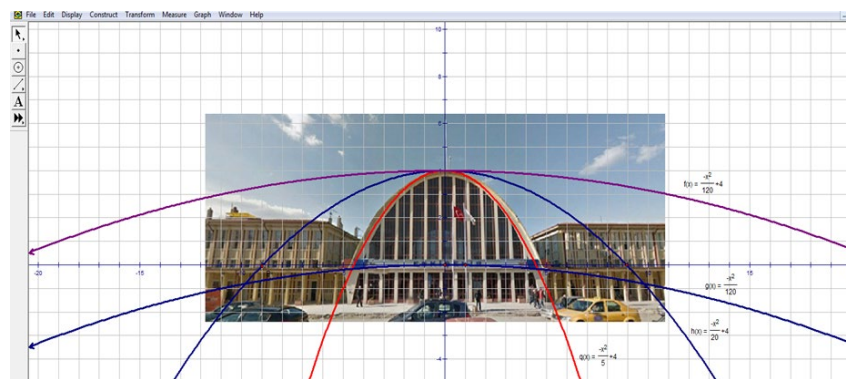


Figure 5. Model of the participant with code 1

In Figure 5 photography, Eskişehir Station is the main train station in Eskişehir, Turkey. It was built in 1955. This built photography has only one parabola. Using parabola modeling and using a dynamic geometry program to create this model in Figure 5, he/she has been able to reach the correct parabola model and equation by

drawing parabolas with different equations. The way the red parabola and its corresponding equation is the right mathematical model for this example. In this example, he/she has been selected boundary curve of 3D object on paper.

In Figure 6 was given model of the participant with code 2.

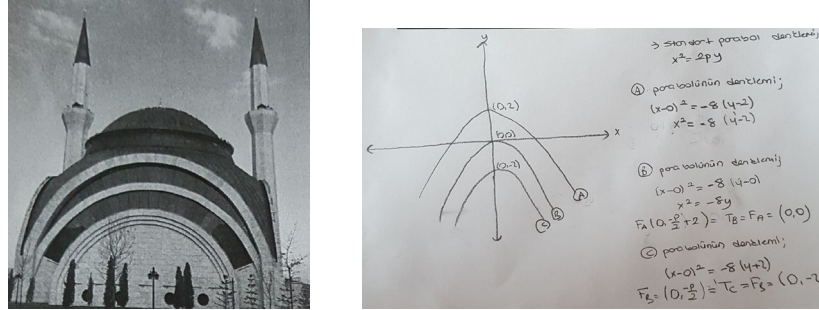


Figure 6. (a) Mosque with parabola columns, (b) Model of the participant with code 2

In the sample building, two of the parabola columns are intersect and the two are at equal distances (see figure 6(a)). The participant with code 2 modeled three parabola columns equal to each other in the mathematical model and did not fully reflect the actual situation in the building. The participant model was drawn by hand in the coordinate system and found the equations corresponding to three parabola in Figure 6(b)). In this example, he/she has been determined of the status of three different parabola.

In Figure 7 was given model of the participant with code 3.



Figure 7. (a)Istanbul Airport with parabola ceiling, (b) Model of the participant with code 3

In the Istanbul airport building has numerous of the parabola on the ceiling. These parabolas are not intersect (see figure 7(a)). The participant 3 correctly modeled these parabolas in the mathematical model and did fully reflect the actual situation in the building. The participant model was drawn by using dynamic computer software in the coordinate system and found the equations corresponding to these parabola in Figure 7(b)). In this example, he/she has been written the equation by using the positions of the parabola in the image in the coordinate system and the determined peak point.

In Figure 8 was given model of the participant with code 7.

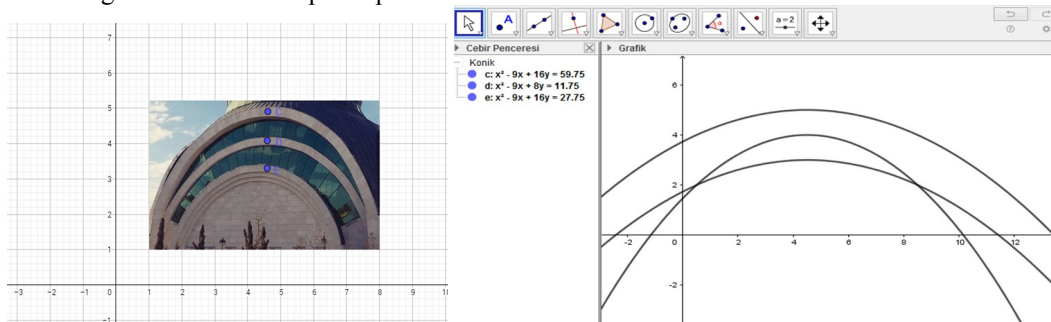


Figure 8. (a) Mosque with parabola columns, (b) Solution of the participant with code 7

The student with code 7 has posed his problem “*The parabola with corner points $C(9/2, 5)$, $D(9/2, 4)$ and $E(9/2, 3)$ are given as $y = 9$, $y = 6$ and $y = 7$ respectively. Based on this information, find the parabola equations and foci respectively. Place their focus in the picture.*” using the visual (see Figure 8(a)). The participant model was drawn by using dynamic computer software in the coordinate system and found the equations corresponding to these parabola in Figure 8(b). In this example, he/she has been determined of the status of three different parabola and used boundary curve of 3D object on paper.

In Figure 9 was given model of the participant with code 5.



Figure 9. Model of the participant with code 5

In Figure 9, the photography has only one non-central parabola. The participant model was drawn by using parabola modeling and using a dynamic geometry program to create this model in Figure 9. The way the red parabola and its corresponding equation is the right mathematical model for this example. In this example, he/she has been selected two-dimensional curve.

CONCLUSIONS

The results obtained from the findings of the studies conducted in order to determine the learning deficiencies of the participants in the analytical study of the parabola can be summarized as follows; Pre-service teachers created the graphics by placing the parabola or parabolas in the architectural structure in the coordinate system. It has been observed that the pre-service teachers do not take into account their status in relation to each other in more than one parabola in the selected architectural structures.

By using dynamic geometry software, it is ensured that the equations of these parabola do not reflect the situation in the visual of their choice. In this case, they were able to determine what they should pay attention to by examining the correct equations.

Half of the pre-service teachers used the geometry software to find the equations of the parabola or parabola in the architectural structure and to check the accuracy of the program by drawing all the graphs. The other half has been a tool for them to see the correct graphs and correct their errors by writing the equations they have determined in order to see their errors in the dynamic program.

REFERENCES

- Ada, T., Kurtuluş A. & Yanık, H.B., (2015). Developing the concept of a parabola in Taxicab geometry, *International Journal of Mathematical Education in Science and Technology*, 46:2, 264-283
- Büyüköztürk, Ş. (2003). *Sosyal Bilimler için Veri Analizi El Kitabı*, Pegem Akademi Yayıncılık, Ankara.
- Duren, P. E. (1997). Bridging the gap between algebra and geometry—using graphing utilities to teach conic sections. *Learning & Leading With Technology*, 24,34-38.
- Leapard, B. B., & Caniglia, J. C. (2005). Conic Sections: Draw It, Write It, Do It. *Mathematics Teacher*, 99(3), 152-155.

MISSION AND VISION ANALYSIS IN THE DETERMINATION OF NEW TRENDS IN DISTANCE EDUCATION: EADTU AND AAOU EXAMPLE

Seçil KAYA GÜLEN

Open Education Faculty, Anadolu University, Turkey

secilk@anadolu.edu.tr

ABSTRACT

International partnerships and unions are becoming increasingly important as they provide a convenient environment for close monitoring and rapid dissemination of developments. This situation is also valid for the field of distance education. The institutions which want to follow the developments in the field of distance education and which are open to international collaborations are becoming members of these associations. The starting point of membership in these associations is shared values and targets, and these values are often included in the vision and mission statements. In this research, the vision and mission statements of AAOU and EADTU member universities were analyzed and it is aimed to examine current trends in distance education. Vision and mission statements are valuable to observe and analyze educational trends. Comparison of similar research results related to vision and mission statements gives insight about the changes in educational trends. So this research is also important in terms of providing comprehensive data to similar studies. Similarities and differences related to the point of view of AAOU and EADTU universities are also presented. A total number of 64 universities, 40 of which were from AAOU and 24 from EADTU, were included in the sample group. In this study, which was designed in descriptive research model, the data were analyzed by using the content analysis method (Nvivo 12). Mission and vision statements found on the websites were scanned, grouped under certain themes and concept maps were created; then frequencies were determined. The comparison of the elements emphasized in the vision and mission statements of the two organizations was realized by the word clouds.

VISION AND MISSION IN EDUCATION AND INTERNATIONALIZATION

In today's competitive environment, institutions, that want to preserve their presence and improve their position, emphasize the importance of meeting requirements for strategic management. The increasing importance of strategic management has led to gain popularity of vision and mission statements as well as being one of the topics frequently studied. Many studies have been carried out in different dimensions related to vision and mission concepts. Although there are different reasons why the mission and vision are popular and on the agenda; perhaps the most important one is that the mission and vision explain simple but very critical questions for the organization like “Why are we here?”, “What is our purpose?”, “What are we trying to achieve?”. These questions can be considered as the beginning of all strategic intentions and activities.

The word vision which is used intensively in management literature and comes from French is based on the Latin word “visio (opinion, sight)”. It has been defined as “forward vision, ideal and righteousness” by the Turkish Language Association (<http://www.tdk.gov.tr>). Lucas (1998) sees the vision as “an organizational manifesto of fundamental values and principles” and “the source of our priorities, plans and objectives”. On the other hand, the mission is expressed as a long-term task or purpose for distinguishing the organization from its competitors (Doğan, 2002). It is defined in summary with the words “task and purpose” (<http://www.tdk.gov.tr>).

Visions and mission statements are distinguished by their focus and purpose. Vision statements focus on the destination—where the organization aims to go—whereas mission statements focus on the journey—how the organization moves forward to reach that vision. Vision statements are the impetus for mission statements and they therefore guide policy, practice, decisions, and operations (Rozycki, 2004). Similarly, Bowen (2018) mentioned that vision and mission statements are both based on the core ethical values of an organization and are essential to its success because they give it direction. Vision statements drive the long-term goals that determine where the organization would eventually like to be in the competitive landscape. Mission statements are more concrete and specific to an organization's competitive advantage, and are used to prioritize activities. Furthermore, Anthony (2012: 389) emphasizes that the statements of vision and mission have a role to accelerate the activities of organizations.

Educational institutions, which are considered as a social entity and provide services in a wide perspective, need to express their vision and missions as well as organizations operating in other sectors. Although they aim to meet human needs such as other businesses; they distinguish from other businesses in terms of qualitative characteristics (Ocak and Karabulut, 2017). They are based on the training qualified individuals and the progress increasingly depends upon these educated minds/individuals. As UNESCO (2002) mentioned, education is the most effective means that society possesses for confronting the challenges of the future and education will shape the world of tomorrow. So all these make the role of the vision and mission statements more critical in educational perspective. The existence of such statements has been identified as an important factor for creating effective educational institutions that positively contribute to learning outcomes. Institutions' vision and mission statements are also valuable to educational researchers to observe and analyze educational trends in terms of the purpose that they see themselves (Allen, Kern, Vella-Brodrick, & Waters, 2018).

Indeed, vision and mission statements “arise from a set of values that answer fundamental questions about the purpose of education and how educational programs should be carried out” (Boerema, 2006, p. 182). These set of values outlined in V/M statements are considered as an unspoken contract between the school and its various stakeholders. They provide a framework for action, promote collaboration, and incorporate goals for the future (Jones & Crochet, 2007; Manley & Hawkins, 2009; Allen, Kern, Vella-Brodrick, & Waters, 2018).

On the other hand, educational systems have a responsibility to give students the knowledge and skills necessary to become productive members of society. In the twenty-first century, this responsibility means preparing students to be globally literate so that they can accept responsibility for world citizenship (Spaulding, Mauch, and Lin, 2001). So it can be accepted that education has now become a real part of the globalization process and this is one of the most important factors that bring the internationalization of education to the agenda. Internationalization especially in higher education is the process of integrating an international / intercultural dimension into the teaching and research (Knight, 2006). Also internationalization of education is one of the routes for achieving an equitable globalization. The combination of the effects of globalization on education with the developing technological opportunities has made the alternative education models such as distance education increasingly widespread and popular. Internationalization, follow-up of global developments, cooperation and partnerships are also very important in terms of distance education practices that eliminate boundaries and limitations. Marmolejo (2011) conclude that internationalization of higher education is no longer just about the mobility of students. Issues now include facts like “brain drain” versus “brain circulation,” the internationalization of research, and foreign partnerships. Together with these changes and transformations, international partnerships gain more importance. International partnerships and unions in the field of distance education provide a favorable environment for close monitoring and rapid dissemination of developments. The institutions that want to follow the developments in the field of distance education and which are open to international collaborations are becoming members of these associations.

INTERNATIONAL DISTANCE EDUCATION ASSOCIATIONS: EADTU AND AAOU

The European Association of Distance Teaching Universities (EADTU) is Europe's leading institutional association in online, open and flexible higher education, and is at the heart of the modernization agenda of European universities. They define themselves through three critical features of European open and distance higher education: (1) student-centered learning based on high quality online learning environments; (2) Openness to learners achieved through flexible, inclusive structures and methods that take higher education to students when and where they need it; (3) networked education and mobility, where students can learn across national, sectoral and institutional boundaries. EADTU's mission is to empower and support its members by: Fostering the development of open and flexible higher education; developing and sustaining sectoral leadership at national, European and international level; leveraging its QA capabilities by creating an internationally recognized quality system in open and flexible higher education; supporting the extension of learning opportunities and student mobility through networking and collaboration between institutions.

Asian Association of Open Universities (AAOU) is a non-profit organization of higher learning institutions that are primarily concerned with open and distance education. It strives to widen the educational opportunities available to all people in Asia and to improve the quality of the institutions in terms of their educational management, teaching and research. It promotes education by distance teaching systems, as well as professional and ethical standards; develops potentialities of open and distance education; cooperates with official bodies and others directly or indirectly interested in education at a distance; and facilitates cooperation with other similar regional and international bodies. Members share a common belief that the development of distance education can be obtained

through friendship and close exchanges among institutions of open higher learning. It provides a focal point for bringing everyone up to date on the issues, ideas and developments in the field of open distance learning.

METHODOLOGY

The aim of this study was to examine current trends in distance education by analyzing the vision and mission statements of AAOU and EADTU full member universities. In this study, which was designed in descriptive research model, the data were analyzed by using the content analysis method (Nvivo 12) as one of the qualitative research methods. Mission and vision statements found on the websites of the member universities were scanned and grouped under certain themes, then their frequencies were determined. Comparison of similar research results related to vision and mission statements gives insight about the changes in educational trends. So this research is important in terms of providing comprehensive data to similar studies.

AAOU and EADTU are considered to be among the leading international organizations in the field of distance education. This research is important in terms of comparing the vision and mission statements of AAOU and EADTU full member universities and also in revealing similarities and differences. In addition, it is thought that it will provide important expansions in terms of seeing the effects of cultural differences and understanding the place of universities in different cultures. In the preliminary examination, there are no studies revealing the similarities and differences of the vision and mission statements of the Asian and European organizations in the field of distance education. Therefore, it is aimed to reveal the elements used in the vision and mission statements of AAOU and EADTU member universities and to determine the similarities and differences between them. Vision and mission statements were analyzed separately for both institutions and consequently concept maps were created. The comparison of the elements emphasized in the vision and mission statements of the two organizations was realized by the word clouds formed as a result of the coding process. In order to be able to clarify the most emphasized elements in vision expressions, word clouds are composed of 15 words most commonly used in coding.

The target audience of the research is the universities which have full membership to AAOU and EADTU. In this context, a total of 64 universities, 40 of which were from AAOU and 24 from EADTU, were included in the research sample. The distribution of member universities is given below.

AAOU Full Member Universities (40)

(1)Al-Madinah International University (2)Allama Iqbal Open University (3)Indira Gandhi National Open University (4)Bangladesh Open University (5)Institute of DOL, Gauhati University (6)International Center for Academics (7)Jiangsu Open University (8)Karnataka State Open University (9)Ho Chi Minh City Open University (10)Korea National Open University (11)Payame Noor University (12)Sukhothai Thammathirat Open University (13)Tamilnadu Open University (14)The Open University of Hong Kong (15)The Open University of Kaohsiung (16)The Virtual University of Pakistan (17)Tianjin Open University (18)UNITAR International University (19)University of the Philippines Open University (20)Al-Quds Open University (21)Asian e-University (22)Beijing Open University (23)Dr. B.R.Ambedkar Open University (24)Polytechnic University of the Philippines Open University System (25)Hanyang Cyber University (26)Krishna Kanta Handiqui State Open University (27)Chongqing University (28)School of Open Learning, University of Delhi (29)Shanghai Open University (30)Singapore University of Social Sciences (31)Symbiosis Centre for Distance Learning (32)The Open University of Japan (33)The Open University of Sri Lanka (34)Universitas Terbuka (35)Wawasan Open University (36)Yashwantrao Chavan Maharashtra Open University (37)Yangon University of Distance Education (38)Uttarakhand Open University (39)Open University Malaysia (40)Hanoi Open University

EADTU Full Member Universities (24)

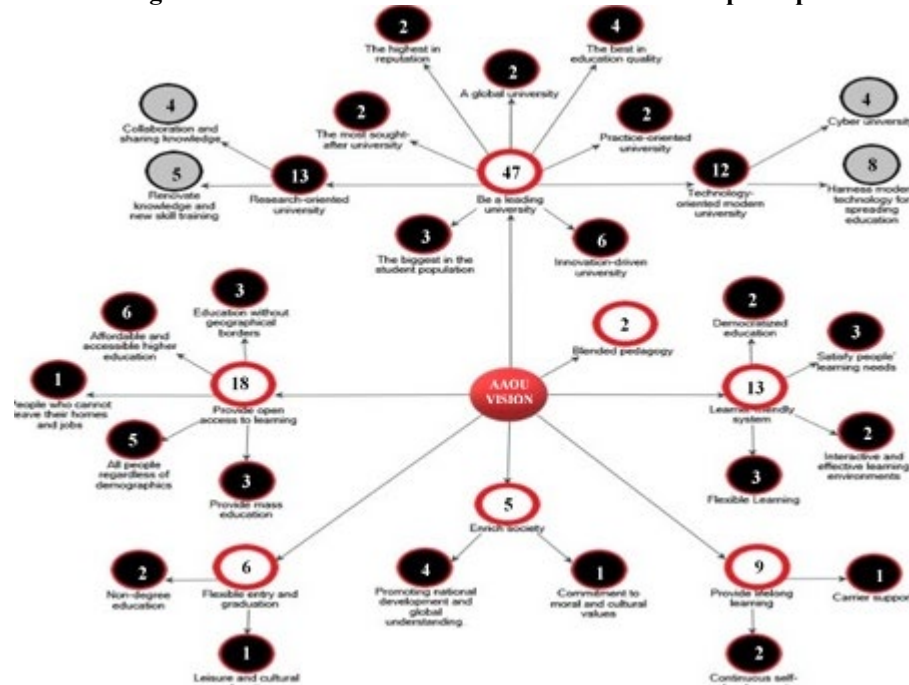
(1)Anadolu University (2)FernUniversität in Hagen (3)Hellenic Open University (4)Open University of the Netherlands (5)The Open University (6)Open University of Cyprus (7)Universidade Aberta (UAb) (8)Università Telematica Internazionale UNINETTUNO (9)Universitat Oberta de Catalunya (10)Swiss Distance Learning University (11)The Open University of the University of Jyväskylä (12)Akademia Górniczo-Hutnicza (13)Consorzio NETTUNO (14)Danish Association of Open Universities (15)Distance Education Centre of Latvia (16)National Institute for Digital Learning (17)Polish Virtual University (18)Tampere University of Applied Sciences (19)Centre for Distance Studies Austria (20)Open University of Israel (21)Universidad Técnica Particular de Loja (22)Fédération Interuniversitaire de l'Enseignement à Distance (23)Lithuanian National Distance Education Association (24)The Norwegian Agency for International Cooperation and Quality Enhancement in Higher Education (Diku)

FINDINGS

Findings related to the vision statements of AAOU member universities are given in Figure 1. As it seen in the Figure 1, the most emphasized vision expression was "being a leading university" with a frequency of 47. It is followed by the "provide open access to learning" with the frequency of 18 and "learner-friendly system" with the frequency of 13. The lowest frequency is belong to blended pedagogy with 2 expressions. When we look at the details about "being a leading university" as the most emphasized one, it can be seen that being "a research oriented" and "technology oriented" university are the most popular leading categories. The fact that the institutions that do not research, do not follow the developments and innovations will be left behind in adapting to the competition and global education, is also manifested by these results. It is also accepted that distance education cannot progress without a technology-centered understanding. In this context, being a leading technology and research-oriented university is most emphasized facts by Asian distance education institutions. From this point on, it would not be wrong to say that universities give priority to continuous improvement and renewal by researches and new technologies.

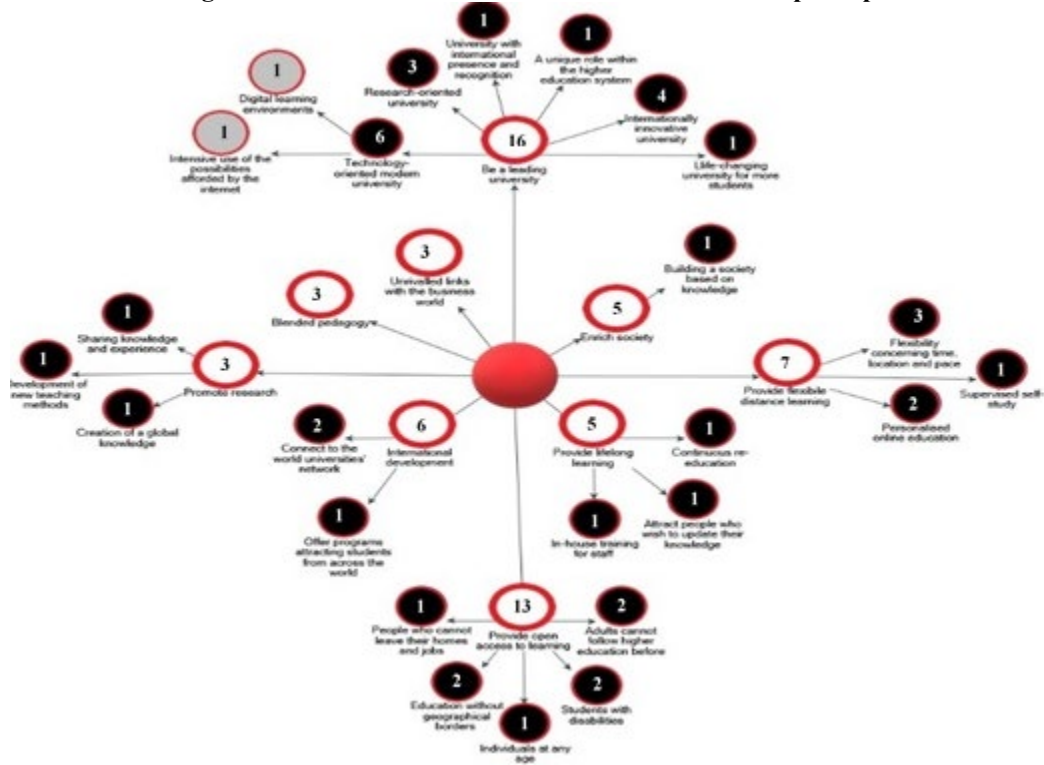
Another point that draws attention about vision statements is the emphasis on cultural education. Cultural values and non-diplomatic cultural education have been addressed both in terms of flexible entry-graduation and enrichment of society.

Figure 1. AAOU Members' Vision Statements Concept Map



Findings related to the vision statements of EADTU member universities are given in Figure 2. It is seen that the most frequently mentioned vision expressions are almost the same as those in the AAOU. "Being a leading university" and "provide open access to learning" are the most emphasized vision statements with the frequency of 16 and 13. It is followed by the "provide flexible distance learning (7)" and "international development (6)". The details about "being a leading university" as the most emphasized one, is also similar with the AAOU results. Being technology oriented university ranks first leading category. The second one is being internationally innovative university. This can be thought as a distinctive element in the vision statements of EADTU members that they emphasized internationality in both independent vision statements and in the leading institution category. In this context, it can be thought that internationalization and international initiatives are considered more important by EADTU members. This can be interpreted as the EADTU members are emphasizing international values rather than cultural values.

Figure 2. EADTU Members' Vision Statements Concept Map



The word clouds formed according to the frequency of the words used in vision expressions are given in Figure 3. When the prominent words in the vision statements were compared, the most repeated four words (university, education, learning, openness) appear to be the same. Considering the differentiated words, it is seen that the word "international" is preferred in EADTU and "national" in AAOU. This differentiation between "international" and "national" is also seen in concept maps. The fact that word clouds and concept maps are parallel to each other is important in terms of consistency of results. EADTU has also come up with "innovation", "development" and "student" words as distinct from AAOU. More frequent use of the word "student" may suggest that student needs are more voiced or student satisfaction is considered more in EADTU. On the other hand, AAOU has come up with "quality" and "lifelong" words as distinct from EADTU. This can be interpreted as the priority of AAOU is quality and lifelong education.

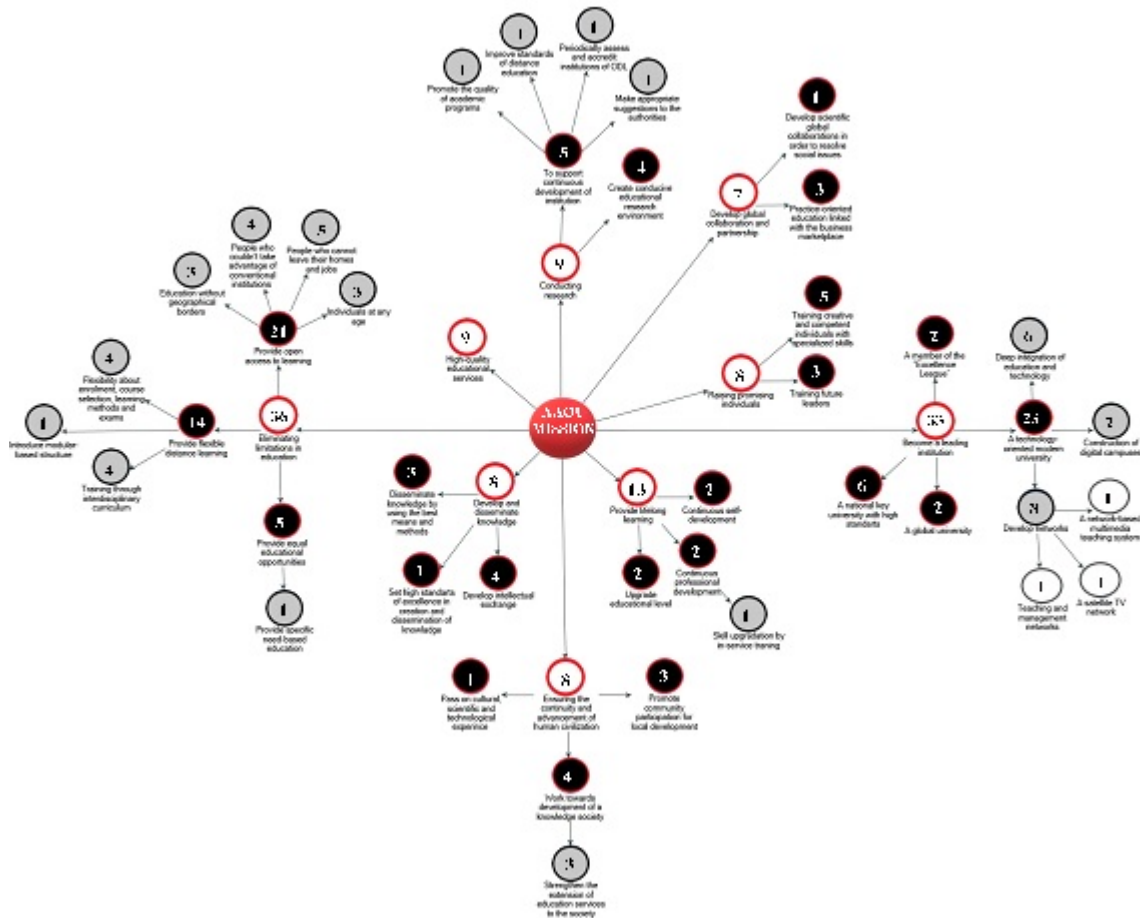
Figure 3. AAOU and EADTU Members' Vision Statements Word Clouds



The concept maps of the mission statements are more comprehensive than the vision maps. Since the mission explains the path to vision, it is usual that the statements are more comprehensive and detailed. Findings related to the mission statements of AAOU member universities are given in Figure 4. As it seen in the Figure 4, the most emphasized mission expression was "eliminating limitations in education" with a frequency of 36. It is followed by the "become a leading institution" with the frequency of 33 and "providing lifelong learning" with the frequency of 13. The lowest frequency is belong to "developing global collaboration and partnership" with 7 expressions. On the other hand, ensuring the cooperation is the third highest frequency among EADTU mission statements as seen in

Figure 5. In this context, it can be said that the two organizations disagree on the priority of global cooperation and partnership. When we look at the details about “eliminating limitations in education” as the most emphasized one, the sub themes are “provide open access to learning (21)”, “provide flexible distance learning (14)” and “provide equal educational opportunities (5)”.

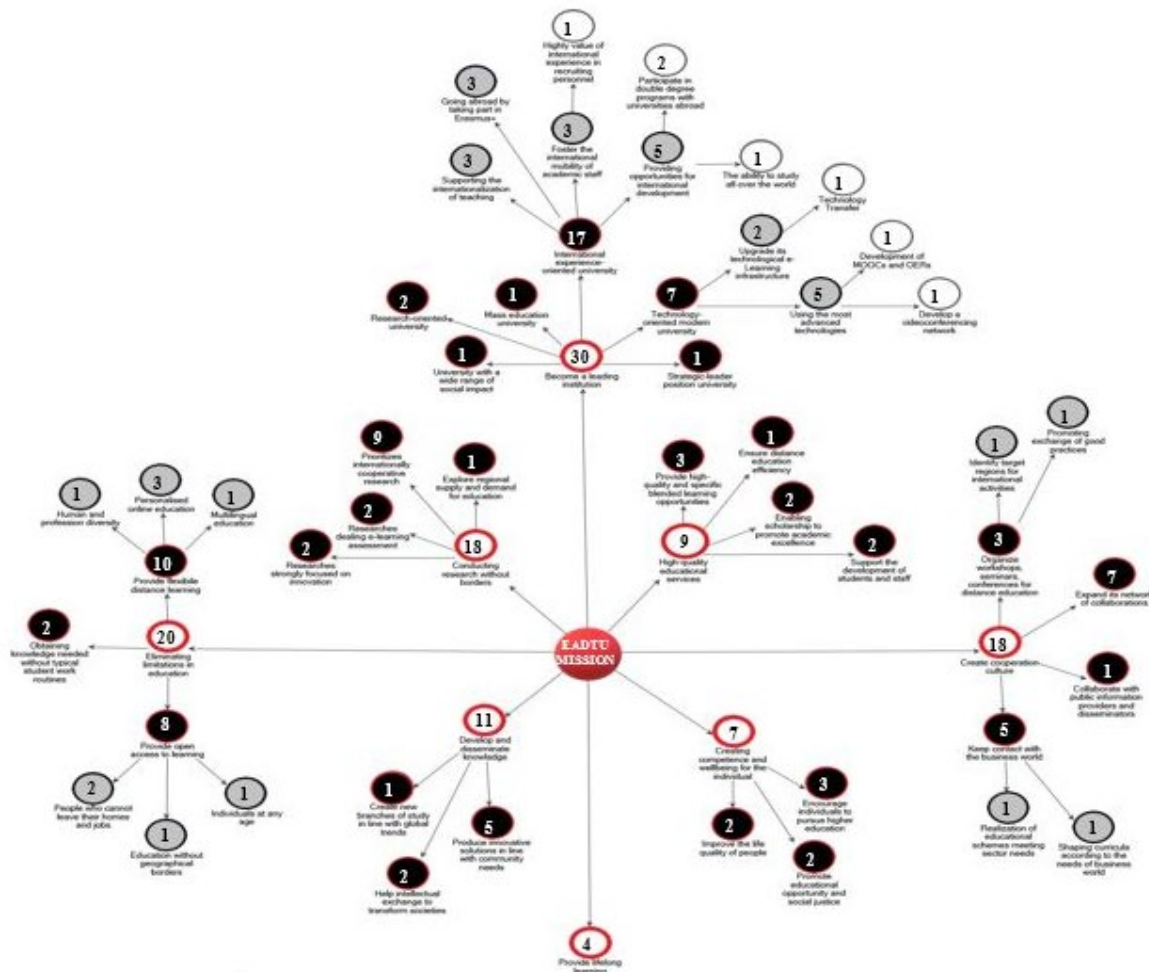
Figure 4. AAOU Members’ Mission Statements Concept Map



When the details of “being a leading university” - as the second most emphasized mission statement - are examined, the most underlying sub-theme is “being a technology-oriented university” with the frequency of 23. This shows that the use of technology and the ability to follow current technologies are priorities for the majority of institutions.

Findings related to the mission statements of EADTU member universities are given in Figure 5. It is seen that the most frequently mentioned vision expression is “Become a leading institution” with the frequency of 30. Parallel to their prioritization of cooperation, they stated that they want to lead by becoming a university focused on international experience and cooperation. Similar to the AAOU mission statements, “eliminating limitations in education” is one of the most emphasized mission statements with the frequency of 20. In the context, it is seen that the focus is especially on flexibility (10) and open access (8). It is followed by the “conducting research without borders (18)” and “create corporation culture (18)”. The lowest frequency is belong to “providing lifelong learning” with 4 expressions.

Figure 5. EADTU Members' Mission Statements Concept Map



In order to compare the EADTU and AAOU mission statements and to see the fundamental differences between them, word clouds were formed. The word clouds formed according to the frequency of the words used in mission expressions are given in Figure 6. When the prominent words in the mission statements were compared, the most repeated three words (education, learning, university) appear to be the same.

Figure 6. AAOU and EADTU Members' Mission Statements Word Clouds



Considering the differentiated words in Figure 6, it is seen that while the words "international" and "cooperation" were not included in the AAOU mission statements, they were frequently repeated in EADTU statements. These differentiation is in parallel with concept maps. On the other hand, "technology" and "quality" are the concepts that are emphasized by AAOU but not by EADTU. These highlighted words are related with the priorities in their roles

determined for themselves. Based on differentiating points, it can be said that AAOU prioritizes “technology” and “quality”, and EADTU prioritizes “cooperation” and “internationalization” concepts.

RESULTS AND SUGGESTIONS

To summarize the most noteworthy results, although the most prominent words in the vision statements (university, education, learning, openness) appear to be the same; there are also elements and highlights that make a difference. It is seen that EADTU members emphasize international concepts and processes in vision statements, while AAOU members emphasize national values and cultural education. This difference was observed in both concept maps and word clouds. In addition, EADTU has come up with “innovation”, “development” and “student” words, while AAOU has come up with “quality” and “lifelong” words. As a result, the concepts highlighted for the members of the two organizations differ from each other. It is similar for the mission statement. The most prominent words in the mission statements (university, education, and learning) also appear to be the same. But EADTU members emphasize elements related with “international” and “cooperation” concepts, while AAOU members emphasize technology and quality elements.

On the other hand, it is noteworthy that vision and mission findings support each other and show parallelism. AAOU members emphasizing the concept of nationality in their vision statements did not give up on the issue of “global cooperation and partnership” in the mission statements and mentioned the expansion of cultural education opportunities. In the same way, EADTU members, who emphasized international relations in their visions, focused on international cooperation and partnerships in their missions.

REFERENCES

- Allen, K. A., Kern, M. L., Vella-Brodrick, D. and Waters, L. (2018). Understanding the Priorities of Australian Secondary Schools Through an Analysis of Their Mission and Vision Statements. *Educational Administration Quarterly*, Vol.54 (2), pp.249–274, Sage Publications DOI: 10.1177/0013161X18758655
- Anthony, Sotunde Olalekan (2012), “Influence of Vision and Mission Statement on Organizational Effectiveness: An Appraisal of a Private Sector Experience in Nigeria”, *The Pacific Journal of Science and Technology*, 13, 1, 389-397.
- Boerema, A. J. (2006). An analysis of private school mission statements. *Peabody Journal of Education*, 81, 180-202.
- Bowen, Shannon A. (2018). *The International Encyclopedia of Strategic Communication: Mission and Vision*. John Wiley & Sons, Inc. doi:10.1002/9781119010722.iesc0111, <https://onlinelibrary.wiley.com/doi/abs/10.1002/9781119010722.iesc0111>
- Doğan, Selen (2002), “İşletmelerde Vizyon ve Misyon Bildirisi Geliştirme ve Önemi Üzerine Bir Araştırma”, *Amme İdaresi Dergisi*, Cilt: 35, Sayı:1, 143-174.
- Jones, L., & Crochet, F. (2007). The importance of visions for schools and school improvement. *Journal of Research in Educational Psychology*, 9, 463-496.
- Lucas, James R. (1998), “Anatomy of a Vision Statement”, *Management Review*, Vol.87, No.2, 22-26.
- Manley, R. J., & Hawkins, R. J. (2009). *Designing school systems for all students: A toolbox to fix America's schools*. Lanham, MD: Rowman & Littlefield Education.
- Ocak, M., Karabulut, B. (2017). Türkiye-İngiltere Üniversitelerinin Vizyon Ve Misyon İfadelerinin İçerik Analizi İle Karşılaştırılması A Comparison Study on Turkey and England's Universities' Vision and Mission Statements By Using Content Analysis *C.Ü. İktisadi ve İdari Bilimler Dergisi*, Cilt 18, Sayı 2, 2017, 113-130
- Rozycki, E. G. (2004). Mission and vision in education. *Educational Horizons*, 82(2), 94-98.
- Spaulding, S., Mauch, J., and Lin, L. (2001). “The Internationalization of Higher Education: Policy and Program Issues.” In P. O'Meara, H. D. Mehlinger, and R. M. Newman (eds.), *Changing Perspectives in International Education*. Bloomington: Indiana University Press.
- UNESCO (2002). *Education for Sustainability - From Rio to Johannesburg: Lessons learnt from a decade of commitment*. World Summit on Sustainable Development Johannesburg, 26 August – 4 September 2002, Paris.

NEW AND EMERGING STUDY RESOURCES AS ENRICHMENT AND REPLACEMENT OF TRADITIONAL SCHEME OF INTRODUCTORY MATHEMATICAL COURSES IN HIGHER EDUCATION

Jana GLIVICKÁ

Department of Mathematics, University of Economics, Prague, Czech Republic

jana.glivicka@vse.cz

ABSTRACT

In this paper we examine the use of new and emerging study resources (mobile applications, video tutorials, massive open online courses etc.) by undergraduate students as complementing or replacing a traditional higher education scheme of courses based on lectures, recitations and textbooks. The data used for our examination were gathered by distributing questionnaires among students of an introductory courses *Mathematics for Economists* and *Mathematics for Informatics* taught at the University of Economics, Prague, Czech Republic. The responses show that although the majority of students would welcome other study resources than textbooks and use video tutorials during their self-study time, most of them are not familiar with such platforms and projects as edX, Coursera, Khan Academy, or WolframAlpha. We argue that implementing video tutorials and other online resources into the scheme of the courses mentioned above would not only correspond to students' self-assessment of their study experiences and needs, but also allow more time for direct interaction between teachers and students in class, leading to both better mastery of higher mathematics and final test results.

INTRODUCTION

A traditional undergraduate course in mathematics usually consists of two basic components – lectures and recitations. During the lectures, attended by a large number of students in one group, the lecturer presents the topic, explains theory, gives basic examples and solves a few typical problems related to that topic; students are usually expected to follow the lecture completely without or with only limited interaction between them and the lecturer. The lecture is then followed by recitations; students are divided into a larger number of smaller recitation groups and engage the studied topic individually or in small groups under the observation and in interaction with teacher's assistant, solving problems, discussing challenging topics, and recalling the theory they learned during the lecture. A textbook or a number of them, supplemented by problem sets and additional printed or printable materials (list of formulas, lecture notes) constitute the body of materials available to students for their home-study.

The courses *Mathematics for Economists* and *Mathematics for Informatics* have been taught this way for more than 10 years. These are one-semester undergraduate courses offered to students of University of Economics in Prague both during the winter and summer term. As compulsory subjects for various study programs, they are attended every year by a large number of students from six different faculties of the university. In the winter semester 2018/2019, 1042 students (divided into 7 lecture groups and 37 recitation groups) were enrolled in the course *Mathematics for Economists* and 406 students (divided into 2 lecture groups and 14 recitation groups) were enrolled in the course *Mathematics for Informatics*; so in both cases the recitation groups comprised of about 30 students. Students are expected to spend 26+26 (resp. 26+52) hours per semester attending lectures and recitations in *Mathematics for Economists* (resp. *Mathematics for Informatics*), 26+26 hours preparing for them, 13+13 hours preparing for the interim and final test and 26 hours preparing for the final oral exam; the expected workload makes these course worth 6, resp. 7 ECTS credits. The course covers basic topics in undergraduate mathematics – linear algebra and matrices, convergence, differentiation, integration, functions of two variables and differential equations; the course *Mathematics for Informatics* includes also basics of mathematical logic and modular algebra. Apart from the lectures and recitations, another study resource is available to students – the textbook *Mathematics for University of Economics* [Klůfa, 2016], written especially for these courses.

Our primary interest was to find out whether students tend to use modern study resources and tools (mobile applications, video tutorials, massive open online courses etc.) during their self-study time, whether they consider them beneficial as compared to attending lectures and recitations and whether they would welcome usage of some of these resources and tools as part of the on-campus course. Based on our findings we sketch possible enrichment or partial replacement of some components of the traditional lecture-recitation scheme of the above-mentioned courses.

METHODOLOGY

During the winter term of the academic year 2018/2019, the author of this paper was employed as an assistant professor at the University of Economics in Prague, Czech Republic and lead six recitation groups of the courses

Mathematics for Economists and *Mathematics for Informatics*. During the final week of the semester, the students were asked to fill in an anonymous on-line survey. We managed to collect 80 individual responses.

The questions and possible answer choices are presented below.

1. Which course are you enrolled in?
 - a. *Mathematics for Economists*
 - b. *Mathematics for Informatics*
2. What is your Faculty?
 - a. Faculty of Finance and Accounting
 - b. Faculty of International Relations
 - c. Faculty of Business Administration
 - d. Faculty of Informatics and Statistics
 - e. Faculty of Economics
 - f. Faculty of Management
3. Is this your first enrollment in this course or do you repeat this course?
 - a. This is my first enrollment.
 - b. This is my second enrollment
 - c. This is my third of further enrollment.
4. What percentage of lectures did you attend?
 - a. 100-80%
 - b. 79-60%
 - c. 59-40%
 - d. 39-20%
 - e. 19-0%
5. What percentage of recitations did you attend?
 - a. 100-80%
 - b. 79-60%
 - c. 59-40%
 - d. 39-20%
 - e. 19-0%
6. Do you or do you intend to hire a private mathematics tutor?
 - a. Yes
 - b. No
7. Not including the preparation for the interim test, how many hours per week did you spend home-studying for the course? (open question, numerical answer required)
8. How many hours did you spend home-studying for the interim test? (open question, numerical answer required)
9. How many hours do you expect to spend home-studying for the final exam? (open question, numerical answer required)
10. Have you ever heard of MOOC courses (e.g. edX, Coursera, Udacity)?
 - a. Yes
 - b. No
11. Have you ever been enrolled in an MOOC course?
 - a. Yes
 - b. No
12. If so, what course and on what platform? (open question)
13. Do you know the Khan Academy project?
 - a. Yes
 - b. No
14. If so, have you ever used it while home-studying for this course?
 - a. Yes
 - b. No
15. Have you ever systematically studied mathematics on Khan Academy?
 - a. Yes
 - b. No
16. Do you know the WolframAlpha project (wolframalpha.com)?
 - a. Yes
 - b. No
17. If so, have you ever used it while home-studying for this course?

- a. Yes
 - b. No
18. If so, how did you use it? What topics did you study? (open question)
19. Have you ever watched video tutorial on Youtube or similar servers while home-studying for this course?
- a. Yes
 - b. No
20. If so, how beneficial do you consider these tutorials in comparison to lectures and recitations?
- a. More beneficial than lectures
 - b. As beneficial as lectures
 - c. Less beneficial than lectures
 - d. More beneficial than recitations
 - e. As beneficial as recitation
 - f. Less beneficial than recitation
21. Besides the above mentioned (MOOC courses, Khan Academy, WolframAlpha, video tutorials), have you ever used other modern study resources or tools (e.g. mobile applications, internet forums or chat groups, social networks, on-line materials) while home-studying for this course?
- a. Yes
 - b. No
22. If so, which? (open question)
23. Besides classical textbooks and printed problem sets, would you like other study resources and tools like those mentioned above to be available for this course?
- a. Yes
 - b. No
24. If so, which of them would you most use while home-studying for this course? (open question)

The questionnaire was designed to gather data not only for this paper, but for other research as well. That is why we will not include all the questions in our analysis; nevertheless, for the sake of completeness, we present the questionnaire as a whole.

DESCRIPTION OF STUDY RESOURCES AND TOOLS

In this section we briefly describe the study resources and tools that were mentioned in the questionnaire above.

MOOC courses

The term *massive open on-line course* (abbreviated as MOOC) was probably first used [Cormier, 2008] for the course *Connectivism and Connective Knowledge*, which is today considered one of the first MOOCs. Nowadays there are many platforms offering MOOC courses, some of them with close connections to world's best universities, as in the case of edX and Coursera. EdX was established in 2012 as a result of cooperation of Massachusetts Institute of Technology and Harvard University. Coursera was founded in the same year by Andrew Ng and Daphne Koller, two Stanford University professors.

The courses offered on platforms like edX and Coursera in some aspects closely resemble traditional university courses. Pre-recorded video lectures (sometimes actual on-campus university lectures) often form a backbone of a MOOC course, supplemented by on-line (sometimes interactive) study resources and lecture notes, moderated discussion forums, on-line tests and individual assignments, even group activities. To complete a course students usually have to complete some assignments (these may or may not have real-time deadlines), often there is a final exam, much like in the case of typical university course. Many of the MOOC courses are actually online versions of real on-campus university courses of the universities in the given MOOC platform. For an overview of MOOC courses see [Baturay, 2018].

Khan Academy

Khan Academy was founded in 2008 by Salman Khan as a non-profit organization providing online educational resources and tools. The trademark of Khan Academy is a "blackboard-style" video lecture, where the voice of a tutor explains a given topic and comments on formulas, graphs, charts, solved examples etc. being written on a black background. Nowadays, Khan Academy makes these videos and additional materials available in complete courses on various topics in mathematics, science and engineering, arts and humanities, computing, finance and more for pupils and students ranging from preschool to college. The video tutorials are recorded in English, but

are being translated into many languages, usually by groups of volunteers creating subtitles. Khan Academy understands its role as providing supports and supplement materials to students involved in in-class learning. [Timcenko, Triantafyllou, 2015] discussed how students themselves perceive possible benefits of using Khan Academy videos as part of their home-study.

WolframAlpha

WolframAlpha is a computational engine developed by Wolfram Research based of its well-known computing system Wolfram Mathematica. Its first version was released on-line in 2009. It allows its users to submit queries using a text field and produces a structured “answer” based on the data available in its knowledge base. Probably the most typical use of WolframAlpha by students in mathematics is to input a formula defining a function to which WolframAlpha produces a structured answer including the graph of the function, its limits, derivative, antiderivative, and so on, offering also a step-by-step explanations of these (i.e. how to compute the derivative and so on). [Perry, Thrasher, 2015] describes how WolframAlpha can be used to improve mathematics classroom practice and student’s technological literacy.

Youtube and similar servers

Youtube and other video-sharing websites are today used by many individuals and institutions to upload and share recorded lecture, video tutorials and other educational resources. Since these websites make it possible for almost anyone to upload a video material with minimal resources, the quality of the educational videos available there varies greatly. One can find lectures recorded at the worlds prestigious universities as well as first attempts of high school students to explain to others topic they barely understand themselves. Unlike in the case of MOOC platforms or Khan Academy, Youtube is primarily video-sharing website, so apart from discussion threads under the individual videos, it does not provide any easy way to complement the video lectures and tutorials by additional materials like on-line tests, lecture notes and so on.

DATA ANALYSIS AND SUMMARY

The data gathered from the questionnaires show the following:

- Out of 88 students, 22 payed or intended to pay a private tutor to help them study for the course.
- On average, students spent 3 hours per week preparing for the course during the semester.
- On average, students spent 12.7 hours preparing for the interim test.
- On average, students expected to spend 38.8 hours preparing for the final test and oral exam.

During the semester, students are expected to spend 1.5 hours per week at lectures and 1.5 hours per week at recitations. Thus, spending 3 hours per week preparing for the course at home makes home-study as time-consuming activity as attending both lectures and recitations. Another more than 50 hours spent in preparation for the interim test and final exam and the fact, as is shown below, that many students actually don’t attend the lectures they are expected to, clearly shift the students’ focus from in-class time to home-study time even more.

Figures 1 and 2 summarize students’ attendance of lectures and recitations. In the case of lecture attendance, we consider worth noting that only slightly more than half of the students (54.4%) attended most, i.e. 80-100%, of the lectures, while 15.2% of the students attended almost no, i.e. 0-19%, of the lectures. The case of recitations is notably different, 73.3% of the students attended most of the recitations, while only 3.8% attended almost none.

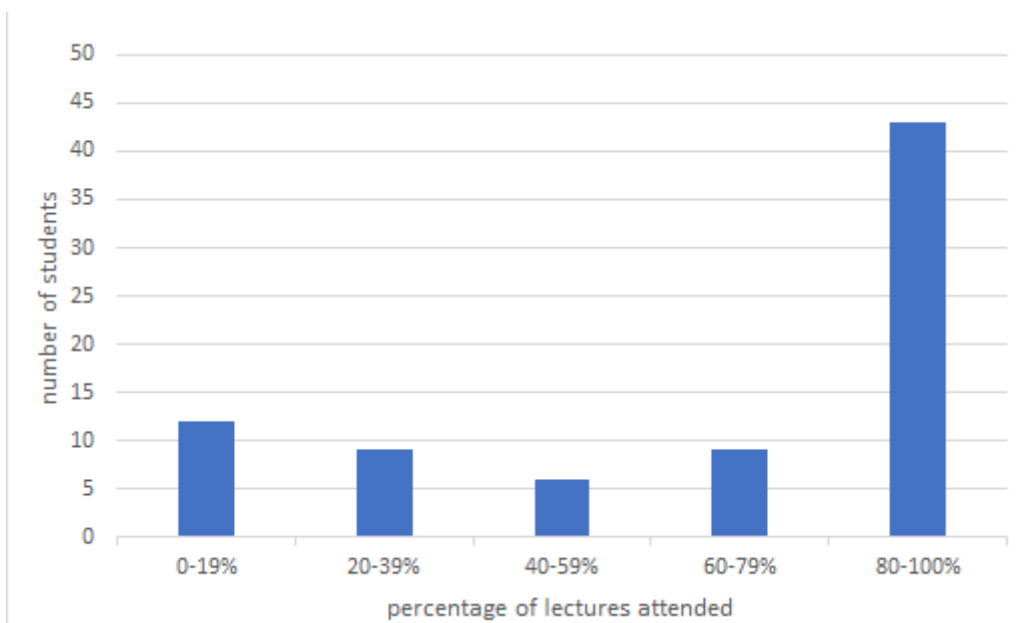


Figure 1

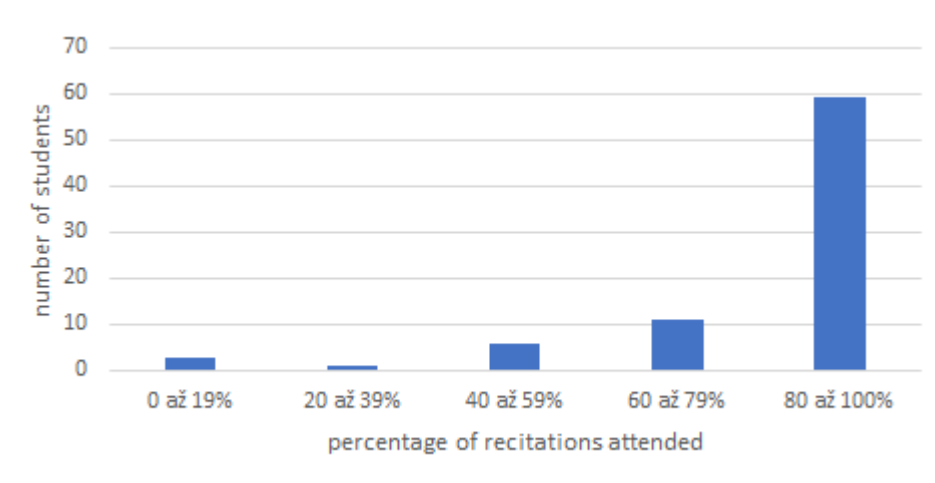


Figure 2

As for the students' familiarity with and usage of modern study resources and tools, our findings are as follows:

- Only 7 out of 80 students ever heard of MOOC courses.
- Of those 7, 4 have been enrolled in an MOOC course (on platforms edX, Coursera, Udemy and Udacity).
- 24 out of 80 students have heard of Khan Academy, 3 have ever used it as part of their home-study for the course, and 1 has used it systematically.
- 29 out of 80 students know the project WolframAlpha, 14 have used it as part of their home-study for the course. The usage was to draw graphs of functions and determine their domain and range, to compute limits of functions, and to compute derivatives and antiderivatives.
- 64 out of 80 students have watched video tutorials on Youtube or similar servers as part of their home-study for the course. Figure 3 show how the students compare the benefits of watching these tutorials to benefits of attending lectures and recitations.
- 49 out of 80 students would welcome other study resources and tools like those mentioned above to be available for the course besides textbooks and problem sets.

Thus, our findings show that with the exception of video tutorials most students are either not aware of existence of some of the well-known modern study resources or have heard of them do not use them, nonetheless. This may be a bit surprising in the time of almost unlimited access to the online tools through students' smartphones

and other devices and suggests that as far as education is in question, students still tend to depend on the materials provided by the university and their teachers.

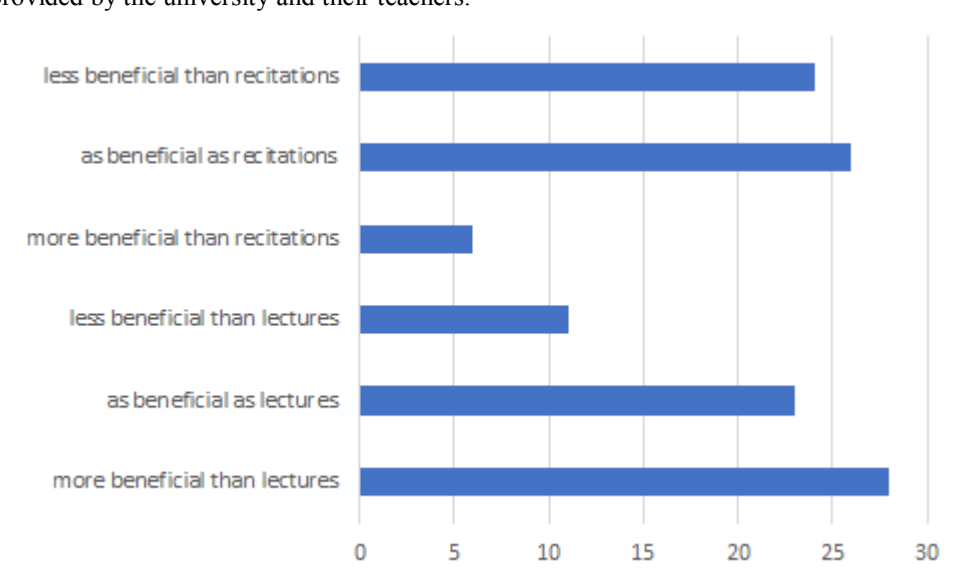


Figure 3

CONCLUSIONS

As we have seen a typical student spends more time studying at home than on in-class activities, while often skipping lectures but tending to attend as many recitations as possible. During the home-study time she probably watches video tutorials and maybe uses WolframAlpha to check some graphs or limits of functions. She finds the video tutorials more beneficial than lectures, maybe that is why she tends to skip them, and probably slightly less or as beneficial as recitations, which explains why she usually does not skip those as she does with lectures.

This suggests that from the students' perspective, it would make sense to replace some of the in-class lectures by pre-recorded video lectures that could be watched at students' own schedule. Studies [Cardall, Krupat, Ulrich, 2008] show that students tend to find them more valuable than live lectures. From the author's experience as a university teacher and from conversations with students, pre-recorded lectures are preferred mainly for three reasons. First, as we have already mentioned, they can be watched at students' own schedule; second, they can be paused and replayed as many times as the student wishes, in case she find some part of the lecture challenging and hard to understand; third, they can be watched again at the end of the semester as a suitable refresher material while the student is studying for the final exam.

From the perspective of the faculty, replacing some lectures by videos also seems reasonable, as it would free some of the teachers' time that could be dedicated to either more recitations (which again would seem to benefit the students who attend the recitations significantly more than lectures), or to other pedagogical or scientific work.

Our findings show that most students are not familiar with platforms and services like edX, Coursera, Khan Academy, and WolframAlpha, so rather than using those as help in their preparation for the course and final exam, about a quarter of them considers hiring or actually hires a private tutor. This, together with the strong tendency to attend recitations rather than lectures suggests that students value quite highly the direct interaction that is possible with teachers assistant during recitations or with private tutor. Nonetheless, since most of the students are simply not aware or the existence of the above mentioned platforms and services, rather than being aware of them but not using them anyway, it is impossible to even guess from our findings whether some of these would have the potential to at least partially replace or supplement the direct teacher-student contact. This would not seem totally unreasonable, since unlike in the case of video tutorials, MOOC platforms or Khan Academy offer moderated discussion forums where students can ask questions and get answers either from creators or moderators of the course or from other students. Yet, this remains a topic for a possible further research.

ACKNOWLEDGMENT

This paper was processed with contribution of long-term institutional support of research activities by Faculty of Informatics and Statistics, University of Economics, Prague.

REFERENCES

- Cardall, S. & Krupat, E. & Ulrich, M. (2008). Live lecture versus video-recorded lecture: are students voting with their feet?. *Academic medicine: Journal of the Association of American Medical Colleges*, 83(12), 1174-8.
- Baturay, M. H. (2014). An Overview of the World of MOOCs, *Procedia - Social and Behavioral Sciences*, 174, 427-433.
- Cormier, D. (2008). The CCK08 MOOC – Connectivism course, 1/4 way [On-line]. Available: <http://davecormier.com/edblog/2008/10/02/the-cck08-mooc-connectivism-course-14-way/>
- Klůfa, Jindřich (2016). *Matematika pro Vysokou školu ekonomickou*. Praha: Ekopress, s.r.o.
- Timcenko, O., Triantafyllou, E. (2015). Student perceptions on learning with online resources in a flipped mathematics classroom. *CERME 9 - Ninth Congress of the European Society for Research in Mathematics Education*, 2573-2579.
- Perry, A. D., Thrasher, E. P. (2015). High-Leverage Apps for the Mathematics Classroom: WolframAlpha, *The Mathematics Teacher*, 109 (1) (August 2015), 66-70.

ON THE RELATION BETWEEN ATTITUDES AND SCHOOL ACHIEVEMENT OF VOCATIONAL SCHOOL STUDENTS

Sinan AYDIN

Accounting Department, Kocaeli Vocational School, Kocaeli University
sinanaydin1704@yahoo.com

ABSTRACT

Mathematical subjects are accepted to be most difficult study area for students from all over the world. In this study, the students were selected from one of the vocational schools in Turkey. The participants were the 142 first year students from different departments that accounting and task, business management and marketing who were selected by probability random sampling method. To obtain students' idea about their attitudes and school performance, we applied them to answer the research questionnaires. First, it was gathered the socio-demographic situation of the students. Secondly, the attitudes of the students about mathematics were adopted to reach their ideas. And finally, students' academic achievement math lecture was gathered from their basic mathematics lecture grade, it was discussed the relationship between students' attitudes and school achievement in math lecture at the conclusion part of the study. One of the main results of the study that vocational school students had positive attitudes about math lecture but their attitudes for this course was not positive or negative. According to the results of this study, we can say that the respondents' attitudes are an important factor for their school performance.

Key words: attitude, academic performance, vocational school student

INTRODUCTION

The development of countries and the growthy of their vision in the world are directly related with education performance, motivation to teaching-learning subjects and especially the level in mathematics. Mathematic is necessary not only for scientific studies but also for all people because of the power it's in daily life activities to solution of the problems when they are faced (Capuno at al. 2019). For this reason, the countries that is aware the important of mathematics pay special attention to teaching and learning mathematics, organizing mathematics lectures in curricula and teacher training programs (Liljedahl at al., 2009). According to many countries focusing on this lecture carefully, the academic results of the countries are not sufficient standards by the view of national or international examinations results as PISSA. But some countries academic plans for mathematics lectures and academic performance are parallels as South Korea and Finland (Sakirudeen and Sani, 2017).

Study habits are one of the essential elements that have directly effect on students' academic performance. There are no enough academic studies on this subject so; it could be conducted research studies to solve this problem. That is not only for academic performance but also it is necessary to get daily life habits and to be able to plan all activities in life as a father or as a mother or as a business man. In their studies, Moenikia and Babelan, (2010) determined some attitudes towards math that items contain positive and negative items about the subject analyzing students' feelings. There is a positive correlation between students' habits and their academic performance, also it takes time to develop the positive study habits, teachers and families pay consistent attention to enhance this habit (Khoo & Ainley, 2005; Atanasova, 2015). Many papers on students' habit showed that student' attitudes forward to mathematics lecture has a powerful effect on their study times, their role in mathematics lectures and their approach to the any mathematical subjects (Bloom, 1984; Chamot, 2004; DuFour & Mattos, 2013).

Positive attitudes toward to mathematics also make positive approaches to the other lectures' learning and on students' all school life (Rashbarry at al., 2011)). Sirmaci (2010) focused the relationship between learners' academic performance and their attitudes in mathematics lecture by the help of math attitude scale. He showed that the correlation between students' performance and their attitudes toward math lecture is significant level and positive way. In another study conducted by Karianto (2017), it was analyzed university students' attitude taught basic mathematics lecture using a scale of attitudes towards mathematics.

The aim of this paper is to determine the attitudes, study habits and academic performance of a vocational school student in accounting & task, business management and marketing departments. The following items are the main headlines of this study;

- General profile of the students
- Study habits in mathematics
- Students' attitude towards mathematics lecture
- Relationship between the attitudes and academic performance

METHOD

In this study, we are focusing on the relations between attitudes and study habits of the students and their academic performance in mathematics lecture by using a descriptive correlation method. Before the determining of this relation, we analyzed students' habits, attitudes and academic performance at the mathematics lecture. The study was applied to a vocational school of a university in Turkey. The students taking math lectures were 142 at the first year of their departments. The data were statistically analyzed by using frequency, percentage and mean. The scale had main three parts;

- The socio-demographic ways of the students
- The attitudes of the students towards mathematics
- The study habits of the students

The statements about the attitudes of the students toward mathematics adopted the scale by Tapia and March (2004). It contains four subgroups such as self-confidence of students, Value of Math, Motivation and Enjoyment. 12 elements for self-confidence in math that 7 of them positively expressed and 5 of them negatively expressed. 7 elements for value of math and 9 elements for enjoyment in math and 4 elements for the motivation in mathematics. Totally 32 elements in the scale were settled by 5-point Likert scale as 1 has lowest point that means very negative attitude and 5 has highest point that means very positive attitude for mathematics.

The statements about the study habits of the students toward mathematics adopted the scale by Charles, Ogan and Alamina (2014). It contains totally 9 positively expressed elements in the scale were settled by 5-point Likert scale as 1 has lowest point that means very poor and 5 has highest point that means excellent for mathematics. The students' first mathematics exam points were used to determine their performance in mathematics.

FINDINGS

First, the basic demographic structure of the participants in terms of their gender, departments were presented in Table 1.

Table 1. Gender and department of the participants.

Departments	Male (n = 53)		Female (n = 89)		Total (N = 142)	
	f	%	f	%	f	%
Accounting & Task	14	26.4	28	31.4	42	29.5
Business	18	33.9	36	40.4	54	38.0
Marketing	21	39.7	25	28.2	46	32.5

According to Table 1, the number of female students were approximately the same in Marketing department but in Accounting & Task and Business department the number of females was double the number of male students. The total number of the students from all the departments was approximately the same level.

Table 2. Academic Performance of the Students in Mathematics

Performance Level	Grade	f	%
Perfect	90 – 100	6	4.3
Very Good	85 – 89	11	7.8
Good	80 – 84	13	9.1
Successful	75 – 79	29	20.4
Sufficient	65 – 74	40	28.1
Failure	Below 65	43	30.3

The above academic performance of the students in basic mathematics lecture taught in the first year of their two-years education program were taken from first exam points (Table 2).

According to the analyzing of Table 2, we see that the academic performance points of the students were centered at the intervals “Successful” (75 -79) & 29 students, “Sufficient” (65 -74) & 40 students and “Failure” (Below 65) & 43 students. The meaning of this data is clear, and it say that the academic performance of these students is very low, and need be promoted. Especially, high level points of students were very low that “Perfect” (90-100) & 6 students, “Very Good” students (85-89) &11 students and “Good” level (80-84) & 13 students.

Table3. Self-Confidence of the Respondents in Mathematics

Indicators	Mean St Dev.		Verbal
			Description
1. I hate mathematics.	2.91	0.823	Neutral
2. I couldn't make connection between my brain and mathematical ideas when study math or listen math.	3.21	1.012	Neutral
3. I don't feel relax when study math or listen math	2.81	1.136	Neutral
4. Mathematics makes me feel uncomfortable.	2.73	1.225	Neutral
5. In my speech situation, when the subject is math, I feel boring.	3.37	1.346	Positive
6. Mathematics doesn't fright me in anywhere at any time.	2.80	0.849	Neutral
7. I am fearlessness for mathematical subjects and problems	1.83	0.421	Negative
8. I don't feel any trouble when listen math or learn new math subjects	1.79	0.327	Negative
9. I can take good exam points when I take a mathematical quiz.	2.01	0.715	Neutral
10. I am not confused in math lectures.	3.17	1.310	Neutral
11. I understand and learn math easily.	1.92	0.462	Negative
12. According to me, I am good problem solver in mathematics	1.83	0.398	Negative

Table 3 shows the attitudes of the students about mathematics in that four factors were used as self-confidence, value of math, enjoyment from math and motivation in mathematics lectures.

According the table, we can say that students had neutral attitudes for learning mathematics. The social program students from Business, Marketing, Accounting and Task departments believed that mathematics was difficult because of its nature and inability of their background. We know that there is direct connection mathematical knowledge and attitudes for learning this course. Analyzing the perceptions of the students on enjoyment from math was not positive (mean 3.37 and stand. div. 1.346). So, mathematics is an absolute lecture for these students. They had a self-confidence problem for mathematics; they were fearing when facing with mathematical

subjects and problems, were troubling when listening math or learning new math subjects and were not understanding math easily.

Table 4. Study habits of the students

Indicators	Mean	Std. Dev	Verbal Description
<u>1 I pay attention mathematics if I don't feel good.</u>	<u>1.78</u>	<u>0.356</u>	<u>Unsatisfactory</u>
<u>2 I study mathematics by motivating to problematic parts for me</u>	<u>3.89</u>	<u>1.499</u>	<u>Satisfactory</u>
3. I usually study mathematics about 40 minutes intervals and 20 minutes break times.	3.32	1.213	Satisfactory
<u>4 I usually use math books when I study math for exams or for learning.</u>	<u>1.54</u>	<u>0.658</u>	<u>Unsatisfactory</u>
5. I usually make group studies with my friends on mathematics homework and studies for math exams.	2.18	0.859	Satisfactory
<u>6 When I am listening math, I give special attention to critical points.</u>	<u>2.35</u>	<u>0.680</u>	<u>Satisfactory</u>
7. I spend time for mathematics without making any time limitation for my homework or to lean any subject.	2.15	0.787	Satisfactory
<u>8 I feel happy when I solve any math problem</u>	<u>4.15</u>	<u>1.612</u>	<u>Satisfactory</u>
<u>9 I give high level attention when I listen mathematics.</u>	<u>2.31</u>	<u>1.103</u>	<u>Satisfactory</u>

According Table 4, Ours students have normal level study habits and we can say that it could be accepted as satisfactory. Especially, they have much happiness when they solve any math problems by themselves or when they understand well a math subject. They usually copy teachers' solutions and try to adapt teachers' solution to their problems. So, solving any math problems for themselves is rarely situation at math lectures. As unsatisfactory situations for the students, they don't use textbooks when they study mathematics for exams or for learning to the subjects. Another words, they only use their class notes to learn math, to do homework or to study for the exams. For one reason to this situation, they are a social program student or they believe that math is not an important part of their education program.

CONCLUSIONS

The attitudes and study habits of the students have a powerful effect their academic performance in mathematics lectures for the social department's students in the vocational school. By the changing and improving of students' attitude and math study habits, their academic performance will be enhanced. For this reason, social programs' mathematic lectures curricula and weekly lecture plan should be renewed. Also, teachers' motivation on the lecture should be determined by workshop studies and some necessary activities and daily life applications need to be added in the semester program. Finally, all research study about the attitudes toward mathematics and study habit of students are directly connected their academic performance, their daily lifestyles and enhancing of all school achievement.

REFERENCES

- Atanasova-Pacemska, T., Lazarova, L., Arsov, J., Pacemska, S., Trifunov, Z., & Kovacheva, T. (2015). Attitude of secondary students towards mathematics and its relationship to achievement in mathematics. In *Proceeding from the International Conference on Information Technology and Development of Education-ITRO, June 2015. Zrenjanin, Republic of Serbia* (Vol. 7, pp. 109-114). Technical Faculty" Mihajlo Pupin." Retrieved from <http://bit.ly/2W2qT89>
- Bloom, B. S. (1984). The 2 sigma problem: The search for methods of group instruction as effective as one-toone tutoring. *Educational Researcher*, 13(6), 4-16. <https://doi.org/10.3102/0013189X013006004>
- Capuno, R., Necesario, R., Etcuban, J.O., Espina, R., Padillo, G. & Manguilimotan, R. (2019). Attitudes, Study Habits, and Academic Performance of Junior High School Students in Mathematics. *International Electronic Journal of Mathematics Education* E-Issn: 1306-3030. 2019, Vol. 14, No. 3, 547-561.
- Chamot, A. U. (2004). Issues in language learning strategy research and teaching. *Electronic journal of foreign language teaching*, 1(1), 14-26. Retrieved from <https://nus.edu/2UxJNCs>
- Charles-Ogan, G., & Alamina, J. (2014). Differential students' study habit and performance in mathematics. *Journal of Education and Practice*, 5(35), 133-139. Retrieved from <http://bit.ly/2L3ueCY>.
- DuFour, R., & Mattos, M. (2013). Improve schools? *Educational Leadership*, 70(7), 34-39. Retrieved from <http://bit.ly/2GGB6C8>
- Liljedahl, Peter & Durand-Guerrier, V & Winsløw, Carl & Bloch, Isabelle & Huckstep, P & Rowland, T & Thwaites, A & Grevholm, Barbro & Bergsten, Christer & Adler, Jill & Davis, Zain & García Blanco,

- María & Sánchez, Victoria & Proulx, Jerome & Flowers, J & Rubenstein, R & Grant, Theresa & Kline, K & Moreira, Plinio & Chapman, O. (2009). *Components of Mathematics Teacher Training*. 10.1007/978-0-387-09601-8_4.
- Karjanto, N. (2017). Attitude toward mathematics among the students at Nazarbayev University Foundation Year Programme. *International Journal of Mathematical Education in Science and Technology*, 48(6), 849-863. <https://doi.org/10.1080/0020739X.2017.1285060>
- Moenikia, M., & Zahed-Babelan, A. (2010). A study of simple and multiple relations between mathematics attitude, academic motivation and intelligence quotient with mathematics achievement. *Procedia Social and Behavioral Sciences*, 2(2), 1537-1542. <https://doi.org/10.1016/j.sbspro.2010.03.231>
- Khoo, S. T., & Ainley, J. (2005). Attitudes, intentions, and participation. *LSAY Research Reports*, 45. Retrieved from <http://bit.ly/2UFAGJP>
- Rasberry, C. N., Lee, S. M., Robin, L., Laris, B. A., Russell, L. A., Coyle, K. K., & Nihiser, A. J. (2011). The association between school-based physical activity, including physical education, and academic performance: A systematic review of the literature. *Preventive medicine*, 52, S10-S20. <https://doi.org/10.1016/j.ypmed.2011.01.027>
- Sakirudeen, O. A., & Sanni, B. K. (2017). Study habits and academic performance of secondary school students in mathematics: A case study of selected secondary schools in uyo local education council. *Istraživanja u pedagogiji*, 7(2), 283-297. <https://doi.org/10.17810/2015.65>.
- Sirmaci, N. (2010). The relationship between the attitudes towards mathematics and learning styles. *Procedia-Social and Behavioral Sciences*, 9, 644-648. <https://doi.org/10.1016/j.sbspro.2010.12.211>
- Tapia, M., & Marsh, G. E. (2004). An instrument to measure mathematics attitudes. *Academic Exchange Quarterly*, 8(2), 16-22. Retrieved from <http://bit.ly/2v81vCh>.

POLYNESIAN YOUTH LITERATURE AND BILINGUAL PHILOSOPHICAL DISCUSSIONS AT SCHOOL

Deprez Simon
deprezsmon@outlook.fr

ABSTRACT

This research is motivated by curiosity, the need to better understand and better meet the needs of the Polynesian education system. In fact, in the multilingual Polynesian school, what is the meaning of the quest for knowledge and truth ? This study is a qualitative and exploratory research. The experiment will take place in Moorea, in class of year one (entry into learning to read, gateway class...). Initiating philosophical discussions at school from works of youth literature is possible (Chirouter, 2011). In addition, the school institution recognizes the interest of these practices (official programs, 2015). This research is innovative thanks to the parental involvement as well as its literary and linguistic Polynesian dimensions. Discussions can be in French or in Tahitian because the aim is rather to develop cognitive abilities, using the language as a tool (Vygotsky, 1935). The problematic is in what way would the practice of philosophical discussions based on endogenous youth literature stimulate the cognitive skills of the group ? As regards the method envisaged and analytical instruments, a corpus of Polynesian youth literature will be selected according to specific criteria. Parents will be invited to come and read a text in class and participate in the discussions. A work of understanding, and interpretation will then be followed by a discussion with a philosophical aim. The sessions will be recorded (linguistic transcription of exchanges, corpus study : cognitive interactions, analysis according to the taxonomy of Bloom; process of thought at work). Semi directional interviews with parents and oral questionnaires to students will be conducted. It may seem that some pieces of Polynesian literature would allow for philosophical reflection in the classroom, and that these discussions would develop the learning of philosophizing, reading and oral language. In addition, parental involvement would facilitate an additive bilingualism.

Keywords: Polynesian youth literature-oral communication-philosophy at school-bilingualism-parents.

FULL TEXT

This research is directed by Mrs. Rodica Ailincăi and co-directed by Mr. Alain Mougnotte. The topic of the research is Polynesian Youth Literature and bilingual philosophical discussion. How would the practice of philosophical discussions from Polynesian youth literature stimulate the Group's cognitive abilities ?

Initiating philosophical discussions (DVP) at school from works of youth literature is possible (Chirouter, 2011). In addition, the school institution recognizes the interest of these practices (Programs, 2015). My work is in line with the research of Michel Tozzi and Edwige Chirouter. For as in Michel Tozzi, the skills targeted included the ability to philosophize (conceptualize, argue and problematize) but also the mastery of discursive behaviors (Chirouter, 2013). In addition, similarly to Edwige Chirouter, the alliance between youth literature and philosophy is used to initiate philosophical discussions.

This research is innovative as it deepens knowledge and addresses DVP from youth literature by introducing two new factors, Polynesian literary and linguistic specificity and parental involvement, as bilingual philosophical discussions will be launched from endogenous youth literature. The thesis therefore includes an axis specific to the Pacific island environments, and more particularly to French Polynesia, the context of the research. Thus, this presentation consists of six parts: firstly an account on philosophical discussions, then the context of the research, the problem and the method, the literary corpus, the coeducational dynamic and the expected results.

A philosophical question is defined by three criteria (Tozzi, 2003). The first one is the universality of the question, that is to say that the question can concern everyone, regardless of their background social status, age, culture. Secondly, the question must create a possible controversy. It is not a closed question which can just be answered by yes or no. Thirdly, this question is formulated, debated, argued and discussed orally.

The intellectual requirements related to philosophical discussion are three in numbers (refer to Tozzi). Students must problematize. Find in the question what is controversial (example: do we all have the same fears ?). Conceptualize, that is to say define the notions (fear is ...). And argue, that is to say justify ~~his~~ their words.

THE CONTEXT

Is there a Polynesian philosophy ? On the occasion of an educational consultation on Friday, March 22, 2019 at Teavaro School, Hinano Murphy opened some interesting lines of thinking.

According to her, Polynesians have an island way of thinking, linked to the ocean. She emphasized their humility, their love and their respect for nature and people. They see themselves as an integral part of nature, with which they have a familiar and respectful relationship. Nature offers them natural medical care. For example, they know how to use coconut in many different ways depending on the different stages of ripening (beverage, rope weaving, medicines ...). All this knowledge helps to better understand the environment (learning to listen to the wind, the waves, to watch the fish, the sky, the movement of clouds, the flight of birds). In addition, it highlights the fact that Polynesians have the duty to pass this knowledge to future generations. She, for her part, feels she has a message to convey: we have a vested interest in taking care of our land to have a better life. Education seems to her very important to form ambassadors of nature. The importance of knowing one's culture seems essential to her. Valuing traditional knowledge, know-how and skills is crucial.

Polynesian philosophy might be a different way of life, another way of thinking the world, principles of life (the warm welcome, the familiarity of custom, the joy of living, love, simplicity, positivity, generosity, sharing, caring and fraternity, the generous smile, the habit of greeting everyone, kindness, the ability to live the present time, the unique relationship to nature, the magic of mana, the beliefs). Polynesian society has many specific characteristics. *Te reo* (language), *te 'ori tahiti* (dance), *te 'orero* (oratory), *te himene* (music), *te tatau* (tattoo) (Lamy, 2013). It is a special context.

This investigation is an integral part of the research of the team of Home Traditional and Contemporary Societies in Oceania (laboratory EASTCO, EA 4241). The investigation is conducted on site, in French Polynesia, in contact with Polynesians (students, parents, teachers, partners). This project is therefore an exploratory research that is a continuation of the work done by the members of the laboratory, in the field of school and family educational practices in French Polynesia (Rodica Ailincăi, Ali Maurizio, Gabillon Zehra, Mirose Paia, Eleda Petit, Bruno Saura and Jacques Vernaudeau).

This doctoral research takes place in French Polynesia, which is made up of 118 islands located in the heart of the Polynesian triangle (Hawaii, New Zealand, Easter Island). In the heart of the Pacific Ocean, this territory is composed of five archipelagos: the archipelago of the Society (composed of islands of the wind and the leeward islands), the archipelago of Tuamotu, the archipelago of Austral, the archipelago of Gambier and that of the Marquesas. Geologically, the islands of French Polynesia are of volcanic origin. They include high islands and atolls (Tuamotu). Most of them are surrounded by a protective coral reef, which acts as a bulwark against oceanic forces.

The Polynesian population overcame painful episodes (colonization, nuclear tests). In addition, it has undergone a policy of cultural assimilation (Paia, Salaün & Vernaudeau, 2016) which has resulted in a decrease in the inter-generational transmission of Polynesian languages.

Before the arrival of Europeans, houses of instruction (*fare ha'api'ira'a*) for men and women already existed. The transmission of knowledge was oral, mainly by singing and the memory was strongly solicited. Knowledge was often related to social practices. Thus, teachers taught « history, heraldry, geography, navigation, astronomy, astrology, mythology, time, numbers, seasons, genealogies, [...] the study of enigmas and comparisons » (Teuira, 2004). Nevertheless, these schools were mainly aimed at the favored social classes, the « eldest sons of the dominant families ». In fact, the Polynesian society of the past was divided into four great castes. «The *Ari'i-marō'ura* (sovereigns in the *ura* belt), the *Ari'i ri'i* (kings and queens of less importance), [...] the *hui ra'atira* (the nobility and bourgeoisie)) and the *manahune* (plebeians)».

To transform the Polynesian society into a civilized Christian state, the first weapon of the missionaries was education (Tagupa, 1980). Thus, in order to attract the population and evangelize them, small schools were built. Also, the Maohi were fascinated by writing (Barré, 1987), but often derided the biblical discourse. Literacy, was therefore a means used by missionaries to unite them. Even Pomare II, the king of Tahiti, wanted to discover, know and master scripting skills. The Maohi quickly understood that writing was a very useful means of communication for the management of transactions, the possibility of acquiring knowledge ... That is why, in 1818, the first copies of the Gospel are experiencing unprecedented success.

In the middle of the 17th century, the colonial administration encouraged the regrouping of populations within the villages. Thus, a new social, family and economic organization is in place, new standards appear. In 1860, Pomare IV promotes the surveillance and schooling of children, a necessary measure for the population gathering near the village. Polynesians are attracted by the dominant culture of the colonizer. For example, the concept of the rights of persons and property has altered attitudes and behavior.

The arrival of missionaries brings about a normalization of the Tahitian language. As they perceive the need to take into account the local language in their teaching. Thus, in 1805, an alphabet is created for Reo Tahiti with 5 vowels and 8 consonants. In 1810, the first school book in Reo Tahiti was published (AEBI no Taheiti). From 1815 to 1817, several schools were created where the Reo Tahiti was taught.

However, in 1842, the protectorate with France was signed and the governor outlawed the Reo Tahiti schools in 1857. This ban will last more than a century. The school has therefore played an important role in the language reduction process. Since the French language was the language of academic success and social advancement.

It was not until 1970 that the Vice-Rectorate was created and the sanctions imposed on Tahitian-speaking children were abolished. In 1980, the territorial assembly of French Polynesia decreed Tahitian as the official language of the territory jointly with French. In 1981, the Déixonne law allows the teaching of regional languages in schools. Then, in 1982, Polynesian languages became part of compulsory education in primary schools. In 2005, multilingualism is promoted, all Polynesian languages are valued. The *Orero*, public speaking, is promoted in 2008 in schools. The ECOLPOM program is set up in 7 classes of Moorea from 2008 to 2010. This program involves five hours of teaching Polynesian languages per week. The results are positive, as the students can speak better Reo Tahiti and French, thanks to the transfer of competences. The valorization and the implication of the families in the transmission is fundamental.

A new charter of education is born in 2011. It is structured around three main axes. A school open, powerful and for all. The goal is the success of all students. Language proficiency contributes to the formation of the person and the citizen. The school must rely on linguistic diversity to promote multilingualism.

Since the 1970s, identity claims have led to the adaptation of school curricula to local linguistic and cultural distinctiveness. However, Marie Salaün wonders about the effect of the transmission of indigenous knowledge by the school, in a decontextualized situation. She questions the impact of institutional formatting. For example, from the transition from oral transmission to written transmission. But also, from the local to the universal, from the elite to the whole group, from experience to theory, from mystical beliefs to scientific knowledge. Moreover, she thinks that a change in the modalities of transmission induces a modification of the contents. Moreover, according to Sundar (2002), the recognition of indigenous knowledge is a political process influenced by the identity claim of local populations.

In 2011, a symposium entitled “Learn several languages, several language to learn a place”. According to Jacques Vernaudeau, a multilingual person is a speaker who uses two or more languages daily, according to the registers or functions. The bilingual person is able to manage the languages according to the situations of communication. This ability boosts intelligence. According to Christine Helot, a university professor in Strasbourg, bilingual education works with all languages, even minority languages. No negative repercussions are to be feared. It seems important to her to show children that their language, their differences are legitimate while building a multilingual culture. Jim Cummins, professor of education at the University of Toronto, agreed with Christine Helot. He added multilingual education to many intellectual and linguistic benefits. The loss of Aboriginal languages results in a significant cultural deficit. In addition, between learning to read, write and oral language, learning in Tahitian has positive impacts in French and vice versa. For what I learn in one language helps in another. After generations of monolingual “linguistic imperialism” and symbolic violence, today the school institution promotes multilingualism (Vernaudeau, 2018).

Today, school failure, dropout, widening of gaps, poverty, delinquency, alcohol and drugs are the ills of Polynesian society. According to Serra Mallol (2010), despite significant financial resources allocated by the State, the Polynesian system is known for low performance and to have many dysfunctions.

First of all, the cost of a Polynesian student is higher than in metropolitan France (salaries, internships, transportation ...). In addition, students' scores on national assessments are lower than metropolitan students. The gap is widening in higher education. In 2010, 40% of students left school without a diploma and only 38% of students graduated. School failure, absenteeism, school dropout are too great.

The school of the French Republic is an essential institution of a democratic society. It aims at the formation of free and autonomous citizens and the acquisition of knowledge, skills and attitudes essential to social integration. The causes of the failure of the Polynesian education system are explained in a plural way. First, the socio-professional situation of parents, a context of social precariousness is at stake. Secondly, the lack of training of teachers and their distribution, made difficult because of insularity. In fact, despite a salary bonus, isolated islands or remote atolls are struggling to attract full teachers. Finally, an interesting reason, as part of this research has pointed out, is the cultural cause, more exactly, the « differences in learning-teacher culture » (Mallol, 2010).

A Rodica Ailincăi (2010) research conducted in Guyana mentions the reasons for the lack of school performance in a multilingual and multicultural context, namely, student education, insufficient teacher training, socio-linguistic context (linguistic isolations with different values), social difficulties (geographic isolation). Indeed, according to the groups, investment in schooling differs. In addition, the influence of the family is considerable. Family realities explain the differences between students.

This research is motivated by curiosity, the need to better understand and better meet the needs of the Polynesian education system. In fact, in the multilingual Polynesian school, what is the meaning of the quest for knowledge and truth? Namely, culture and reading are part of the aspirations of mankind, which gives meaning to life. This research is innovative by its

literary and linguistic Polynesian dimension. Discussions can be in French or in Tahitian because the aim is rather to develop cognitive abilities, using language as a tool (Vygotsky, 1935). This exploratory qualitative research is innovative because bilingual philosophical discussions will be launched from endogenous youth literature.

The experiment will take place in Moorea, in class of year one (entry into learning to read, gateway class). The transition to the class of year one is a turning point in child schooling, with a major challenge (Frier, 2006), that of learning to read. The goal is clearly defined and the social issue is important. In addition, the preparatory course is a bridge class. A transitional step between kindergarten and elementary school.

Geographically, Moorea is part of the Windward Islands in the Society Islands with an area of 134 km². It is located at about 18° latitude and 150° longitude. It is a lush green island, surrounded by a coral reef and a beautiful lagoon. Marine biodiversity is abundant. The mountains are covered with lush tropical forest due to heavy rainfall and high temperature. Exotic fruits and flowers grow in abundance. The beauty of the landscape attracts many tourists. Despite its insularity, the island of Moorea is not in a real situation of isolation, as the proximity to the island of Tahiti influences its socio-cultural, economic and linguistic context.

LINGUISTIC CONTEXT

French Polynesia is experiencing a situation of multilingualism. Several parameters can explain this phenomenon: successive immigrations, insularity and colonization. In August 2016, Jacques Vernaudeau (2016) drew a portrait of the linguistic situation in French Polynesia in the context of welcoming new staff.

There are many dialects, Polynesian indigenous languages, which correspond to specific linguistic areas (*Reo Tahiti*, *'Eo' Enata*, *'Eo' Enana*, *Reko Pa'umotu*, *Reo Tuha'a pae*, *Reo Mangareva*, *Reo Rapa*). In addition, French remains the official language. It is the language mainly used by the school institution. The French language symbolizes success in school and social climbing. Also, due to Asian immigration, the Chinese languages (Hakka and Punti) are spoken by more than 1000 people. Finally, it is important to understand that the vehicular languages are French (or rather a local variety of French) and Tahitian.

Moorea-Maiao numbers 16899 inhabitants including 2745 children under 10 years old. 95% of the population declares to be fluent in French and 79% in Tahitian. 65% use French in their family and 32.4% speak Tahitian. At the school of Paopao, 95% of individuals over 15 years of age declare to master French and 71.6% Tahitian. 70.7% use French in their family and 26.4% speak Tahitian.

In the preservation of the Tahitian language and culture, the school has an important role to play, Polynesian languages have a legitimate place in education.

On the occasion of the book fair, a short film, *Te Reo tumu*, was screened. This film wonders about the future of the Polynesian languages. Indeed, children are no longer stimulated, they do not know how to speak in Tahitian anymore. Tahitian-speaking children are rare, approximately 13% (4 out of 30). Many children understand Tahitian but do not speak it. How did this happen ? With the arrival of the consumer society, the French and English languages have been considered by Polynesians as the languages of social success. Furthermore, at school, the violence of the ban on speaking Tahitian was not only symbolic, as punishments and corporal punishment were practiced (ruler blows, pulling weeds ...).

Officially, the adapted programs of French Polynesia (2016) advocate 2h40 of weekly teaching devoted to learning the Tahitian language. In addition, Polynesian can be used as a language of instruction in physical education and sports or other lessons. In Cycle 2, focusing on the skills related to this research, oral language is the priority. Students must be able to take part in a conversation through communication situations. In a constructivist approach, student errors are a learning step. In addition, learning activities must be linked to cultural appropriation.

During discussions, the root language brings an emotional dimension that could release the students' speech differently (intensity, frequency, depth ...). And one of the hypotheses of this research is that depending on the language used during the discussion, the students' comments will be different.

For Marie Salaün (2016), « the consideration of vernacular languages and indigenous cultures in formal education is today seen as the best way to repair the wrongs of colonization and promote school justice ». She focused her research on educational experiments in Hawaii and New Zealand.

In Hawaii, immersion schools have been created, and teaching is done in *'Ōlelo Hawai'i*, the native Hawaiian language. In New Zealand, there are teachings related to Kanak culture and language. As in French Polynesia, these territories have had a colonial history marked by Christianization and schooling.

According to official instructions (2016), imperfect expression is part of the process of acquiring a language. Thus,

when learning a language, recourse to a second language is advisable when needed. The de-dramatized speech takes advantage of the risk taking necessary for learning. Also, sound recording facilitates the analysis of language practices. Benevolent and formative assessment is preferred. The linking of languages is recommended through comparisons around a youth album.

Thus, during the experimentation phase of this research, the mixture of languages will not be pointed out. On the contrary, this mix of languages will « honor languages, maintain culture and show students that they can incorporate their own language into the discussion » (Alice, 2018). The monolingual teaching framework being insufficient, it is a question of noticing the pearls of language mixture in the oral speech of the pupils in order to improve the control of the two languages.

During a roundtable, which took place on November 17, 2018 at the Papeete House of Culture, the moderator debaters (Vernaudeau) recalled an essential aspect of learning a language, to speak as much as possible. Thus, it is important to break down and speak without fear of being wrong. Indeed, in a constructivist approach, error is a stage of learning. Learning grammar then refines learning.

Furthermore, from a neuroscientific standpoint, at the cognitive level, bilingual learning programs would promote the control of student attention. This would be explained by « the continued use of the attention required to manage the selection between two jointly activated languages » (Hewings-Martin, 2019). Besides, the promotion of additive bilingualism will contribute to transferable intellectual gymnastics in other areas.

At the DVP, the root language brings an emotional dimension that could release differently the speech of the students (intensity, frequency, depth ...). And one of the hypotheses of this research is that according to the language used during the discussion, the students' comments will be different.

Also, Anne Sophie Cayet (2018) highlights an essential aspect in this research focused on the Polynesian education system. The DVP « promotes plurilingual and intercultural exchanges but always through individual subjectivities ». Thus, cultural and linguistic differences do not confine students to their origin. They are « apprehended as universal-singular subjects, beyond cultural determinisms » (Cayet, 2017).

« Linguistic and cultural diversity [is] envisaged with the possibility of multiplying the points of view, of making the understanding of the world more complex and of making them captivating (Chirouter, 2015) which suddenly gives more of individual experience » (Cayet, 2017).

METHOD AND ANALYTICAL INSTRUMENTS

Inspired by the conclusions of a congress of specialists inventorying the approaches and tools of analysis (symposium, 2013), from the human sciences, possible in a DVP. We are led to understand how to analyze DVP situations and professional practices in school context. The main objective related to the problematic is to account for the cognitive dynamics during DVP from the endogenous literature.

A corpus of Polynesian youth literature will be selected according to specific criteria (tales, legends or albums of the society's archipelago; bilingual works or which contain a certain degree of language mix; works adapted to class of year one). Parents will be invited to come and read a text in class and participate in the discussions.

A work of understanding, and interpretation will then be followed by a discussion with a philosophical aim. The sessions will be filmed, with a linguistic transcription of the exchanges and nonverbal aspects (gestures, mimicry) because the nonverbal components in the communication are very important. The study will focus on cognitive interactions between parents, children and teachers; as well as the processes of thought at work). So, the sessions will be recorded (linguistic transcription of exchanges, study of corpus: cognitive interactions, analysis according to the taxonomy of Bloom; process of thought at work).

Semi-directional interviews with parents and oral questionnaires to students will be conducted. About 20 students will participate in the experiment and will be questioned orally. Student questionnaires will be individualized to mitigate peer group influence.

Moreover, some parameters will be constant. In fact, it will always be the same researcher, the same teacher, the same activity, the same mixed class, the same time of the day and the same room.

In addition, as a guide to the method of collecting data, Johanna Howken (2017) has created a timely didactic and pedagogical tool, the circle of philosophical discussion. This is a diagram that represents the thread of discussion among students. This makes it possible to visualize the distribution of the exchanges and to measure equality between the speeches within the discussion.

Furthermore, reflective drawing is another relevant analytical tool (Molinié, 2010). This is a representation made by each student at the beginning or end of the workshop. These drawings are completed by the students and become supports for the discussion. Moreover, they facilitate the emergence of cognitive processes specific to the philosopher (conceptualize, problematize, argue). In preparation, with the young students, these courses allow an abstraction (Cayet, 2018), a reflexive distance and a crystallization of philosophical reflection. For instance, drawing one's conception of happiness (conceptualization), then identify what is pleasure or happiness (problematization). Finally, the verbalization is necessary to the fine analysis of the drawing. Paul Ricoeur (1975) speaks of metaphorical truth. Namely, links between the « concepts, perceptions and affirmations of the world from a figurative, linguistic and philosophical point of view » (Cayet, 2018) are woven.

To facilitate the concentration of students, relaxation exercises will be performed at each philosophical discussion (comfortably in your chair, uncross your legs, and stay quiet, breathe slowly and deeply). Indeed, according to the researches of Florent Pasquier and Raymond Barbry, these roles develop students' concentration skills and reduce conflicts.

In addition, according to research conducted in Brazil (Silva, 2015), a physical education and sports session also facilitates the concentration of students. Thus, an alternation between physical and intellectual activities optimizes cognitive performance (Jarraya, S. Jarraya, M. Souissi, 2016).

LITERARY CORPUS

Using endogenous teaching aids (stories, legends, proverbs ...) makes it possible to ensure a cultural transmission and a pedagogy more adapted to the pupils. In addition, the endogenous youth literature generates strong cultural stakes, an authenticity in the pedagogical relationship and a quest for meaning in relation to knowledge (Kola, 2016).

In addition, the programs (2016) offer a progressiveness of which one of the themes is the childish universe. The use of Polynesian tales and legends is strongly recommended. In fact, students must be able to follow the thread of a story while listening to the reading of albums. A story made of knowledge and skills. Students are invited to exchange around a youth album.

As European heritage tales, the transmission of myths and legends in Polynesia of old, was conducted orally. Indeed, « Oral [...] literature held a very important place in ancient societies » (Gleizal, 1986). This literature had aesthetic and educational functions. It transmitted many « religious, scientific and technical » knowledge (Gleizal, 1986).

A research carried out by Étienne Kola (2016), *Making Philosophy with African Children from the Endogenous Cultural Background: Track of an Educational Renewal in Africa* is relevant to justify the use of a Polynesian youth literature. His conclusions are as follows: using endogenous didactic materials (stories, legends, proverbs ...) ensures a cultural transmission and a pedagogy more adapted to the students. In addition, the endogenous youth literature generates strong cultural stakes, an authenticity in the pedagogical relationship and a quest for meaning in relation to knowledge (Frier, 2006).

Also, in the plurilingual context of the other seas, Isabelle Nocus, Jacques Vernaudeau and Mirose Paia (2014) advocate the use of identity texts to stimulate student engagement in reading. It is a question of stimulating the learners' appetite for reading by using adapted teaching strategies (activate students' experience, assert their cultural and linguistic identity). In fact, the affirmation of identity favors the educational success of Aboriginal groups. The aim is to generate « empowerment » (Nocus, I. Vernaudeau, J & Paia, M., 2014) through interactions between teachers and students by creating an educational program aimed at the development of both languages. The ideal is to choose a program that develops critical thinking and values students' talents (linguistic, literary, cognitive ...).

At a conference titled *Eating the Language* that took place at the Papeete House of Culture on November 17, 2018, three writers (Chantal Spitz, Patricia Grace and Fabienne Kanor) shared their literary vision. Their literatures describe close landscapes, their writings deal with identity and its relationship to the world (do not forget who we are !). Indeed, their literatures reflect their rhythms, their tastes, their look... It seems important to them to anchor their fictional worlds in reality, to integrate their culture, to allow a process of identification to the characters.

The choice of the body of youth literature was based on precise selection criteria. Indeed, I have chosen to restrict the corpus to deepen my thinking. This corpus comes from a scientific choice, the texts are rigorously selected.

Considering the learning of reading as a moment of pleasure, a bearer of meaning (Frier, 2006), the choice of books for experimentation turns towards the books of youth literature (specific literary form, particular text-image ratio, strength of illustrations...). In effect, thanks to the narrative and its characters, the process of identifying receivers is facilitated.

Catherine Frier proposes to end the reading session undergone without any dialogue. For students get bored, waiting. The school should privilege shared reading in all its forms because it develops an intrinsic motivation. According to her, exchanging situations are « a gateway to learning » (Frier, 2006). My proposals for classroom implementations will complement the tools available to education professionals and will benefit a large number of students.

As part of this doctoral research titled Polynesian Youth Literature and Bilingual Philosophical Discussions, I have selected 6 books among the youth literature.

These are albums, tales or legends of the Society Islands (Tahiti and Moorea). Books are bilingual or contain some degree of code mixing. The books are adapted to the age and culture of CP students (children 5-6-7 years old). Finally, the literature raises philosophical questions.

These Polynesian stories help students to better understand their environment, to become the heirs of the Polynesian literary and cultural heritage. Anchoring of students in their culture gives meaning to learning. For, while preserving us from extreme nationalism, we are forced to note that the knowledge of one's own culture is a necessary prelude to openness.

In addition, the programs adapted to French Polynesia recommend the use of youth literature fitting to the age and culture of the students, starting from the immediate environment.

Then, the narrative frame unfolding in the near environment, the places of the story can be known to children. The vocabulary used is familiar, it is part of the close environment, the real context of the child. The student has a lot of personal, family experience to share with the research community. Fictional stories can appeal to their memories, to the sensations they know. Thus, the visual, auditory, olfactory and kinesthetic sensory experiences related in the works are part of their emotional memory (examples: the perfume of the flowers, the mountains on which they climb, the sources in which they have bathed, the animals they've met ...). And even if they do not know the places, plants or animals, the shared reading of these books could allow a later family outing in order to explore what we have discovered in the books.

An example of the corpus : *Ari'i the moon parrot fish*, written by Annie Sossey, illustrated by Carine Thierry. To begin with, the summary of the story: a little boy has fun disguising himself as a parrotfish while his father is fishing. He decides to jump in the water but may drown, his dad saves him.

It is therefore a fishing story that will facilitate the process of identifying children, as they will easily talk about their personal and family experiences. This book in Tahitian language offers a Polynesian atmosphere reflecting the island philosophy, facing the ocean. The story recounts situations of daily life in French Polynesia.

After working on understanding the text, what philosophical extension can we give to this work with a class of year one students ? This is asking a philosophical question related to the text read. In this story, for instance, the little boy goes from laughter to tears. Thus, we can ask students: why does the character cry ? And you, why do you cry sometimes ? How did he feel in the water ? What emotion did he feel ? He was afraid. And you, what are you afraid of ? In fact, what is fear ? The discussion is launched ...

Narrative is "the tool of construction of culture" (Bruner, 2008), it is the "main medium of exchange within a culture" (Bruner, 2008). This is why it seems interesting to rely on the literature of youth to develop a successful coeducation with parents.

COEDUCATIONAL DYNAMIC

This research is innovative by the parental involvement it includes. The education of a child does not stop at the doors of the school, families have an essential educational role to play. Indeed, there is a significant correlation between the school failure of children and the disinterest of families. The weaving of a bond of trust between the actors of the school, the school institution and the parents is fundamental. Parental involvement in educational and pedagogical projects is necessary (Mallol, 2010). Parents will be valued by their cultural and linguistic skills.

One way to improve the Polynesian education system would be to open the school to families and to society as a whole. In other words, the education of a child does not stop at the doors of the school, families have an essential educational role to play.

The weaving of a bond of trust between the actors of the school, the pupils and the parents is fundamental. Parental involvement in educational and pedagogical projects is necessary. A re-appropriation of the school by parents is judicious in order to change representations.

The experimentation of this research plans to involve the parents by inviting them in class to read a piece of literary

work in French or Reo Tahiti. Following this, they can actively participate in the philosophical discussion. A relationship of mutual trust is therefore woven through this investigation.

In a co-educational perspective, the parents' reading and their active participation in the DVP will nourish the reflective discourse of the group and enrich it with their linguistic and cognitive abilities.

Moreover, as passers-by, to use Catherine Frier's term (2006), parents and teachers will become mediators between the book and the child. They will be able to guide students' thinking and support their comments. School teachers have an interest in working with families (Frier, 2006). This research creates bridges between family and school practices.

Further to this, an investigation conducted by Rollande Deslandes and Richard Bertrand (2004) helps to better understand how to motivate parents. To boost parental involvement, an invitation from the teacher is necessary. This can be done face-to-face or by phone. The goal is to have a direct and personalized contact. Secondly, it is important that parents perceive the importance of their involvement in their child's academic success. They must also identify the expectations of the teacher, understand their positive role, unique and privileged. Finally, the teacher who aims for a co-educational partnership must value the skills of the parents, in this case as part of this research, linguistic, cultural and reflective skills.

EXPECTED RESULTS

To conclude, we will concentrate on the expected results. This research is being ventured into unknown tracks, where success is not guaranteed. It may seem that some parts of Polynesian literature would allow philosophical thinking in the classroom. That these discussions would develop the learning of philosophizing, reading and oral language. In addition, parental involvement would facilitate an additive bilingualism.

What's more, the experimentation of this research has thus resulted in a practical and practical educational situation with class of year one students. Polynesian youth literature albums are a cultural medium for an environment close to students (local context). It is a program of open-mindedness, reflection built by the research community (tending toward more truth).

REFERENCE SECTION

Research works

- Baré, J.F. (1987) Tahiti, times and powers. For a historical anthropology of post-European Tahiti, Paris, Orstom, 94.
- Bruner, J. (2008). Culture and ways of thinking, France, Retz, 8-9.
- Chirouter E. (2015). The child, literature and philosophy, Paris: L'Harmattan, 168.
- Frier, C. (2006) Readers, Reading together at home and at school. Ed. Retz, coll. Forum Education Culture, Paris, 4.
- Gleizal, G. (1986) Everyday life in Polynesia of ancient times, encyclopedia of Polynesia, Multipress, 102.
- Nocus, I. Vernaudon, J & Paia, M. (2014). The multilingual school in overseas: Learn several languages, several languages to learn, ed. PU Rennes, coll. Companies, Rennes, 55-56.
- Ricœur P. (1975). The lively metaphor, Paris: Editions du Seuil.
- Teuira, H. (2004 [1928]) Tahiti in ancient times, Paris: Society of Oceanists, 282.
- Vygotski, L. (1997) Thought and Language, ed. The Dispute, Paris.
- Vygotski, L. S. (1934). Thought and Language, Translation by F. Sève, Paris: Messidor / Editions sociales.

Research Articles

- Ailincal, R. (2010) Educational Interactions in a Plurilingual and Multicultural Context. CMLF 2010 - 2nd World Congress of French Linguistics, New Orleans, United States, 11. <halshs-00504108>.
- Deslandes, R. and Bertrand, R. (2004). Motivation of parents to participate in school monitoring of their child in primary school. *Journal of Educational Sciences*, 30 (2), 411-433. Doi: 10.7202 / 012675ar.
- Jarraya, S. Jarraya, M. Souissi, N. (2016) Physical Education and Sports: Effect on Cognitive Performance of Tunisian Schoolchildren, *Childhood* 2016/3 (No. 3), 315-327. ISSN: 0013-7545.
- Kola, E. (2016). To make philosophy with African children from the endogenous cultural background: Track of an educational renewal in Africa. *Theological and Philosophical Laval*, 72 (2), 261-271. doi: 10.7202 / 1039297ar.
- Parrini-Aleman, S. (2007) Background and Contextualization in the Qualitative Approach to Organizational Communication QUALITATIVE RESEARCH - Special Issue - Issue 3 Proceedings of the Colloquium BALANCE SHEET AND PROSPECTS FOR QUALITATIVE RESEARCH © Association for Qualitative Research, 338. ISSN 1715 -8702.
- Silva AP, Prado SOS, Scardovelli TA, Boschi SRMS, Campos LC, Frère AF (2015) Measurement of the Effect of Physical Exercise on the Concentration of Individuals with ADHD. *PLoS ONE* 10(3):e0122119. doi:10.1371/journal. Pone.0122119 .
- Sundar, N. (2002), "Indigenizing, indianizing and spiritualizing education? A whole program ... ", *International Social Science Journal*, 173, 413-424. DOI: 10.3917 / riss.173.0413.

Research Articles on line

- Ailincal, R., Delcroix, A. (2017) "Collection of a corpus of teaching and parenting educational practices in French Polynesia. Presentation of the PrEEPP project ", Contexts and Didactics [Online] (accessed 03 March 2019). URL: <https://www.contextesetdidactiques.com/215>.
- Cayet, A.S. (2018) Philosophical discussion: a pedagogical device in the service of plurilingual and intercultural education. SHS Web Conf. Volume 52. ICODOC 2017: The resources mobilized in interaction. N ° 01003. [Online] (referred to 03 March 2019) <https://doi.org/10.1051/shsconf/20185201003>.
- Chirouter, E. (2011). "Does youth like short forms? The child, literature and philosophy ", Publije, 2. [Online]. (Accessed March 19, 2017) <http://ressources.univ-lemans.fr/AccesLibre/PRN/publije/Vol2/pdf/2.B2.CHIROUTER.publije2.OK.pdf>.
- Chirouter, E. (2013). "Thinking the world through literature: analysis of a philosophical practice in primary school. ", Journal of Educational Sciences 391, 91-117. [Online]. (Website accessed March 19, 2017). <URL: file: /// C: /Users/extas/Downloads/1024534ar.pdf.
- Hawken, J. (2017). The draftsman of the circle of the philosophical speech: a new function to schematize the nature of the discussion, Diotime, n ° 74 (10/2017). [Online]. (Website accessed on October 22, 2018). <URL: www.educ-revues.fr/DIOTIME/AffichageDocument.aspx?iddoc=110225.
- Hewings-Martin, Y. (2019) "Bilingualism: What happens in the brain? Medical News Today. [Online]. (Website accessed on April 19, 2017). <URL: <https://www.medicalnewstoday.com/articles/319642.php>.
- Paia, M., Salaun, M., & Vernaudo, J. (2016). "Tahitian is to say hello and goodbye": words of children on a native language in suspension. Childhood, Families, Generations, 25, summary. [Online]. (Website accessed on April 19, 2017) <https://id.erudit.org/iderudit/1039498ar>.
- Lamy, F. (2013). Tattooing: media of Polynesian culture. Hermes, La Revue, 65, (1), 165-170. [Online]. (Website accessed on April 19, 2017) <https://www.cairn.info/revue-hermes-la-revue-2013-1.htm-page-165.htm>.
- Salaun, M. (2016) "Is Aboriginal Culture Soluble in School Form? Reflections from some educational experiences (Hawai'i, New Caledonia) ", Research Papers on Education and Knowledge [Online], 15 | 2016, posted on May 10, 2016, accessed May 16, 2019. URL: <http://journals.openedition.org/cres/2959>.
- Serra Mallol, C. (2010) "The Polynesian Educational System: Diagnosis and Recommendations of the French Overseas General States in French Polynesia", Research Gate. p. 4. [Online]. (Website accessed on March 17, 2019). <URL: https://www.researchgate.net/publication/281204733_The_polynesian_system_diagnosis_and_recommendations_of_General_States_of_the_other_in_in_Polynesia_english.
- Tozzi, M. (2003) Practices of philosophical discussion in primary school and college, issues and specificities, Cahiers pédagogiques, No. 432, "La philo en question", February 2003. [Online]. (Website accessed on February 20, 2017). <URL: <http://www.cahiers-pedagogiques.com/The-practices-of-discussion-to-visit-philosophicalA-l-school-primary-and-to-college-issues-and-specificities>.

Official instructions

- Elementary School and College Education Programs (2015), Ministry of National Education. B.O. Special No. 11, November 26.
- Programs adapted to French Polynesia cycles 2 and 3 (2016), Ministry of Education and Higher Education of Youth and Sports. Order No. 1026 CM of July 27, 2016 establishing the programs Cycle 1, Cycle 2 and Cycle 3 of the primary school and college of French Polynesia.

Internet sources

- Pasquier, F. and Barbry, R. (2018). Practices of full attention and effects of meditation. Instructional Books, 547. [Online]. (Website accessed on February 20, 2017). Spotted at www.cahiers-pedagogiques.com/Pratiques-de-pleine-attention-et-effets-de-meditation.
- Symposium, Analyzing School Situations and Practices for Philosophical Discussion (2004). CERFEE-IRSA / LIRDEF Study Days 4/5 June 2004, Iufm Montpellier and University Montpellier 3, [Online]. (Website accessed on March 10, 2019). <URL: <https://www.philotozzi.com/2004/09/analyze-the-situations-and-practice-school-of-the-philosophical-visit-content/>

University of French Polynesia, TEAM HOSTING TRADITIONAL AND CONTEMPORARY SOCIETIES IN OCEANIA (EASTCO EA 4241). [Online]. (Website accessed on April 17, 2017). <http://www.upf.pf/fr/content/equipe-daccueil-societes-traditionnelles-et-contemporaines-en-oceanie-eastco-ea-4241>.

ISPF and INSEE, general census of the population 2015. [Online]. (Website accessed on February 17, 2019). <URL: http://www.ispf.pf/bases/Recensements/2012/Donnees_detaillees/Langues.aspx.

Vernaudo, J. (2016). Languages in French Polynesia. [Online]. (Website accessed on February 17, 2019). <URL: https://www.education.pf/wp-content/uploads/2016/08/diapo_vernaudo_accueil-enseignant_5aout2016.pdf.

Others

- Molinié M. (eds.) (2010). *Reflective Drawing: Element for a Hermeneutic of the Plurilingual Subject*, Cergy-Pontoise: CRTF-Belles Lettres.
- Vernaudon, J. (2018). What do we do with our languages? Round table, 18th book fair on the theme of languages from 15 to 18 November from 16:20 to 17:40 at the House of Culture. Debaters: Marquesan speakers, paumotu, reo tahiti, mangereva / gambier, hakka.
- Ancient History (2007), "Socrates and Plato, the Place of Philosophy in the City", No. 33, 20-21.

Audio-visual sources

- Sossey, A. Carine Thierry C. (2015) Ari'i the moon parrot fish, éd. CRDP in French Polynesia [Online]. (Website accessed March 19, 2017). <https://youtu.be/QdeQQzi9tsw>.
- Te reo tumu, Polynésie première (2016). [Online]. (Website accessed March 19, 2017). <https://youtu.be/r3ykATO0ZmA>.
- Murphy, H. (2014). [Online]. (Website accessed March 19, 2017). <https://www.youtube.com/watch?v=3gBYYqItGOW>.

PREPARING ENGINEERING STUDENTS FOR THE EXPECTATIONS OF THE LABOUR MARKET

Ildikó HOLIK

Ágoston Trefort Centre for Engineering Education, Óbuda University, Hungary
holik.ildiko@tmpk.uni-obuda.hu

ABSTRACT

In present-day higher education, it is becoming an increasingly emphatic goal for students to gain modern, applicable and practical knowledge during their training, which will help them navigate within the world of work as well as in everyday life (Bodnár et al, 2017; Hives, 2006). However, it is a frequently asked question how to achieve this goal. What abilities and skills need to be developed besides professional knowledge?

In the fields of IT and engineering, the challenge is especially great, as graduates must also adapt to the rapid technological development in order to stand their ground in the labour market (Markes, 2006; Conlon, 2008; Lappalainen, 2009; Kolmos, 2006; Van der Molen et al, 2007; Williamson et al., 2013).

The aim of our study was to survey the abilities and skills of engineering informatics students and to find ways to develop them. We asked them what competences they considered necessary in the labour market and which of these they thought they had.

The study was conducted in the academic years 2016/2017 and 2017/2018, surveying 475 freshmen engineering informatics students altogether.

INTRODUCTION

The technological development of the 21st century and the constant changing of the labour market also pose new challenges for the labour market. The technological paradigm shift has resulted in a change of attitudes in higher education. The new focus now has to be on the factors determining the quality of education: result-based education and competence development based on the demands of the labour market as well as practice and student-based methodological solutions (Bodnár et al, 2017).

It is becoming increasingly important for students to gain, modern, applicable and practical knowledge during their training, which will help them navigate within the world of work as well as in everyday life. Thus, one of the priority objectives of higher education is to prepare students for a successful working life.

However, it is a frequently asked question how to achieve this goal. What kind of knowledge must higher education pass on besides professional knowledge? What abilities and skills ought to be developed?

How can young people prepare for the challenges of our time? (Molnár et al, 2018; Simonics, 2017)

When browsing through job advertisements, we can often see such requirements as excellent communication and negotiation skills, problem solving ability, cooperation and organisational and managerial skills. Furthermore, candidates should also be able to act decisively, have a high load capacity, the ability to work independently, good analytical skills, creative thinking, precise work, flexibility, team spirit, high motivation and success orientation as well as foreign language knowledge and computer literacy (Engler, 2004). The question is how higher education can help young people live up to all these expectations.

DEVELOPING HARD AND SOFT SKILLS IN HIGHER EDUCATION

The general aim of higher education is to provide students with field-specific knowledge, skills and competences that they can apply and use in practice in the workplace in a variety of circumstances. This knowledge is divided into two different parts by the literature: hard and soft skills.

The knowledge which can be learnt in the school, from books, is generally referred to as hard skills. It is relatively easy to measure and test and has a tried and trusted evaluation system. Once the students have acquired this general and professional knowledge, it will determine the rules and routines of what and how to do in different situations. Employers can easily be informed about these skills, such as language knowledge, numeracy and the knowledge of computer programmes.

‘Soft skills’ is an umbrella term for all the abilities and skills which, in addition to professional competence, will fundamentally determine how the employee can adapt, to what extent (s)he can be motivated and how (s)he can solve different problems (Tóth, 2017).

Soft skills are grouped in different ways in the literature.

Bennett et al (1999) divide them into four main categories:

- self-management,
- relationships with co-workers,
- information management and
- problem solving skills.

Gallivan et al (2004) divide them into six categories: communication and interpersonal skills, managerial and organisational skills, self-motivation and creativity. According to their survey, these occur in some 26% of online job advertisements.

Beard et al (2007), in their survey of 250 respondents, mention 13 soft skills expected by employers. These include communication skills, analytic thinking, team-work, interpersonal and organisational skills, motivation and the flexibility of thinking.

Chamorro-Premuzic et al (2006) created a soft skill system consisting of 15 components, which are the following: communicational, interpersonal and emotional intelligence, intuition, creativity, critical thinking, team-work, the skills and ability for self-regulation, working under great pressure, the willingness to learn, attention to detail, responsibility, planning and organisational skills, maturity and professionalism.

It is important to state that the groups of hard and soft skills complement each other, are equally important and their synergy can provide more efficient learning and teaching processes and an improvement in the quality of higher education (Daruka, 2017).

The development of hard skills is markedly present in the training programmes of Hungarian higher education institutions, whereas the deliberate improvement of soft skills is much less so.

EXPECTATIONS ON THE LABOUR MARKET

The world of work is constantly changing and these changes are manifold. Shorter and shorter time is available to adapt to actual situations; therefore, the abilities and skills that make accelerated adaptation possible in the long run are gaining in value. Such abilities and skills are, for example, the ability and willingness to learn independently, flexibility and adaptability.

It is often expected in the world of work that the employee be able to solve problems and elaborate new projects in co-operation with colleagues working in different parts of the world and having different cultural backgrounds. This requires digital literacy and good written and oral communication and co-operation skills (Daruka, 2017).

In accordance with the changes of the labour market, the characteristic features corresponding to labour market demands may be rearranged and new skills appear as requirements.

In its expert analysis, the World Economic Forum (2014) compared the 10 skills that were considered the most important in 2015 with those expected to be the most important in 2020. In their opinion, some skills which are considered important today will not even be on the list of ten in 5 years' time, such as the ability for quality control or active listening; there will be depreciating ones like harmony with others, negotiations skills, service mentality; appreciating ones such as judgement and decision, creativity and critical thinking as well as ones that have not been on the list so far, such as cognitive flexibility and emotional intelligence. However, no change is expected in the leading position: the most important skill is thought to continue to be complex problem solving (quoted by: Daruka, 2017).

A large-scale competence survey was conducted in 12 OECD-countries between 1997 and 2002, whose outcome, among others, was a list of competences. This list contains 23 competences arranged in three groups which characterise the employee who will ensure future competitiveness within the organisation, according to the studies conducted in member countries (quoted by: Karcsics, 2007).

Key competences:

- communication
- quantification skill
- problem-solving skill
- learning and performance improvement.

Work competences:

- flexibility
- creativity
- initial independent decision-making
- ability to act
- foreign language knowledge
- self-confidence
- critical approach
- exploring possibilities
- responsibility.

Management competencies:

- leading;

- motivating others
- learning from mistakes
- maintaining and building relationships
- influencing others
- decision-making
- focusing on results and processes
- creating strategy
- ethical approach.

In Hungary in recent years, several studies have been conducted about the requirements of the labour market from employees with degrees.

In his study published in 2006, Tamás Híves made an analysis of 954 job advertisements targeted at graduate employees to identify the criteria that are considered the most important by the labour market regarding the employment of graduate professionals.

The results of the study have shown that foreign language knowledge is outstanding among the required competences. In half of the job advertisements, it was a compulsory requirement to know one foreign language on some level and in over 10% of them, two or more foreign languages were required. In one third of advertisements, no language competences were mentioned, so supposedly, no language knowledge is necessary for these jobs. The knowledge of the English language is indispensable on the Hungarian labour market. 57% of job adverts required a certain level of English language proficiency of potential candidates; generally wanting “high level” knowledge. The second language is undoubtedly German, but it was only required in 18% of job adverts.

As we are dealing with engineering training, we are going to focus on the 123 job advertisements regarding the technical field. In this field 56.1% of job advertisements require the English language, 23.6% require German and 5.7% of them require some other foreign language.

The next area that is very important on the labour market is IT skills, even in the case of non-IT-expert jobs. 36% of the surveyed advertisements refer to it as a requirement. In most cases (82%), they only require basic user skills like word processing, Windows and the use of basic software, but in 8%, greater knowledge is needed, such as the use of special software or deeper knowledge. In the technical field, 35% of advertisements require basic IT knowledge, 2.4% of them high level skills, 4.9% of them require the knowledge of the internet and website design and 7.3% requires the knowledge of some special software.

Another important area is professional experience. The question regarding this area usually asks for “up-to-date knowledge”; in 54%-ban on their own and in a further 7%, together with other kinds of experience. They often ask for “a wide range of experience” (12%). In 9% of adverts, professional experience is only mentioned generally, without any specification. In a quarter of adverts, there is now actual time of experience; one fifth of advertisers require 2-3 years of experience and another fifth longer than 5 years, whereas 12% of them require 4-5 years of experience.

22.5%- of adverts require management skills, but often without any mention of the length of the experience; they only mention it among the requirements.

Firstly, employers expect several professional competences which can be acquired through one’s training or previous employment. Secondly, they require general competences related to the work activity, which often constitute the expected characteristic features of employees. Thirdly, they expect character traits regarding one’s relationship to fellow workers, the company and to the working conditions.

On the basis of the survey results, assertiveness and good communication skills are indispensable. Problem solving skills, organisational skills and managing skills are also emphasized.

General competences appear in 5-14% of advertisements, and they indicate that this area is also quite important besides qualifications and other professional knowledge and competence. What stands out is the expectation of the ability to work independently.

All in all, the expectations regarding adaptation to the workplace carry significantly less emphasis. What is worth mentioning is team working ability and result-orientedness.

Tünde Bajzát (2011) analysed 1000 job advertisements for mechanical engineers. She found that every one of them contained foreign language requirements. Besides, 60.5% of adverts also required other competences. Her results show that companies primarily seek engineers with good communication, problem solving and team work skills.

Iván Selmeczy (2006) surveyed labour market requirements broken down to different job areas. In his study, he found that in the assessment of graduates entering the labour market, the most important skills include the following:

- working accurately
- computer skills
- taking a heavy work load
- foreign language knowledge
- team work.

Besides, the following are also important

- working independently
- knowledge of the basics of the profession
- professional experience
- organisational skills.

In Selmeczy's research, it was often raised in expert interviews regarding engineers that they are not assertive enough, do not know enough about practical issues and how companies operate, as well as that they ought to speak foreign languages better. On the other hand, they have a definite idea about what they want to work on; they are not anxious and they stick with a company and an occupation.

As regards fresh graduates, respondent employers emphasized the lack of work experience and the lack of foreign language knowledge, especially the knowledge of professional language. The first expectation raises the important question of how (several years of!) work experience can be expected of fresh graduates.

Livia Mihályka Ablonczyné and Anikó Tompos (2007) found in their survey that what companies consider important include foreign language communication, reliable work, creativity, team spirit, flexibility, problem solving skills and initiative.

In her survey of the national press, Klára Czenky (2006) found that so-called marketable knowledge, expertise and professional knowledge are the most sought after by employers; that is, knowledge applicable in practice rather than theoretical knowledge.

In her study, Anna Szerepi (2006) made interviews with representatives of multi-national companies and recruitment agencies. She found that employers have very strong and specific expectations of potential employees.

Respondents formulated strong criticism against fresh graduates:

- "Fresh graduates know almost nothing; at best, they know one or two areas but have no thorough knowledge, nor language knowledge.
- "Fresh graduates are not prepared for the realities of the job market, tend to shift to extremes and do not have a market approach."
- It is imperative to improve self-confidence, "as young people cannot even sell the abilities that they have. It would be important for them to believe in themselves and want to succeed; in other words, be motivated during their job search."
- "Young people are unable to make compromises, which means to take a worse-paid job and gain professional experience in a few years, learn company culture and move on from there with much better opportunities and the promise of better pay. Companies only pay for what they get; so you have to perform!"
- Another complaint that often appeared in the assessment of fresh graduates is the lack of practice and the predominance of (largely unnecessary) theoretical knowledge. This hinders both the job search and the integration in the workplace. Furthermore, the employee has to make up for his lack while already working.
- It was also mentioned that fresh graduates are not all equipped with qualities required of employees-to-be and, what is more, a lot of young people lack basic skills like mental arithmetic, good spelling and, in the case of engineers, hand drawing, which can be attributed to problems in primary education.
- A lot of new graduates have too much self-confidence and too many expectations, which repels employers. (Szerepi, 2006: 103-104.)

Research results show that there is often a great gap between the abilities and skills developed by higher education institutions and employers' expectations. Therefore, it would be important to place an emphasis on bridging this gap in higher education.

THE AIM OF THE RESEARCH AND HYPOTHESES

The aim of our study was to survey the abilities and skills of engineering informatics students and to find ways of developing them.

The study was conducted in the academic years 2016/2017 and 2017/2018, surveying 475 freshmen engineering informatics students altogether.

On the basis of previous research results and our own experience in higher education, we set up the following hypotheses:

1. The surveyed engineering informatics students emphasize that the labour market expects problem-solving, practice-oriented engineers.
2. They are aware of great lacks in their own competences.
3. The social skills of the surveyed students need improvement, especially open-mindedness, communication and co-operation.

THE CHARACTERISTICS OF THE SAMPLE

A sample of 475 first-year undergraduate engineering informatics students of a Hungarian university participated in the study, including 43 females (9.1%) and 432 males (90.9%). The average age was 20.15. The youngest student was 18 years old and the oldest one was 35. The majority (33.7 %) of the participants was 19 years old (see Figure 1).

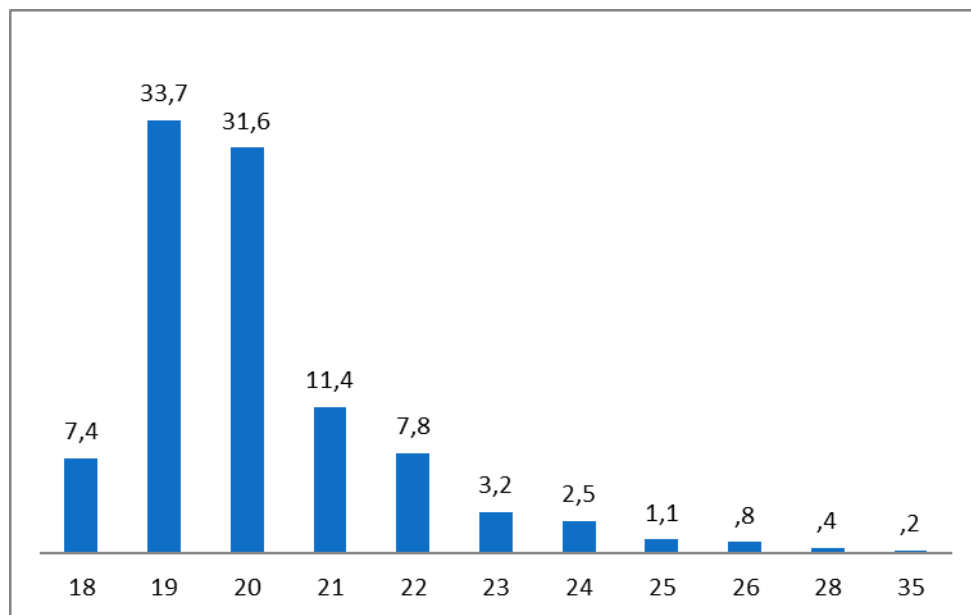


Figure 1: The age distribution of the engineering informatics students % (N=475)

Most of the students live in the capital (37.3%), 11.8% in a county seat, 33.18% in some smaller town and 17.9% of them lives in a village.

Their majority, 30.3%, took the final exam in a traditional secondary school of 4 years and 28.8% in a vocational school.

Most of the participants (77.3) have work experience: 27.6% of them had student jobs in their secondary school years, 70.1% summer jobs, 32.2% worked after secondary school and 9.7% of them are working students.

METHODS

The competences of engineering informatics students were measured with a self-rating list of competences consisting of 24 items, which had been constructed by using job advertisements and the results of previous competence assessments in higher education in Hungary. Besides, we also examined (using a 5-point Likert scale) the extent to which students thought these competences were necessary for their future job and also the extent to which they possessed these competences at the beginning of their studies (Holik – Tordai, 2017; 2018a,b; Tordai – Holik, 2018a,b). The two sets of competences showed acceptable internal consistency (Cronbach's alpha: 0.860 and 0.872).

Personality traits of engineering informatics students, based on the Big Five model, were assessed with the Hungarian version of the Big Five Questionnaire (BFQ, Caprara et al., 1999). The BFQ measures five

personality factors: energy, friendliness, conscientiousness, emotional stability and openness. The questionnaire consists of 132 items, with five dimensions and ten sub-scales, and a social desirability scale. The internal consistency coefficient of the questionnaire was feasible (Cronbach alpha: 0.86). For data analysis, statistical methods were performed using the SPSS program.

COMPETENCES NECESSARY ON THE LABOUR MARKET

On the basis of the competence list, students regard the problem-solving skill as the most necessary for their future profession (4.9 average on a 5-point scale). Hungarian and international research shows that the problem-solving skill is indeed among the most important traits on the labour market (Daruka, 2017; Karcics, 2007; Híves, 2006; Bajzát, 2011). In our study, respondents also consider the ability to understand context and correlations (4.8) and the ability to apply the acquired knowledge (4.77). These results (see Table 1) proved our first hypothesis.

Students thought that the qualities least necessary on the labour market writing skills (2.97), self-knowledge (3.2) and conflict-management (3.23).

We would like to highlight an interesting fact: that the assessment of competences necessary on the job market varied according to gender. Whereas 90.7 of women regard learning ability as greatly important of the job market, this ratio is only 69.2% among men ($p=0.029$). The ability to understand correlation is also considered to be more important by women. According to 97.7% of them, it is greatly important, whereas only 81.5% of men thought the same ($p=0.042$).

In their own assessment, respondents thought that they possessed the ability to apply the acquired knowledge (3.97) and to understand correlation (3.95). The results proved our second hypothesis: students experienced a lack in all areas, since none of the point averages given for the assessed qualities reach 4 on a 5-point scale. The improvement of these areas plays an important role in our training programme.

As regards genders, we found significant correlations in the following areas:

Women think that they possess writing and composition skills to a greater extent (41.9% of them to a very great extent and 18.6% to a great extent, whereas 28.2% of men to a great extent and 13.8% to a very great extent, $p=0.034$). Women also lead in the area of responsibility. In their own assessment: 48.8% of women possess this quality to a great extent and 25.6% of them to a very great extent, whereas 40.3% of men to a great extent and 29.4% to a very great extent ($p=0.017$).

We found that the biggest gaps between existing competences and those necessary in the labour market are in the areas of attention concentration, problem-solving skills and learning abilities. Therefore, these competences must be improved. In higher education, emphasis should also be placed on teaching students how to study effectively, as their failure in their studies may be due to inadequate studying methods. Effective tasks are those that require students' attention, raise problems and make them think independently. It is important that, instead of memorising masses of information, they learn to recognise and understand correlations and solve the problems that arise.

It is a surprising result that in four areas (realistic self-assessment, self-knowledge, writing skills and conflict management), students thought that they possessed the given competence on a higher level than would be necessary on the labour market.

Table 1. Means, standard deviations (SD) and differences between the perceived importance and self-reported proficiency level of competencies (N=475)

	Importance (Mean)	Own level (Mean)	Difference	Wilcoxon (Z)
Oral communication	3,80	3,31	0,49	-8,525*
Problem solving	4,90	3,81	1,09	-17,678*
Ability to work precisely	4,76	3,75	1,01	-16,325*
Cooperation	4,22	3,90	0,32	-6,912*
Teamwork ability	4,25	3,88	0,37	-7,488*
Working independently	4,53	3,91	0,62	-12,402*
Analytical thinking	4,69	3,80	0,89	-15,110*
Learning ability	4,66	3,60	1,06	-16,008*
Innovation	4,64	3,68	0,96	-16,154*
Conflict resolution	3,23	3,53	-0,3	-4,694*
Organization	3,53	3,28	0,25	-4,878*
Persistence	4,18	3,67	0,51	-8,686*
Written communication	2,97	3,33	-0,36	-6,179*
Openness	3,86	3,81	0,05	-1,275**
Goal orientation	4,57	3,91	0,66	-12,834*
Self-knowledge	3,20	3,65	-0,45	-6,994*
Stress tolerance	4,22	3,53	0,69	-10,324*
Responsibility	4,31	3,93	0,38	-8,036*
Adaptation to change	4,37	3,93	0,44	-8,887*
Concentration	4,74	3,65	1,09	-16,510*
Understanding causal relationships	4,80	3,95	0,85	-16,208*
Applying knowledge	4,77	3,97	0,8	-15,397*
Flexibility	4,29	3,82	0,47	-9,428*
Evaluation and self-evaluation	3,54	3,55	-0,01	-,420**

*p=0,000

** Not significant

STUDYING CHARACTERISTIC FEATURES

To study students' personalities, we used the Hungarian version of the Big Five Questionnaire (BFQ, Caprara et al, 1993), the dimensions and sub-scales of which are introduced in Table 2.

Table 2. A brief review of the dimensions and sub-scales of the BFQ

BFQ Factors	Sub-scales	Sample item
<i>Energy</i>	Dynamism Dominance	<i>I am an active and vigorous person.</i>
<i>Friendliness</i>	Cooperativeness Politeness	<i>I hold that there's something good in everyone.</i>
<i>Conscientiousness</i>	Scrupulousness Perseverance	<i>I always pursue the decisions I've made through to the end.</i>
<i>Emotional Stability</i>	Emotion control Impulse control	<i>Usually I don't lose my calm.</i>
<i>Openness</i>	Openness to culture Openness to experience	<i>I'm fascinated by novelties.</i>

The statistical characteristics of the five personality dimensions and the social desirability scale for the complete sample are shown by Table 3, in comparison with the results of a previous study.

Table 1. Means and standard deviations (SD) of engineering informatics students on five personality factors and social desirability scale compared with the Hungarian norm group (raw scores)

BFQ Factors	Engineering informatics students (N=475) Mean (SD)	Hungarian norm group (N=774)* Mean (SD)
Energy	74.87 (12.06)	77.51 (11.85)
Friendliness	78.40 (10.09)	82.25 (10.09)
Conscientiousness	81.89 (10.80)	81.34 (11.11)
Emotional stability	73.03 (12.59)	68.60 (15.83)
Openness	79.55 (11.11)	85.52 (6.88)
Social desirability	34.17 (5.45)	29.54 (6.88)

*Rózsa (2000)

In comparing our own survey results with those obtained during the Hungarian adaptation of the BFQ (Rózsa, 2000), in the dimensions of Energy, Friendliness and Openness, our students scored lower, in the dimension of Conscientiousness, near average and in the dimension of Emotional stability, they scored higher. On the Social desirability scale, our surveyed students scored higher, which indicates that they want to be seen in a more favourable light (positive distortion).

Converting the raw scores to a standardised T-value, we grouped the averages obtained in different colleges into low – average – high categories. ($T < 45$: low, $45 \leq T \leq 55$: average, $T > 55$: high).

Table 4. Distribution of the sample in the low, average and high zones of BFQ dimensions (N=475)

BFQ Factors	Low	Average	High
Energy	37%	41%	22%
Friendliness	34%	43%	23%
Conscientiousness	23%	44%	33%
Emotional stability	20%	44%	36%
Openness	54%	33%	13%
Social desirability	2%	35%	63%

On the basis of occurrence frequency in the low, average and high zones, we can see that in the Energy factor, the majority of surveyed students are only active and communicative to an average or lesser extent, which suggests weaker social skills. Results indicate that the majority of respondents are rather reserved and prefer to work independently.

As regards the Friendliness factor, they also scored average or below, which suggests that they are characterised by tolerance and unselfishness to a lesser degree. Due to this, they are presumed to be less suitable for team-work and co-operation. However, it would be very important for engineering informatics experts to be able to work in a team. This is also supported by studies and employers also voice this expectation (Bajzát, 2011; Daruka, 2017).

In the area of conscientiousness, most students fall into average or high categories, which means that they are responsible, reliable and precise in their work, which are particularly advantageous traits in the field of engineering.

In the area of Emotional stability, the majority of respondents reached an average or high score, which indicates that they tend to be balanced, patient and self-controlled.

In the Openness dimension, the vast majority scored low, which indicates adherence to traditions and routine procedures, the avoidance of change and innovation, less original and creative thinking and a low-level knowledge and openness to culture. This may pose a problem because information technology is the fastest developing branch of industry, where innovation, creativity, seeking novelties and rising to new challenges are everyday requirements for professionals working in this field.

The results proved our third hypothesis: the surveyed students need improvement in the area of social skills, especially in openness, communication and co-operation.

CONCLUSIONS

The picture reflected by our results is also supported by our experience in university education: some students were less energetic and less enthusiastic, communicate in a rather reserved manner; when called upon in class, they tend to answer reluctantly and they are hard to activate. Although they may be very well-prepared and know the answers to all of the questions, it is the teachers who have to elicit these as students have difficulties in speaking up in front of others. What can be the role of university education here? It may provide a solution to create as many opportunities for students as possible to speak up, to interact and to state their opinions and standpoints (professional and personal alike) and to make students interested in participating in the learning process (Holik – Tordai, 2018). Furthermore, it is also important that teachers assist student's work with developmental assessment (Sanda, 2016).

Our research results have shown that it would be very important to improve students' concentration, problem-solving ability and learning skills. It is also imperative to improve their communication and social skills.

Courses which focus on self-knowledge and improve problem-solving thinking by a variety of methods would greatly help the personality development of engineering informatics students. A good foundation for personality development would be the introduction of various teaching methods based on active student participation, which goes beyond the view of education as the transfer of content and information.

REFERENCES

- Ablonczyné, M. L. – Tompos, A. (2007). Gazdasági szaknyelvi kommunikációs modell. In Silye, M. (Ed.), *Porta Lingua – 2007. Szaknyelvoktatásunk – határokon átívelő híd* (pp. 115-122). Debrecen: Debreceni Egyetem.
- Bajzát, T. (2010). *A mérnökök kommunikatív és interkulturális kompetenciája: elvárások és felkészítés*. Pécs: Pécsi Tudományegyetem.
- Bennett, N. – Dunne, E. – Carré, C. (1999). *Patterns of Core and Generic Skill Provision in Higher Education* (pp. 71-93) Higher Education, 37.
- Beard, D. – Schwieger, D. – Surendran, K. (2007). Incorporating Soft Skills into Accounting and MIS Curricula. In *Proceedings of the 2007 ACM SIGMIS CPR Conference on 2007 Computer Personnel Doctoral Consortium and Research Conference: The Global Information Technology Workforce* (pp. 179-185). St. Louis, MO: ACM.
- Bodnár, É. – Csillik, O. – Daruka, M. – Sass, J. (2017). *Varázsszer-e a tükrözött osztályterem?* Budapest: Budapesti Corvinus Egyetem.
- Caprara, G.V. – Barbaranelli, C. – Borgogni, L. – Perugini, M. (1993). *The "big five questionnaire": "A new questionnaire to assess the five factor model. Personality and Individual Differences*. 15. (pp. 281-288). doi: 10.1016/0191-8869(93)90218-R
- Chamorro-Premuzic, T. – Furnham, A. (2006). *Self-Assessed Intelligence and Academic Performance*. Educational Psychology, 26(6) (pp. 769-779).
- Czenky, K. (2006). Diploma, munkaerőpiac, munkanélküliség a hazai sajtó tükrében. In Berde, É. – Czenky, K. – Györgyi, Z. – Híves, T. – Morvay, E. – Szerepi, A. (Eds.), *Diplomával a munkaerőpiacon* (pp. 117-128). Budapest: Felsőoktatási Kutatóintézet.
- Conlon, E. (2008). *The New Engineer: Between Employability and Social Responsibility*. European Journal of Engineering Education, 33 (2) (pp. 151-159). doi: 10.1080/03043790801996371
- Daruka, M. (2017). Miért van szükség az innovációk különböző fajtáira a felsőoktatásban? In Bodnár, É. – Csillik, O. – Daruka, M. – Sass, J. (Eds.), *Varázsszer-e a tükrözött osztályterem?* (pp. 6-13). Budapest: Budapesti Corvinus Egyetem.
- Engler, Á. (2004). *A szociális kompetencia fejlesztése*. Magiszter, 2. (pp. 13-31).
- Gallivan, M.J. – Truex, D.P. – Kvasny, L. (2004). *Changing Patterns in IT Skill Sets 1998-2003: A Content Analysis of Classified Advertising*. Database for Advances in Information Systems, 35. (pp. 64-86).
- Híves, T. (2006). Munkaadói elvárások megjelenése az álláshirdetésekből. In Berde, É. – Czenky, K. – Györgyi, Z. – Híves, T. – Morvay, E. – Szerepi, A. (Eds.), *Diplomával a munkaerőpiacon* (pp. 73-87). Budapest: Felsőoktatási Kutatóintézet.
- Holik, I. – Tordai, Z. (2017). Kompetenciafejlesztési igények és lehetőségek a mérnökinformatikus hallgatók körében. In Tóth, P. – Simonics, I. – Duchon, J. – Varga, A. (Eds.), *Pedagógiai kutatások a Kárpát-medencében: II. Kárpát-medencei Oktatási Konferencia* (pp. 400-416). Nagyvárad: Partiumi Keresztény Egyetem.
- Holik, I. – Tordai, Z. (2018a). Hallgatói kompetenciák, hallgatói különbségek. In Tóth, P. (Ed.), *Pedagógiai kézikönyv oktatóknak* (pp. 23-27). Budapest: Typotop Kft.
- Holik, I. – Tordai, Z. (2018b). Mérnökinformatikus hallgatók kompetenciáinak kutatása. In Endrődy-Nagy, O. – Fehérvári, A. (Eds.), *Innováció, kutatás, pedagógusok* (pp. 44-67). Budapest: Magyar Nevelés- és Oktatókutatók Egyesülete (HERA).

- Karcsics, É. (2007). *A versenyképes munkavállaló kompetenciái az Európai Unióban és Magyarországon*. Európai Tükör, 3. (pp. 128-140).
- Kolmos, A. (2006). Future Engineering Skills, Knowledge and Identity. In Christensen et al. (Eds.), *Engineering Science, Skills, and Bildung* (pp. 165-186). Denmark: Aalborg University.
- Lappalainen, P. (2009). *Communication as part of the engineering skills set*. European Journal of Engineering Education 34. (pp. 123-129). doi: 10.1080/03043790902752038
- Molnár, Gy. & Nagy, K. & Szűts, Z. (2018). Development Opportunities of Digital and Labor Market Competences in Higher Education. In *ICERI2018 Proceedings* (pp. 10590-10594). Seville: 11th annual International Conference of Education, Research and Innovation.
- Markes, I. (2006). *A review of literature on employability skill needs in engineering*. European Journal of Engineering Education, 31. (pp. 637-650). doi: 10.1080/03043790600911704
- Rózsa, S. – Kő, N. – Oláh, A. (2006). *Rekonstruálható-e a Big Five a hazai mintán?* Pszichológia, 26. (pp. 57-76).
- Sanda, I. D. (2016). *Fejlesztő értékelés (Developing evaluation)*. Budapest: Typotop Kft.
- Selmeczy, I. (2006). *Az üzleti szféra felsőfokú végzettségű pályakezdők iránti kereslete, ennek várható alakulása és a pályakezdők tudásával való elégedettség 2005-ben. Egy empirikus vállalati felvétel és szakértői interjúk elemzése*. Budapest: Magyar Kereskedelmi és Iparkamara.
- Simonics, I. (2017). Use of ICT equipment by engineer teachers and mentors. In Auer, M. E (Ed.), *IEEE Global Engineering Education Conference* (pp. 527-535). Athens: EDUCON.
- Szerepi, A. (2006). Munkaadók és fejedelmek a munkaerőpiacról és az oktatási rendszerről. In Berde, É. – Czenky, K. – Györgyi, Z. – Híves, T. – Morvay, E. – Szerepi, A. (Eds.), *Diplomával a munkaerőpiacon* (pp. 91-114). Budapest: Felsőoktatási Kutatóintézet.
- Tordai, Z. – Holik, I. (2018a). *Student's Characteristics as a Basis for Competency Development in Engineering Informatics Education*. International Journal of Engineering Pedagogy, 8(4) (pp. 32-42).
- Tordai, Z. – Holik, I. (2018b). The Necessity of Competency Development in Engineering Informatics Education in the Light of Students' Characteristics. In Auer, M. E. – Guralnick, D. – Simonics, I. (eds), *Teaching and Learning in a Digital World: Proceedings of the 20th International Conference on Interactive Collaborative Learning – Volume I*. (pp. 224-232). Cham: Springer International Publishing.
- Tóth, P. (2017). A tanulási stílus vizsgálata a műszaki felsőoktatásban: Elméleti háttér. In Tóth P. – Simonics, I. – Duchon, J. – Varga, A. (Eds.), *Pedagógiai kutatások a Kárpát-medencében: II. Kárpát-medencei Oktatási Konferencia: Tanulmánykötet* (pp. 315-352). Nagyvárad: Partiumi Keresztény Egyetem.
- Van Der Molen, H.T. – Schmidt, H.G. – Kruisman, G. (2007). *Personality characteristics of engineers*, European Journal of Engineering Education, 33. 495-501. doi: 10.1080/03043790701433111
- Williamson, J.M. – Lounsbury, J.W. – Hanc, L.D. (2013). *Key personality traits of engineers for innovation and technology development*. Journal of Engineering and Technology Management, 30 (2) (pp. 157–168). doi: 0.1016/j.jengtecman.2013.01.003

REPRESENTATION OF “SPIRIT” IN ADVERTISEMENTS: THE CASE OF ALFA ROMEO GIULIETTA

Süheyla AYVAZ

Selçuk University, Faculty of Communication

suayvaz@gmail.com

Tuba LİVBERBER

Selçuk University, Faculty of Communication

tubalivberber@windowslive.com

İlker ÇÖZELİ

Selçuk University, Faculty of Communication

ilkercozeli@hotmail.com

ABSTRACT

Animism is basically the belief that every object has a soul. In primitive times, human beings have added the "soul" element, which is unique to man, and tried to establish equal relations with them in order to make sense of the events they cannot explain. Today, among the marketing activities, it is widely used to simulate human beings and give them spirit by coding products with verbal or visual messages. Giving spirit to products enables the personalization of products and enables the consumer to establish an emotional relationship with the product, thus eliminating inequality between them. This created upper reality is one of the subjects of mystical marketing. Mystical marketing, which deals with the instrumentalization of mysticism for marketing purposes, takes advantage of the resources of spiritualism, covering a wide range of topics from astrology to mythology, from celestial religions to superstitions. The aim of the study is to explain the linguistic anthropomorphism created by advertisements in line with animism-based beliefs by the semiotic method with the concepts of denotation and connotation. Alfa Romeo Giulietta's "cars with a soul" metaphor, which appears in three advertising films with the slogan "We are only a machine without our soul", is a sample of the work.

Keywords: Alpha Romeo Giulietta, Animatism, Anthropomorphism, Mystical Marketing, Semiotics.

INTRODUCTION

Mysticism, which is in a close relationship with the spiritual one, takes its power from the sense of wonder that is loaded with the inexplicable or the unknown. It argues that the meaning of life can be explained by intuition or emotion, not by reason, science or logic (Kırgız, 2014, p. 14). The role of these mystics is to explain the internal knowledge of goods (the knowledge in their essence) and to bring it back to eternity (the timeless world) (Sunar, 1966, p. 4). There are two aspects of the concept of mysticism today. The first is to break away from material reality and to mean the human experience of seeking truth in an intuitive way. In this period of experience, the essential is the unification, the state of the human self, to reach the 'absolute' which is above and beyond itself without any means. In short, it involves a transcendental ascent process (Serouya, 1967, p. 8; Safa, 1961, p. 7). The second is that it is a reference to the phrase 'things' that are vaguely, mysteriously, transcending logic as used in its broad sense. Mysticism is not only religious, it is a universal humanitarian event that manifests itself in almost every culture, non-religious belief system (Hökelekli, 2001, p. 314). At the same time, it has been subject more or less to many areas of expertise such as psychology, philosophy, fine arts, biology, theology since the past, influencing them or playing the role of their nurturer. Especially today, in the postmodern period, when the relationship of the individual with the rational is opened up compared to the modern period, there is an increase in interest in the mystical because individuals approach things that are extraordinary and unusual.

However, the concept of animism has two origins: the first is the Latin anima (life); the second means Celtic mother (the spirit of the world). The combination of the two forms the nature of animism. This belief positions the "soul" to the beginning/center of everything (Scognamiglio and Arslan, 2001, p. 24). While animism in the narrow sense is a doctrine that deals with recreations related to the soul, in the broad sense it refers to the teaching about all spiritual beings (Freud, 2010, p. 153). For primitive man, everything in nature lives; the mountain, stone, river, star, and planets all have a soul. All these creatures of nature are both constituting of life and participating in all of life. Primitive man personified nature by attributing the qualities that make up his existence to nature and blessing his soul, which he could not understand. As Hume points out, "People have a universal tendency. They consider every being as themselves and attribute to each object the characteristics they are familiar with and familiar to" (Freud, 2010, p. 156). Primitive man also acquired the soul element to beings he could not identify by using his usual reflex and/or narcissistic tendency. Behind such an attempt lies meaning-making and fear. The soul, which becomes a tool in the description of the areas that it cannot reach, just like the dreams it has seen, thus spreads to all fields. In the end, it establishes relationships with inanimate things by giving them soul. This allows them to make contact with them, to establish relationships, to ask for help from inanimate beings or to help calm them (Scognamiglio and Arslan, 2001, p. 23). According to Freud, the important element of animism technique is

magic. The meaning of magic is that, here, man, again with a narcissistic tendency to protect the individual from enemies or dangers, even going a step further, when necessary, to gain the ability to harm those enemies. Magic is realized in two ways: Imitator and Infectious. In imitation magic, there is a process of imitating rain and asking for help from nature. In the case of infectious magic, anything that belongs to the hostile person is added to another object, making it hostile to that object (such as a rag doll example). Therefore, considering the relation of animism to magic, it is understood that the aim is to impose the laws of life on real objects by force. As a matter of fact, the goal of creating a change in the soul of the person in the spells directed towards the person is realized by attributing the soul to an object (Freud, 2010, pp. 157- 174). Even if there was a belief that the animistic belief had disappeared with the Enlightenment period, this belief essentially changed its content and still exists today. According to Adorno and Horkheimer, a kind of animism that “transforms the spiritual aspect of the living into a commodified, marketable object remains valid today (Altıntuğ, 2013, pp. 121-122). In primitive times, the main goal of animism was to make sense of unexplained events, to give life to objects and to provide some sort of taming of evil spirits. Therefore, in this type of animism, instead of materialization, the desire to reach and communicate with the substance was behind it. But today, on the one hand, as another manifestation of the inclusiveness of every sphere of capitalism, we come across an animism that acts as the blessing of the consumer's act of purchase and/or consumption by giving spirit to objects. On the other hand, with the forgiveness of the human soul to objects, the soul turns into a profit-making tool, which leads to its transformation into matter.

In addition, Anthropomorphy; anthropos (human) and morphe (form) derives from the words "human formalism" means. The concept involves the attributing of the material or spiritual characteristics of human beings to any being (Cevizci, 2010, p. 128). The concepts of anthropomorphism and animism are two concepts that seem to be interchangeable. However, while animism includes the belief that all beings and the universe carry a soul; anthropomorphism involves humanizing non-human things. In other words, one believes in bringing souls to all beings independently of human beings, that is, transforming them into a living being, while the other is completely human, putting people in the center and humanizing / personalizing objects visually and / or linguistically. In short, anthropomorphism is an attempt to impose human characteristics on non-human beings. Today, products are advertised in line with communication strategies that break the ties with material reality, such as automobiles that are names or charismatic, detergents declared friendly, bottles resembling the female body, microbes being made. Besides, human characteristics are added to the brands. This process, which enters the literature as creating a brand personality, means that the four-basic knowledge must come together to personalize the brand. These; the brand has a body, emotions, mind and spirit. Thus today, the creation of brands, both in line with animistic belief and using anthropomorphic elements, constitutes an important aspect of communication strategies.

THE STUDY

The aim of the study is to explain the linguistic anthropomorphism created by advertisements in line with animism-based beliefs by the semiotic method with the concepts of denotation and connotation. Denotation consists of simply signifier-signified-sign scheme. Signifier is objective reality; signified is the mental design of the object, is understood from the signifier; the sign is a combination of the signifier (expression plane) and the signified (content plane). As a result of denotation becoming a new signifier and merging with signified, the new sign creates the connotation. Thus, connotation consist of a two-stage sequence of indicators (Barthes, 2014; Barthes, 2011). In this context, based on the metaphor of "spirited cars", the randomly selected three of Alfa Romeo Giulietta's commercials with the slogan "we are only machines without our soul" were analyzed.

FINDINGS

1. Alfa Romeo Giulietta with a Soul

The postmodern individual degenerates and becomes everyday in the face of large and complex bureaucratic organizations, multinational corporations, and the society led by the media. As a result of everyday life, she/he experiences the moment, meets the daily needs created for her/him, falls into the clutches of hedonism and thus becomes lonely by weakening his social relations. On top of that, she/he takes a keen interest in mysticism due to lack of hope, anxiety about living the future and fear of death (Kızıltan, 2006, p. 44). Considering that the individual's aim in mystical orientation is even commodified even today, it is possible to evaluate it as an effort to get closer to inner peace. This individual is paying more attention to things that are mysterious, concentrating on them, and remembering products or messages that are encoded in this way more quickly. Mystery increases both curiosity and interest and learning. The messages, which are not directly explained, by implication and by symbolic depictions, appeal not to the mind or to the intellectual but to the heart and to the intuitive. The experience of being able to communicate with the absolute for the individual who becomes lonely, and the anxiety of being able to ascend to the metaphysical realm through mystical experiences, indicate that he is on a spiritual quest. In this context, in the postmodern marketing approach, consumption involves constructing the connection between the customer and the object. Marketers who act in line with the animistic beliefs of primitive people in order to provide the customer's relationship / contact with the object, provide human characteristics to the objects and enable them

to be revived. Thus, animistic belief serves as a bridge between primitive man and postmodern man. In the process of consumption, human beings are directed to objects that are similar to him and as a result the line between human and non-human disappears. Based on these, the philosophy of "every being has a soul", a fundamental defense of animistic belief, forms the main theme of the respective three of the Alfa Romeo Giulietta advertising films.



Figure 1- The main slogan is: "We are only machines without our soul"

Denotation: Alfa Romeo Giulietta has a soul.

Connotation: The object of Giulietta is transformed into a living being by gaining soul. The brand's slogan "We are only machines without our soul" gives rise to the metaphor of "cars with a soul" and thus functions as giving spirit to the car object. With this slogan, the brand carries the object into

a spiritual space. It establishes the relationship of the object with life as a manifestation of the animistic belief that every being has life. Giulietta is transformed into a "living being" by gaining spirit.



Figure 2- Cross section from AD 1: "We are not operators of a machine."

Denotation: The part objects of the Giulietta object are also not machine operators.

Connotation: In AD 1, with the text "we are not operators of a machine", a life is also conveyed to the car-specific objects themselves that enable the operation of the machine. Not being operators of the machine supports the brand's main slogan. So what exactly is this automobile, not a machine, if the objects that make up its structure are not operators? As

can be seen from these two discourses of the ad text, the car on the connotation level is more than a machine. "Being a machine" is a phrase that metaphorically emphasizes soullessness, dullness, coldness. Then the machine will gain a temperature only when that object gains life. The first condition of being alive, as human beings suggested in the primitive age, is the existence of the soul. Based on this idea, the brand is turning them into warm assets by offering life to cars and their parts.



Figure 3- Cross section from Ad 2

Denotation: Giulietta is a pure product.

Connotation: The most important feature of the soul is its purity. Human beings, influenced by this purity of spirit, clarity, unreachable and existence independent of matter, adopted animistic beliefs in order to make it meaningful. This feature of the soul is used in Ad 2 with the text "I am purity". The brand communicates purity to its target audience by acquiring the means of analogies and objects that we liken purity to in

our visual memory. For example; white dress was preferred and water was used in the commercial. Water and white are both indications of purity connotation. So Giulietta has a pure and lucid soul.



Figure 4- Cross section from Ad 2

Denotation: Giulietta is made from the substance in which dreams are made.

Connotation: That spirit is a means of reaching the mystical area where mankind has longed for and been afraid for centuries. For example; it is the means to make sense of the dream. Giulietta, who takes advantage of the mystical meaning of dreams that have no rational side and says, "I am made of the substance in which dreams are made," adds mystery to

itself. The matter in which dreams are made is an unresolved matter in animistic belief and is associated with the soul. The provider of seeing dreams is the spirit, and the human being relates to the truth by dreaming. Using this mysterious and magical phenomenon, Giulietta constructs a spiritual bridge to his relationship with his target audience.



Figure 5- Cross section from Ad 3

Denotation: She has a name, Giulietta.

Connotation: The other link of these ads to animistic belief is that people give them souls in order to communicate with objects. Giulietta says "I'm Giulietta" in Ad 3. She introduces himself as a human and shows that it is possible to communicate with her. This communication with the object comes from the nature of animistic belief. The object, which exists independently of man and is alive and even able to communicate with him, speaks with consumers. The issue here is not that the human-

specific act of speech is passed on to the object. Animistic belief has already been formed based on man. But here is not an analogy, but an attempt to impose meaning on it by coding the qualities that man knows to an entity he cannot identify. To put it more clearly, it will only be possible for him to understand the object with the concepts he knows. In terms of denotation, yes, she is a Giulietta; however, in terms of connotation, she is a living being.

2. Alfa Romeo Giulietta as a Character

Human beings are beings with unique attributes. For example, he is smart, cool, beautiful, handsome, affectionate, trustworthy, jealous, sensitive, compassionate or not. Indeed, all of these, such characteristic or aesthetic qualities, are used to describe human nature. The transfer of such human-specific qualities to objects is the subject of linguistic anthropomorphism. Giulietta uses these human-specific qualities in advertising films. So far, the relationship between animism and the acceptance of the car as a living creature was analyzed. The attribution of human characteristics or aesthetic characteristics to this living creature in the context of linguistic anthropomorphism will now be discussed.

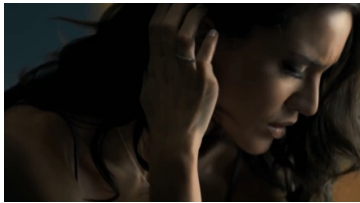


Figure 6- Cross section from Ad 3

Denotation: The woman is sad.

Connotation: In AD 3, the story of the film begins with a married woman sending off her husband. The woman is sad. She is sad because the man left her and went to another person (to car). She curiously questions what qualities she lacks from that object. She compares herself to that car.



Figure 7- Cross section from Ad 3

Denotation: Is the car more beautiful than the woman?

Connotation: The female voice asks Giulietta, "are you prettier than me?" Beauty, this aesthetic concern, is a human-specific romantic element, keeping in mind that the woman compares with herself. Giulietta manifests himself aesthetically in the visual while this sound is heard. It comes across as under lights, in a glowing way and a presentation of beauty. The woman questions

her beauty as a feminine beauty. At this point, the brand adds an aesthetic judgment to the car that it identifies with the human being.



Figure 8- Cross section from Ad 2

Denotation: It is beauty.

Connotation: Similarly in ad 2, the car that says "I am beautiful" makes a depiction of the female body (Uma Thurman) in the visual. Marka, kadının (insanın) estetik yargısını arabanın nesnesine taşıyor. Resmi olarak, insan vücudunda aranan güzelliğin arabaya aktarılması yasalaştırılmıştır.

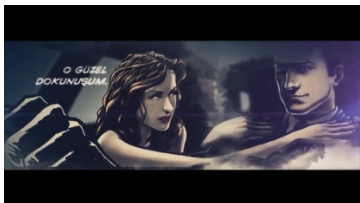


Figure 9- Cross section from Ad 2

Denotation: The car is hand and touch.

Connotation: In Ad 2, the car talks. It says "I am the hand" and "I am the touch." In terms of denotation, the steering wheel of the car is defined as a hand. In terms of connotation, the sense of feeling, which is a human feature, is transferred to the car. Again, the sense of being touch is transmitted to the consumer in the context of sensation.



Figure 10- Cross section from Ad 3

Denotation: Questioning confidence, self-confidence and fun

Connotation: "Are you more reliable than me," the woman asks the car. If there is a question about the reliability of the car from the point of view of denotation, it is seen that the car is loaded with a human-specific reliability feature in terms of connotation. The person who is reliable is the more preferred person. We don't worry about communicating with someone we trust

and sharing with him. But being reliable, just like being cool, is actually a human-specific characteristic. Thus, it can be mentioned that advertising also uses a method such as linguistic anthropomorphy. The other anthropomorphic element in the ads is the question of whether the car has confidence in itself. A depiction of a car trusting itself again indicates the use of a characteristic human element. In Ad 3, the question "Do you trust yourself more" again uses elements that are visually related to the car's confidence. Another anthropomorphic element is the phrase "Are you more fun" mentioned in Ad 3 again. Being fun is described in this commercial by identifying with people. It is emphasized that the car is surrounded by such a feature in the related advertisement film.

CONCLUSIONS

Giulietta puts a "magical field" at the heart of the communication strategy. It uses the animistic belief that he reproduced with the anthropomorphism technique functionally in order to establish the emotional connection between the product and the consumer in his advertisements.

The brand depicts Giulietta as a car with a soul in line with animistic beliefs. In animistic belief, it is instrumental in gaining spirit to the object in order to overcome the fear of the meaningless. In order for it to be a living thing, it has to be given as a message that it is the soul of the car. In this sense, with the slogan "We are a machine without a soul", the brand makes the car live. At the same time, the brand again benefits from the ability to communicate with the object, which is the fundamental reflex in animistic belief. In order for the product to be able to relate to the consumer, it is necessary to define it with its specific qualities and to establish equality. In order to establish this relationship, the brand gives the product a separate life by calling it "you" for example, and thus brings it to an equal structure with the consumer.

The other method used by the brand in the context of linguistic anthropomorphism is to impose on the object the human characteristic and aesthetic features that support the animistic belief. A car is a talking entity because it is like a human being with a car spirit here. The car is beautiful because it has an aesthetic level. The car is as reliable as a person and has confidence in itself. With this and other human characteristics, the car turns into a living creature, enabling the consumer to magically engage with the car. As a matter of fact, Alfa Romeo Giulietta is an indication of the production of a new living thing that has common features with human beings.

REFERENCES

- Altuntuğ, N. (2013). Tüketim Ve Tüketicinin Geleceğinde Kaynağını Mitolojiden Alan Mistik Pazarlamanın Etkisi. *Organizasyon Ve Yönetim Bilimleri Dergisi* 5(2), 119-133.
- Barthes, R. (2014). *Göstergebilimsel Serüven* (Mehmet Rifat ve Sema Rifat, Trans.). İstanbul: Yapı Kredi Yayınları.
- Barthes, R. (2011). *Çağdaş Söylenler* (Tahsin Yücel, Trans.). İstanbul: Metis Yayınları.
- Cevizci, A. (2010). *Felsefe Sözlüğü*, İstanbul: Paradigma Yayınları.
- Freud, S. (2010). *Totem ve Tabu* (Akın Kanat, Trans.). İzmir: İlyas Yayınevi.
- Hökelekli, H. (2001). *Din Psikolojisi*. Ankara: Türkiye Diyanet Vakfı Yayınları.
- Kirgiz, A. C. (2014). An Example to the Use of Mystical Metaphor for Brand Identity in Turkey: The Evil Eye Bead. *European Scientific Journal* 10(11), pp. 14-26.
- Kızıltan, H. (2006). *Narsisizm ve Psikopatolojisi*, <http://www.psikomitoloji.com/attachments/article/79/narsisizm.makalesi.pdf> (26.05.2015).
- Scognamillo, G. & Arslan, A. (2001). *Doğu ve Batı Kaynaklarına Göre Ruhçuluk ve Reenkarnasyon*. İstanbul: Karizma Yayınları.
- Serouya, H. (1967). *Mistisizm (Gizemcilik-Tasavvuf)* (Nihal Önoğlu, Trans.). Ankara: Varlık Yayınları.
- Sunar, C. (1966). *Mistisizmin Ana Hatları*. Ankara: Ankara Üniversitesi Basımevi.

SAUDI TEACHERS' PERCEPTIONS REGARDING ADOPTING DIGITAL GAMES IN TEACHING PRACTICE

Assistant Professor Dr. Dhaifallah Alsuhaymi

College of Education, Imam Abdulrahman Bin Faisal University, Saudi Arabia

dalsuhaymi@iau.edu.sa

Assistant Professor Dr. Ali Alzebedi

College of Education, Umm Al-Qura University, Saudi Arabia

aazebedi@uqu.edu.sa

ABSTRACT

This study applied a qualitative approach to shed light on computer teachers' perception of video games and the barriers toward integrating these games into their teaching. The data were gathered through face-to-face interviews with 22 Saudi teachers from the Eastern Province of Saudi Arabia. The results show that teachers in Saudi schools hold a positive attitude toward adopting video games and they realize the importance of adopting new technologies; however, they do not use them for teaching purposes. As far as barriers to adopting video game are concerned, lack of facilitating conditions, low awareness of the potential for video games in learning, and the lack of video games that are suited to Saudi peculiarities and curricula are the most perceived barriers among teachers.

INTRODUCTION

Nowadays students have become part of a "digital generation" (Van Eck, 2006); they already know how to use different technologies and computer applications. They are looking for fun and enjoyable ways to learn that may be harder to achieve in traditional schools (Van Eck, 2006). One way to make the learning process more enjoyable and engaging is to adopt video games in teaching and learning (Su & Cheng, 2013; Papadakis, 2018). Digital games have become very prevalent among children and youth, and they spend a considerable amount of time using them (Subrahmanyam & Greenfield, 2008). Several studies have demonstrated the importance of using video games to improve students' engagement, academic achievement, motivation, and critical thinking (Eseryel, Law, Ifenthaler, Ge, & Miller, 2014; Su, & Cheng, 2013; Tham, & Tham, 2014; Tokac, Novak, & Thompson, 2019; Watson, Yang, & Ruggiero, 2013). Since the popularity of video games among 21st generation's lives and the potential benefits of integrating them in teaching, Saudi educational system might employ this technique for teaching and learning (Alqurashi & Williams, 2017). However, it is confounding that teachers do not embrace video games in their teaching practices (Papadakis, 2018, Papadakis & Kalogiannakis, 2017). For the purpose of this study, the researchers seek to highlight the Saudi teachers' perceptions towards video games and also highlight the most common barriers in Saudi educational system that limits of the role of using such tools. At this stage of the research, a video game is defined as "a game played by electronically manipulating images displayed on a television screen" (Video Game, 2019, p.1).

LITERATURE

In the 21st century, well-designed games can be used as a medium to foster learning. Dikkers (2015) indicated that teachers adopting new media determined the degree to which it gets used and if the games are one such medium, then "it stands to reason that some of those games (media if adopted by teachers) can be effective and powerful learning experiences" (p.10). He also stated that well-designed games, if employed as media by teachers, "can tell powerful stories, challenge the mind, and convey the thinking of the designers" (p.10).

The relative importance of using digital games in teaching derives from their key role in enhancing students' motivation. Motivation is a crucial factor that affects learning outcomes (Asgari & Kaufman, 2009). Students in traditional classrooms have lower motivation than students in digital game-based learning classes (Prensky, 2007; Papadakis, 2018). Asgari and Kaufman (2009) stated that using games plays a significant role in making the learning process enjoyable and more engaging and this, in turn, increases students' motivation. According to Tokac et al. (2019), students who used video games for learning had better achievement and more motivation than their counterparts in traditional classrooms. According to Papadakis and Kalogiannakis (2017) and Tham and Tham (2014), game-based learning can be utilized as an efficient pedagogical approach to motivate and engage students; however, it is important to ensure that the selected educational game enriches students' experiences, increases student motivation, and immerses students in learning.

In addition, using video games in teaching can improve students' achievements and establish a positive attitude toward curricula (Papadakis, 2018). In software engineering classes, students achieved deeper learning when they used 3D game-based learning systems compared to students that used traditional methods (Su & Cheng 2013, Tokac et al., 2019). The researchers attributed this learning improvement to the students' enhanced motivation and immersion in the learning activities when using 3D game-based learning systems. The findings showed high satisfaction and confidence rates for students, as well as improved learner curiosity and immersion in learning activities (Su & Cheng, 2013).

Furthermore, using video games supports other 21st-century learning skills, such as creativity and problem-solving. Video games spark learners' creativity and give them the opportunity to find and organize information, solve problems, and evaluate solutions (Miller & Doering, 2014; Hwang, Hung, & Chen, 2014; Prensky, 2007). According to Squire (2005), digital games offer complex holistic problems for players, and this, in turn, increases the players' creativity and problem-solving skills. Moreover, players in digital games are active participants, while readers or viewers are passive observers (MediaJuice, 2014). The role of readers or viewers is just watching; they cannot make any decisions that will change the ending. In a game, the ending is a reward, particularly when the player reaches the desired goals (MediaJuice, 2014).

Educational video games have a significant impact on students' learning attitudes and achievements regardless of their age or gender. Cheng, Lou, Kuo, and Shih (2013) investigated the ability of elementary school students to accept and use digital game-based learning (DGBL) in their learning environment. The results of this investigation showed that using DGBL is suitable for both genders. In addition, the 4th-grade students' "perceived ease of use," "perceived usefulness," "attitudes toward use," and "intention to use" revealed high correlations.

In addition, Akinsola and Animasahun (2007) highlighted the impact of using a simulation-game environment on the achievements and attitudes of high school students regarding math courses. They found that students had poor achievement when using traditional teaching approaches. Using the simulation-game environment increased the students' achievement and led to a positive attitude regarding math subjects.

At the college level, using DGBL for learning can also improve students' achievement. To illustrate this, Afari, Aldridge, Fraser, and Khine (2013) conducted a study to highlight students' perceptions toward mathematics by using video games at the college level in UAE. The results showed that students were involved in these experiences and such learning tools had a significant positive impact on their math enjoyment, academic efficacy, and achieved learning outcomes.

Although using educational video games could play a vital role in motivating students (Papastergiou, 2009; Papadakis, 2018) and improving students' performance (Su & Cheng, 2013), the adoption of video games for learning has not been prevalent in schools as of yet (Alquarshi, 2016, Koh, Yeo, Wadhwa, & Lim, 2011). The lack of use of educational video games in classrooms is due to the presence of obstacles and challenges. According to Baek (2008), there are six factors that prevent teachers from using educational digital games in their classrooms. The main difficulty teachers indicated was the inflexibility of some subjects or curricula. It is hard to find a game that is suitable for such lesson objectives. The potential negative effects of video games on students' vision and behavior constitute another challenge preventing teachers from using video games. Furthermore, some teachers avoid using video games because some students are not yet ready to deal with video games. Some teachers feel they do not have enough supportive materials, such as reference materials. Moreover, time constraints do not allow teachers to use games. Having a busy, fixed schedule and a heavy curriculum constrains the use of video games. Lastly, schools have limited budgets, therefore they cannot provide the requirements for using educational video games, such as computers and connectivity.

Wu (2015) divided the difficulties that hinder the adoption of video games into internal and external difficulties. The internal difficulties were composed of the lack of self-efficacy, the difficulty of assessing student learning, and the difficulty of choosing video games that were suitable for the subject matter. The external challenges included inconsistency between the use of digital games and the curricula, the negative perceptions some administrators had about DGBL, the lack of facilitating technology and professional development, short class periods, and the poor quality of the digital games that existed in the market.

THE PURPOSE OF THE STUDY

The main purpose of this qualitative study was to identify Saudi teachers' perceptions regarding adopting video games for learning. It investigated the barriers that concern teachers regarding the adoption of DGBL in Eastern Province schools in Saudi Arabia.

THE SIGNIFICANCE OF THE STUDY

This study will enrich the Saudi educational research field. There has been little research thus far examining the barriers to adopting game-based learning in classrooms (Alqurashi, 2016). This study could benefit teachers, school leaders, and policymakers. As far as teachers are concerned, this study is the teachers' voice toward school leaders and policymakers. It presents the obstacles toward the adoption of digital game-based learning in classrooms. Participation in this study may also help teachers in conducting their own research. In addition, interviewing teachers may help them evaluate their current teaching practices.

Furthermore, this study might help policymakers identify the main reasons that prevent Saudi teachers from using digital games in classrooms, allowing them to take actions that will increase the incorporation of educational video games in classrooms. These actions may include the allocation of funds or the creation of policies.

This study will play an important role in raising school leaders' awareness regarding adopting digital games in teaching and revealing to what extent their teachers perceive its benefits for learning. Thus, school leaders should take actions such as arranging teacher training to enhance the adoption of DGBL.

RESEARCH QUESTIONS

This study attempts to address the following questions:

- A. What are teachers' perceptions regarding using video games for educational purposes?
- B. What are the barriers to the adoption of digital games in Saudi schools from Saudi teachers' perspectives?

METHODOLOGY

Research Design

This was an exploratory study aimed at identifying Saudi teachers' perceptions of adopting video games for learning as well as revealing the difficulties teachers might face when they intend to embrace video games in their teaching.

Instrument and Data Collection

The interview questions were self-designed based on the literature. Then the questions were modified by four experts in the field. A pilot test was conducted in order to validate the research instrument. The researchers conducted an interview with two participants from the target population. After this interview, the researchers made some changes to the interview questions. The final version of the interview contained eleven questions. The researchers used a one-to-one structured interview. The researchers used the Arabic language to conduct the interviews, as per the participants' preference. Each interview lasted for 10–20 minutes.

Sample

The population of this study was gathered from Saudi teachers in public Eastern Province schools in Saudi Arabia. All the subjects were males 25–50 years old. The researchers used a convenience sample combined with snowball sampling. This study included 22 Saudi teachers in the Eastern Province of Saudi Arabia during the 2018–2019 academic year. These teachers taught computer courses in middle and high schools. No personally identifiable information (like respondents' names, house address, or ages) was collected, as per some participants' requests.

Data Analysis Procedures

All interviews were transcribed using InqScribe software. Then the researchers read through each interview transcript separately and highlighted the most significant information in order to divide the transcript into information segments that were related to the first research question. The researchers coded these segments using in vivo codes, codes from the social sciences, and/or codes from the researchers that best described these segments. The researchers then read separately through each interview transcript and highlighted the most significant information in order to divide the transcript into information segments related to the second research question. These segments were then coded by the researchers using in vivo, social studies, and/or researcher-sourced codes that best described the information segments. A number of codes were identified. Similar codes were then grouped and categorized into three themes.

The Validity of the Results

After the researchers finished coding the data and coming up with three themes, they needed to confirm that these themes and results were accurate and corresponded to the participant's intentions. They used member checking to establish credibility. The researchers emailed the theme table and findings to the participants to test the accuracy and credibility of the data and received confirmations from all participants. They also emailed the codes to a friend who spoke both English and Arabic language to double-check the translation.

FINDINGS AND DISCUSSION

To answer the first question, what are the teachers' perceptions about using video games for educational purposes, the researchers analyzed the interviewees' responses to the first three interview questions, which were:

- A. What do you think about using games in general to support your teaching?
- B. What is your opinion about using digital games (i.e., *Minecraft*) as a teaching and learning tool?
- C. Do you think teachers and school leaders believe in the importance of using video games for educational purposes?

Generally speaking, all participants agreed that video games were useful for enhancing student learning and enriching the learning environment. Video games can be useful for learning since students today are part of the digital generation and they are already involved in the world of digital games. According to participants, nowadays a large number of Saudi students use video games on their tablets, computers, smartphones, or game consoles; thus, why don't teachers leverage this for the benefit of students learning? Indeed, adopting video games is considered a smart move by teachers to reach students where they already are, as was said by participant A.

Participants stated that many potentials could be associated with using video games. To illustrate this, according to the participants, adopting video games in teaching could make the learning environment more enjoyable, practical, interactive, and competitive than a traditional learning environment and consequently make students more engaged, immersed, and thrilled to achieve better learning.

According to participant E, "using digital video games can assist teachers to draw students' attention and consolidate information in students' minds, unlike lecturing." Further, participant B stated that "there is no question that video games can play a vital role in fostering 21st century learning skills such as problem-solving, creativity, and collaboration," as well as "video games simulate what students' might face in their real lives," as stated by participant K. Participant G indicated that "Adopting video games could assist teachers to explain sophisticated topics and also students might acquire some implicit skills that are implied in some well-designed games." Participant U affirmed the role of video games in teaching programming concepts; he said, "video games such as scratch video games for learning purpose helps students learn program commands, logical sequence of programs, information structure, problem-solving, and teamwork skills in an enjoyable way." Although all the interviewees perceived the benefits of integrating video games into teaching, interestingly, none of them had ever used them in their teaching. This result is consistent with Noraddin and Kian's (2014) study, which found that teachers in Malaysia had a positive attitude toward the use of video games to support their teaching; however, more than 70% of participants had never used video games for educational purposes. Further, in a Saudi context, Alquarshis' (2016) reported that Saudi teachers had positive attitudes toward using video games to enhance students' motivation, engagement, thinking skills, and achievements. Noraddin and Kian (2014) also found that teachers held favorable attitudes. However, Alquarshi (2016) could not confirm that video games could improve teaching strategies or teacher performance.

With respect to the respondents' colleagues' and administrators' beliefs about using video games for learning as reported by the interviewees, the majority of respondents (19 out of 22) stated that their colleagues and administrators had not absorbed the notion of using of video games for educational purposes yet. One of the interviewees stated that "using digital game might make the educational process unserious and waste students time without educational benefits"; another stated that "integrating video game in teaching can be a more distraction of students than attraction." According to the interviewees, there are some teachers who realize the benefit of using video games for learning; however, they are a little worried about the possible negative consequences that might be associated with using video games, such as addiction and distraction. This result is in conflict with a study conducted by Noraddin and Kian (2014). Noraddin and Kian concluded that the teaching discipline had no impact on teachers' attitudes toward adopting video games in their teaching.

Five participants attributed this lack of awareness of the significance of video games to the dominance of traditional teaching methods in Saudi classrooms. Some teachers and school leaders are not familiar with millennial and Z

generation needs and expectations. Those teachers have been taught the traditional methods and resist any changes that conflict with their personal beliefs. Another reason for not seeing the importance of digital games is that “some leaders think video games are not serious and they can be only used for fun,” as stated by participant J.

In order to answer the second research question regarding barriers that could prevent teachers from adopting video games in their teaching, three major themes were identified based on the participants’ answers. The biggest concerns about the adoption of video games revolved around three fundamental factors—facilitating resources, lack of awareness, and game issues.

The First Theme: Lack of facilitating conditions

The first theme is the lack of facilitating conditions. “Facilitating conditions are defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system” (Venkatesh, Morris, Davis & Davis, 2003, p.453). There are many conditions that could facilitate the integration of digital games in Saudi classrooms. Based on the participants’ responses, this theme included two main codes—facilitating technology and facilitating resources.

Facilitating technology illustrated that schools have to be equipped with the necessary technologies to use digital games, such as internet connectivity, computers, and tablets. This result is in agreement with other studies (Alquarshi, 2016; Baek, 2008; Wu, 2015). Based on the participants’ responses, there was a consensus that their schools are not equipped to adopt video games. The schools needed a lot of development in terms of internet connectivity, computers, video games, and technical support. One participant said, “There are some computers in schools and the number of these computers does not exceed 20 computers. However, each classroom has approximately 30 students.” Another teacher reported that “the computers that are currently used in schools are not able to run digital games because running some digital games required availability of specific features, such as screens with high resolution and computer with big ram size.” In addition to the lack of computers in the lab, ten participants mentioned that the schools didn’t have adequate access to the internet to take advantage of the full potential of adopting video games, such as communication and collaboration. This result is in agreement with other studies’ findings (Alqurashi, 2016; Beak, 2008; Koh et al., 2011; Wu, 2015).

Time formed another challenge for the teachers. Interviewees mentioned that the duration of each lesson in Saudi schools is 45 minutes, and this short time is not enough to employ video games, especially when the curricula are heavy. Koh et al. (2011) concluded that having insufficient time to embrace video games in the curriculum was the greatest obstacle that impeded Singapore teachers from integrating video games into teaching. This result is in agreement with the results found by Wu (2015) and Alquarshi (2016).

The second code was facilitating resources. These included the materials, plans, policies, and manuals that are required to incorporate digital games effectively in classrooms. This result is in agreement with other studies’ findings (Alqurashi, 2016; Beak, 2008; Koh et al., 2011). In Saudi classrooms, there are neither mechanisms nor policies for the adoption of video games, as some participants mentioned. Participant Q stated that “The biggest issue we have in Saudi Arabia regarding using educational digital games is the absence of planning.” Other teachers said, “If Saudi Ministry of education would provide simple manuals about how to use video games, the number of teachers who used digital games in classrooms definitely will grow.” Some participants mentioned the importance of having specific policies tailored for adopting video games in classrooms when they talked about the possibility of addiction, bullying, blackmail, and misbehavior. Having clear policies from the educational authorities is a significant factor that affects the use of video games in the curriculum (Koh et al., 2011).

Facilitating resources also included financial and technical support, which are considered other obstacles to the adoption of video games by Saudi teachers. The interviewees stated that there are neither adequate financial allocation for the use of educational games nor adequate technical support to provide assistance for teachers who want to use and subscribe to educational video games. This finding is consistent with prior studies that found financial issues to be a significant factor that prevents teachers from integrating video games into teaching (Alqurashi, 2016; Wu, 2015). According to Watson, Yang, and Ruggiero (2013, p.236), “Teachers should be provided more technical assistance and financial support for purchasing computers and suitable games.”

The Second Theme: Lack of awareness

According to the participants, school leaders and teachers need to learn about the importance of using digital games in the classroom first and then learn how to use video games effectively to enhance their teaching. This theme included two major codes—lack of awareness and training.

Lack of awareness meant that Saudi teachers and school leaders did not believe that digital games are capable of improving student learning. According to participant C, “many Saudi administrators, particularly school leaders or teachers, are from the old generation, think using digital games is a waste of students time. Teachers can use it only for entertainment, not for education.” Alquarshi (2016) found that a lack of awareness of the benefits of educational video games was a reason not to adopt video games among Saudi teachers. Also, Baek (2008, p. 671) stated that “an effort should be made to raise awareness among teachers and parents of the positive educational benefits of gaming.”

Awareness could be raised by providing professional development regarding the effectiveness and integration of digital games into teaching. According to the participants, some teachers might realize the importance of video games, however, they do not have the required skills to purposefully and effectively introduce them into their teaching. All of the participants indicated that the Saudi Ministry of Education should provide workshops and training for teachers, and consequently they expected the number of Saudi teachers who used video games in classrooms would increase. Participant Q said, “I have met some teachers who are computer illiterate and they do not know how to run computers rather than integrating video games.” This result confirmed Wu (2015) and Alqurashi’s (2016) findings that the lack of professional development was the biggest challenge that prevented teachers from using video games (Alqurashi, 2016).

The third theme: Game Issues

The last theme revolved around different issues related to video games, including language, consistency, and assessing student learning. For example, the majority of well-known video games use English for instructions and interfaces. However, the formal language in Saudi Arabia is Arabic, which means students and teachers who do not understand English will not be able to properly use such games. Participant Q said, “I read about *Minecraft* and I know it is adopted in western country schools because of capacity in supporting student skills. However, my students can’t understand English language; therefore, I will not be able to adopt *Minecraft*.” Participant U said, “there are some video games with Arabic interface; however, there are not common among students and are poorly designed.”

Game consistency referred to the alignment between digital video games, the Saudi curricula, and Saudi societal peculiarities. Participants mentioned that many digital games are common among students, but these games can’t serve the curriculum in any way. This finding is supported by previous studies (Alquarshi, 2016; Kirriemuir & McFarlane, 2004; Koh et al., 2011; Watson et al., 2013; Wu, 2015). According to participant C, “there are difficulties related to the games themselves in terms of their relevance to nature and the requirements of educational levels and consistency with what are in Saudi education policy.” In addition, some participants said that some well-designed games conflict with Saudi culture and religion because of certain women, pictures, and music.

The last obstacle that hindered the use of video games by teachers in Saudi Arabia from the interviewees’ perspectives is the difficulty of assessing students’ learning when they play educational video games. This result is in agreement with Wu’s (2015) study. Having an assessment element in the games used in the classroom would assist teachers in monitoring their students’ progression and evaluating their skills (Borji & Khaldi, 2015). This assessment element in games could include criteria such as a progress indicator and player tracking. According to participants B & C, any video game should have an assessment section in order to evaluate the progression of learning that in turn helps students to achieve the learning goals. On the other hand, participant A stated that “teachers need to learn how to measure learning process managed by such tools.”

CONCLUSION

This study aimed to investigate Saudi teachers’—particularly computer teachers’—perceptions of the benefits of using video games in their teaching. The results show that computer teachers perceive the benefits of embracing video games in teaching. However, they stated that their colleagues who teach other subjects had a low awareness of the benefits of using video games for learning. Interestingly, none of the interviewees had ever employed video games for teaching purposes. This study also identified the difficulties that prevent Saudi teachers from adopting video games from computer teachers’ perspectives. These challenges are attributed to the lack of facilitating conditions, low awareness of video games’ potential for learning, and the lack of video games that suit Saudi peculiarities and curricula.

IMPLICATIONS

Saudi educational authorities could begin initiatives to encourage teachers to adopt technological innovation in their teaching, such as video games. The Saudi Ministry of Education could provide incentives for teachers who adopt technological innovations in their teaching.

According to the interviewees, teachers emphasized that policymakers, school leaders, and teachers needed to assemble incorporate guidelines, materials, and plans regarding the implementation of video games for learning. Teachers could suggest a list of video games to be used in each subject based on their experiences, with manuals that showed clear instructions about the method of use, the purpose of use, and the target audience of the game. Further, the Saudi Ministry of Education should enact rules and policies to control the use of video games in classrooms.

According to the interviewees, there are no video games that align with the Saudi community's peculiarities or the prescribed outcomes of the Saudi curricula. As such, the Saudi Ministry of Education could create a partnership with pioneer companies specializing in game design so that the Saudi Ministry could ask for tailored games that aligned with Saudi culture and curricula. Also, there should be teams of specialists in different areas (science, social studies, psychology, and religion) who suggest effective video games teachers may use in the classroom and who evaluate the consistency of the video games with course outcomes and the community's religious, social, and cultural values. From the researchers' perspectives, Saudi authorities should rethink the ability of the current educational system to embrace technological innovations in general and encourage the integration of DGBL in particular.

According to the participants, there are teachers who do not know how to integrate video games effectively into their teaching. In order to use educational video games effectively in Saudi classrooms, the Saudi Ministry of Education should provide courses, training, and workshops for teachers to assist them in selecting, designing, and using effective games. Also, holding seminars and conferences that discuss technological innovations and share successful experiences of adopting video game would remove skeptics' doubts and increase the use of educational games in Saudi schools (Koh et al., 2011). Since there is little research written in Arabic that sheds light on the use of video games for learning, the Saudi Ministry of Education could support researchers in conducting more research to identify technological innovations that might enhance student learning and sharing the results of these studies among teachers.

FUTURE RESEARCH

For future research, the researchers suggest conducting the same study with females only and comparing the results of this study and the future one to better understand the influence of gender. Also, changing the population and conducting studies in different sites using different research methods, such as qualitative or mixed methods, would give us a deeper understanding of these obstacles, and the results would assist the policymakers in overcoming these obstacles.

REFERENCES

- Afari, E., Aldridge, J. M., Fraser, B. J., & Khine, M. (2013). Students' Perceptions of the Learning Environment and Attitudes in Game-Based Mathematics Classrooms. *Learning Environments Research*, 16(1), 131-150.
- Akinsola, M. K., & Animasahun, I. A. (2007). The Effect of Simulation-Games Environment on Students Achievement in and Attitudes to Mathematics in Secondary Schools. *TOJET: The Turkish Online Journal of Online Submission, Educational Technology*, 6(3).
- Alqurashi, M. A. (2016). *Saudi teachers' experiences and attitudes toward integrating video games for learning: Affordances and constraints of using video games in saudi arabian classrooms* (Order No. 10191600). Available from ProQuest Dissertations & Theses Global. (1868419196). Retrieved from <https://library.iau.edu.sa/docview/1868419196?accountid=136546>
- Alqurashi, M. A., & Williams, M. K. (2017). The teachers' experiences with video games play in Saudi Arabia. In I. Akman (Ed.), *Proceedings of the International Conference on Education, E-Governance, Law and Business (ICEELB-17)* (pp. 58–84). [https://doi.org/ 10.15242/ICEHM.UH0117025](https://doi.org/10.15242/ICEHM.UH0117025)
- Asgari, M., & Kaufman, D. (2009). Motivation, Learning, and Game Design. In *Handbook of Research on Effective Electronic Gaming in Education* (pp. 1166-1182): IGI Global.
- Baek, Y. K. (2008). What hinders teachers in using computer and video games in the classroom? Exploring factors inhibiting the uptake of computer and video games. *CyberPsychology and Behavior*, 6, 665-671.
- Borji, Y. E., & Khaldi, M. (2015). Comparative Study to Develop a Tool for the Quality Assessment of Serious Games Intended to be used in Education. *International Journal Of Emerging Technologies In Learning*, 1050-55. doi:10.3991/ijet.v9i9.4150

- Cheng, Y., Lou, S., Kuo, S., & Shih, R. (2013). Investigating Elementary School Students' Technology Acceptance by Applying Digital Game-Based Learning to Environmental Education. *Australasian Journal of Educational Technology*, 29(1), 96-110.
- Demirbilek, M. (2010). Investigating Attitudes of Adult Educators towards Educational Mobile Media and Games in Eight European Countries. *Journal of Information Technology Education*, 9, 235-247.
- Dikkers, S. (2015). *TeacherCraft : How Teachers Learn to Use MineCraft in Their Classrooms*, Pittsburgh (PA), ETC Press.
- Eseryel, D., Law, V., Ifenthaler, D., Ge, X. & Miller, R. (2014). An investigation of the interrelationships between motivation, engagement, and complex problem solving in game-based learning. *Educational Technology & Society*, 17(1), 42-53.
- Hwang, G. J., Hung, C. M., & Chen, N. S. (2014). Improving learning achievements, motivations and problem-solving skills through a peer assessment-based game development approach. *Educational Technology Research and Development*, 62(2), 129-145.
- Kirriemuir, J., & McFarlane, A. (2004). Literature review in games and learning: A NESTA Futurelab research report. Retrieved from <https://telearn.archives-ouvertes.fr/hal-00190453/document>
- Koh, E., Kin. Y. G., Wadhwa, B., & Lim, J. (2011). Teacher perceptions of games in Singapore schools. *Simulation & Gaming*, 42(4), 1-16.
- Mediajuice Studios. [waqas umar]. (2014 November 15). Watch Digital Games The Movie 2014 avi [Video file]. Retrieved from <https://www.youtube.com/watch?v=JIETwkkDQ7g>
- Miller, C., & Doering, A. (2014). *The New Landscape of Mobile Learning: Redesigning Education in an App-based World*. New York: Routledge.
- Papastergiou, M. (2009). Digital game-based learning in high school computer science education: Impact on educational effectiveness and student motivation. *Computers & Education*, 52(1), 1-12.
- Papadakis, S. (2018) 'The use of computer games in classroom environment', *Int. J. Teaching and Case Studies*, Vol. 9, No. 1, pp.1-25.
- Papadakis, S., & Kalogiannakis, M. (2017). Using gamification for supporting an introductory programming course. the case of classcraft in a secondary education classroom. In *Interactivity, Game Creation, Design, Learning, and Innovation*(pp. 366-375). Springer, Cham.
- Prensky, M. (2007). *Digital game-based learning* (Paragon House ed.). St. Paul, Minn.: Paragon House.
- Squire, K. (2005). Changing the game: What happens when video games enter the classroom? *Innovate* 1 (6). <http://www.innovateonline.info/index.php?view=article&id=82>
- Su, C. H. & Cheng, C. H. (2013). 3D game-based learning system for improving learning achievement in software engineering curriculum. *Turkish Online Journal of Educational Technology*, 12(2), 1-12.
- Subrahmanyam, K., Greenfield, P. (2009). Designing Serious Games for Children and Adolescents: What Developmental Psychology Teach Us. In: Ritterfeld, U, Cody, M, Vorderer, P (Eds). *Serious Games. Mechanisms and Effects*. New York: Routledge, 167-178
- Tham, R. & Tham, L. (2014). The effectiveness of game-based learning as an instructional strategy to engage students in higher education in Singapore. *International Journal on E-Learning*, 13(4), 483-496.
- Tokac, U., Novak, E., & Thompson, C. G. (2019). Effects of game-based learning on students' mathematics achievement: A meta-analysis. *Journal of Computer Assisted Learning*, 35(3), 407-420.
- Van Eck, R. (2006). Digital game-based learning: It's not just the digital natives who are restless. *EDUCAUSE review*, 41(2), 16.
- Venkatesh, V., Morris, M.G., Davis, G. B. & Davis, F. B. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*. 23(3), 425-478.
- Video game. (2019). In Oxford English Dictionary online. Retrieved from https://en.oxforddictionaries.com/definition/video_game
- Watson, W. R., Yang, S. & Ruggiero, D. (2013), Games in Schools: Teachers' Perceptions of Barriers to Game-based Learning. *Journal Of Interactive Learning Research*, 27(2), pp. 153-170.
- Wu, M. L. (2015). *Teachers' experience, attitudes, self-efficacy and perceived barriers to the use of digital game-based learning: A survey study through the lens of a typology of educational digital games* (Order No. 3714969). Available from ProQuest Dissertations & Theses Global. (1700837494). Retrieved from <https://library.iau.edu.sa/docview/1700837494?accountid=136546>

SCHOOL CLIMATE AS PREDICTOR OF TEACHERS' COMPETENCES TO RECOGNIZE THE EDUCATIONAL NEEDS OF ADOPTED CHILDREN IN ITALY

Cinzia Novara

Università degli Studi di Palermo

Giorgia Coppola

Università degli Studi di Palermo

Alessio Castiglione

Università degli Studi di Palermo

Michela Lenzi

Università degli Studi di Padova

ABSTRACT

The current study examines the association between different components of school climate (teacher-principal and teacher-parent relationships, parents' involvement in school activities, connection between school and the local services) and teachers' competences and knowledge regarding the adoption experience. Participants were 573 teachers (95.7% women; mean age= 47.06, SD= 8.66, ranging between 25 and 65) residing in three Italian regions characterized by rates of international adoptions that are higher than the national average. The association between school climate and teachers' knowledge and competences on adoption was evaluated via independent multiple logistic regression analyses. Findings show that three of the components of school climate under examination are associated to teachers' knowledge and competences regarding the adoption experience. Thus, interventions aimed at improving school climate hold promise for promoting teachers' capacity to handle the challenges of the adoption process.

INTRODUCTION

In the last report of the Commission for Intercountry Adoptions (CIA 2014-2015) it reports that, while rates in other countries seem to be falling, Italy continues to rank first in Europe and second in the world after the United States for the number of foreign-born children its citizens adopt: every year between 3,000 to 4,000 new adoptions are approved by Italian courts. Of these, approximately three out of four are international adoptions. During the 2014-2015 period, 4,422 children were adopted.

In Italy, the bureaucratic path to international adoption is a long process (4-5 years) entailing an psychosocial evaluation of the would-be adoptive parents by the juvenile court. The complicated practices, unexpected setbacks, and inadequate assistance that often characterize the undertaking may lead to long delays and provoke anxiety and stress for potential parents.

The success in settling in (for both children and parents) and the goodness of the entire adoption process also depend on the reception capacity of the host country, of the local community and school (Novara et al. 2015).

As we know, adopted children can be particularly vulnerable to academic and relational problems due to neglect or past traumatic experiences (Palacios, Román, and Camacho, 2010)

but the school environment is an fundamental aspect in order to prevent these problems. Recent studies (Masten, 2008) are giving more and more relevance to the role of the school environment in influencing students' behaviour, since children and adolescents spend much of their time at school. Existing researches have indicated that several dimensions of school climate are positively associated with students' achievement as well as well-being of all school staff (Vos et al. 2012). That means that schools can contribute to the prevention and reduction of children problematic behaviours by optimising different dimensions of school climate. A promising strategy consists in promoting those characteristics of the school climate that can foster the teachers' competence to satisfy the educational and emotional needs of pupils with a familiar history of adoption.

As mentioned above, promoting the creation of a school climate improving teachers' understanding of the adoption process and the emotional complexities families face would seem to be a particularly important measure to facilitate the children's adjustment. In addition, teachers themselves should be aware of the importance of their role and be provided with classroom management competencies preparing them for the dynamics of a class with children with stories among them very different.

Teachers should be prepared to handle behavioural problems, learning difficulties and emotional reactions resulting from a past often marked by the neglect or absence of adult caregivers. As above anticipated, all adopted children have experienced some trauma linked to loss, to the broken attachment bond, and to feeling themselves in danger or not safe. The implications of these experiences are revealed in the social, emotional, cognitive and behavioural development of these children and they could represent a challenge for teachers. Even if this paper will not deal with the complex issue of trauma management, it is important to know the problems that might derive

from it and require particular educational and psychological programs in the school context. These teachers' specific competences will not enter into our dissertation but it is a well established fact that teachers who have been provided with background information about their students can better meet their particular educational needs, leading to a positive effect in academic performance. Little, however, is known about the factors that can promote teachers' competencies in meeting students' additional support needs. Teachers' knowledge about the adoption process/experience and their ability to provide sensitive responses to the adopted children in their class may be affected by some features of the school climate such as the level of connectedness between teachers, principals, parents and the community at large.

THE RESEARCH

The study aims to investigate the relation between school climate and teachers' competences/knowledge about the legal and emotional journey that foreign-born students and their adoptive families are traveling.

About the sampling, five hundred seventy-three teachers (95.7% women; mean age= 47.06, standard deviation = 8.66, ranging between 25 and 65) with mean years of teaching experience = 20.1 years (standard deviation = 9.41) and mean years of education = 14.7 years (standard deviation= 2.89) participated in the study.

The teachers have been divided into three groups as far as the number of years they had been teaching was concerned: 0 to 10 years (10.1%), 11-20 years (43.3%), more than 20 years (46.6%).

As far their contractual status was concerned, 85.7% of the teachers had a permanent contract, the remaining (14.3%) had short-term ones.

Of the 573 teachers interviewed, 42.2% said that they have currently an adopted pupil in their classroom, and consequently to have experience in this field.

The teachers were asked to fill up a questionnaire including:

- some demographic questions (e.g. gender, age, qualifications, the subjects they taught);
- measures of school climate, measured via 4 subscales of the teachers' version of the Questionnaire of the School Situation: (1) "relationships between teachers and the principal", 2) "relationship between the teachers and the parents", 3. "parents' involvement in school activities", 4) "connection between the school and the local institutions and social services");
- teachers' knowledge about the adoption process, including legal and emotional aspects.

After controlling the effect of other variables (gender, age, length of career, adoption experience), the association between the components of school climate and teachers' knowledge about the adoption process and their perceived competence was evaluated via independent multiple logistic regression analyses (one for each dependent variable). All statistical analyses were conducted using IBM SPSS software (22.0).

Therefore in the research design, the school climate represents the independent variable, while the others are all considered as dependent variables.

RESULTS

A relatively small percentage of the teachers interviewed claimed knowing the legislation on adoption (15.9 %). A slightly lower percentage of teachers identified parents' most stressful experience during the national adoption process (12.4%); the percentage of teachers who identified the most stressful experience during the international adoption process was even smaller (8.2%).

Four logistic regression models were run to test the association between different dimensions of school climate and teachers' knowledge and competence about the adoption process.

A positive correlation was found between the "school-local institutions/social services connection" and the likelihood of knowing the legislation about adoption. Data analysis showed that: teachers reporting higher levels of connection between the school and the local community were more likely to feel knowledgeable about the legislation on adoption. More specifically, teachers were almost twice more likely to report feeling competent on the legislation about adoption for each one-unit increase in the degree of connectedness between the school and local services. This was the only component of the school climate examined showing a significant association to the teachers' knowledge about the legislation on adoption.

Regarding the teachers' knowledge about adoptive parents' stressful experiences, two components of the school climate resulted to be positive predictors: the "connection between the school and local services" and "parental involvement in school activities". Findings showed that teachers were more than twice more likely to correctly identify the most stressful aspect of the pre-adoption national and international practices for each one-unit increase in school-local services connectedness. A correlation was also found between the "parents' involvement in school activities" and the teachers' knowledge about the adoptive parents' stressful experience during the evaluation of parental suitability (for national and international adoption). Results showed that teachers reporting parents' active participation in school activities were more likely to correctly recognize the most stressful aspects of the adoption process. That means that, for each one-unit increase in parents' involvement in school activities, teachers were

more than twice more likely to correctly identify the stressors that parents have to cope during the evaluation of parental suitability, both for national and international adoption.

Finally, the perceived competences about the adoption process were significantly predicted by two of the components of the school climate examined in the study. Higher levels of “connection between the school and the community” were positively associated with the teachers’ perception of competence regarding the adoption process, i.e., when teachers reported that their school had a strong “connection with local services”, they were more likely to feel competent on the adoption process. In short words, for each one-unit increase in the perceived connection between the school and the local services, teachers were twice as likely to report feeling competent in relation to the adoption experience. “Good relationships among teachers” were, instead, negatively associated to the teachers’ perceived competence about the adoption process. Indeed, findings show that when reporting good relationships among teachers in the school, teachers were less likely to feel competent on the adoption process (every one-unit increase in perceived cohesion among teachers corresponded to a 55% decrease in the likelihood of reporting to feel competent in the adoption domain).

The only component of the school climate examined that was not significantly associated to teachers’ knowledge and competences about adoption was the quality of the “relationships between teachers and principal”.

Overall, according to our results, the degree of “connectedness between the school and local services” was the most relevant component of the school climate in predicting the teachers’ knowledge and competences about adoption; indeed, teachers reporting high levels of connectedness were more knowledgeable about the laws on adoption, more likely to correctly identify the stressors for parents in the process of international adoption and felt more competent on the overall adoption experience. “Parental involvement in school activities” was also very important for the teachers’ knowledge about adoption, especially in relation to parents’ emotional experience, i.e., by knowing the stressors that parents have to face during the evaluation of parental suitability in national and international adoption.

IMPLICATIONS

The principal objective of the study has been confirmed: the associations between some dimensions of school climate and teachers’ knowledge and perceived competences about the national/international adoption process have emerged. The results emphasize that it is important that teachers recognize the school climate as a protective factor with regard to the efforts to meet the educational needs of these students (Novara, Lenzi, Santinello, 2018). These findings confirm that school climate dynamically interacts with educational effectiveness, in a particular way in supporting inclusive good practices. Training programs that are able to provide adoption-related information and to outline measures to improve the general school climate could help educators to meet the challenges that these students bring to their classrooms. There is a new awareness about the need to support the school programs linked in some way with adoption, but in Italy only a few efforts have been made until now to address the aspects outlined here and thus to further enhance the beneficial effects of training programs.

Private and personal networks are presently working at a grassroots level in Italy to improve the school experience of adopted children, and we are hopeful that the Ministry of Education will make its own tangible contribution in the years to come by investing in opportunely organized training programs (Novara, Garro, Serio, Vitano, 2015; Novara, Serio, Lavanco, 2017). According to an ecological view, the beneficiaries of a positive school climate are not only the teachers but the school and local community as well as. Indeed, although the school has a central role in this process, an effective strategy to improve the overall adoption process must incorporate actions at a wider societal level and include interventions in multiple ecological settings. The teachers’ training on the adoption process should not be considered as a direct consequence deriving from governmental choices but rather the outcome of a “consultative process” having children at the center of this ecological perspective (Sempowicz 2017, 320).

In so doing, the flow of the interactions among parties is radically changed: we should start from a micro-centered level, where we find the children and their educational needs, followed by other “consultative partners” (e.g.: parents, non-school professionals and others social recourse of the local community), which in turn should guide and implement the government policy, then the school policy and finally the teachers preparation programs. Even if the interaction between the school climate components and larger societal pressures is not considered in our study, this topic could be further deepened in a future research because an ecological approach is very important to promote resilience, especially in presence of risk factors as argued above about adopted children.

REFERENCES

- CIA (Commission for Intercountry Adoption) 2014-2015. Data and perspectives in Intercountry adoptions. Report on files from January 1, 2014 to December 31 2015. Florence: Institute of Innocents. http://www.commissioneadozioni.it/media/153043/report_statistico_2014-2015.pdf.
- Masten, A. S., J. E. Herbers, J. J. Cutuli, and T. L. Lafavor. 2008. “Promoting competence and resilience in the school context.” *Professional School Counseling* 12 (2): 76–84.
- Novara, C., Lenzi, M. & Santinello, M. (2018). “School climate as predictor of teachers’ capacity to meet the

- educational needs of adopted children in Italy”. *International Journal of Inclusive Education*, DOI: 10.1080/13603116.2018.1459889 .
- Novara, C., M. Garro, C. Serio, and S. Vitrano (2015). “New Trends in Teacher’s Education. Educational Placement of the Adopted Child”. *Procedia - Social and Behavioural Sciences* 174: 355–361. doi:10.1016/j.sbspro.2015.01.6.
- Novara, C., Serio, C. and Lavanco, G. (2017). “Teacher’s Representations on Adoptive Families and Educational Practices: New Challenges in Teachers’ Preparation.” *Adoption Quarterly*, 20 (2): 135–154. doi:10.1080/10926755.2016.1201707.
- Palacios, P., M. Román, and C. Camacho. 2010. “Growth and Development in Internationally Adopted Children: Extent and Timing of Recovery After Early Adversity.” *Child: Care, Health and Development* 37 (2): 282–288. doi:10.1111/j.1365-2214.2010.01142.x.
- Sempowicz T. A. 2017. “Examining the primary school experiences of intercountry adoptees: perspectives of adoptive parents and children” PhD. diss. Queensland University of Technology.
- Vos, D., P. C. van der Westhuizen, P. J. Mentz, and S. M. Ellis. 2012. “Educators and the Quality of Their Work Environment: An Analysis of the Organisational Climate in Primary Schools.” *South African Journal of Education* 32: 56–68. <http://sajournalofeducation.co.za/index.php/saje/article/viewFile/520/283>.

SELF-EFFICACY OF PRE-SERVICE SCIENCE TEACHERS IN PHYSICS COURSE

Supranee PITSAMAI
Naresuan University, Thailand
supraneep60@nu.ac.th

Asst.Prof.Dr.Thitiya BONGKOTPHET
Naresuan University, Thailand
thitiyab@nu.ac.th

ABSTRACT

This research aimed at exploring the perceived self-efficacy of pre-service science teachers. The participants were 205 pre-service teachers in general science major at a Rajabhat University who were selected by purposive sampling method. The research instruments comprised of a questionnaire and a semi-structured interview. All participants completed the questionnaire (SOSESC-P) with the Likert rating scale, which was applied from Fencel and Scheel (2005). Then five pre-service science teachers were selected for a semi-structured interviews in order to gather in depth data. Data were analyzed through mean, standard deviation, and content analysis, which was divided into four aspects including: 1) Performance Accomplishment (PA); 2) Vicarious Learning (VL); 3) Social Persuasion (SP); and 4) Emotional Arousal (EA). The finding revealed that the perception of self-efficacy towards physics of these pre-service science teachers were at the medium level ($\bar{X}=3.21$, $SD=0.35$). When considering each aspect, the medium levels of the perception of self-efficacy towards physics were also reported as following PA; $\bar{X}=3.12$, $SD=0.35$, VL; $\bar{X}=3.39$, $SD=0.37$, SP; $\bar{X}=3.60$, $SD=0.27$ and EA; $\bar{X}=3.23$, $SD=0.24$. In addition, the findings elicited from the semi-structured interviews were as the followings. 1) PA; students perceived that learning physics was at the medium level because it had difficult formulas that required mathematical skills. 2) VL; students perceived that they intended to do the best as they could during studying and they thought they should be able to do as well as their classmates. They valued that group work and tutoring peers were the opportunities to exchange and review their physics content knowledge. 3) SP; students perceived that receiving suggestions from instructor whenever they have problems during study, using a variety of teaching techniques and activities, and working in groups were key factors to motivate them to learn and understand physics successfully. 4) EA; students perceived that they felt pressurized by the physics content and assignments which were more difficult and confusing than other subjects. Getting advice from teachers and friends could help to decrease the pressure. Therefore, the researcher suggested that the learning management of physics should focus on developing both the student's knowledge on physics content knowledge and mathematical skills. Class activities should be carried out through learning-by-doing, collaborative and interactive learning principles, which can provide students with the opportunity to exchange knowledge, develop interaction between friends and teachers, and create stress-free classroom environment.

Keyword. Self-efficacy, Pre-service Science Teachers, Physics Course

INTRODUCTION

All science teacher program in Rajabhat University is changed from 5 years program to 4 years program from Rajabhat University Policy. The courses in the program are expected to be competency based courses which focusing on content knowledge and pedagogy knowledge (Curriculum of education of general science, 2019). Students in this program are required to learn general science courses for the first three years. Physics is one of the mandatory courses that the first year students have to study.

Self-efficacy affects the decision making. People who recognize that they are highly capable will try to show that behavior. Self-efficacy is a factor that influences actions of individuals. Self-efficacy reflects confidence in the knowledge and ability to perform duties of teachers. It is a mental center that gives teachers a feeling of being able to perform their duties efficiently. It is also a motivation for teachers to act or change their behavior regarding the performances of teachers. Self-efficacy influences decision making of teachers in their teaching in the future. (A Bandura, 1997; Hoy & Spero, 2005; Wang & Liu, 2008).

The success of performing some behavior does not only depend on the knowledge, abilities, and skills, but it also depends on the idea that the person has towards himself whether he is capable or not capable of doing something. Even though a person has some abilities and skills, but he thinks that he has no ability, he will not be able to become successful in his work. People, who try to work in a coercive situation successfully and achieve the expected results, will have their self - realization of their abilities; it makes them become fearless when they have to experience the similar kinds of situations. If anyone has a low tolerance for work, they will have lower self-efficacy and have fear to perform that job. This can be concluded that self-efficacy refers a judgment of one's abilities to be able to work at any levels, while expectations of consequences resulted by the actions are judgments for behavior people express. Such a confidence in deciding how talented he is indicates how much the person will try to do that job. If he believes that he does not have the ability to complete the activity, he will be afraid and try to avoid that activity. Pre-service teachers, who receive more active trainings while they were in the university program, have higher levels of self-efficacy in the classroom (Woodcock & Reupert, 2013). For people with high self-efficacy who have had enough experiences in practice, they learn through their experiences that they still have not had enough knowledge to stay efficacious (Dorel, Kearney, & Garza, 2016).

Research has shown that self-efficacy is positively correlated with academic achievement for students with high self-efficacy.. It is likely that their achievement will be high. For those students with low self-efficacy, their academic achievements tend to be low. (Bandura, 1986; Schunk, 1982) The study of the impacts of an inquiry-based science course on preservice elementary teachers' self- efficacy for science and science teaching, understanding of science, and willingness to teach it in their future careers. It was found that for some pre-service students in the inquiry- based science course were positively influenced their self- efficacy for science and science teaching. It made in a majority of students' conceptual understanding of science, understanding of the science process and scientific research, and confidence with science and science teaching. (Avery, L. M., & Meyer, D. Z.,2012 ; Deepika Menon & Troy D. Sadler, 2017). At the same time, from research studies on the effects of self-efficacy in teachers found that self-efficacy in the profession an effect on the success of the profession with statistical significance. (Day & Allen ,2004; Pachulicz et al., 2008; Savran & Cakiroglu, 2003). Self-efficacy is an area that is widely studied in education and science education research; however, In Thailand, a few researches relating to self-efficacy of pre-service found that ;1) the factors related to perceived self-efficacy of teaching and 2) variables of self-efficacy in the profession with direct influence on career success indicated. Themruthai, (2004) study of the factors related to perceived self-efficacy of teaching of fourth-year students for the bachelor of education degree at Rajabhat college in the lower part of the northern district, ministry of education indicated that the relationships were found between the fourth-year student's perceived self-efficacy of teaching and among the following factors: genders, teaching practice environments, teaching achievement motivations, attitudes toward teaching profession. Patcharee , (2012) study of the variables of self-efficacy in the profession with direct influence on career success indicated the results with statistically significant (influence size = 0.212). This means that recognizing their abilities will affect the understanding of science concepts, achievements, and also affect the success of the profession.

In this research, the purpose was to explore the self-efficacy in physics of pre-service science teacher at Rajabhat University.

PARTICIPANTS

Participants were 205 pre-service science teachers who were first year students in Bachelor Degree of Education of General Science Program at Phetchabun Rajabhat University, academic year 2018. The research instruments in this study included questionnaires and se-mi structured interview. The participants were selected by purposive sampling method The participants consisted of 180 females and 25 males students. For interviews, the researcher selected the purposive sampling from 5 students, who answered the questionnaire and the data from this survey most accurately.

INSTRUMENTS

self-efficacy questionnaires and semi-structured interview forms were research instruments of this study. The details of each instruments were described as follows:

1) Self-efficacy Questionnaire

1.1 Self-efficacy questionnaire was developed based on Heidi Fencl and Karen Scheel concepts, (2004) is the sources of Self-efficacy in science Courses-Physics (SOSESC-P), which consists of 33 items, divided into 4 groups as follows:

1. Performance Accomplishment (PA) Performing a task successfully strengthens our sense of self-efficacy. However, failing to adequately deal with a task or challenge can undermine and weaken self-efficacy.
2. Vicarious Learning (VL) gained by observing others perform activities successfully. This is often referred to as modeling, and it can generate expectations of observers that they can improve their own performances by learning from what they have observed.
3. Social Persuasion (SP) is the activity that people are led, through suggestion, into believing that they can cope successfully with specific tasks. Coaching and giving evaluative feedback on performances are common types of social persuasion.
4. Emotional Arousal (EA) is about the individual's physiological or emotional states, which influence self-efficacy judgments with respect to specific tasks. It refers to emotional reactions to such tasks that can lead to negative judgments of one's ability to complete the tasks.

1.2 The question is classification of opinions based on a five-point Likert scale, with responses that range from "strongly agree" to "strongly disagree."

1.3 Data were collected by online with Google forms between 7-11 Jan 2019.

1.4 The data were analyzed by using basic statistics such as mean, standard deviation.

2) Semi-Structured Interviews

2.1 Semi-structured interviews were created according to the concept Heidi Fencl and Karen Scheel, (2004) , which could be divided into 4 main points as follows : 1) Personal Accomplishments (PA), 2) Vicarious Learning (VL),3) Social Persuasion (SP), and 4) Emotional Arousal (EA)

1. How do students have the ability to study physics? what are the obstacles and problems in learning?

2. How do classmates influence student learning ?

3. How does the instructor influence students in learning?

4. How do students think that physical readiness and emotions affect the study of physics?

2.2 The data was collected after this group of students answered their questionnaires.

There were 5 students in each focused group. All students had answered every questions.

2.4 The data from semi-structured interview was analyzed through content analysis.

FINDINGS

The findings were divided into 2 main parts as follows:

1. The research results from the questionnaire consisted of 33 items. The researcher classified the questions into 4 categories according to Bandura's theory and Heidi Fencl and Karen Scheel, (2005), which were used as the sources of Self-efficacy in Science Courses-Physics (SOSESC-P).

Table.1 Results from the questionnaire.

Categories	\bar{X}	SD
1) Performance Accomplishment (PA)	3.12	0.35
2) Vicarious Learning (VL)	3.39	0.37
3) Social Persuasion (SP)	3.60	0.27
4) Emotional Arousal (EA)	3.23	0.24.
Average	3.21	0.35

From Table 1, it was found that the survey of self-efficacy of teacher students. In the overall picture, the survey results were at a moderate level (\bar{X} = 3.21 SD = 0.35). When considering each aspect, it was found

that the most surveyed areas were the use of social persuasion (SP) was at a high level (\bar{X} = 3.60, SD = 0.27), followed by vicarious learning (VL) at a moderate level (\bar{X} = 3.39 SD = 0.37), and emotional arousal (EA) (\bar{X} = 3.23 SD = 0.24), Performance Accomplishment (PA) at a moderate level (\bar{X} = 3.12, SD = 0.35), respectively.

2. The results of the interviews using semi-structured interview revealed that:

The result about personal accomplishments (PA) in question 1 found that: 100% of students perceived that physics course had difficult formulas that required mathematical skills, 80% of students perceived that learning physics was at the medium level, and 20% of students perceived that high level respectively.

Example

Questions : How do students have the abilities to study physics?

What are the obstacles and problems in learning?

- Answers : - physics have difficult formulas , used mathematical skills. (students 1,2,3,4,5)
 - can learning physics in medium level because he/she is not confident in taking exams (students 1,2,3,5)
 -confident in taking exam so think high level (students 4)

The result about 2) Vicarious Learning (VL) in question 2 found that: 100% of students perceived that they valued that group work and tutoring peers were the opportunities to exchange and review their physics knowledge, 80% of students perceived that they intended to do the best as they could during studying and they thought they should be able to do as well as their classmates, and 20% of students perceived that friend don't influence him because student can do by himself .

Example

Questions : How do classmates influence student in learning ?

- Answers : - group work, cooperative learning, tutoring peers help exchange for physics learning. (students 1,2,3,4,5)
 - can intended to do during studying and they thought they should be able to do as well as their classmates (students 1,3,4,5)
 - can do by himself/herself (students 2)

The result about Social Persuasion (SP) in question 3 found that: 100% of students perceived that receiving suggestions from instructor whenever they have problems during study , 80% of students perceived that working in groups were key factors to motivate them to learn and understand physics successfully and 60% of students perceived that using a variety of teaching techniques and activities.

Example

Questions : How does the instructor influence student learning?

- Answers : - suggestions from teacher help student learning. (students 1,2,3,4,5)
 - working in groups with friend, collaborative, friend help friend. (students 1,2,3,5)
 - teacher using a variety of teaching techniques, hand- on techniques (students 1,4,5)

The result about Emotional Arousal (EA) in question 4 found that: 100% of students perceived physics course as a subject difficult , 60% of students perceived that it is more confusing than other subjects , 60% of students perceived that they felt pressurized by the physics contents , 40% of students perceived that if they practiced frequently, they would be able to understand, and 40% of students perceived that getting advice from teachers and friends could help to decrease the pressure.

Example

Questions : How do students think that physical readiness, emotions affect the study of physics?

- Answers : - physics course is a subject difficult very much. (students 1,2,,3,4,5)
 - physics topic is confuse. (students 2,3,4)
 - they feel pressure by the physics content (students 1,2,3)
 - if practiced frequently, he/she would be able to understand. (students 1,2)
 - suggestion form teacher and friend help for learning physics .(students 3,5)

DISCUSSIONS

The finding revealed that the perception of self-efficacy towards physics of these pre-service science teachers were at the medium level (\bar{X} = 3.21, SD = 0.35). When considering each aspect, the medium levels of the perception of self-efficacy towards physics were also reported as following PA; \bar{X} = 3.12, SD = 0.35, VL; \bar{X} = 3.39, SD = 0.37, SP; \bar{X} = 3.60, SD = 0.27 and EA; \bar{X} = 3.23, SD = 0.24. It can be concluded that pre-service science teachers are not confident in learning physics because they are not understands in science concept. In accordance with Deepika Menon and Troy D. Sadler, (2017) the research found that some pre-service students, the inquiry-based science course positively influenced their self- efficacy for science and science teaching. It made in a majority of students' conceptual understanding of science, understanding of the science process and scientific research, and confidence with science and science teaching. According Patcharee, (2012) The study of the variables of self-efficacy in the profession with direct influence on career success indicated recognizing their abilities will affect the understanding of science concepts, achievements, and also affect the success of the profession.

CONCLUSIONS

The survey of self-efficacy of students in general science teachers of Phetchabun Rajabhat University. In the overall and each aspect is at a moderate level (\bar{X} = 3.21 SD = 0.35). When considering each aspect, it was found that the most surveyed areas were the use of social persuasion (SP), which showed the result of a high level (\bar{X} = 3.60, SD = 0.27), followed vicarious learning (VL), which showed the result of moderate level (\bar{X} = 3.39 SD = 0.37), and emotional arousal (EA), which showed the result of \bar{X} = 3.23 and SD = 0.24, and Performance Accomplishment (PA), which showed the result of moderate level (\bar{X} = 3.12, SD = 0.35), respectively. From the interviews, it was found that 1) PA students perceived that they were able to learn physics at a moderate level because physics had difficult formulas, which required mathematical computational skills. With the need to have more willingness and effort in learning and working in groups and teaching friends, it gave them the opportunity to exchange knowledge and review Their side 3) SP students opine that. If the instructor gives advice, it will create motivation for learning and this affected the success of the study. At the same time, if the instructor has a variety of teaching techniques and activities for group work, it will cause enthusiasm for learning and a greater understanding of physics. Sometimes in physics, I feel stressed about the physics contents because they are more difficult than other subjects. Also, when I am assigned to work, there will be no confidence in the work assigned because of confusion in the materials I have studied. Getting advice, teachers and friends has helped me to feel less stressed. From the results of the study, it was concluded that the science teachers must develop their self-efficacy so that students can understand physics and be able to design teaching and learning. I hope to use the information obtained in the design of teaching and learning management for developing science concepts, achievements, and to make students who study in the program become successful teachers in either for their further education or their teacher occupation.

REFERENCES

- Bandura, (1969). Principle of Behavior Modification. New York: Holt,
- Renhart and Winston. (1977). Social Learning Theory. New Jersey: Prince-Hall.
- , (1986). Social Foundations of Thought and Action: A Social cognitive Theory. Prentice Hall, Englewood Cliffs, NJ.
- Avery, L. M., & Meyer, D. Z. (2012). Teaching science as science is practiced: Opportunities and limits for enhancing pre-service elementary teachers' self-efficacy for science and science teaching. *School Science and Mathematics*, 112(7), 395–409.
- Day, R., & Allen, T. D. (2004). The relationship between career motivation and self-efficacy with protégé career success. *Journal of Vocational Behavior*, 64, 72-91.
- Deepika Menon and Troy D. Sadler, (2017). Sources of Science Teaching Self-Efficacy for Preservice Elementary Teachers in Science Content Courses, *International Journal of Science and Mathematics Education*,
- Curriculum of education of general science. (2019) Bachelor Degree of Education of General Science Program , Phetchabun Rajabhat University

- Fencl, H., & Scheel, K. (2005). Engaging students: An examination of the effects of teaching strategies on self-efficacy and course climate in a non-majors physics course. *Journal of College Science Teaching*, 35(1), 20-24.
- Hoy, A. W., & Spero, R. B. (2005). Changes in teacher efficacy during the early years of teaching: A comparison of four measures. *Teaching and Teacher Education*, 21, 343-356.
- Patchareeporn Chaifaruk (2012). A causal model of teachers' career success with achievement motive, career self efficacy, and career commitment as mediators. Faculty of Education Chulalongkorn University.
- R. M. Schwartz and J. M. Gottman, (1976). Toward a task analysis of assertive behavior, *J. Consult. Clin. Psychol.* 44, 910
- Savran & Cakiroglu, (2003) Differences Between Elementary and Secondary Preservice Science Teachers' Perceived Efficacy Beliefs and their Classroom Management Beliefs. *Turkish Online Journal of Educational Technology.*, v2 n4 Article 3 p15-20 Oct 2003.
- Schunk, D. H. (1982). Effects of effort attributional feedback on children's perceived self-efficacy and achievement. *Journal of Educational Psychology*, 74(4), 548-556.
- Temruthai Meksuwan (2004). Factors Related to Perceived Self-Efficacy on Teaching of Fourth Years Students for the Bachelor of Education Degree at Rajapat collage in the lower Part of the northern District. Ministry of Education. Master Project, M.ED (Guidance and counseling psychology) Bangkok: Graduate school, Srinakharinwirot University.
- Vashti Sawtelle¹ Eric Brewe,^{2,1} Renee Michelle Goertzen,¹ and Laird H. Kramer¹ (2012)
¹Department of Physics, Florida International University, Miami, Florida 33199, USA
- Vrugt, A. J., Langereis, M. P., & Hoogstraten, J. (1997). Academic self-efficacy and malleability of relevant capabilities as predictors of exam performance. *Journal of Experimental Education*, 66(1), 61-72.
- Wang, C. K. J., & Liu, W. C. (2008). Teachers' motivation to teach national education in Singapore: a self-determination theory approach. *Asia Pacific Journal of Education*, 28, 395-410.

SELF-REGULATED LEARNING AND REFLECTION: WEB-BASED ASSESSMENT PORTFOLIOS VS PAPER-BASED PORTFOLIOS

Chi-Cheng Chang & Chun-Yu Lin

Department of Technology Application & Human Resource Development
National Taiwan Normal University

ABSTRACT

The present study was to identify the differences in self-regulated learning between students using the web-based assessment portfolios and students using paper-based portfolios. Participants were the experimental group (41 students) reflecting on learning processes through the web-based assessment portfolios and the control group (41 students) reflecting on learning processes through paper-based portfolios. The result revealed that students reflecting on learning processes through the web-based assessment portfolios significantly outperformed students reflecting on learning processes through paper-based portfolios in self-regulated learning.

Keywords: Reflection, Self-regulated learning, Portfolio, Assessment portfolio

INTRODUCTION

1.1 Web-based Assessment Portfolio and Reflection

During the process of developing portfolios, self-reflection could alter students' learning behavior (McCready, 2007). Therefore, reflection is not only considered as one of the most important activities for a web-based assessment portfolio but also a motivation for adjustment and improvement of learning behavior. In the process of developing web-based portfolios, students can engage in online reflection and self-review about the outcome of their selections. This behavior not only helps students enhance their learning but also cultivates their reflective learning (Koole et al., 2013). Barrett (2010) stated that web-based portfolios made it more convenient for peers to observe, share, and give feedback, indicating that peers' reflections could be shared more easily, and peers could be given feedback more simply. How online reflections enhance reflective learning and facilitate self-regulated learning was an issue examined in the present study.

1.2 Web-Based Assessment Portfolio and Self-Regulated Learning

Web-based assessment portfolios include the features of self-reflection, self-review, self-monitoring, and self-improvement (Bartlett & Sherry, 2006). Consequently, it implied that a web-based assessment portfolio is embedded with the mechanism of self-regulation. The self-regulated learning theory mainly explains that a person's cognition and behavior are regulated by himself or herself based on his or her experiences from the environment (Schunk, 2005; Zimmerman, 2008). Self-regulated learning helps an individual achieve his or her goal through repeated reflection, behavior and cognition (Schunk, 2005; Zimmerman, 2008). Self-regulated behavior occurs when a student, who holds learning motivations, sets goals and meets standards, and uses learning strategies and self-monitoring functions to appropriately regulate his or her learning behavior. According to the motivation theories of learning proposed by Bandura (1986) and Schunk (2005) and the self-regulation cycle proposed by Zimmerman (2002 & 2008), self-regulated learning contains the constructs of learning motivation, self-observation, self-judgment, and self-reaction. However, can these constructs of self-regulated learning be enhanced through a web-based assessment portfolio? This was an issue examined in the present study.

1.3 Research Question

Based on the aforementioned background, the research question was: How is the differences in self-regulated learning between students using the web-based assessment portfolios and students using paper-based portfolios?

METHOD

1 Participants

Participants were two classes of juniors majoring in data processing and taking a course called "Website Design" at a high school in Taiwan. One class was randomly selected as an experimental group (41 students) reflecting on learning processes weekly by web-based assessment portfolios, whereas the other class was assigned as a control group (41 students) reflecting on learning processes weekly by paper-based portfolios. There were 82 students, with 37 males and 45 females.

The two types of portfolios were the same in data entries but different in creation, presentation, and assessment methods. The web-based assessment portfolios allowed students to complete tasks via the Internet, such as learning goal setting, reflection, project uploading, and self-assessment, and peer assessment. On the other hand, the paper-based portfolios did not allow students to create portfolios and assessments online; instead, it required the students to print learning goals, reflection, projects, and outcomes of self-assessment and peer assessment, and to store them in folders.

2 Experimental Process

Three stages of self-regulated learning strategy, including forethought, performance, and reflection, proposed by Zimmerman (2002) were adopted for the experiment in the present study. The duration of the experiment was 10 weeks, and students were required to complete two projects. There were two assessments for portfolios, which were conducted after the completion of two projects. In the stage of *forethought*, students set learning goals before starting a project. Students engaged in and completed the projects in the stage of *performance*. After completing the projects, students reflected on their learning processes in the stage of *reflection*. The activities of the two groups are the same, except that the methods of doing the activities are different. The two groups did not know of each other's existence for removing the impact on how they viewed the different mechanism that they were being asked to use for their reflection.

3 Scale of Self-Regulated Learning

The scale of self-regulated learning employed in the present study was developed based on self-regulated learning theory proposed by Schunk (2005) and Zimmerman (2002). The measurement is based on a Likert 7-point scale, with a total of 50 items. There are six constructs including self-efficacy, task value, learning anxiety, self-observation, self-judgment, and self-reaction. Among of these constructs, a higher score of self-efficacy, task value, and learning anxiety indicates a strong motivational belief. Self-judgment includes three sub-constructs, which are self-judgments of peer-set goals, teacher-set goals, and self-set goals. Self-reaction includes two sub-constructs, which are adaptive self-reaction and defensive self-reaction. A higher score indicates better self-regulated behavior. The reliability coefficients of the overall scale and the constructs were higher than 0.86, as measured by Cronbach's α , suggesting that the items had a relatively high internal consistency.

RESULTS

For decreasing errors caused by the difference in prerequisites between the two groups, ANCOVA with grades from the previous semester and pretest of self-regulated learning as the covariance was conducted. As shown in Table 1, the overall self-regulated learning was significantly different between the two groups ($p < 0.05$), implying that the experimental group had better overall self-regulated learning than the control group.

Among the six constructs of self-regulated learning, self-efficacy, task value, and self-judgment were significantly different between the two groups, and the experimental group outperformed the control groups. This showed that the students reflecting through the web-based assessment portfolios outperformed the students reflecting through paper-based portfolios in self-efficacy, task value, and self-judgment. Task value had the highest effect size ($\eta^2 = 0.106$), followed by self-judgment and self-efficacy.

Among three sub-constructs of self-judgment, there were significant results for self-judgments of teacher-set goals and self-set goals. The judgment of self-set goals had a greater effect size than the judgment of teacher-set goals. The effect of the types of portfolios on adaptive self-reaction and defensive self-reaction was not significant.

Table 1. ANCOVA for self-regulated learning between the two groups.

Construct	Source of variance	F	Sig.	Effect size	Mean	
					Experimental	Control
Self-efficacy	Grade	0.411	0.524	0.006		
	Pretest	8.836	0.004**	0.118	37.43	33.79
	Group	4.192	0.045*	0.060		
Task value	Grade	0.351	0.556	0.005		
	Pretest	30.463	0.000***	0.316	25.90	22.85
	Group	7.837	0.007**	0.106		
Learning anxiety	Grade	1.919	0.171	0.028		
	Pretest	21.709	0.000***	0.248	19.87	19.18
	Group	0.682	0.412	0.010		
Self-observation	Grade	0.782	0.380	0.012		
	Pretest	15.330	0.000***	0.188	24.59	23.30
	Group	1.192	0.279	0.018		
Self-judgment	Grade	0.532	0.468	0.008		
	Pretest	80.315	0.000***	0.549	53.11	48.12
	Group	4.371	0.040*	0.062		
Peer modeling	Grade	0.124	0.725	0.002		
	Pretest	67.463	0.000***	0.505	16.21	15.19
	Group	0.330	0.567	0.005		
Teacher criteria	Grade	1.711	0.195	0.025		
	Pretest	21.242	0.000***	0.243	17.39	15.43
	Group	5.787	0.019*	0.081		
Self-set goals	Grade	0.255	0.615	0.004	18.88	18.67

	Pretest	43.900	0.000***	0.392		
	Group	6.099	0.016*	0.082		
Self-reaction	Grade	2.482	0.120	0.036		
	Pretest	1.714	0.015*	0.025	31.17	30.01
	Group	0.808	0.372	0.012		
	Grade	5.291	0.025*	0.074		
Adaptive	Pretest	4.147	0.046	0.059	18.48	17.64
	Group	0.686	0.411	0.010		
	Grade	0.373	0.543	0.006		
	Pretest	9.535	0.003**	0.126	12.93	12.71
Defensive	Group	0.698	0.406	0.010		
	Grade	0.301	0.585	0.005		
	Pretest	25.56	0.000***	0.297	190.99	177.51
	Group	7.025	0.010*	0.096		

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; Grade from the previous semester and pretest were the covariance.

DISCUSSIONS

1 Overall Self-Regulated Learning

The experimental group significantly outperformed the control group in overall self-regulated learning. This result revealed that reflection by the web-based assessment portfolios facilitated more overall self-regulated learning than reflection by the paper-based portfolios. The result was consistent with the result found by Wade, Abrami and White (2006). The difference between their studies and the present study is that their studies argued that e-portfolios facilitated self-regulated learning without comparing the two types of portfolios and the educational levels of participants were different.

2 Self-efficacy

The experimental group had significantly better self-efficacy than the control group, revealing that reflection by the web-based assessment portfolios enhanced more self-efficacy than reflection by the paper-based portfolios. The two groups adopted the same reflective activities and guidelines but different reflection functionalities. Under the circumstance of the same reflective activities, the experimental group significantly outperformed the control group in self-efficacy, meaning that reflection functionalities in the web-based assessment portfolios had a better effect on self-review for enhancing learners' self-efficacy.

3 Task value

The experimental group had significantly better task value than the control group, revealing that reflection by the web-based assessment portfolios enhanced task value more than reflection by the paper-based portfolios. A study done by Wu (2005) revealed that there was a positive relationship between self-efficacy and task value. In general, self-efficacy is cultivated in the process of learning. Students experiencing more learning experiences can facilitate their self-efficacy and enhance task value. Those learning experiences can be observed from the reflection portfolios (Mansvelder-Longayroux et al., 2007).

4 Learning anxiety

There was no significant difference in learning anxiety between the experimental group and the control group, showing that reflection by the web-based assessment portfolios did not produce more learning anxiety than reflection by the paper-based portfolios. According to Wu (2005), there was a negative relationship between self-efficacy and learning anxiety. The better the self-efficacy is, the better the learning achievement and experience are. The experimental group had better self-efficacy than the control group. However, there was no significant difference in learning anxiety between the two groups. The reason for this phenomenon should be further examined.

5 Self-observation

There was no significant difference in self-observation between the experimental group and the control group, implying that reflection by the web-based assessment portfolios did not facilitate more self-observation than reflection by the paper-based portfolios. A study done by Iannotti et al. (2006) revealed that students with high self-efficacy and task value did not facilitate their self-observation, meaning that those students lacked action control. Also, although students held a higher motivational belief, they did not have a specific strategy for improvement. Hence, even if the experimental group enhanced their learning motivational beliefs after using the web-based assessment portfolios, they did not have better self-observation due to the lack of action control.

6 Self-judgment

The experimental group had significantly better self-judgment than the control group, revealing that reflection by

the web-based assessment portfolios enhanced self-judgment more than reflection by the paper-based portfolios. It is not surprising that the experimental group had significantly better self-judgment than the control group because the experimental group had better self-efficacy and task value than the control group. Among three sub-constructs, besides the self-judgment of peer-set goals, there were significant differences in the judgments of teacher-set goals and self-set goals between the two groups. In other words, reflection by the web-based assessment portfolios facilitated more self-judgment based on teacher-set goals and self-set goals than reflection by the paper-based portfolios.

7 Self-reaction

There was no significant difference in self-reaction between the experimental group and the control group. There was also no significant difference in sub-constructs, including adaptive self-reaction and defensive self-reaction, between the two groups. The study results showed that reflection by the web-based assessment portfolios did not facilitate more self-reaction than reflection by the paper-based portfolios. A study by Wu (2005) revealed that there were positive correlations among self-observation, self-judgment, and self-reaction. Self-observation could affect self-judgment and also affect self-reaction indirectly through self-judgment.

CONCLUSION

Although reflecting on learning processes through paper-based portfolios could also facilitate self-regulated learning (Mansvelder-Longayroux et al., 2007), two different types of reflection in the present study with the same course schedule and course contents, showed that reflecting on learning processes through online reflection functionalities in the web-based assessment portfolios facilitated more self-regulated learning than reflecting on learning processes through paper-based portfolios. Based on the motivational beliefs, one of the factors that affected self-regulated learning was using the reflection functionalities to enhance self-efficacy and task value. This was because of the convenience of the reflection functionalities in the web-based assessment portfolios for students to reflect on their learning, which led to an enhancement of the quality of reflection.

REFERENCES

- Barrett, H. C. (2010). Balancing the two faces of ePortfolios. *Educação, Formação & Tecnologias*, 3(1), 6-14.
- Bartlett, A., & Sherry, A. (2006). Tow views of electronic portfolios in teacher education: Non-technology undergraduates and technology graduate students. *International Journal of Instructional Media*, 33(3), 245-253.
- Iannotti, R. J., Schneider, S., Nansel, T. R., Haynie, D. L., Plotnick, L. P., Clark, L. M., Sobel, D. O., & Simons-Morton, B. (2006). Self-efficacy, outcome expectations, and diabetes self-management in adolescents with type 1 diabetes. *Journal of Development Behavior Pediatrics*, 27(2), 98-105.
- Koole, S., Vanobbergen, J., De Visschere, L., Aper, L., Dornan, T., & Derese, A. (2013). The influence of reflection on portfolio learning in undergraduate dental education. *European Journal of Dental Education*, 17(1), e93-e99.
- Mansvelder-Longayroux, D. D., Beijaard, D., & Verloop, N. (2007). The portfolio as a tool for stimulating reflection by student teachers. *Teaching and Teacher Education*, 23(1), 47-62.
- Schunk, D. H. (2005). Self-regulated learning: The educational legacy of Paul R. Pintrich. *Educational Psychologist*, 40(2), 85-94.
- Wade, A., Abrami, P. C., & White, B. (2006). Using electronic portfolios to help students become self-regulated learners. *The Canadian Association of Principals Journal*, 14(2), 23-25.
- Wu, P. H. (2005). A study on teachers' instructional strategy based on self-regulated learning theory. *Educators and Professional Development*, 22, 57-65.
- Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into Practice*, 41, 64-72.
- Zimmerman, B. J. (2008). Investigating self-regulation and motivation: Historical background, methodological developments, and future prospects. *American Educational Research Journal*, 45(1), 166-183.

SOCIAL AND SCIENCE DEPARTMENTS STUDENTS' BELIEFS ABOUT MATHEMATICS

Sinan AYDIN

Accounting and Task Department, Kocaeli Vocational School, Kocaeli University
sinanaydin1704@yahoo.com

ABSTRACT

Educational politics in many industrial countries usually have a strong effect on science, engineering and mathematics. It has special meaning for the education of the Scientific's area especially for mathematics teaching and learning. students' ideas are essential in their learning and problem solving of math. Many mathematics education researchers focus on this subject to make clearer and more powerful the learning and understanding of the course. In this study, the data was obtained from a science department (construction department) and a social department (business department) of a vocational school in Turkey. The quantitative data was analyzed using mean and independent sample t-test for this study. As a basic result of the study that all students' beliefs for math learning and problem solving had significant difference according to their departments.

Keywords: mathematics learning, problem solving belief, vocational school

INTRODUCTION

One of the main characteristic ways of the developments people is to have good problem solver members. Modern and well-designed education systems create these citizens. Mathematics and Science are the basic tools to construct problem solving abilities with which countries gets well-educated students or personals (Ayele, Dadi, 2016; Schoenfeld, 1988; Moe, 2008; Fennema, & Sherman, 1977). In this point, students' idea or beliefs about science especially about mathematics have a powerful effect on the achieving of these lectures. According to many students from all over the world, mathematics known as a difficult lecture and they spend much performance to understand and to achieve this course. Some researches were conducted on the students' belief for mathematics learning and math problem solving, their difficulties with problem solving in math and the main factors on the students' achievement in mathematics (Ayele, Dadi, 2016; Presmeg, 2002; Mapolelo, 2009).

There are classic and universal students' beliefs about mathematics and learning math; Everybody need to use the same solution method for every math problem. To understand mathematics, especially to able to solve math problems need to be very clever. Math problems always have unique right solutions. Mathematics is only a school activity and not transform to the real-life problems. If I will solve the problem, I need to use same solution method that teacher showed in the classroom. If somebody learn or understand to any mathematics subject, so he/she solve math problems very fast or without need much time or without thinking much (Reyes, 1984; Sconfeld, 1992; Ayele, Dadi, 2016). All these beliefs could have more or less negative effect on the students understanding math, their concentration to math lectures and so, their learning mathematics.

As a main way of doing mathematics, problem solving has its special steps that;

- defining problems,
- determining of the reasons,
- finding a solution method,
- applying the solution
- evaluating of the solution

Accomplishing of these steps needs some abilities, backgrounds and beliefs. Each of them has a powerful effect on problem solving but beliefs have natural and psychological effect on students' characters. The concepts "simple problem" and "difficult problem" are directly connected with the student's beliefs (Crosswhite, 1972; Nibbelink, Stockdale, Hoover & Mangru, 1987; Ayele, Dadi, 2016).

In vocational schools especially social program of this school, conceptual understanding and the ability of problem solving usually are low level (Sconfeld, 1992). According to many researcher, two mean reasons of the problem relate to student learning mathematics and the student's beliefs in mathematics (Crosswhite, 1972; Asfaw, Otores, Ayele, & Gebremariam, 2009; Ayele, Dadi, 2016). So, the aim of this paper is to determine vocational school students' beliefs about problem solving in math and mathematics learning. The research questions are as below;

- What is the level of vocational school beliefs about math learning and problem solving?
- Are the male and female students' beliefs about math learning and problem solving same
- Are the construction department (science program) and business department (social program) students' beliefs about math learning and problem solving same

METHOD

This study was conducted with 2 departments which were construction department (science program and business department (social program) at a vocational school in Turkey. The sample was 162 students from construction departments (136 male and 26 female) and 184 students from business departments (61 male and 123 female) and so totally 346 students (197 male and 149 female).

In order to data collection the mathematics belief scale was used that was modified from (Hannula, Kaasila, Laine, & Pehkonen, 2005; Ayele & Dadi, 2016). The scale had two subscales that students' beliefs about math learning and students' beliefs about math problem solving, and every subscale had 8 items, so the math belief scale had totally 16 items. The items for students' beliefs about math learning deal with the effect of group study in math learning, math abilities end memorization. The items for students' belief about math problem solving deal with problem solving methods, math problem solutions, insistent approach in math problem solution, math problem solution without using any formula. Also, the half of the all items were positive and the other half one was negative.

In the math scale the students were requested to complete on a five point Likert Scale: "Strongly agree", "Agree", "Undecided", "Disagree", and "Strongly Disagree", and for the positive items pointed as 5, 4, 3, 2, and 1 respectively; and for the negative items pointed was contrary wised. For the data obtained from the students with the research scale mean and independent t-test analyses were made by the author.

For the content validity and the face validity of the math belief scale, two math education researchers from the author's university were asked to check it. The pilot application of the scale was conducted with 42 students at the same vocational school from the different departments' students of the sample. The Cronbach's Alpha reliability volume of the students' belief about math learning and problem-solving pilot point = .783 and main data = .871; the Cronbach's Alpha reliability volume of the students' belief about math learning pilot point = .796 and main data = .898; the Cronbach's Alpha reliability volume of the students' belief about problem-solving pilot point = .802 and main data = .893.

FINDINGS

- *Students' Beliefs About Mathematics Learning and Problem Solving*

Table 1. Students' beliefs about math learning and problem solving

Beliefs	N	M	SD
Students' beliefs about math learning and problem solving	346	2.96	.71
Students' beliefs about math learning	346	3.03	.76
Students' beliefs about math problem solving	346	2.89	.68

According to table 1, vocational school students' beliefs about math learning and problem solving was neutral level (between 2.5 and 3.4 scores). The level representations are below;

- ✓ very low (strongly negative beliefs): interval from 1.0 to 1.4;
 - ✓ low (negative beliefs): interval from 1.5 to 2.4;
 - ✓ medium (neutral): interval from 2.5 to 3.4;
 - ✓ high (positive beliefs): interval from 3.5 to 4.4;
 - ✓ very high (strongly positive beliefs): interval from 4.5 to 5.0
- *Students' Beliefs about Mathematics Learning and Problem Solving with respect to the departments (The Independent t-test)*

Table 2. Students' Beliefs about Mathematics Learning and Problem Solving with respect to the departments

Beliefs	Department	N	M	SD	SE	df	t	p
Students belief about math learning and problem solving	Construction	162	3.10	.92	.03	344	7.56	.000
	Business	184	2.82	.53	.03			
Students' beliefs about math learning	Construction	162	3.18	1.15	.05	344	6.12	.000
	Business	184	2.87	.91	.04			
Students' beliefs about problem solving	Construction	162	3.05	1.23	.05	344	10.05	.000
	Business	184	2.73	.74	.05			

$p < .05$ (2-tailed)

162 constructor department students which were 46.8% of the all participants to the study and 184 business department students which were 53.2% of the all participants to the study. The hypothesis that there is a significant difference between business department students and construction department students was analyzed with independent sample t-test. According to Table 2, there was significant difference between these two group students' beliefs about math learning and problem solving ($t(344) = 7.56, p < .05$). The mean of construction department students' beliefs about math learning and problem solving was more than the mean of business department students. And, there was significant difference between these two group students' beliefs about math learning ($t(344) = 6.12, p < .05$). The mean of construction department students' beliefs about math learning was more than the mean of business department students. Finally, there was significant difference between these two group students' beliefs about math problem solving ($t(344) = 10.05, p < .05$). The mean of construction department students' beliefs about math problem solving was more than the mean of business department students.

- *Gender Analyze of the Students' Beliefs about Mathematics Learning and Problem Solving*

Table 3. Students' Beliefs about math Learning and Problem Solving with respect to the gender

Beliefs	Gender	N	M	SD	SE	df	t	p
Students belief about math learning and problem solving	Male	197	3.11	.59	.05	344	1.82	.076
	Female	149	2.81	.53	.05			
Students' beliefs about math learning	Male	197	3.17	.89	.06	344	1.17	.125
	Female	149	2.90	.92	.06			
Students' beliefs about problem solving	Male	197	2.99	1.12	.06	344	1.54	.801
	Female	149	2.80	1.20	.07			

197 male students which were 56.9% of the all participants to the study and 149 female students which were 43.1% of the all participants to the study. The hypothesis that there is a significant difference between male students and female students was analyzed with independent sample t-test. According to Table 3, there was not significant difference between these gender group students' beliefs about math learning and problem solving ($t(344) = 1.82, p > .05$). And, there was not significant difference between these gender group students' beliefs about math learning ($t(344) = 1.17, p > .05$). Finally, there was not significant difference between these gender group students' beliefs about math problem solving ($t(344) = 1.54, p > .05$).

- *Students' Beliefs about Mathematics Learning and Mathematics Problem Solving*

Table 4. The analyze of the students' beliefs about math learning and mathematics problem Solving

Beliefs	N	The numbers of students' answers				
		Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Students' beliefs about mathematics learning	346	71	156	50	42	27
Students' beliefs about mathematics problem solving	346	46	67	103	89	41

Table 4 that about the Students' Beliefs about math Mathematics learning was closely separated in the section of the scale at "strongly agree", "undecided" and "disagree" levels. The students' beliefs about mathematics learning was the top rated (156) at "agree" level. The students' beliefs about mathematics learning was minimum rated (27) at "strongly disagree" level. The Students' Beliefs about math Mathematics problem solving was closely separated in the section of the scale at "strongly agree", "agree" and "disagree" levels. The Students' beliefs about mathematics problem solving was top rated (103) at "undecided" level. The students' beliefs about mathematics problem solving was the minimum rated (41) at "strongly disagree" level.

- *The Analyze of The Positive Math Learning Items of The Students' Beliefs About Math Learning and Problem-Solving Scale*

Table 5. The analyze of the positive math learning items of the scale (n =346)

Beliefs	N	The numbers of students' answers				
		Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Mathematics learning depends to memorize formula	346	34	172	53	61	16
Mathematics learning needs numeric ability	346	107	225	10	3	1
Mathematics is learned with individual studying	346	59	79	98	70	38
Group study is very useful for mathematics learning	346	93	125	46	52	30

According to table 5, Students' Beliefs about Math Learning was piled up "agree" and "strongly agree" level at the positive math learning items of the scale. The student's beliefs about the item that "Mathematics learning needs numeric ability" was the top rated (225) at "agree" level. The student's beliefs about the item that "Mathematics learning needs numeric ability" was the minimum rated (225) at "strongly disagree" level. With a general evaluation, the students' belief that mathematics learning needs memorizing of the math formula, numeric ability and group study. Also, they were "undecided for the item of the scale that "Mathematics is learned with individual studying"

- *The analyze of the Positive problem-solving items in the Students' Beliefs about math Learning and Problem-Solving scale*

Table 6. The analyze of the positive problem-solving items of the scale (n = 346)

Beliefs	N	The numbers of students' answers				
		Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
A mathematics problem could be solved with more than one method	346	59	72	98	67	50
A mathematics problem could have more than one true answer	346	33	53	103	85	72
A mathematics problem could be solved without using any math formula	346	76	110	72	71	37
A mathematics problem could be studied until find a solution	346	15	34	125	130	42

Table 6 that about the Students' Beliefs about math Problem-Solving was closely separated to each other in all section of the scale as "strongly agree", "agree", "undecided", "disagree" and "strongly disagree". So, we can say that our students' beliefs didn't focused on a certain point of the scale. The student's beliefs about the item that "A mathematics problem could be solved with more than one method" was the top rated (98) at "undecided" level and the minimum level (50) at "strongly disagree" level. The student's beliefs about the item that "A mathematics problem could have more than one true answer" was the top rated (103) at "undecided" level and the minimum level (33) at "strongly agree" level. The student's beliefs about the item that "A mathematics problem could be solved without using any math formula" was the top rated (110) at "agree" level and the minimum level (37) at "strongly disagree" level. The student's beliefs about the item that "A mathematics problem could be studied until find a solution" was the top rated (130) at "disagree" level and the minimum level (15) at "strongly agree" level. According to table 6, it could be said that math problem solving idea wasn't understood by the students.

RESULT

By the view of the analyze, we can conclude that; the vocational school students' beliefs about math learning and problem solving was neutral level (between 2.5 and 3.4 scores. There was significant difference between business department and constructor department students' beliefs about math learning and problem solving. There wasn't significant difference between male and female students' beliefs about math learning and problem.

REFERENCES

- Asfaw, E., Otores, D., Ayele, T., & Gebremariam, Z. (2009) Science and mathematics secondary education. *An Option paper presented at the Technical Workshop on Science and Mathematics Secondary Education in Africa (SEIA) Followup Program*, Tunis
- Ayele, M.A., Dadi, T.B. (2016). Students' Beliefs About Mathematics Learning and Problem Solving: The Case of Grade Eleven Students in West Arsi Zone, *Ethiopia. Education Journal*, doi: 10.11648/j.edu.20160504.14.
- Crosswhite, F. J. (1972). Correlates of attitudes toward mathematics (National Longitudinal Study of Mathematical Abilities Report No. 20). Palo Alto, CA: Stanford University Press
- Fennema, E., & Sherman, J. (1977). Sex-related differences in mathematics achievement, spatial visualization and affective factors. *American Educational Research Journal*, 14, 51-71.
- Hannula, M. S., Kaasila, R., Laine, A., & Pehkonen, E. (2005) The structure of student teacher's view of mathematics at the beginning of their studies. In *Proceedings of the Fourth Congress of the European Society for Research in Mathematics Education*. Sant Feliu de Guixols, Spain-17-21 February (pp. 205-214).
- Mapolelo, D. C. (2009) Students' experiences with mathematics teaching and learning: listening to unheard voices. *International Journal of Mathematical Education in Science and Technology*, 40 (3), 309-322.
- Mo, E. (2008) Annual Intake and Enrolment Growths and Professional and Program Mix of Ethiopian Public Higher Education: *Strategy and Conversion Plan*, 2001-2005. Addis Ababa.
- Nibbelink, W. H., Stockdale, S. R., Hoover, H. D., & Mangru, M. (1987) Problem solving in the elementary grades: Textbook practices and achievement trends over the past thirty years. *Arithmetic Teacher*, 35 (1): 34-37.
- Presmeg, N. (2002) Beliefs about the nature of mathematics in the bridging of everyday and school mathematical practices. In G. Leder, E. Pehkonen, & G. Torner (Eds.), *Beliefs: A hidden variable in mathematics education?* (pp. 293-312).
- Schoenfeld, A. (1989). Explorations of Students' Mathematical Beliefs and Behavior. *Journal for Research in Mathematics Education* 20. 338. 10.2307/749440.
- Schoenfeld, A. H. (1992) Learning to think mathematically: Problem solving, metacognition, and sense making in mathematics. In D. A. Grouws (Ed.), *Handbook of research on mathematics teaching and learning*, New York: Macmillan, pp. 334-369.
- Reyes, L. (1984). Affective variables and mathematics education. *The Elementary School Journal*, 84(5), 558-581.

SPREGO TOOLBOX: A WAY TO TEACH SPREADSHEETING MEANINGFULLY

Ádám GULÁCSI

Faculty of Informatics, University of Debrecen, Hungary
adam.gulacsi@gmail.com

Nikolett DIENES

Faculty of Informatics, University of Debrecen, Hungary
dienesniki@gmail.com

Maria CSERNOCH

Faculty of Informatics, University of Debrecen, Hungary
csernoch.maria@inf.unideb.hu

ABSTRACT

Sprego (Spreadsheet Lego) programming is an algorithm-based, high mathability method of teaching data-management in spreadsheets. In comparison with the traditional, interface-based approach, Sprego focuses on the problem-solving skills of end-users, relying only on an open set of twelve general-purpose functions, and on an extensive set of handy tools – constructed by our research group – with an intent to make the teaching-learning process as interesting and efficient as possible.

These previously mentioned resources range from unplugged games and activities to meaningful, plugged-in tasks on authentic data. In fact, this variety is crucial not just to motivate learners, but to make them more involved in computer sciences and strengthen their belief in the incremental nature of sciences. Nowadays, it is proven and widely accepted that students have various means of acquiring knowledge, consequently, it is advantageous to present topics from multiple angles. Based on these findings, in our methodology, fundamental programming algorithms are introduced in unplugged sessions. In these computer-free environments, students act out the steps of the algorithms themselves. Furthermore, we present semi-unplugged, animated visualizations of the same problems in both 2D and 3D virtual environments. The combination of these two different representations can be used in advance to plugged-in sessions. Eventually, when students get to solve problems in any spreadsheet software, they are already familiar with the algorithm of the problem, the teacher only has to describe the syntax of the given environment.

Our research group have had numerous opportunities to teach Sprego and use these tools in practice. The experiences show that the same methods work with students in K-12 education from grade 6 to 12. On top of being age-independent, another interesting aspect of the method is the prior background knowledge of the students. Younger students had no prior spreadsheet experience, while older students have studied this topic using the traditional methods. Despite this contrast, we found no relevant differences between the two groups when it comes to understanding Sprego. Both groups were able to comprehend the material, including the algorithms and the concept and the use of array formulas and composite functions.

INTRODUCTION – SPREGO

Working in spreadsheet environments has always been a relevant topic in Informatics. The vast majority of companies and firms manage their data using such software, and the expertise in this topic is generally expected from employees in the middle-skill job market (Burning Glass Technologies, 2017).

Despite this relevance, the traditional method of teaching spreadsheet management has major pitfalls. One of the main problems with the approach is that it relies heavily on software-specific and interface-related knowledge. As a consequence, end-users can only acquire a specific knowledge which is heavily software- and version dependent and easy to forget (Bíró and Csernoch, 2014). On top of that, textbooks related to the topic generally lack authentic data as they tend to rely on mock-data to teach spreadsheet functions and syntax (Papp and Csernoch, 2018). Besides that, there is an enormous amount of problem-specific functions built-into these programs which are impossible to memorize and use effectively and efficiently (Microsoft, 2019a).

On the other hand, Sprego (Spreadsheet Lego) offers an alternative which resolves many of the issues mentioned beforehand (Csernoch, 2014). As opposed to the traditional approach, Sprego relies on array formulas and composite functions built from a small set of functions. In the newest versions of Microsoft Excel, formulas are evaluated as array formulas by default (Microsoft, 2019b). This set consists of 12 general functions which can be categorized into 3 subgroups as presented in Figure 1.



Figure 1. The 12 general functions of Sprego can be subcategorised into three groups.

It is important to note that this is an open set which can be expanded with other simple, general-purpose functions if there is a need. This approach of using only a dozen functions to solve problems in a given environment makes spreadsheeting convenient as a first programming language (Booth, 1992; Sestoft, 2011).

Besides having a notably smaller memory-load, Sprego also relies on the algorithmic skills and computational thinking of the students which makes it even more suitable as an introductory programming language for the students. Moreover, we have collected an extensive amount of authentic, real-life data-tables like the top rated movies from the IMDb (IMDb, 2019), as presented in Figure 2.

	A	B	C	D	E
1	Rank	Rating	Title	Votes	
2	1	9,2	The Shawshank Redemption (1994)	790425	
3	2	9,2	The Godfather (1972)	585045	
4	3	9	The Godfather: Part II (1974)	371343	
5	4	8,9	Pulp Fiction (1994)	621174	
6	5	8,9	The Good, the Bad and the Ugly (1966)	244920	
7	6	8,9	12 Angry Men (1957)	194680	
8	7	8,9	Schindler's List (1993)	414133	
9	8	8,8	The Dark Knight (2008)	736027	
10	9	8,8	The Lord of the Rings: The Return of the King (2003)	559517	
11	10	8,8	Star Wars: Episode V - The Empire Strikes Back (1980)	401532	
12	11	8,8	Fight Club (1999)	602785	
13	12	8,8	One Flew Over the Cuckoo's Nest (1975)	335035	
14	13	8,7	The Lord of the Rings: The Fellowship of the Ring (2001)	582406	
15	14	8,7	Inception (2010)	583724	
16	15	8,7	Goodfellas (1990)	351749	
17	16	8,7	Star Wars (1977)	451124	
18	17	8,7	Seven Samurai (1954)	132075	
19	18	8,7	The Dark Knight Rises (2012)	56128	
20	19	8,7	The Matrix (1999)	578883	
21	20	8,7	City of God (2002)	261761	

Figure 2. Using authentic data tables during spreadsheet management lessons.

Consequently, the Sprego method allows teachers to present real, authentic problems and tasks to their students which makes the learning process much more engaging, interesting and fun for them.

Another advantage of this approach is that it is applicable from a range of relatively young children (4th graders and up) to adults, regardless of their prior knowledge or experience in the topic. The distinction of the 3 groups discussed above demonstrates the learning process excellently because the purpose of this method is to extend the students' knowledge incrementally, starting from relatively easy, text-based tasks. Starting with texts is much easier for younger end-users as they do not have to rely on advanced mathematical background knowledge to start learning. Consequently, they are able to learn the syntax and the interface much earlier. Besides that, they can start solving algorithm-based tasks which helps to develop their algorithmic skills and computational thinking. In fact, this way of teaching computer science enables the teacher to develop a constructivist learning environment which is beneficial for the students in a sense that it helps them in developing long-lasting knowledge (Chen, Morris and Mansour, 2015, Sweller, Ayres and Kalyuga, 2011).

UNPLUGGED TOOLS

Our research group developed a versatile toolbox with the intention of making the spreadsheet management learning process as interesting and efficient as possible. Unplugged tools are rarely used in IT education (Bell and Newton, 2013) because lessons tend to focus on getting things done in front of a computer. However, unplugged tools are certainly helpful when it comes to developing algorithmic skills and computational thinking. As a matter of fact, by providing an unplugged environment, the different interfaces, software, syntactic rules of a given language and other unnecessary distractions disappear from the process. As a result, students can develop these crucial skills in a creative, algorithm-centred environment.

Are you tall enough?

One frequently reoccurring problem in programming is conditional counting to which we built one of our unplugged games. The purpose of this algorithm is to count how many entities of a set satisfy a given condition. In our approach, the context of this unplugged task is that the class is at an amusement park where they want to ride the Ferris wheel. However, there is a height limit which you need to pass in order to ride it. Consequently, the data set is provided by the students themselves as their height is the input vector for this algorithm. As a first step, students form a line and get tested one-by-one whether they meet the requirements or not. Whoever passes the height limit gets a green team marker vest. As a result, students end up either wearing a vest or not, and this corresponds to true (vest) and false (no vest) boolean values for the following question: “Am I tall enough to ride the Ferris wheel?”. Finally, the teacher has to count how many students are wearing a vest to complete the algorithm. For illustration, see Figure 3.



Figure 3. Students marked with team marker vest in the amusement park unplugged game to demonstrate how condition works in programming.

Do you live here?

Linear search is another common problem not just in spreadsheet environments but generally in programming. This problem is presented to the students from a postman’s point of view. The postman has to deliver a letter but he does not know the address of the house, only the inhabitant. Students have to draw their houses in sizable, colourful cardboards, as it can be seen in Figure 4. This unplugged task requires creativity from the side of the students and it is easier to get them involved and interested in algorithms like this. On top of that, they get an opportunity to express themselves in the form of art which is seldom associated with the field of informatics.



Figure 4. Teaching linear search during an unplugged session.

There are many unplugged visualizations of algorithms like these, such as dances demonstrating searching and sorting algorithms (Kátai, 2010). The main advantage of using such tools is that these classes are vividly visual, consequently, easier to remember. As a result, when it comes to actually solving these problems in front of a computer the teacher can refer back the unplugged sessions in order to aid and accelerate the learning process.

On top of that, many of these unplugged tools can be used as complementary material in a plugged-in classroom as well. For instance, teachers from our research group utilize origami boats to help students comprehend how composite functions work (Figure 5). The variously sized and coloured boats visualize both the syntactic and semantic properties of these functions. Specifically, one asset represents one step of the algorithm with its input, output and the step itself indicated on it in any natural language. Putting a smaller boat into a bigger one demonstrates how the output of one function or expression can serve as the input for another one. These unplugged tools are invaluable in teaching such abstract concepts because they can be used as reference points in plugged-in lessons.



Figure 5. Origami boats can be used to represent each distinctive step of an algorithm.

SEMI-UNPLUGGED TOOLS

Besides the unplugged tasks, this toolbox also offers semi-unplugged tools to help end-users with their spreadsheet-learning experience. Semi-unplugged means that at least one computer (or smartphone) is needed to use these tools. However, spreadsheet programs are still not necessarily involved in the process. There are two different applications currently available which are both being developed by our research group (Dienes, Gulácsi, 2018, Dienes, Gulácsi & Csernoch, 2018, Csapó & Sebestyén, 2017; Csapó, 2017; Csapó & Sebestyén, 2018). The purpose of both of these is to visualize programming algorithms as animations for the end-users in Sprego environment.

In general, both applications provide visualizations for the conditional counting and the linear search algorithms. On top of that, they are using matryoshka dolls as avatars for their animations. The reason for that is that matryoshka dolls are excellent for demonstrating how composite functions work, just like the origami boats mentioned beforehand. There are three different animations available at the time, as presented in Table 1.

Table 1. Currently available semi-unplugged animations.

Algorithm	Context
Conditional counting (equality-based)	Counting matryoshka dolls around a campfire, based on their colours.
Linear search	Delivering a mail to the a house, based on the inhabitant of the letter.
Conditional counting (inequality-based)	Counting how many dolls can ride the Ferris wheel, based on their height.

The major difference between the two applications is their virtual environments. The earlier software utilizes hand-drawn 2D graphics, hence it is built in a 2D environment (Csapó & Sebestyén, 2017; Csapó, 2017; Csapó & Sebestyén, 2018).

On the other hand, the second one is built in a 3D space. As a consequence, the second application uses 3D models and textures for the animations (Dienes & Gulácsi, 2018). Despite the differences, the motivation behind them is the same: providing reinforcement for the students by supporting what they have already learned in the unplugged sessions with visually appealing, motivating animations. In other words, semi-unplugged tools can be considered as bridges between the unplugged and the plugged-in classes. It is important to point out that the semi-unplugged tools are available for the end-users as well. Specifically, both the 2D and the 3D applications support Android devices. The 3D tool is yet to be published in Google Play, but the 2D software is already available from the online store (Google, 2019).

The research group is currently focused on expanding the semi-unplugged tools by implementing new algorithms in the two software. On top of that, there is a spreadsheet-related smartphone game in an early development stage which will provide a fully interactive semi-unplugged tool to further enhance end-users' experience in- and outside the classroom.

EXPERIENCES

Our research group have tested the toolbox in practice this year, in a K-12 education environment. Namely, we were asked to teach spreadsheet management for two days in Ajka, Hungary. Each day consisted of six, 45-minute long sessions. The students were 6th, 7th and 8th graders with varying background knowledge in spreadsheet management. Some of the students had absolutely no prior experience in the topic, and some of them were already started learning about the topic, but with the traditional methods. Each group had 12 lessons in total, so we had 540 minutes to introduce them to spreadsheets which is an incredibly narrow schedule. However, despite the difficulty of having a small amount of time to produce results, we have received encouraging feedback from the students.

In the learning process itself, the main focus was to utilize the whole toolbox as effectively as possible. There were two different scenarios for the groups because some of the groups started with three unplugged classes, followed by three plugged-in classes, while the other groups had it the other way around. Surprisingly, we have found out that it is much easier to work with groups who started with the unplugged lessons. Due to the fact that they were already familiar with the algorithms and the workflow of building algorithms to solve problems, we only had to teach how the interface and the syntax work in Microsoft Excel. Despite that, we still built the algorithms step-by-step using the semi-unplugged applications first for demonstration purposes, and then the origami boats to implement each step of the solution.

Additionally, we used authentic data exclusively during the teaching process. As a promising result, students became more engaged and motivated throughout the 12 lessons. They even told us that they appreciate the real-life data tables and the related tasks like the one in Figure 6.

	A	B	C	D	E	F
1	Rank	Grade	Username	Uploads	Subs	Video Views
2	1st	A	LetsGoMartin - Nursery Rhymes	242	7387857	2150257699
3	2nd	B+	Childrenofworld2014	73	589831	124812329
4	3rd	B+	bella022	2	486188	138011598
5	4th	B+	KerekMese	151	568922	821203405
6	5th	B+	R3D ONE Official	201	1312515	164714175
7	6th	B+	Magneoton	1085	418223	489902371
8	7th	B	AK26 OFFICIAL	33	282313	83842525
9	8th	B	FollowTheFlow	24	220493	112105870
10	9th	B	ZGSTUDIO Official 1	834	326129	406400258
11	10th	B	Toys TV For Kids	747	329456	131211136
12	11th	B	No FakeTM	9	28718	16588
13	12th	B	UborCraft	530	389824	151326644
14	13th	B	Barni.	855	556166	168784504
15	14th	B	DUNA BEATS	44	74013	51195058
16	15th	B	PamKutya	133	1031888	290633169
17	16th	B	YoungG26	227	143599	103228719
18	17th	B	#MISSHMUSIC	129	455942	266211967
19	18th	B	KEDD	900	411203	469303612
20	19th	B	HeyKids - Gyerekdalok és...	56	191911	98172156
21	20th	B	Lidl Magyarország	555	17824	26743826

Figure 6. An authentic data table which contains information about the top Hungarian YouTube channels.

Finally, after finishing up our two-day spreadsheet training session, we have sent the students an online questionnaire. This form was designed to provide an image of the students' experience, and a self-evaluation of how well they think they were managed to grasp the basics of this topic. In total, 60 students have filled in the form among the three participating classes. Here are some promising data from the evaluation of the questionnaires:

- 86,67% of the students found the material comprehensible,
- 73,33% said that the material was useful,
- 75% of them stated that they could solve spreadsheet-related tasks with guidance,
- 55% of them stated that they could solve spreadsheet-related tasks on their own,
- 58% of the students said that they would like to participate in more Sprego lessons,
- 60% said that the unplugged games helped to comprehend the material,
- 71,67% stated that the semi-unplugged visualizations were helpful,
- 61,67% of them said that the origami boats were helpful in the learning process.

For further details, all questions from the questionnaire are listed with the respective answers in Table 2.

Table 2. Feedback from the 60 students who filled out the online form after the 2-day teaching session.

	not at all	not really	rather yes	absolutely
The material was comprehensible.	2	6	27	25
I found the material useful.	4	12	29	15
I can solve similar tasks with guidance.	4	11	22	23
I can solve similar tasks on my own	4	23	20	13
The unplugged lessons were helpful.	17	20	15	8
I would like to attend more similar classes.	9	16	18	17
The origami boats slowed down the lessons.	29	13	11	7
The origami boats confused me.	30	17	9	4
The semi-unplugged animations were helpful.	7	10	25	18
The origami boats were helpful.	8	15	20	17
The unplugged lessons helped to comprehend the material.	15	9	22	14

CONCLUSION

In conclusion, our research group successfully developed a toolbox that provides a way to teach spreadsheet management in a meaningful way. The base of the toolbox is the Sprego methodology which is a computer science- and algorithm-based framework as opposed to the traditional, interface-based teaching methods. Sprego is built upon the idea that a spreadsheet environment is suitable for teaching programming, thus it is an exquisite way to develop the algorithmic skills and computational thinking of end-users, especially, students. Another crucial point is the nature of the data tables presented in the teaching process. The traditional approach and even textbooks tend to use mock-data which is discouraging for the students. However, our toolbox utilizes authentic, real-life data tables from a wide range of topics in order to provide challenging and interesting tasks for the students while maintaining variety.

The toolbox itself consists of unplugged and semi-unplugged tools. The purpose of these tools is to make the material more interesting and easier to comprehend, at the same time. Moreover, after using them in practice, they become suitable reference points for the teacher, so they smoothen out the plugged-in lessons as well. Both the unplugged and the semi-unplugged tools are mainly focused on two pivotal algorithms in spreadsheet management: conditional counting and linear search. However, the toolbox is not limited to these two problems as there are many more tools available. For instance, the origami boats are more universal as they can be used to build composite functions for any task.

As for future plans, the main goal for the research group is to extend the toolbox with more complementary material. More games, more visualizations for algorithms, even smartphone games to make the learning experience as interesting and as efficient as possible. Besides extending the toolbox itself, we want to collect more experience and feedback from students and institutions. Constructive feedback and gaining more teaching experience is essential in order to improve and evolve the framework.

ACKNOWLEDGEMENT

This work was supported by the construction EFOP-3.6.3-VEKOP-16-2017-00002. The project was supported by the European Union, co-financed by the European Social Fund.

REFERENCES

- Bell, T. & Newton, H. (2013). Unplugging Computer Science. *Improving Computer Science Education*, Routledge.
- Biró, P. & Csernoch, M. (2014). Deep and surface metacognitive processes in non-traditional programming tasks. *5th IEEE Conference on Cognitive Infocommunications (CogInfoCom)*. pp. 49-54.
- Booth, S. (1992). Learning to program: A phenomenographic perspective. Gothenburg, Sweden: ActaUniversitatis Gothoburgensis.
- Burning Glass Technologies (2017). The Digital Edge: Middle-skill Workers and Careers. Retrieved August 07, 2019 from https://www.burning-glass.com/wp-content/uploads/Digital_Edge_report_2017_final.pdf.
- Chen, J. A., Morris, D. B., & Mansour, N. (2015). Science Teachers' Beliefs. Perceptions of Efficacy and the Nature of Scientific Knowledge and Knowing. In International Handbook of Research on Teachers' Beliefs. (Eds.) Fives, H. & Gill, M. G. Routledge, 370–386.
- Csapó, G. & Sebestyén, K. (2017). Educational Software for the Sprego Method. *The Turkish Online Journal of Educational Technology*, INTE 2017 October, pp. 986-999. Retrieved July 22, 2018 from http://www.tojet.net/special/2017_10_1.pdf. ISSN 2146-7242
- Csapó, G. & Sebestyén, K. (2018). Sprego – Spreadsheet Lego. Retrieved May 30, 2018 from <https://play.google.com/store/apps/details?id=hu.sprego.oktatoprogram>.
- Csapó, G. (2017). Sprego Virtual Collaboration Space. 8th IEEE International Conference on Cognitive Infocommunications, (pp.137-142). Retrieved January 31, 2018 from <http://ieeexplore.ieee.org/document/8268230/>. ISBN 978-1-5386-1264-4. DOI=10.1109/CogInfoCom.2017.8268230
- Csernoch, M. (2014). *Programming with Spreadsheet Functions: Sprego*. In Hungarian: *Programozás táblázatkezelő függvényekkel – Sprego*. Budapest, Műszaki Könyvkiadó.
- Dienes, N. & Gulácsi, Á. (2018). 3D Software Environment For Educational Sprego Programming. *The Turkish Online Journal of Educational Technology*, INTE 2018 November, pp. 837-844. Retrieved August 07, 2019 from http://www.tojet.net/special/2018_12_3.pdf. ISSN 2146-7242
- Dienes, N., Gulácsi, Á., Csernoch, M. (2018). Sprego Avatars in 3D Space. In Hungarian: Sprego avatárok a 3D térben. INFODIDACT'2018. Retrieved 18 August, 2019 from <https://people.inf.elte.hu/szlavi/InfoDidact18/Manuscripts/DNGACsM.pdf>
- Google (2019). Sprego - The official Sprego application. Retrieved August 07, 2019 from https://play.google.com/store/apps/details?id=hu.sprego.oktatoprogram&hl=en_US

- IMDb (2019). IMDb Top 250. Retrieved August 07, 2019 from https://www.imdb.com/chart/top?ref=nm_mv_250
- Katai, Z., & Toth, L. (2010). Technologically and artistically enhanced multi-sensory computer-programming education. *Teaching and teacher education*, 26(2), pp. 244-251.
- Microsoft (2019a). Excel functions (alphabetical) – Office support. Retrieved August 07, 2019 from <https://support.office.com/en-us/article/excel-functions-alphabetical-b3944572-255d-4efb-bb96-c6d90033e188>
- Microsoft (2019b). Create an array formula – Office support. Retrieved August 18, 2019 from <https://support.office.com/en-us/article/create-an-array-formula-e43e12e0-afc6-4a12-bc7f-48361075954d>
- Papp, P. & Csernoch, M. (2018). Is Spreadsheet Management Problem Solving? In Hungarian: A táblázatkezelés is problémamegoldás? INFODIDACT'2018. Retrieved 18 August, 2019 from <https://people.inf.elte.hu/szlavi/InfoDidact18/Manuscripts/PPCsM.pdf>
- Sestoft, P. (2011). Spreadsheet technology. Version 0.12 of 2012-01-31. IT University Technical Report ITU-TR-2011-142. Copenhagen, Denmark: IT University of Copenhagen.
- Sweller, J., Ayres, P. & Kalyuga, S. (2011). *Cognitive Load Theory*. Springer Science & Business Media, 2011.

SYMBOLIC VIOLENCE AND MEDIA

Prof. Dr. Ahmet ESKİCUMALI
Media and Communication Studies
Sakarya University, Turkey
ecumali@sakarya.edu.tr

Mehmet ÖZER
Media and Communication Studies
Sakarya University, Turkey
mehmet.ozel1@ogr.sakarya.edu.tr

ABSTRACT

Media play a significant role in functioning of symbolic violence and power relations in modern societies. Today, mass media is absolutely crucial and prerequisite to understand the social structure and relations in modern societies and currently mentioned as fourth estate after the legislative, executive and judicial branches as a form of power. Additionally, as one of the main and preeminent important agent of socialisation, mass media substantially contributes to the production and reproduction of social identity, social relations and structure. Bourdieu developed a reflexive sociology to understand the power relations in modern societies with different interrelated theories of symbolic violence, field, habitus, capital to get a deep insight how social stratifications and inequalities are perpetuated and legitimatised. The article concentrates mainly on Bourdieusian theory of symbolic violence and other interrelated theory of field, habitus and capital and their relationships with the mass media in reproduction and legitimation of social structure and relations in modern societies.

Key words: Symbolic violence, field, habitus, capital, media

INTRODUCTION

Pierre Bourdieu is unequivocally one of the most eminent, controversial and prolific sociologists of modern times (Silva & Warde, 2010). Webb, Schirato & Danaher (2008) claim that leading social scientists as Durkheim, Marx Weber, Norbert Elias and Marcel Maus inspired Bourdieu. Works of Marx, Wittgenstein and Pascal have important contribution to Bourdieu's sociological theory. Swartz (1997) states that Bourdieu drew on the several social scientists from a variety of disciplines e.g. philosophy, sociology, anthropology to lay the foundations of his sociology.

Bourdieu (as cited in Swartz, 1997) developed a reflexive sociology to unmask the inequalities and stratification in modern societies with interrelated theories as symbolic violence, habitus, field and capital and applied these theories to different fields and institutions such as state, art, education, media, housing, academy, cultural tastes. He stresses on the role of culture in production and reproduction of social structure and relations and developed the symbolic dimension of power in legitimation of unequal, stratified, historically arbitrary structures in modern societies. Bourdieu (as cited in Jenkins, 2002) attempted to theorise how social order are reproduced through cultural mechanisms and symbolic forms instead of direct and coercive mechanisms in modern societies.

Bourdieu (1990, p. 15) states that “the cycle of life is one of social reproduction in the continuous medium term.” Swartz (1997) states that Bourdieusian sociology mainly focuses on cultural and symbolic dimension in social reproduction. Jenkins (2002, p.104) states that Bourdieu systematically grounded the theory of symbolic violence in *Reproduction in Education, Society and Culture* to analyse how educational system of France contributes to legitimation and perpetuation of social structure through symbolic power and violence. Whole work of Bourdieu may be interpreted as “a materialist anthropology of the specific contribution that various forms of symbolic violence reproduces and transforms the structures of domination.”

Media consumption in daily life is essential and of the utmost importance in modern societies (Anderson & Witham, 2009) and highly important to understand modern societies (Thompson, 1998). Essentially, media transform the organisation of social life both in space and time by creating new forms of practices and “new modes of exercising power.” Therefore, media and its impact must take the central role to grasp the cultural transformations related to the modern societies. Taking the media seriously into consideration provides people to be aware of its serious repercussions on some social and political concerns (Thompson, 1998, p. 4). Bourdieu (1998a) emphasizes the inconspicuous symbolic dimension of media as a form of power to perpetuate and legitimatise the social order. Couldry (2003) expresses that media should be considered as a meta-capital with its capacity to exert power on the power of economic, social and cultural capital.

THEORETICAL BACKGROUND

According to Rey (2007); questioning how reality is constructed in modern societies, Bourdieu has become incontrovertibly one of the leading iconoclastic theoretician of the modern philosophy. Swartz (2010) states that Bourdieusian perspective influenced much work in several fields of social sciences as culture, art, media, education, sociology, stratification, etc.

Bourdieu and Passeron (2000b) developed a discipline on the reproduction of social structures in modern societies. Bourdieu (as cited in Rey, 2007) purposed to develop a scientific sociology to disclose how domination is reproduced and perpetuated in modern societies. He (as cited in Swartz, 1997) tried to explore the role of social and cultural reproduction in terms of power relations between both groups and individuals. Bourdieu's (2000b) sociology proposes a theory of symbolic capital and violence to analyse the connection between symbolic and non-symbolic characteristics of social life. Power requires legitimation and therefore he lays emphasis on symbolic forms of power structures in modern capitalist societies.

For Bourdieu (as cited in Swartz, 2010), all instituted groups struggle symbolically to perpetuate and legitimate social order. Bourdieu (as cited in Burawoy & Holdt, 2012) focuses on the mechanisms of domination and theorised the concepts of "symbolic violence", "cultural capital", "habitus" to explore those mechanisms in social order. Swartz (1997) states that Bourdieu created a sociology of symbolic power and through which concentrated on connections between practice, culture and social structure. Symbolic systems have social consequences and play an important role in the construction of social life and order.

Bourdieu deliberately eschewed the dichotomy of subjectivism/objectivism and agent/structure and created the theories of practice and practical knowledge (Cicourel, (1993). Bourdieu draw on different concepts and theories rather than creating division or exclusion. He claims that quality of being explanatory of any concept and theory is contingent and depends on the phenomena and cases (Görgün Baran, 2017). Concept of habitus is especially important to transcend the division of subject and object, agency and structure in modern social theories (Swartz, 1997).

Swartz (1997) states that Bourdieusian perspective marries constructionist and structuralist perspectives to establish the theory of symbolic power which arises from the problem of the relationship between symbolic representations and social structures. Bourdieu (1990, p. 123) alludes to his discipline as "constructivist structuralism" or "structuralist constructivism". By structuralism, he implies that "there exist, in the social world itself, and not merely in symbolic systems, language, myth, and desires of agents are capable of guiding or constraining their practices and their representation." By constructivism, he implies that "there is social genesis on the one hand of the patterns of perception, thought and action which are constitutive of the habitus, and on the other hand of social structures, and in particular of fields and groups, especially of social classes."

Habitus

According to Webb, Schirato, & Danaher (2008); concept of habitus both specifically and generally establishes and explains practices take place in sociocultural contexts. Swartz (1997) claims that relationships between structures and actors based on the objective structures lead to subjective consequences which compatible with the social world constructed by actors.

Bourdieu (1998b, p. 8) states that "habitus is a generative and unifying principle which retranslates intrinsic and relational characteristics of position into a unitary lifestyle, that is, a unitary set of choices of persons, goods, practices." According to Webb et al. (2008, p. 36); habitus is "partly unconscious "taking in" of rules, values and dispositions." In other words, habitus is the dispositions and values which are acquired culturally. Bourdieu (2011) explains the habitus as following;

The habitus could be considered as a subjective but not individual system of internalized structures, schemes of perception, conception, and action common to all members of the same group or class and constituting the precondition for all objectification and apperception: and the objective coordination of practices and the sharing of a world view could be founded on the perfect impersonality and interchangeability of singular practices and views. (Bourdieu, 2011, p. 86)

The habitus structures objective practices, but it is itself subjective generative principles which are produced by the objective structures in social life (Jenkins, 2002). Habitus provides "a bridge between subjective agency and objective position" (Field, 2008, p. 16). Swartz (1997, p. 212) states that "habitus represents a mediating between practices and structures rather than a structurally determinative construct." According to Bourdieu (2011, p. 79), habitus is constructed during the process of socialisation. Habitus is not constructed through conscious learning, or not ideological imposition, instead it is acquired through practice.

Differences such as goods, practices, and especially manners function in each society in connection with different positions form symbolic systems, “such as the set of the phonemes of a language or the set of distinctive features that form “a mythical system”, in other words, “distinctive signs” (Bourdieu, 1998b, pp. 8-9). “Difference becomes a sign and a sign of distinction ... only if a principle of vision and division is applied to it which, being the product of incorporation of the structure of objective differences is present among all the agents” (Bourdieu, 1998b, p. 9). “The representations of agents” diversified with their “position (and the interest associated with it)” and with their habitus, “as a system of models of perception and appreciation, as cognitive and evaluative structure” which are attained through the permanent experience of a social position. The habitus is summarily “a system of models for the perception and appreciation of practices.” (Bourdieu, 1998b, p. 9). The habitus manufactures practices and representations which exist for classifications, “which are objectively differentiated; but they possess the code, the classificatory models necessary to understand their social meaning.” As a consequence, the habitus insinuates a “sense of one’s place” but also a “sense of other’s place” (Bourdieu, 1990, p. 131).

Habitus is a system of lasting, transposable disposition which, integrating past experiences, functions at every moment as a matrix of perceptions, appreciations, and actions and make possible the achievement of infinitely diversified tasks, thanks to analogical transfers of schemes permitting the solution of similarly shaped problems. (as cited in Swartz, 1997, p. 100)

“Habitus is not innate capacity but habitus is a “structured structure” that drives from the class-specific experiences of socialisation in family and peer groups (as cited in Swartz, 1997, p. 102). Swartz (1997, p. 103) explains that habitus is not the outcome of early socialisation experiences which are internalized outside structures, but instead outcome of internalized “dispositions of broad parameters and boundaries of what is possible or unlikely for a particular group in a stratified social world develop through socialisation.” Swartz (1997, p. 97) states that key idea to understand habitus is that “objective structures have subjective consequences is not compatible with the view that the social world is constructed by individual actors.

Habitus is inclined to reproduce those practices, perceptions, and behaviours congruent with the conditions under which it was manufactured (as cited in Swartz, 1997, p. 103). “Particularly important role played by habitus and its strategies in setting up and perpetuating durable relations of domination is once again an effect of the structure of the field” (Bourdieu, 1998b, p. 131).

Three points Bourdieu (as cited in Webb et al., 2008, p. 38) associates with the concept of habitus; “first, knowledge is always constructed through the habitus, second, we are disposed towards certain attitudes, values or ways of behaving because of the influence exerted by our cultural trajectories, and third, the habitus is always constituted in moments of practice.” In Bourdieu, (as cited in Burawoy & Holdt, 2012, p. 67) “the symbolic violence that works through habitus linked to the broader symbolic order in that the hierarchies of society and the meanings of those hierarchies are stabilised and made normal.”

Field

Bourdieuian social theory is named as *field theory* (Maton, 2008). Swartz (1997, p. 10) states that practices in social life take place in *fields* which is structured. Field, in Bourdieuian sociological perspective, connects the practices of habitus to the structures of power which is stratified in modern societies. Field is a social structure in which habitus operates (Swartz, 1997). Bourdieu (2010, 2018, pp. 40-41) explains field as; “a structured social space, a field of forces, a force field.” Field is occupied by the dominant and the dominated. Long-lasting, and continuous unequal and stratified relationships take place within the field. At the same time, various agents or actors struggle to transform and preserve the field. Individuals compete for relative power for their interest. Bourdieu (as cited in Swartz, 1997, p 104) defines the concept of the field as;

a network, or configuration, of objective relations between positions. These positions are objectively defined, in their existence and in the determinations they impose upon their occupants, agents or institutions, by their present and potential situation in the structure of the distribution of species of power (or capital) whose possession commands access to the specific profits that are at stake in the field, as well as by their objective relation to other positions (domination, subordination, homology, etc.).

According to Jenkins (2000, p. 85); a field is defined as a social domain in which practices, struggles and activities occur to obtain certain resources or interest. According to Swartz (1997, p. 10), “field mediates the relationship between social structure and cultural practice”. Agents produce, circulate and appropriate services, goods, knowledge, competitive position and status, and they struggle to accumulate and monopolise the economic, social, cultural or symbolic capitals in certain fields.

Capital and Forms of Capital

Bourdieu (as cited in Swartz, 1997, p. 74) mentions four forms of capitals: “economic capital (money and property), cultural capital (cultural goods and networks including educational credentials), social capital (acquaintances and networks), and symbolic capital (legitimation)” and their interrelationship to get insight to how inequalities are produced and reproduced within social order in modern societies. Bourdieu (as cited in Field, 2008) claims that “position of agents in social field as determined by the amount and weight of their relative capitals.” He combines different kinds of capitals to understand the roles of capitals in creation and reproduction of inequalities in modern societies.

Swartz (1997, p. 127) states that under certain conditions any capitals in any form can transform into other form of capitals, yet forms of capitals are not reducible to each other. Bourdieu (as cited in Hughes & Blaxter, 2007, p. 108) states that “all forms of capital are accumulated labor and have a capacity to produce and reproduce themselves so that in society people are not equal and everything is not equally possible or impossible.” Bourdieu, (1998b, p. 12) states that “the position occupied in social space, that is, in the structure of the distribution of different kinds of capital, which are also weapons, commands the representations of this space and the position-takings in struggles to conserve or transform it.” Webb et al. (2008) notes that the amount of power agents owns in a field is related to the position of agent in the field, and how much capital in any form they own.

Bourdieu (as cited in Swartz, 1997) mainly focused on the power and domination, however, the concept of capital is not congruous with the Marxian theory of exploitation. Bourdieu broadens the forms of labour (social, symbolic, cultural, religious, etc.) and constitute power resources which can be transformed into one another at certain rates and under certain situations. Bourdieu’s reflexive sociology goes beyond the Marxian perspective to get insight to the inequalities in modern societies with the concepts of capital in different forms (economic, social, cultural and symbolic capital). The most important contribution of Bourdieu to sociology is that interchangeability of economic, social and cultural capital in power relations in modern societies.

Swartz (1997) states that economic capital is the money and properties which an agent possesses in the field. Economic capital can transform into other capitals easily. Bourdieu (1980, p. 252) states that “economic power is first and foremost power to keep economic necessity at arm’s length.” According to Swartz, (1997) social, cultural and symbolic capitals are rooted in economic capital. Social, cultural and symbolic capitals are the ones that is transformed implicitly from economic capital. It can be managed rationally, conserved, transmitted and calculated easily. According to Calhoun (1993) essentially, economic capital is a form of capital which is immediately and directly can be transformed into any kinds of capital such as cultural, social or symbolic one.

Essentially, social capital contributes to reproduction of inequality, yet it is partly and inseparably autonomous from cultural and economic capital. Bourdieu (as cited in Field, 2008, p. 20) propounds that “social capitals the exclusive property of elite; designed to secure their relative position.” Bourdieu and Wacquant (as cited in Field, 2008, p. 17) state that “social capital is the sum of resources, actual or virtual, that accrue to an individual or a group by virtue of possessing a durable network of more or less institutional relationships of mutual acquaintance and recognition.”

Bourdieu (as cited in Swartz, 1997) initially founded the theory of cultural capital during the research to explain the inequalities of students’ achievement and the relation of inequalities with their families with different educational and but similar social backgrounds. Cultural capital accumulated and embodied in the early years of childhood through family members especially parents and other professionals they interacted.

Cultural capital is form of power within the differentiated societies that Bourdieu (as cited in Swartz, 1997, p. 75) conceptualises by extending the logic of economic analysis to apparently non economic product and services. Concept of cultural capital includes a variety of resources such things as “verbal facility, general cultural awareness, aesthetic preferences, information about the school system, and educational credentials.”

The social role of culture is to classify people and thus underwrite a stratified society. He introduces the notion of cultural capital which is possessed by those who have taste and power of discrimination. Discrimination and taste are both apparently natural abilities of the individuals but are actually the products of a specific class and educational system. Culture and the knowledge that is integral to it are replacing economics as a means of differentiating classes. In late capitalism when many members of the subordinate classes are comparatively affluent, money loses its ability to mask class difference and culture moves in to fill the gap (Bourdieu, 1980). To sum up, Unequal distribution of objectified and institutionalized cultural capital in modern societies is the key to inequality and stratification (Swartz (1997).

Bourdieu (as cited in Swartz, 1997, p. 90) initially originated the concept of symbolic capital while working on peasants of Algerian Kabyle society. Agents in the fields do not perceive symbolic capital as a power which legitimates the social order. Bourdieu (1998b, p. 47) states that “symbolic capital is any property (any form of capital whether physical, economic, cultural or social) when it is perceived by social agents endowed with categories of perception which cause them to know it and to recognize it, to give it value”.

Symbolic capital is the form taken by any species of capital whenever it is perceived through categories of perception that are the product of the embodiment of divisions or of oppositions inscribed in the structure of distribution of this species of capital.” (Bourdieu, 1998b, p. 47)

Bourdieu (Swartz, 1997, p. 82) emphasize strongly that “symbolic systems not only provide cognitive and integrative functions but also serve as instrument of domination.” Bourdieu (2017) asserts that cultural practices, symbols and preferences in any field such as, art, dressing and eating habits, religion, literature, philosophy and science, especially language contribute to embodiment of interests and enhancement of social distinctions.

Bourdieu (2000a) claims that any form of capital to some and different extent tends to function as symbolic capital. All forms of capital have symbolic effects which is acquired explicitly and practically by agents in any field. Habitus is symbolically created and produced in accordance with the structure of field. Any form of capital becomes symbolic one when it is recognised or misrecognised as a power, potential or capacity. To sum up, any form of capital come to existence and works as symbolic one when relationships inside habitus produce dispositions or recognition to regard it as a power.

Symbolic Power

The most substantial contribution of Bourdieu to modern perspective about power is the concepts “*symbolic power, violence and capital*” as a form of power which makes the stratified social order legitimate. In sociological perspective, power refers to any potential or ability to influence others and exists in several different forms. It can be used by individuals or groups within formal and informal social institution and can originate from “persuasion, charisma, law, political activism, and coercion” (Anderson & Witham, 2009, p. 322). According to Thompson (1998); power exists in four forms; political, coercive, economic and symbolic power. Symbolic power is of great importance in all social life, in spite of its invisibility and inconspicuousness. Bourdieu (2003) lay emphasis on symbolic power which necessitates recognition, and works only with accompliceship of its victims.

In Bourdieusian perspective, power is analysed in three different ways: First, power considered as valued resources such as different forms of economic, social and cultural capital. Second, power considered as specific domain of struggle (fields). Third, power considered as legitimation through symbolic power, violence and capital (Swartz 2010). Words or symbols are not single-handed power but functions as power when they have potential for legitimacy. According to Bourdieu (2001), symbolic power determines the relationship between those who wield and those who undergo it and produces or reproduces social relations and order. Symbolic power contributes to legitimacy of political and economic power but it is not reduced to them.

Bourdieu (1990, p. 138) explains the concept of symbolic power;

is a power of creating things with words. It is only true, that is, adequate to things, that a description can create things. In this sense, symbolic power is a power of consecration or revelation, a power to conceal or reveal things which are already there.

Jenkin (2002) states that naming and categorisation process of language is vital in the construction of social reality. According to Bourdieu (as cited in Swartz, 1997, p. 83); symbolic systems are “structuring structures” which work as mechanisms or tools used to understand and construct the social world. In this sense, different modes of knowledge such as language, art, science, etc. represent the social world in order to be understood, made sense of, therefore “exercise a cognitive function.” Bourdieu (2003) claims that language structures worldview of individuals in social order, consequently establishes and constructs the social world.

According to Bourdieu (2003), language is an inextricable element of the struggles within the social structure in terms of culture and its reproduction process which contributes substantially to reproduction of the traditional social order. Swartz (1997, p. 87) claims that symbolic representations have political effects. They hierarchically identify social structures and thus legitimise social distinctions. Mental structure is acquired via the binary logic and impacts our cognitive capabilities, thus produces a certain kind of map of social distinctions. Moreover, social distinctions are structured and adopted by “the polarity logic of cognitive process.” Symbolic systems becomes a form of “vertical classification”, through which “cognitive logic of polarity” and “social exclusion and inclusion” is connected and established.

Power relations establish the structure of social space through reproduction and reinforcement. In other words, not a deliberate propaganda but symbolic imposition legitimates the social order. Social agents apply symbolic systems which are produced in objective structures. On this account, objective structures of the social world is regarded as self-evident and does not require to be justified and legitimised. Social inequalities and stratifications in any field are perpetuated and legitimised through more by symbolic power than physical power (Bourdieu, 1990).

Symbolic Violence

Bourdieu states (1998b, p. 133) that "... symbolic violence is the gentle, disguised form of violence." This form of violence takes place when it is not possible to exercise overt violence. People may misunderstand or minimize the effect of concept of symbolic violence by comparison with physical violence because the concept involves the word of symbolic and it is presumably considered as "spiritual" and it does not have real consequences and effects.

The theory of symbolic violence attempts to explain that inequalities and domination in societies are always reproduced, perpetuated and legitimised through symbolic representation and activities. The origin of the concept of symbolic violence dates back to the work of Plato "*Republic*". He lays emphasis on the fundamental propositions derived from metaphysical systems which imply political perspective of society and organize civic life. Plato stresses the important role of art, moral symbolic systems, philosophical or political values to name a few. Symbolic systems are important in this term to constitute the social world. Any form of domination is reproduced and legitimised through symbolic capital which transforms into power to legitimate the other forms of capitals in modern capitalist societies (Swartz, 1997).

According to Quema (2015); symbolic representations construct and produce individuals' perception of the social world. Bourdieu (2003, p. 168) defines the symbolic violence as "the power to impose (or even to inculcate) the arbitrary instruments of knowledge and expressions (taxonomies) of social reality - but instruments whose arbitrary nature is not realized as such." Bourdieu (1998b, p. 127) states that it seems gentle and exists in a form of "invisible trust, obligation, personal loyalty, hospitality, gifts, debts, piety, in a word, of all the virtues honoured by the ethic of honour, presents itself as the most economical mode of domination..."

Bourdieu and Passeron (2000b) theorised symbolic violence in their work *Reproduction in Education, Society and Culture* in that it is enunciated that;

Every power to exert symbolic power, i.e. every power which manages to impose meanings and to impose them as legitimate by concealing the power relations which are the basis of its force, adds its own specifically symbolic force to those power relations. (2000b, p.4)

In Bourdieusian perspective, symbolic violence is a power or potential to impose certain symbolic systems to comprehend and adapt to the social world in invisible and taken-for-granted forms (Swartz, 1997). Rey (2007) states that those who dominate the society impose arbitrary systems and forms of meaning of social order through symbolic violence, which make those who are dominated misrecognise and see it natural. Symbolic violence can be exercised with the unwitting complicity of those who are suffered from it. Bourdieu (2001, p. 171) states that "symbolic power is exerted only with the collaboration of those who undergo it because they help to construct it as such."

Symbolic violence is the imposition of symbolic systems and their meanings on social groups or classes in such a way that they see it as legitimate. Invisible legitimacy disguises the power relations, thereby allowing symbolic violence to be effective. By accepting the imposition as legitimate, cultural symbolic systems systematically reproduce power relations in modern societies. The process works through misrecognition which makes power relations such a form that makes them legitimate in the eyes of those who are undergo symbolic violence rather than perceiving as what it objectively is (Jenkins, 2002). According to Kraus (1993), the strength of symbolic violence results from its inconspicuousness or invisibility.

Symbolic violence works when habitus as a subjective structure and objective structure correspond to each other. Congruity between subjective structures and objective structures originate the power of symbolic violence which constructs the habitus of agents in any field of struggle in modern societies (Kraus, 1993).

To overcome the symbolic violence, social agents need to be conscious of social institutions such as family, school, media, religion which construct the unequal and stratified social order in modern societies (Bourdieu, 2001). According to Quema (2015), symbolic violence takes place at the level of practical knowledge-to put it differently, the social agents occupy in any field put beliefs and structuring principles into practice and thus support and approve the rules and structures which are socially needed to be legitimatised.

Media and Symbolic Violence

According to Thompson (1998); symbolic forms which are mediated by media does not only shape our sense of past but also creates individuals' sense of the world and sense of individuals' place within the social world. Media products enable individuals make sense of experienced events, observe others, concisely learn about a world which is beyond our daily encounters. Today, our sense of world is so profoundly shaped by media products that images and expectations acquired through the media exposure predominate our real experiences. Similarly, Bourdieu (1998a) argues that individuals exposed to television products are imposed to see the world from a rather narrow and mainstream political perspective as a consequence of cultural production.

“Ultimately television, which claims to record reality, creates it instead” (Bourdieu, 1998a, p.22). The theory of symbolic violence proposes that all contents and practices produced in the cultural sphere are historically arbitrary and unsubstantiated (LiPuma, 1993). Bourdieu (2011) claims that all cultural systems are constructed historically by human being and derived from the practices to the interest of certain social groups and contribute to legitimization of unequal power relations in modern societies. Cultural commodities furthermore function ideologically, reproduce and perpetuate the social order and the relations of domination through symbolic violence which is concealed and inconspicuous (Bourdieu, 1998b). Media texts inarguably perform ideologically to reproduce social structure implicitly (Fairclough, 1995; Berger, 1991).

Media manufacturers who produce cultural content have symbolic power to present the things and lead people believe what is presented, to reveal and conceal the practices of both the natural and social world. Consequently, they bring things into fact through symbolic power which is generally wielded for the benefit of those who dominates the social order (Bourdieu, 1990). Dominant classes hide their domination behind the divisions in the cultural sphere by the virtue of symbolic power (Bourdieu, 2017). Individuals do not realise the power of television to hide by showing, which becomes very effective symbolic violence to perpetuate and legitimatise the social order (Bourdieu, 1998).

Bourdieu (1998) claims that domain of media is complex and outside the range of ordinary people in any society. Television is an effective media tool to reproduce and perpetuate power relations inconspicuously while entertaining people (Shanahan & Morgan 2004). According to Fiske (1987), media discourses enable individuals make sense of social practices and order. Fairclough (1995) claims that similar banal and unvarying genres and formats of television programs such as news, soap operas, reality shows, tabloids construct and naturalise social and personal identities and relations to a certain extent.

Media contents are symbolic and cultural commodities which are manufactured in the culture industry and vulnerable to profit oriented pressure within the industrial market (Fairclough, 1995). Adorno & Horkheimer (2002) asserts that mass media have substantial and destructive impact on the mass population. Media contents are not anymore presented as an art instead utilised as an ideological tool to legitimise nonsense commodities which are purposefully manufactured. Culture industry is restrained to produce content in massive amount and standard way and relinquish the authenticity of work relevant to society.

The concept of *habitus* sheds light on that consumer taste or preferences in any field such as art, television programmes, music, etc., are not only subjective level choice but also it is resulted from social circumstances by the virtue of individual's *habitus* (Laughey, 2007). Cultural differences in any society generally functions as a means which generates symbolic power which maintains and reproduces social order. Through their *habitus*, individuals produce and perpetuate the social order and structure with their choices and taste in cultural fields including media contents (Bourdieu, 2017). *Habitus* structures and naturalises symbolic and cultural differences and each *habitus* provides certain way to see, perceive and comprehend the social world, to put it differently a “*distinctive mode of cultural consumption*.” (Lee, 1993, p. 45). Pierre Bourdieu (2000) claims that symbolical goods in cultural field functions as tool to reproduce and perpetuate the social order and establish class relations. According to Bourdieu (2017), the power originates in the process of production of social differences which are presumably in several forms such as social, symbolic, economic or cultural. The media is also a field that constitutes social distinction and strategies of class control and closely influences the social field (Myles, 2010).

Field theory is also related to media and cultural consumption. As any field, media have also autonomous structure with a hierarchy of positions which restricts, regulates and reproduces cultural commodities in certain types and methods. Field of media, which produces cultural commodities, has certain dispositions which correspond to *habitus*, through which producers adopt and shape what to be produced and eventually consumed (Bourdieu, 1993). Economic and social constrains structure the media and cultural production in practice, thus corresponding *habitus* of the field of cultural production is prone to mean that average media consumers are predisposed to similar products of the same producers (Laughey, 2007).

Bourdieu (1998a), in his work of *On Television*, sheds light on the symbolic violence and mechanisms which leads to it, specifically on the field of television journalism. He tries to show in depth-analysis how journalistic field produces and imposes the mass audiences certain worldview with its invisible structure. According to Bourdieu; television is significantly dangerous for many areas of cultural production; art, science, literature, philosophy to name a few, on the contrary it does not have any threat to political life.

In modern media, controlling the instruments of production limits the professionals who appear on journalistic field on television in terms of time and topic which is usually imposed by those instruments, which leads to symbolic violence and structures the media content to a great extent. Mostly those professionals who appear on television does not worry about these control instruments rather they desire to be seen on the television screens. Limitation of the time of programs leads to an invisible censorship. Moreover, professionals in journalistic field censor themselves due to job security because of limited capacity to employ those professionals. This lack of job security also forces the journalistic professionals to political conformity (Bourdieu, 1998a).

Journalistic professionals are subject to self-censorship resulting from economic pressure because television is profit-making institution which needs the ads of companies and subsidies of government, which forces the owners of the media institution in the sense that what is on screens of television. These invisible mechanism leads to censorship of media owners, ultimately journalistic professionals to make television a means for establishing and maintaining the symbolic order which originates from symbolic violence (Bourdieu, 1998a).

According to Bourdieu (1998a); sensationalism on screens, such as sex, blood, crime, etc., is attractive but also turns attention of audiences from important issues and takes up the precious time instead turning important issues. The time spent before screen on worthless and kitschy programs is substantially important in reality because most of the population in society get the news and information on social world from television, thereby becoming the main determinant of worldview of great majority on outer world. Bourdieu uses the metaphor of “eyeglasses” to explain the symbolic power of television which determines what audiences see or do not see. Also, television has symbolic power to exaggerate the importance of certain events or vice versa, thus create, show and bring the social world into existence.

television paradoxically can hide by showing, That is, it can hide things by showing something other than what would be shown if television did what it’s supposed to do, provide information. Or by showing what has to be shown, but in a such as way that it isn’t really shown, or is turned into something insignificant; or by constructing it in s such a way that it takes on a meaning that has nothing at all to do with reality. (Bourdieu, 1988a, p.19)

Television has also the making of political danger with its capacity to make people believe that they see on the screen, which is called *reality effect*. Through this effect, television has power to mobilize groups and create ideas and images by constructing the social reality. This power may lead to arouse negative feeling on audiences such as racism, chauvinism, xenophobia, etc. Television imposes both in local and global struggles to see the world a certain divided way, thereby creating social divisions to mobilise groups as a result of symbolic power and violence (Bourdieu, 1998a).

CONCLUSION

People in almost all societies exchange production, information and symbolic content. Media have possible effects both on individual and social level, which is crucial to understand the modern societies. Mass communication produces practices which are not physical but suitable for individuals in different spaces. New media influences and transforms the structure of societies and therefore functions a new mode of power which does not require to share the same space and time with audiences (Thompson, 1998). Couldry (2003) claims that in Bourdieusian perspective, media is presumably considered as a meta capital which has also power to exercise on the power of other forms of capitals; economic, social and cultural one.

In order to understand the inequalities and stratifications in modern societies, Bourdieu (as cited in Swartz, 1997) originated a reflexive sociology with concepts of field, capital, habitus, symbolic capital, power and violence in order to transcend the dichotomy of “objectivism and subjectivism”, “agent and structure” and “theory and empiricism.” According to Bourdieu (2001), the dominated or subordinated unconsciously act in accordance with the principles and worldview established by the dominants groups in society. Unequal and arbitrary social order is constructed historically and arbitrary through symbolic violence by different social institutions such as mass media, educational system, family and so on. According to Yair (2009); Bourdieu exerted himself and strived for elucidating how symbolic violence unwittingly reproduces, perpetuates and legitimatises the unequal and stratified social order with complicity of the dominated.

Bourdieu (1998b, p.20) states that “we know that to name is to show, create, to bring into existence. And words can do a lot of damage.” Rey (2007, p. 56) states that “only where there is distinction can there be domination.” Being aware of symbolic violence which is exercised in any field is substantial for individuals in a society because it is the source of distinctions and division among individuals and social groups. Bourdieu (2000a) states that any kind of domination has all the time a symbolic dimension.

Bourdieu (1990, p. 137) states that “to change the world, one has to change the ways of making the world, that is, the vision of the world and the practical operations by which groups are produced and reproduced.” According to Bourdieu (2001), elicitation and revealing of symbolic violence through a scientific analysis has presumably two opposite social effects. Either it may reinforce the any form of domination when findings support or converge with the discourse of the dominant order, or it may help to eliminate the dominant order by mobilising the those who are dominated. According to Swartz (1997); Bourdieusian sociology is an instrument in order to be able to resist and fight against symbolic violence which is obscured and inconspicuous.

REFERENCES

- Adorno, T.W. & Horkheimer (2002). Culture industry. In Noerr, G.S. (Ed.) *Dialectic of enlightenment: Philosophical fragments*. (pp. 94-136). [E-book]. Retrieved from https://www.contrib.andrew.cmu.edu/~randall/Readings%20W2/Horkheimer_Max_Adorno_Theodor_W_Dialectic_of_Enlightenment_Philosophical_Fragments.pdf
- Berger, A.A. (1991). *Media analysis techniques*. California, USA: Sage Publications, Inc.
- Bourdieu, P. (1990). *In other words: Essays towards a reflexive sociology*. (M. Adamson, Trans.). California, USA: Stranford University Press. (Original book published in 1987).
- Bourdieu, P. (1998a). *On television*. New York, USA: The New Press. (Original book published in 1996).
- Bourdieu, P. (1998b). *Practical reason: On the theory of action*. California, USA: Stranford University Press.
- Bourdieu, P. (2000a). *Pascalian meditations*. (R. Nice, Trans.). California, USA: Stranford University Press. (Original book is published in 1994).
- Bourdieu, P. & Passeron, J.C. (2000b). *Reproduction in education, society and culture*. (2nd Ed.). England, London; Sage Publications.
- Bourdieu, P. (2001). *Masculine domination*. (R. Nice, Trans.). California, USA. Stranford University Press. (Original book is published in 1998).
- Bourdieu, P. (2003). *Language and symbolic power*. (7th Ed.). (Gino Raymond & Matthew Adamson, Trans.). Cambridge, USA: Harvard University Press.
- Bourdieu, P. (2010). On television. in Sapiro, G. & Bourdieu, P. (Eds). *Sociology is a martial art: Political writings by Pierre Bourdieu*. (pp. 11-61). New York, USA: The New Press.
- Bourdieu, P. (2011). *Outline of a theory of practice*. (R. Nice, Trans.). (4th ed.). New York, USA: Cambridge University Press. (Original book published in 1972).
- Bourdieu, P. (2017). *Ayrılm: Beğeni Yargılarının Toplumsal Eleştirisi* (D.F. Şannan and A. G. Berkkurt, Trans.). Ankara, Turkey. Heretic Publications. (Original book published in 1979).
- Burawoy, M. & Holdt, K.V. (2012). *Conversations with Bourdieu: The Johannesburg moment*. South Africa: Wits University Press.
- Calhoun, C. (1993). Habitus, field, and capital. In Calhoun, C., Edward, L. & Postone, M. (Eds.). *Bourdieu: Critical perspectives*. (pp. 61-88). Washington, USA: Polity Press
- Cicourel, A., V. (1993). Structural and processual epistemologies. In Calhoun, C., Edward, L. & Postone, M. (Eds.). *Bourdieu: Critical perspectives*. (pp. 89-115). Washington, USA: Polity Press
- Couldry, N. (2003). Media meta-capital: Extending the range of Bourdieu's field theory. Retrieved from http://eprints.lse.ac.uk/17655/1/Couldry_Media_meta_capital_2003.pdf
- Fairclough, N. (1995). *Media discourse*. London, UK. Hodder Education.
- Field, J. (2008). *Social capital*. Routledge.
- Fiske, J. (1987). *Television culture*. (2nd ed.). New York, USA: Routledge.
- Görgün Baran, A. (2017). Pratik, kültür, sermaye, habitus ve alan teorileriyle Pierre Bourdieu sosyolojisi. [Sociology of Pierre Bourdieu with the concepts of practice, culture, capital, habitus and field theory]. In Sugur, S. and Gorgun Baran, A. (2017). *Sosyolojide yakın dönem gelişmeler*. Eskisehir, Turkey: Anadolu University.
- Hughes, C. & Blaxter L. (2007). Feminist appropriations of Bourdieu : the case of social capital. In Lovell, T. (Eds.) *(Mis)recongiton, social inequality, and social justice: Nancy Fraser and Pierre Bourdieu*. New York, USA: Routledge
- Jenkins, R. (2002). *Pierre Bourdieu*. (2nd ed.). USA: New York. Routledge.
- Köse, H. (2004). *Bourdieu medyaya karşı: Medya: İşbirlikçi, zorba ve çıkarıcı*. [Bourdieu against media: Media: Collaborative, tyrant and barker]. İstanbul, Turkey. Papirüs Yayınevi.

- Krais, B. (1993). Gender and symbolic violence: Female oppression in the light of Pierre Bourdieu's theory of social practice. In Calhoun, C., Edward, L. & Postone, M. (Eds.). *Bourdieu: Critical perspectives*. (pp. 156-177). Washington, USA: Polity Press.
- Laughey, D. (2007). *Key themes in media theory*. New York, USA: The McGraw-Hill.
- Lee, M. J. (1993). *Consumer culture reborn: The cultural politics of consumption*. USA: New York: Routledge.
- Lipuma, E. (1993). Culture in a theory of practice. In Calhoun, C., Edward, L. & Postone, M. (Eds.). *Bourdieu: Critical perspectives*. (pp. 14-34). Washington, USA: Polity Press.
- Maton, K. (2008). Habitus. In Grenfell, M. *Pierre Bourdieu: Key concepts*. (pp. 49,66). [e-book] Retrieved from <https://ebookcentral.proquest.com/lib/sakarya-ebooks/detail.action?docID=3060927&query=pierre+bourdieu+key+concepts>
- Myles, J. F. (2010). *Bourdieu, language and the media*. USA: New York: Palgrave, McMillan.
- Quema, A. (2015). *Power and legitimacy: Law, culture and literature*. USA: University of Toronto Press.
- Rey, T. (2007). *Bourdieu on religion: Imposing faith and legitimacy*. New York, USA: Routledge Publications
- Shanahan, J & Morgan, M. (2004). *Television and its viewers: Cultivation theory and research*. [e-book]. Retrieved from <https://ebookcentral.proquest.com/lib/sakarya-ebooks/detail.action?docID=202000&query=Television+and+its+Viewers>
- Silva, E. and Warde, A. (2010). The importance of Bourdieu. In Silva, Elizabeth and Warde, Alan. (Eds). *Cultural analysis and Bourdieu's legacy: Settling accounts and developing alternatives*. New York, USA: Routledge.
- Swartz, D. (1997). *Culture and power: The sociology of Pierre Bourdieu*. Chicago, USA: University of Chicago Press.
- Swartz, D. (2010). Pierre Bourdieu's political sociology and public sociology. In Silva, Elizabeth and Warde, Alan. (Eds). *Cultural analysis and Bourdieu's legacy: Settling accounts and developing alternatives*. New York, USA: Routledge.
- Thompson, J.B. (1998). *Media and modernity: Social theory of the media*. Cambridge, UK: Polity Press.
- Webb, J., Schirato, T. & Danaher, G. (2008) *Understanding Bourdieu* [e-book]. Retrieved from <https://ebookcentral.proquest.com/lib/sakarya-ebooks/detail.action?docID=689552&query=bourdieu#>
- Yair, G. (2009). *Pierre Bourdieu: Last musketeer of the French Revolution*. Plymouth, United Kingdom: Lexington Books.

THE ASSESSMENT OF E-BOOK LEARNING WITH ACCEPTANCE LEVEL AND INFLUENCE OF TERTIARY STUDY IN TERTIARY EDUCATION

Hon Keung YAU

City University of Hong Kong

Department of Systems Engineering & Engineering Management

Kowloon Tong, Kowloon, Hong Kong

honkyau@cityu.edu.hk

Mei Ling TSANG

City University of Hong Kong

Department of Systems Engineering & Engineering Management

Kowloon Tong, Kowloon, Hong Kong

meiltsang7-c@my.cityu.edu.hk

ABSTRACT

In the 21st century, the internet is common for everyone. With advanced technology, people would like to take advantages from electronic world. In our daily life, many activities have launched electronic mode instead of traditional methods, e-commerce is one of the examples that replace the physical store style. Comparing with the earlier year, the environment of education has reformed a lot. There is a trend in which involving more electronic versions of learning materials. One of the changing tools is the e-book and it becomes more significant in tertiary education. More and more universities have encouraged students to adopt e-book in replacing traditional books. Moreover, the university campus is proactive to motivate students using the e-book. They have built the e-book system for students to search certain data and read the e-book materials. In order to find out the perception of students on using the e-book, this project conducts a survey which distributed to students who are receiving or received tertiary education. The questionnaires aim to observe the acceptance level of the e-book and the experience of using the e-book, also to discover on what extent e-book influence students' learning.

To examine the perception of students on using the e-book, some hypothesizes from the Technology Acceptance Model (TAM) and the Unified Theory of Acceptancy and Use Technology (UTAUT) have set to support the result. A new research model has been developed by combining some factors in TAM and UTAUT including the performance expectancy of the e-book, the effort expectancy of the e-book, the social influence of e-book, the facilitating conditions of e-book and behavioral intention. The four basic elements from UTAUT have been a critical influence of technology expectancy. Moreover, a new element has been added to evaluate the compatibility of e-book whether an acceptance tool for e-learning. The final part to prove the success of e-book in e-learning is the behavioral or usage intention of the e-book from TAM which is an important factor to support in this model. In this project, the final result would be to what extent that students in tertiary education recognize the e-book as part of their learning method. Also, to summarize all the collected data and information to give some suggestion on improving the e-book environment in higher education.

INTRODUCTION

Before technology advance, teaching activities are by the manual and physical method. For example, using traditional books to teach students or a blackboard is provided at school for the teacher to write down the knowledge during teaching. However, as technology has improved a lot in the 21st century, many countries have introduced e-learning environment to the educational field including Hong Kong. Especially for university students, e-books are one of the learning methods recently.

The definition of e-book is to make traditional book becomes digital version that available users to read it online through electronic devices (Annand, 2008). There are some arguments exist that whether an e-book is suitable for learning although it has lots of advantages. There are still many challenges that need to face in e-book industry such as the standard quality of e-book, missing a proper technology to access the e-book and not enough post-service or service support when having difficulties on reading e-book (Diaz, 2003). The acceptance of the e-book had been affected by those problems.

When focusing on tertiary education, online learning is a common method nowadays especially for long distance learning in some educational institutes (Simpson, 1988). The university is hard to determine the suitable format for

students whereas the improper version of e-book launch on campus would influence the acceptance level on e-book among students, as well as the e-learning. It is one of the barriers that implanting e-book learning in higher education. The growth of e-book has been a significant influence towards university's students since it provides more chance for students to get access to the e-book system (Shelburne, 2009). The attitude of students to use-book would probably have influenced by this growth. Therefore, to find out the perceptions of students in tertiary education, some theory and model has been applied to discover the finding.

For evaluating the reception level of a new technology, Technology Acceptance Model (TAM) can be used to assess the behavioral of users (Davis & Venkatesh, 1996). Another theory is the Unified Theory of Acceptance and Use of Technology (UTAUT) which could be applied in this project for evaluating the acceptance degree of the usage in a technology (Workman, 2014). It contains different aspects for constructing the model. The questions in survey are mainly designed in these two models. For collecting certain data to conclude the acceptance level of e-book in e-learning of tertiary educations. Also, the findings would be discussed and to illustrate the following questions of this study. The questions of this study are:

1. To evaluate between the compatibility of e-book and the technological acceptance level in e-learning of tertiary education
2. The reasons of acceptance / unacceptance of e-book in e-learning of tertiary education
3. The possible suggestions on adopting e-book learning in tertiary education

THE STUDY

What is E-book?

An electronic book is a kind of reading material in digital form. Similar to the conventional book, the e-book can consist of word and photo, and animation which physical book cannot. Media to read it requires computers or equivalent electronic devices only (Gardiner, Eileen and Ronald G. Musto., 2010). E-books not only refer to an electronic version of a printed book (Brewster and Bruce, 2010), but they can also be electronic version only. Such that viewer must use an e-reader to read. The increasing popularity of e-books is due to fewer prices than printed book, more user-friendly, and a larger pool of titles selection (Bhardwaj, D., 2015).

History of E-book

Several e-book pioneers were agreed in today, such as Ángela Ruiz Robles patented the device in 1949, which idea was to reduce the number of books to be carried to school (Lallanilla M., 2014). And the first e-book is recognized as the "Index Thomisticus", this book was prepared by Roberto Busa since 1949 until the 1970s (Priego, E., 2011). Later on in 1971, Michael s. Hart created his first e-document, by inputting the United States Declaration of Independence in the computer, whose intention was to make ease to download and view on devices (Flood A., 2011).

Advantages & Disadvantages of using e-book over printed books

The size of printed books no doubt is bigger and heavier than an e-book reader in terms of the page, and not to mention a single e-book reader can contain a lot of e-books without enlargement. The e-book can adopt different environmental situation for the reader to read for that device with the light source. Text scale can also be adjusted as reader need, and may possible changing font as well. Addition software may be applied for text-to-speech function, which aids reader needs (Harris, C., 2009). In respect to production, the traditional book likely to use more raw materials to produce (Goleman, D., 2010), in other views, printed books cost more than e-books. The production rate of the e-book is not applicable, as it can be "produce" or back-up in no time, the copy can be downloaded without additional cost.

Privacy for the reader may be an issue, as from identity and preference, to what page reader is reading and how long the reader finish the reading can be known in some circumstance (Richards, N., 2015). Other cons of e-book included it cannot be an object itself, some people like to touch it, smell it, hold it, etc. such that, e-books are not targeted to those who want a physical affair with the book (Queenan, J. (2012). There is a possibility that e-book together with e-book reader being stolen, and files can be deleted or lost in some case. The digital rights are another issues e-book are facing at the moment (Hiltzi, M. (2016).

Technologies used in E-book

The e-book is different from the traditional book. It need an application to operate it. Also, readers need to use their device to get delivery of e-book.

1. Hardware

Nowadays, people would access the e-book through the internet. But at the beginning of e-book, the producer can only provide the e-book to someone who demands many reference substances. As the technology advance, producers desire to get more general public aware the e-book. Therefore, producers have improved the e-book device that can download the reading and lighter machine to access the e-book information. It is more convenient compared than the original machine (Thomson Multimedia, 2000). NuvoMedia Rocket eBook is one of the examples.

2. Software

For software aspect, it is for those readers who did not own an e-book device or machine. They can access e-book information by using their personal devices like phone, computer and laptop. By using software aspect of e-book access, readers can adjust the scale of the information with the keyboard (Lynch, 2001). There are two type of Microsoft Reader for downloading materials without any charge online (Shiratuddin N., MLandoni M., Gibb F. & Hassan S. 2013). People who are using the desktop or laptop, they are able to encrypt the e-books from Amazon.com or BarnesandNoble.com. Also, they can encrypt the e-books from the website which provides electronic version. For people who are using Pocket PC devices, they are only allowed to access unencrypted information from e-books (Shiratuddin N., MLandoni M., Gibb F. & Hassan S. 2013). Moreover, the electronic version of e-book also can be found it doc, XML and HTML (McKnight and Dearnley, 2003).

Theory used in evaluation the acceptance of e-book

1. The technology acceptance model (TAM)

This is a model developed by Davis in 1989. It is mainly for the technology aspect of external and internal factors that affect the behavior of users. This model is used to predict the acceptance level of using a new technology in a reliable method (Warshaw, 1989). Perceived Usefulness (PU) means the new technology can achieve the certain objective and Perceived Ease of Use (PEOU) means the level of using technology effort (Davis, 1989). These two variables are used to explain the intention to use in the model.

2. Theory of reasoned action (TRA)

Theory of reasoned action (TRA) was introduced by Fishbein in 1996. The theory used to evaluate human behavior from social psychology aspect (Conner, Kirk, Cade, & Barrett, 2001) and can be supported the estimation of different social behaviors (van den Putte, 1991). It is mainly finding out the attitude of interviewee on e-book.

3. The unified theory of acceptance and use of technology (UTAUT)

The unified theory of acceptance and use of technology (UTAUT) was established by Venkatesh in 2003. UTAUT has combined the technology acceptance model (TAM) and other analysis acceptance models. The model divided into two main aspects to evaluation the user behavior. One is the personal background and habit, another is the attitude of the technology.

DEVELOPMENT OF HYPOTHESIS

Technological expectancy

Base on the Unified Theory of Acceptance and Use of Technology (UTAUT), there are four basic factors included the performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2003). Technological expectancy means the perspective of controlling the technology with the social influence (Talyor & Todd, 1995). The hypothesis of technological expectancy is as follow:

- H2. The positive influence of technological expectancy towards the behavioral intention

By referring the UTAUT model, some factors involve in this project and its hypotheses are important to indicate respective relationship with technological expectancy. The hypotheses of technological expectancy and these four elements are as follow:

- Ha. The positive influence of performance expectancy towards technological expectancy
- Hb. The positive influence of effort expectancy towards technological expectancy
- Hc. The positive influence of social influence towards technological expectancy
- Hd. The positive influence of facilitating conditions towards technological expectancy

2.4.2 E-book Compatibility

The compatibility of e-book mean the experiences of interviewee when using e-book as eLearning tool, including whether interviewee consider the e-book as a learning method. They are believed to have close relationship in eLearning system (Johnson, 1999). For the hypotheses of e-book compatibility, have been recognized that having positive influenced towards technological expectancy and behavioral conditions. Here are the hypotheses:

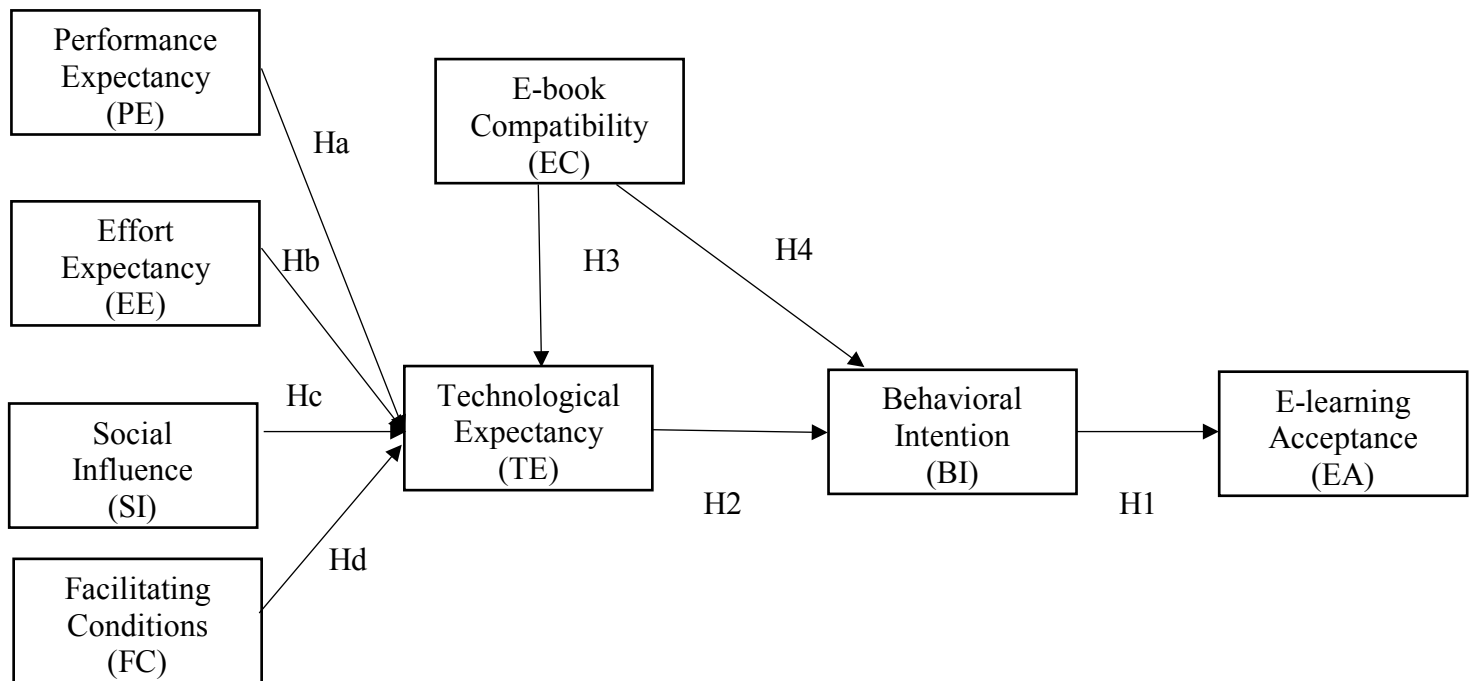
- H3. The positive influence of e-book compatibility towards technological expectancy
- H4. The positive influence of e-book compatibility towards behavioral conditions

2.4.3 Behavioral Intention

The behavioral intention is another element to influence the acceptance level in eLearning. It is used to motivate a user to use in the eLearning system (Park, 2009). Also, the acceptance level on eLearning is directly influenced by behavioral intention (Hardgarave et al., 2003). As a result, there is a relationship between behavioral intention and e-learning acceptance, I propose the hypothesis as follow:

- H1. The positive influence of behavioral intention towards e-learning acceptance

Figure1. The new combined research model



FINDINGS

In this research project, the data collection method is mainly by web-based questionnaires. Web-based questionnaire tends to be easier than paper-based questionnaire in data collection and data organization (Tuft, 1997). Also, to test the reliable of the collected data is important before start analyzing the data (Field, 2013). To evaluate the collected data whether it is valid and reliable for analyzing the result. Principle Component Analysis (PCA) and Reliability analysis would be applied in this project.

A. Population and Sample

In this project, 250 copies of questionnaires were distributed and only 239 copies were filled and returned. Among those 239 copies, there is some disagree sample that was uncompleted, data irrelevant, and other reasons. Therefore, useful questionnaires collected were 213 copies which contained complete information and relevant data for further analyzation.

To summarize, nearly half of the interviewees are male, owned 48.4%. The remaining 51.6% are female. Among those people, only one of them is under 18 years old, the majorities are from 18-25 years old, 19 people age from 26-30, and the remaining two people are greater than 30 years old. In respect to their education institute, around 56% are from CityU, HKU, UST and BU students reply number are less than 2% respectively, 6% of them are CUHK student, less than 8% study in PolyU, only two students from LU, more than 4% are from EdUHK, less than 4% study in HKSYU, 15% are studying or graduated from others institution in Hong Kong. A large percent of interviewees are studying or obtained Bachelor Degree. Data of their year of studies, 4% of people from Year 1, 11% students studying Year 2, 12% of them are from Year 3, most of them are studying Year 4 and there are 45% of them, 16% of interviewees obtained their qualification, the remaining 12% of interviewees are for other reason such as above year 4 etc. Among those 213 interviewees, less than 10% study in Business, 7% in Art/Social Science/Education, 58.2% in Science and Engineering, more than 2% study in Creative Media, and remaining 22% study in other major. 90% of interviewees studying or studied in full time, 9% of them study in part-time mode, and remaining 1% as well as 1 person is an exchange student. In the area of their computer usage, by assessing their computer skills from 1 to 7 where 1 is the least, no one rate themselves 1 or 2, respective 3% rated themselves 3 or 4, 39% interviewees rated 5, there are 46% people rated 6, and around 10% rated 7 to say they are master in computer usage. While asking about the number of computer device(s) they owned, 31% declared they have just 1 device, the majority owned two devices and occupied 42%, 20% of them have up to three devices, and 4% of interviewees are having more than 3 devices at the moment of the interview.

B. Data Analysis & Findings

There are 31 questions from the questionnaire about the acceptance of e-book in different aspects, which is a summary of descriptive statistics in these 31 items. It is the most important part of analysis the hypothesis. Also, this part is an evidence to support the combined research model. The structure of table can be divided into two parts. The left-hand side is the questions had been asked from interviewers in the questionnaire. On the right-hand side, there are five main elements to calculate the result including the total number of collection, mean, standard deviation, variance, and skewness. In this part, the question set in a 1 to 7 scale which provide to respondents for choosing the most suitable level of responding questions. (1 is unlikely for agreement level, 4 is neutral, 7 is absolutely in agreement level).

Table 1. Descriptive statistics of question 18 - 48

Descriptive Statistics							
Questions	N	Mean		Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error
18) The operation of e- book is easy for me.	213	4.53	.111	1.621	2.628	-3.42	.167
19) I am familiar with using e-book.	213	3.83	.125	1.830	3.349	.094	.167
20) E-book has a clear guideline for using it.	213	3.62	.117	1.710	2.924	.297	.167
21) It is easy to learn how to use e-book.	213	4.09	.118	1.727	2.982	.114	.167
22) I can get assist and support easily when using e-book.	213	3.60	.121	1.763	3.110	.339	.167
23) E-book is easy to control it. (E.g. turn to next page, close it and etc.)	213	4.59	.124	1.806	3.262	-.499	.167
24) Most of my mobile device can help me easily to access e-book.	213	4.38	.115	1.672	2.794	-4.12	.167
25) E-book is more reliable.	213	4.57	.103	1.508	2.274	-.603	.167
26) Usually, I can obtain the most updated information from e- Book.	213	3.51	.102	1.491	2.223	.456	.167
27) I think e-book is more convenient.	213	3.62	.114	1.671	2.792	.139	.167
28) E-book is a useful tool for my learning.	213	4.52	.114	1.661	2.760	-.498	.167
29) E-book can help me to achieve my study purpose.	213	4.20	.116	4.693	2.867	-.019	.167
30) E-book is helpful to finish my task earlier.	213	4.78	.111	1.626	2.644	-.562	.167
31) E-book has improved my learning outcomes.	213	4.20	.111	1.613	2.602	-.284	.167
32) I can obtain more knowledge and information from e-book.	213	4.31	.119	1.737	3.019	-.673	.167
33) E-book always helps me to solve the difficulties of study.	213	4.29	.127	1.848	3.415	-.588	.167

34) If I use e-book, I can get a higher opportunity to gain a better grade or GPA.	213	3.59	.113	1.653	2.733	.210	.167
35) E-book is suitable for my current learning style.	213	4.21	.115	1.678	2.816	-.246	.167
36) E-book is the most suitable learning tools.	213	4.01	.117	1.702	2.896	-.113	.167
37) I think e-book makes study more efficient.	213	4.05	.111	1.623	2.634	-.138	.167
38) I am getting along well with e-book.	213	3.47	.106	1.544	2.383	.538	.167
39) My study has involved with e-book.	213	4.13	.112	1.628	2.649	-.226	.167
40) I think e-book attract me to study.	213	3.60	.105	1.528	2.336	.208	.167
41) I got recommend from my friends to use e- book.	213	4.12	.119	1.736	3.013	-.315	.167
42) My professors or tutors suggest me to use e-book.	213	4.41	.116	1.690	2.856	-.258	.167
43) I think that my surrounding people are support me to use e-book.	213	4.04	.101	1.473	2.168	.096	.167
44) I think e-book helps better in my study than traditional method.	213	4.14	.119	1.731	2.996	-.218	.167
45) I think e-book is cheaper comparing with using traditional book.	213	4.76	.115	1.672	2.796	-.575	.167
46) I think I will use more e-book during my university life.	213	4.36	.119	1.733	3.004	-.667	.167
47) I will continue to use e-book.	213	4.62	.117	1.711	2.927	-.338	.167
48) I will suggest my friends or classmates to use e-book.	213	4.28	.100	1.464	2.145	-.354	.167

Hypothesis Testing

The Pearson's correlation coefficient (r) is used in nowadays software packages for curve fitting and displaying data. It can be used to evaluate the internal relationship among the data values (Hall, 2015). While experimental errors are commonly included by applying χ^2 function (Lyons, 1998). The correlation coefficient is used to determine the relationship between two variables. The range from the formula between -1 to +1. The closest value to positive one means a strongly positive relationship between two variables. In opposite, the closest value to negative one means a strongly negative relationship between two variables. If the value is 0, there is no relationship. Moreover, the 2-tailed should be less than 0.05, otherwise no correlation between variables.

Relationship between all factors

Relationship between PE and TE

Correlations		TE	PE
TE	Pearson Correlation	1	.952**
	Sig. (2-tailed)		.000
	N	213	213
PE	Pearson Correlation	.952**	1
	Sig. (2-tailed)	.000	
	N	213	213
**. Correlation is significant at the 0.001 level (2-tailed)			

Table 2. Correlations table between PE and TE

In this table 2, it reflects the relationship between performance expectancy (PE) and technological expectancy (TE). The value of Pearson's correlation coefficient is 0.952 while the t-test check of significant value is smaller than 0.05. It means the two variables PE and TE belong in significant correlated statistically. Also, the result shows the relationship between PE and TE is in a strongly positive relationship condition. As a result, Ha. The positive influence of performance expectancy towards technological expectancy can be supported the hypothesis in the new combined researched model.

Relationship between EE and TE

Correlations		TE	EE
TE	Pearson Correlation	1	.862**
	Sig. (2-tailed)		.000
	N	213	213
EE	Pearson Correlation	.862**	1
	Sig. (2-tailed)	.000	
	N	213	213
**. Correlation is significant at the 0.001 level (2-tailed)			

Table 3. Correlations table between EE and TE

In this table 3, it reflects the relationship between effort expectancy (EE) and technological expectancy (TE). The value of Pearson's correlation coefficient is 0.862 while the t-test check of significant value is smaller than 0.05. It means the two variables EE and TE belong in significant correlated statistically. Also, the result shows the relationship between EE and TE is in a strongly positive relationship condition. As a result, Hb. The positive influence of effort expectancy towards technological expectancy can be supported the hypothesis in the new combined researched model.

Relationship between SI and TE

Correlations		TE	SI
TE	Pearson Correlation	1	.858**
	Sig. (2-tailed)		.000
N		213	213
SI	Pearson Correlation	.858**	1
	Sig. (2-tailed)	.000	
N		213	213
**. Correlation is significant at the 0.001 level (2-tailed)			

Table 4. Correlations table between SI and TE

In this table 4, it reflects the relationship between social influence (SI) and technological expectancy (TE). The value of Pearson's correlation coefficient is 0.858 while the t-test check of significant value is smaller than 0.05. It means the two variables SI and TE belong in significant correlated statistically. Also, the result shows the relationship between SI and TE is in a strongly positive relationship condition. As a result, Hc. The positive influence of social influence towards technological expectancy can be supported the hypothesis in the new combined researched model.

Relationship between FC and TE

Correlations		TE	FC
TE	Pearson Correlation	1	.818**
	Sig. (2-tailed)		.000
	N	213	213
FC	Pearson Correlation	.818**	1
	Sig. (2-tailed)	.000	
	N	213	213
**. Correlation is significant at the 0.001 level (2-tailed)			

Table 5. Correlations table between FC and TE

In this table 5, it reflects the relationship between facilitating conditions (FC) and technological expectancy (TE). The value of Pearson's correlation coefficient is 0.818 while the t-test check of significant value is smaller than 0.05. It means the two variables FC and TE belong in significant correlated statistically. Also, the result shows the relationship between FC and TE is in a strongly positive relationship condition. As a result, Hd. The positive influence of facilitating conditions towards technological expectancy can be supported the hypothesis in the new combined researched model.

Relationship between BI and EA

Correlations		BI	EA
BI	Pearson Correlation	1	.945**
	Sig. (2-tailed)		.000
	Sum of Squares and Cross – products	472.260	372.887
	Covariance	2.228	1.759
N		213	213
EA	Pearson Correlation	.945**	1
	Sig. (2-tailed)	.000	
	Sum of Squares and Cross – products	372.887	329.367
	Covariance	1.759	1.554
N		213	213
**. Correlation is significant at the 0.001 level (2-tailed)			

Table 6. Correlations table between BI and EA

In this table 6, it reflects the relationship between behavioral intention (BI) and e-learning acceptance (EA). The value of Pearson's correlation coefficient is 0.945 while the t-test check of significant value is smaller than 0.05. It means the two variables BI and EA belong in significant correlated statistically. Also, the result shows the relationship between BI and EA is in a strongly relationship condition. As a result, **H1. The positive influence of behavioral intention towards e-learning acceptance** can be supported the hypothesis in the new combined researched model.

Relationship between TE and BI

Correlations		TE	BI
TE	Pearson Correlation	1	.902**
	Sig. (2-tailed)		.000
	N	213	213
BI	Pearson Correlation	.902**	1
	Sig. (2-tailed)	.000	
	N	213	213
**. Correlation is significant at the 0.001 level (2-tailed)			

Table 7. Correlations table between TE and BI

In this table 7, it reflects the relationship between technological expectancy (TE) and behavioral intention (BI). The value of Pearson's correlation coefficient is 0.902 while the t-test check of significant value is smaller than 0.05. It means the two variables TE and BI are belonged in significant correlated statistically. Also, the result shows the relationship between TE and BI is in a strongly positive relationship condition. As a result, **H2. The positive influence of technological expectancy towards behavioral intention** can be supported the hypothesis in new combined researched model.

Relationship between EC and TE

Correlations		EC	TE
EC	Pearson Correlation	1	.887**
	Sig. (2-tailed)		.000
	N	213	213
TE	Pearson Correlation	.887**	1
	Sig. (2-tailed)	.000	
	N	213	213
**. Correlation is significant at the 0.001 level (2-tailed)			

Table 8. Correlations table between EC and TE

In this table 8, it reflects the relationship between e-book compatibility (EC) and technological expectancy (TE). The value of Pearson's correlation coefficient is 0.887 while the t-test check of significant value is smaller than 0.05. It means the two variables EC and TE belong in significant correlated statistically. Also, the result shows the relationship between EC and TE is in a strongly positive relationship condition. As a result, **H3. The positive influence of e-book compatibility towards technological expectancy** can be supported the hypothesis in the new combined researched model.

Relationship between EC and BI

Correlations		EC	BI
EC	Pearson Correlation	1	.892*
	Sig. (2-tailed)		.000
	N	213	213
BI	Pearson Correlation	.892**	1
	Sig. (2-tailed)	.000	
	N	213	213
**. Correlation is significant at the 0.001 level (2-tailed)			

Table 9. Correlations table between EC and BI

In this table 9, it reflects the relationship between of e-book compatibility (EC) and behavioral intention (BI). The value of Pearson's correlation coefficient is 0.892 while the t-test check of significant value is smaller than 0.05. It means the two variables EC and BI belong in significant correlated statistically. Also, the result shows the relationship between EC and BI is in a strongly positive relationship condition. As a result, **H4. The positive influence of e-book compatibility towards behavioral conditions** can be supported the hypothesis in the new combined researched model.

Relationship in new combined research model

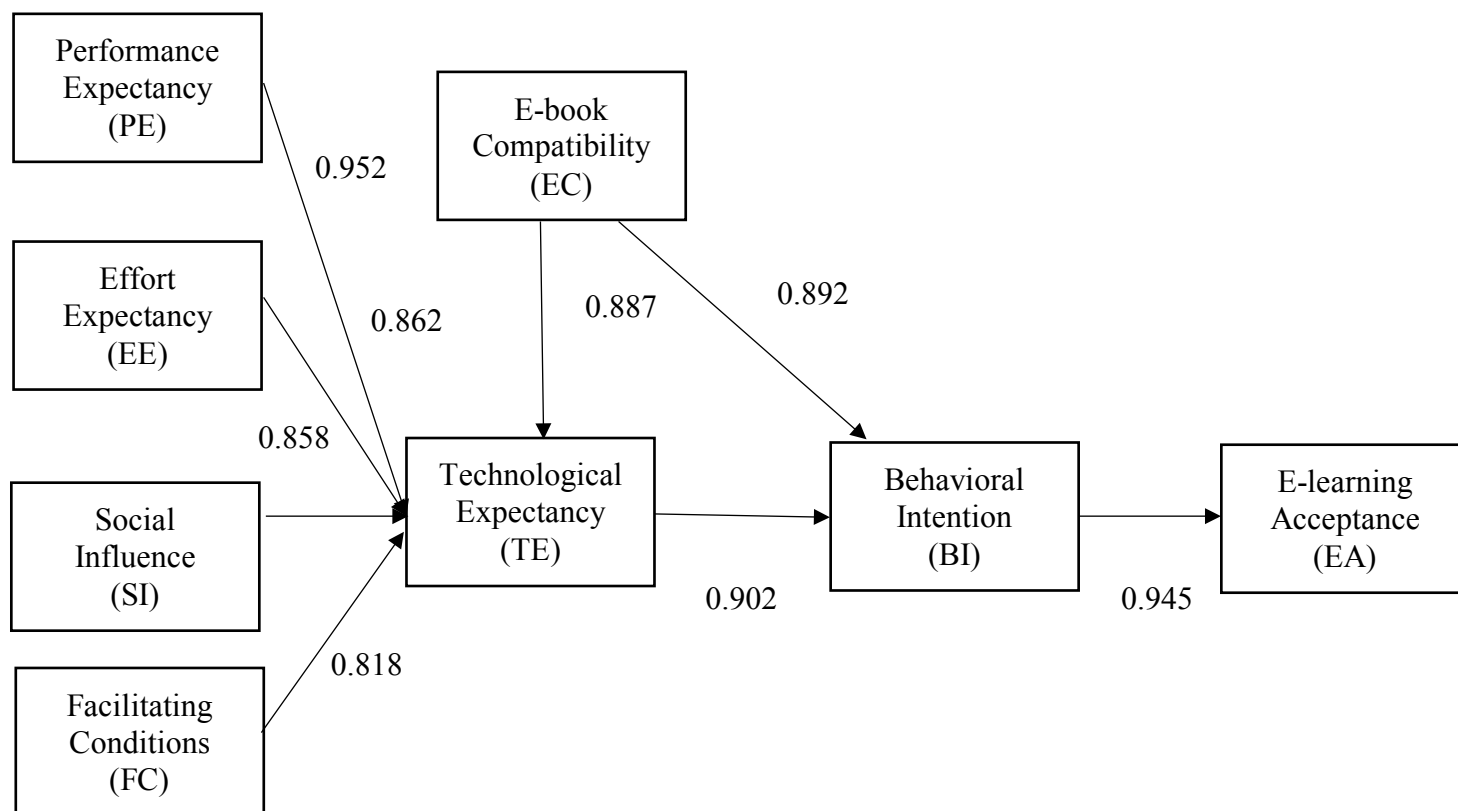


Figure 2. Result of the new combined research model

Discussion of the founding

Discussion all factor in the new combined research model

The factors in the new combined research model can be divided into three main groups which are the Technological Expectancy (TE), E-book Compatibility (EC) and the Behavioral Intention (BI). Firstly, the TE contains four elements including Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI) and Facilitating Conditions (FC). The mean value of them are 4.27, 4.04, 4.19 and 4.02 respectively. The overall performance of TE is just slightly higher than the neutral which is just little agreement level on TE among all respondents. Also, the standard deviation (SD) of them are 1.45, 1.45, 1.49 and 1.23 respectively. The standard deviation of overall performance on TE is a little large which means the agreement level of TE exists a large extent between different individuals. For EC factor in the new combined research model, the overall means of EC is 3.92 and the standard deviation value is 1.34. The overall means reflects interviewees are not satisfy on the compatibility of e-book, especially the items 4 and 6 which are under neutral range. This reflects slightly disagreement on EC among all respondents. Also, there is a large range of SD which means the opinions of EC exists a large extent between different individuals. For BI factor, the overall mean is 4.43 which is the highest value among all factor. It reflects individuals may have intention to continue on using e-book but they have some complaints on other factor. But the overall standard deviation of BI has the largest differences,

the value is 1.67. It can conclude the BI of e-book in eLearning has the largest argument on agreement level between individuals.

Discussion relationship between PE, EE, SI, FC and TE

The construction of TE is based on PE, EE, SI and FC as mentioned in 2.4.1. The hypotheses of them is each factor (PE, EE, SI & FC) has positive influence towards TE. By observing the results of correlations between them. The value of correlations between PE and TE is 0.952, EE and TE is 0.862, SI and TE is 0.858 and FC and TE is 0.818. The relationship FC and TE has the smaller relationship but still is a strongly positive relationship. The facilitating conditions of e-book may affect by the technology used in e-book or other technical problems. As a result, FC is the lowest value among those four elements as the role of FC reflects the existence resource to support students in eLearning (Razak, 2014). The SI and EE factor have a similar value that can conclude that they have similar influence towards TE. SI can be a significant influence of an individual to determine the value or belief (Venkatesh et al., 2003). Therefore, the social influence can be changed the acceptance level of e-book in eLearning. For EE, the software technology used in e-book would be the significant influence towards TE (Subramanian, 1994). The highest value among them is PE which means the performance when using e-book is positively influence towards TE. The PE is the motivation for an individual to use a technology (Terzis, 2011).

Discussion relationship between EC, TE and BI

For EC and TE, they are both influence towards BI in the new combined research model. The value of corrections between EC and TE is 0.887, EC and BI 0.892. The relationship between them has a similar value which can support hypotheses H3 and H4. Also, the correlations value of TE and BI 0.902. The TE has a slightly stronger relationship among in these three factors.

A study of e-learning states that the founding of BI is significant in order to make the success in e-learning system (Navani, 2016). Also, the founding indicates the updated or enhance of the tools may possible to increase the relationship between EC and BI.

Discussion relationship between BI and EA

The value of correlations between BI and EA is 0.945 which is a higher value of the new combined research model. They have a strongly relationship for an individual to accept e-book in eLearning. The increasing of BI would probably increase the acceptance in eLearning (Chen, 2011).

Final concluding remarks

This study aims to find out acceptance level of e-book consentaneousness relationship with technology tools for e-learning in tertiary education. By adopting questionnaire method, the collected data can be used to prove the hypothesis in the new combined research model which is designed from the TRA and UTAUT model. These two theories always used to evaluate the acceptance of a technology.

Since this project only focus on students who are receiving or received from higher education. Therefore, the questionnaire only distributes to tertiary educational students and the range of the project narrows the scope that can more concentrate to analyze the finding. The validation and reliable of collected data are evaluated by PCA and reliability analysis.

To summarize, there are eight elements in the new combined research model which is used to support the hypothesis of this project. The assumption of this study is those factors have closely relationship and would have positive influence towards e-learning acceptance in sequence. The measurement of relationship between each factor by calculating the Pearson correlation coefficient. To support the results of hypothesis, the value of correlation must be positive and it is better to have stronger relationship between them. Here are the summary table of supported hypotheses:

HYPOTHESES	RESULTS
Ha. The positive influence of performance expectancy towards technological expectancy	Supported
Hb. The positive influence of effort expectancy towards technological expectancy	Supported
Hc. The positive influence of social influence towards technological expectancy	Supported
Hd. The positive influence of facilitating conditions towards technological expectancy	Supported
H1. The positive influence of behavioral intention towards e-learning acceptance	Supported
H2. The positive influence of technological expectancy towards behavioral intention	Supported
H3. The positive influence of e-book compatibility towards technological expectancy	Supported
H4. The positive influence of e-book compatibility towards behavioral conditions	Supported

Table 10. The results of hypotheses

References

- Arribas, L. V. P., Gonzalez, M. E. L., & Conrado, N. R., (2017). Learning Principal Component Analysis by Using Data from Air Quality Networks. *J. Chem. Educ.*
- Bell, J., (1999). *Doing your research project*. Buckingham: Open University Press.
- Bhardwaj D. (2016). "Do e-books really threaten the future of print?" In *The Times of India*.
- Bird, D. K., (2009). The use of questionnaires for acquiring information on public perception of natural hazards and risk mitigation – a review of current knowledge and practice. *Natural Hazards and Earth System Sciences*. (Mathers, Fox, Hunn, 2007)
- Brewster and Bruce (2010) "Wayback Machine." Oxford University Press
- Bryman, A., (2012). *Social Research Methods*. Oxford University Press.
- Burcu, A. (2000). A comparison of two data collecting methods: interviews and questionnaires. Hacettepe University.
- Catenazzi N., Aedo I., Diaz P., & Sommaruga L. (1997). The evaluation of e-books. *Journal of Educational Multimedia and Hypermedia*.
- David, A., (2008). Learning Efficacy and Cost-effectiveness of Point Versus e-Book Instructional Material in an Introductory Financial Accounting Course. *Journal of Interactive Online Learning*
- Davis, F. D., & Venkatesh, V. (1996). A critical assessment of potential measurement biases in the technology acceptance model: Three experiments. *International Journal of Human-Computer Studies*, 45(1), 19-45. doi:10.1006/ijhc.1996.0040
- Field, A., (2006). *Reliability Analysis. Research Methods II*.
- Flood, A. (2011). "Michael Hart, inventor of the ebook, dies aged 64" in *The Guardian*
- Gardiner, Eileen and Ronald G. M. (2010) "The Electronic Book." In Suarez, Michael Felix, and H. R. Woudhuysen. *The Oxford Companion to the Book*. Oxford: Oxford University Press, p. 164.
- Goleman, D. (2010). "How Green Is My iPad" in *The New York Times*
- Hague, P. N. (1993). *Questionnaire design*. London: Kogan Page.
- Hall, G., (2015). Pearson's correlation coefficient.
- Harris, C. (2009). "The Truth About Ebooks" In *School Library Journal*. 55(6)
- Harvey, J., (1998). *Evaluation Cookbook*. Heriot-Watt University.
- Hiltzi, M. (2016) "Consumer deception? That 'Buy Now' button on Amazon or iTunes may not mean you own what you paid for" in *LA Times.com*. LA Times
- Janet E. S., (2011). *Questionnaire design and systematic literature reviews*. University of Wollongong.
- Karamizadeh, S., Abdullah, S. M., Manaf, A. A., Zamani, M., Hooman, A., (2013). An Overview of Principal Component Analysis. *Journal of Signal and Information Processing*.
- Kline, P., (1986). *A handbook of test construction: Introduction to psychometric design*. New York: Methune.
- Lallanilla, M. (2014). "Is This 1949 Device the World's First E-Reader" In *Live Science*.
- Landau, S., & Everitt, B., (2004). *A handbook of statistical analyses using SPSS*. Boca Raton, FL: Chapman & Hall/CRC.
- Lyons, L., (1998). *A Practical Guide to Data Analysis for Physical Science Students*. Cambridge University Press.
- Manage, A. B. W. & Scariano, S. M., (2013). An Introductory Application of Principal Components to Cricket Data. *Journal of Statistics Education*.
- Mark, K., (2005). *Designing an Effective Survey*. Software Engineering Measurement and Analysis.
- Meadows, K. A., (2003). So you want to do research? *Questionnaire design*. *British Journal of Community Nursing*.
- Mishra D., Akman I. & Mishra A. (2014). Theory of Reasoned Action application for Green Information Technology acceptance. pp.29-40
- Nancy L. L., Karen C. B. & George. A.M., (2008). *SPSS for intermediate statistics use and interpretation third edition*. Lawrence Erlbaum Associates (Taylor & Francis Group)
- Nigel M., Nick F., Amanda H., (2007). *Surveys and Questionnaires*. The NIHR RDS for the East Midlands/ Yorkshire & the Humber.
- Ormond S. (1988). *Supporting Students in Open and Distance Learning*. RoutledgeFalmer (Taylor & Francis Group): London and New York

- Pasveer, K. A., Ellard, J. H., (1998). The making of a personality inventory: Help from the WWW. Behavior Research Methods, Instruments, & Computers.
- Pearson, K., (1901). On Lines and Planes of Closest Fit to Systems of Points in Space. Philosophical Magazine.
- Peterson, R. A. (2000). Constructing effective questionnaires. Thousand Oaks: Sage.
- Priego, E. (2011). “Father Roberto Busa: one academic’s impact on HE and my career” in The Guardian
- Queenan, J. (2012). “One for the Books.” In Viking Adult
- Richards, N. (2015). “The Fifty Shades of Grey Paradox” in Wayback Machine
- Romeu, J., (2000)., A discussion of software reliability modeling problems., Reliability Analysis Center.
- Ronald D. F. Jr., Matthias S., (2002). Advantages and Disadvantages of Internet Research Surveys: Evidence from the Literature. Field Methods.
- Rutchik, R. H., (1998). EIA Guidelines for Statistical Graphs. Statistical Standards Group, Energy Information Administration, Department of Energy.
- Schmid, C. F., (1983). Statistical Graphics: Design Principles and Practices. New York, NY: John Wiley and Sons.
- Shelburne, W. A. (2009). E-book usage in an academic library: User attitudes and behaviors. Library Collections, Acquisitions, and Technical Services, 33(2-3), 59-72. doi:10.1016/j.lcats.2009.04.002
- Shiratudin N.,MLandoni M., Gibb F. & Hassan S. (2013). E-Book Technology and Its Potential Applications in Distance Education
- Sue, V. M., & Ritter, L. A. (2012). Conducting online surveys. Thousand Oaks, CA: Sage.
- Tufte, E. R., (1997). Visual Explanations: Images and Quantities. Evidence and Narrative. Cheshire, CT: Graphics Press.
- Van, S. M., Jankowski, W. J., (2006). Conducting online surveys. Quality and Quantity.
- Vehkalahti, K., (2000). Reliability of measurement scales: Tarkkonen’s general method supersedes Cronbach’s alpha. Finnish Statistical Society.
- Vosylis, R., Malinauskienė, O., Žukauskienė, R., (2012). Comparison of internet based versus paper and pencil administered assessment of positive development indicators in adolescents’ sample. Psichologija.
- Yurdugul, H., (2008). Minimum sample size for Cronbach’s coefficient alpha: A monte-Cario study. Hacettepe Universitesi Egitim Fakultesi Dergisi.

THE EDUCATION FOR SECURITY: CULTURAL OR TECHNOLOGICAL PROBLEM?

Teresa Grabińska

Military University of Land Forces, Wrocław, Poland

teresa.grabinska@awl.edu.pl

<https://orcid.org/0000-0001-9480-2730>

ABSTRACT

In the globalizing world, the security of individual people and the population depends more and more on the one hand on technological information transmission devices and the quality of devices protecting against natural and military threats. On the other hand, non-military threats, including cultural conflict, are becoming more and more serious. The so-called intercultural dialogue is a necessary way to alleviate cultural conflicts, but it is not enough. The goal of intercultural dialogue should not be cultural unification, but the creation of a global community that preserves the diversity of local cultures. However, it is not enough to provide information in cyberspace in the implementation of this objective, but education is necessary, focused on both familiarity and respect for one's own culture as well as cultures of other populations. The basis of this education should be shaping the universalist ethics of interpersonal relationships, allowing to understand cultural otherness, as well as understanding and cooperation in spite of this otherness.

Ethics in the classical approach is a derivative of anthropology, that is, the most general assumptions about human being. The content of these assumptions influences the dominant culture in a given population. Thus, the problem of cultural dialogue ultimately boils down to the dialogue of people and populations in a different way of perceiving themselves and the so-called strangers. On the other hand, the ontical and cultural layer is the basis of personal security in the psychological and social as well as instrumental and defense layers.

Although the modern communication network in cyberspace serves to standardize cultural patterns, for peace on a global scale it is much more important to shape respect for otherness and coexistence of different cultures. The search for a universal basis, despite this diversity, may come from both the ancient culture of China, medieval Europe etc.

The next step in the unification of not only the cultural but also the psycho-physical equipment are the technological actions implementing the ideology of transhumanism. Undeniable achievements of new technologies should first of all serve the individual in updating his aspirations and abilities and communities in preserving their cultural identity, and not lead to commercialization of the degree of participation and domination of particular groups in the global community. All the more so the system of ethical values should control commercial goals.

The ever-faster variability and technologicalization of living conditions of each communities is conducive to justifying the thesis about the need to monitor the effects of this ethical norms changeability and to replace them with standardized norms and operating procedures. Such a conclusion, however, raises serious concerns about totalitarian goals and the emergence of new conflicts on a global scale between groups competing for the model of cultural unification and for access to global monitoring of the state of this unification.

Key words: intercultural conflict, globalization, network society, transhumanism

INTRODUCTION

Human security and structural security will be the subject of consideration. Human security is the state and process of protecting a given population from threats. Structural security is the state and process of all kinds of activities and their tangible and intangible effects, as a result of which the need for human security is met and natural risks are minimized. The security structure includes all technical infrastructure, as well as organizational, legal and public order one.

In the considerations of human security, as it is understood in the *Human Development Report*, all actions in the field of structural security should satisfy all human needs (United Nations Development Programme, 1994, chs.1-2). The *Report* clearly underlines the necessity of efforts of the entire international community to free all human populations from the scourge of hunger, material poverty, epidemics of disease, all kinds of violence, destructive consequences of environmental contamination, economic exploitation, behavioral and physiological addictions. In addition to all military activities, that cause physical violence, so-called *soft violence* is no less threatening. It occurs most often in the form of so-called *symbolic power* (symbolic violence) or *structural violence* (Bourdieu, 1984; Galtung, 1969; Chopra, 2014). Its purpose is cultural uprooting, ideologization, social exclusion, forcing consumer needs, making media connections dependent, etc.

An eloquent argument in favor of addressing the needs of individual human populations, raised in the *Human Security Reports* (Human Security Centre, 2006; Human Security Report Project, 2010), is to show 100 times more human losses, incurred as a consequence of wars than in direct armed clashes.

Both the humanities, social, cultural, legal and informational sciences as well as economic, biomedical, technical, and military ones are involved in the consideration of human and structural security. However, the addressee of

all research and resulting safety activities is a person, not only perceived as a member of a larger community, but as every individual person. Therefore, human security should apply to both the community (*societal security*) as well as individual human (*personal safety*).

Societal security is neither the same with *human security* nor *social security* (Grabińska, 2019, chs. I, V.2), but first of all there is necessary to distinguish societal security and social security from personal safety because in many contemporary societies, which as a whole have a high level of social and structural security, a significant part of its members feel excluded, alienated, depressed and they are suffering from all kinds of behavioral and physiological addictions. (For the first time, Karen Horney drew attention to this in the study of American society (Horney, 1937)).

Because security science is multidisciplinary and transdisciplinary, the goal of education for security has to be "a dialogue" (of which the so-called intercultural dialogue is one of the components). This dialogue should take place mainly between subjective and objective approach to personal safety. In the present and future projects of human bionization and the globalization of life on Earth, the rapidly progressing convergence of biophysical and technical disciplines (National Research Council of the National Academies, 2014) should go hand in hand with the development of humanities, which allow to determine the ontical, cultural and psychophysical condition of human existence. If this scope of research is dominated by the unreflective use of more and more modern technological solutions, entering not only the security structure, but also the psychophysical and social constitution of man, it threatens him and individual populations with ever stronger objectification and dependence on the global technology and information structure (Grabińska, 2016; Grabińska, 2018).

In the further part of the discussion, an attention will be paid to intercultural dialogue. The term *culture* is here widely understood as it is defined by Alfred L. Kroeber (Kroeber, 1948, p. 253): „culture might be defined as all the activities and non-physical products of human personalities that are not automatically reflex and instinctive.” In the intercultural dialogue, however, it would be a matter of working out an agreement between populations that differ in terms of morals, as well as between the so-called a natural man and a transhuman. Preparation for such a dialogue should be one of the important elements of education for security.

PERSONAL SAFETY AND CULTURAL ROOTING

Personal safety is "the state felt by a particular man in which he is a) capable of realizing his own goals in agreement with other people and in harmony with the natural environment, b) he feels fulfilled in his relations with other people, c) is able to defend himself in the event of occurrence of threats." (Grabińska, 2019, ch. II.2). Respectively to these three characteristics of personal safety one can distinguish three layers of it – ontical-cultural (O-C), psychological-societal (P-S) and instrumental-defensive (I-D). The three layers should correspond with each other, while the level of mutual interaction (assuming the normal state of the physiology of a given person) depends primarily on cultural endowment of a human being, that is on O-C layer which contains a message about who a man is and what are the norms of human relation to other people, as well as to the natural and technological environment (and possibly to supernatural beings).

Each human being is the heir of two basic emoluments: biological and cultural. Both of these types of inheritance are passed on by the ancestors. The biological message is subject to the hard laws of genetics, while the cultural message is sensitive to signals flowing from the outside. The latter either develop a human being or destroy it. The representatives of different cultures (i.e. of various O-C layers, such as Taoist or Aristotle's man, etc.) have usually difficulties with: communicating, establishing interpersonal relations, building a community together. Such relationships belong to P-S layer, and their quality determines the state of personal safety in a culturally diverse community. In order to increase the level of personal safety in this layer, as well as in I-D layer, an intercultural dialogue is necessary. I-D layer predisposes to the defense of others, not only in relation to the biological determinants (life, health), but also cultural ones (which sometimes require the tribute from life or health).

These are the basic conditions for intercultural dialogue.

1. A high degree of awareness of one's culture and its impact on the P-S layer.
2. A high degree of knowledge of the culture of the *Other* and its impact on the P-S layer.
3. Getting rid of the valuation of one's own and the *Other's* culture for the purpose of comparing them with each other and respecting cultural differences.
4. Getting rid of dominating your own culture of the *Other's* culture.
5. Skilful matching of own and the *Other's* cultural dispositions in order to co-exist and creatively develop the community.

The five points mentioned above create a positive declaration, while their implementation, as history and present show, encounters numerous obstacles. There are many causes of them, e.g. the eternal desire to control others and to overcome others (also from their own cultural circle). The appropriate shape of the O-C layer and its transmission through the P-S and I-D layers are able to create of an external security structure in the form of appropriate intangible devices (such as law or organization) and tangible ones (as e.g. protecting against hunger and disease).

The personalists would question the content of point 3. They would say that respect for another person is not enough, because a more intense emotional relationship is needed with another human being, i.e. philosophically (or even theologically) understood love. Only then cultural differences cease to divide, when the *personalist norm* applies (May, 2007). It "in its negative aspect, states that the person is the kind of good which does not admit of use and cannot be treated as an object of use and as such the means to an end. In its positive form the *personalist norm* confirms this: 'the person is a good towards which the only proper and adequate attitude is love' " (Wojtyla, 1981, ch. I.1.6). Unfortunately, the *personalist norm* has not an universal culture extent. Its references can be found most often in the local range only: family, tribal groups or sometimes national groups.

So, how should education to safety look like to ensure the safety of the individual and groups in the culturally different environment? According to the first two of the five points the cultural education is necessary. Next, since not in all cultures the universality of the *personalist norm* is recognized, the other three conditions of intercultural dialogue could be attempted to be implemented by instilling a norm which is complementary to philosophically understood love, namely to educate to make yourself responsible for yourself and others.

The ethical norm of responsibility is, however, a concept that causes philosophical problems (Ingarden, 1983; Jonas, 1984; Picht, 1998). One of the most important is the relationship of responsibility to subjectivity. Emmanuel Levinas pointed to the basic difficulty in this respect and claimed that subjectivity is not ontical (Levinas, 1991; Levinas, 1993). The subjectivity is more primordial than responsibility. The basis of philosophical anthropology in the form of a hylemorphic being is not insufficient to define subjectivity on the basis of ethics. In Aristotle's ethics, every human act requires the temperance measured by responsibility for the effects of the act. Apparently the responsibility for the *Other* is evident in the important Aristotelian virtue of courage (bravery) (Aristotle, 2009, book III). The indifference and sensitivity to the *Other* determine the responsibility for him and precede the presence of the *Other* in the act of every human being consciousness as well as the decision-making. In this light, the origin of responsibility for the *Other* takes on a transcendental character, which, for example, has a theological dimension in the *personalist norm*.

Nevertheless, this over-philosophical subjectivity which determines responsibility for the *Other* is shaped in the process of education by inculcating ethical standards in a manner close to that proposed by contemporary personalists (Marcel, 1949; Maritain, 1951; Mounier, *Personalism*, 2010; Wojtyla, 2007, ch. III; Wojtyla, 1979, part 3 ch. IV.5-7; Speamann, 2006). Therefore, education for safety should include such moral education, which primarily makes sensitive to the *Other* in such a way as if he was a guarantor of personal identity. Finding patterns of such education in different cultures is a weighty task of modern times. Only then it will be possible to create a dialogue of cultures and increase the level of personal safety of every human being.

PERSONAL SAFETY IN THE FACE OF THE CYBORGIZATION OF THE HUMAN BEING AND THE TECHNOLOGIZATION OF LIFE ENVIRONMENT

The soft threats of personal safety, that come from the collision of different cultures, occurred in different human societies, within thousands of years. The new soft threats, however, appear in the contemporary, more and more technologically advanced world. Developing dynamically connected technologies of genetics, robotics, informational science and nanophysics (GRIN) together with the accompanying development of transhumanism ideology (Manzocco, 2019; Grabińska, 2018; Grabińska, 2019) determine a new field of global responsibility ethics. In order for this development to strengthen and not to lower the level of personal safety (as well as structural security) such an education is needed which would bring closer both the positive and negative effects of the increasingly widespread human bionisation and the progressive technologization of social relations. The development of new technologies brings two serious threats.

First of all, the development of GRIN technology is stimulated by the need for fast commercialization of new achievements. The commercialization which is not subordinated to ethical valuation can bring undesirable effects of cultural eradication, the de-naturalisation of the human body function, and the making technical interpersonal contacts. This process threatens with a progressive loss of subjectivity, understood in personalist way or as by Levinas.

Secondly, the ideology of transhumanism accompanying the development of GRIN technology introduces the universal relativization of norms. The species norm of the organism, including the human one, is undermined in the direction of the rapid evolution of the bionic and cyborg transhuman to the ideal of the supernatural being, i.e. the posthuman (Ferrando, 2019; Cecchetto, 2013). Since biological norm itself is questioned, the more over cultural subjectivity as well as the cultural identity of the transhuman are questioned. Ethical norms cease to have any meaning now (Bostrom, 2005; Clarke et al., 2016), not only because they are replaced by technical standards, but because the posthuman is to become not only mentally but also physically an element of the global information network self-optimizing as a whole and in its individual fragments.

To prevent the implementation of catastrophic scenarios it is necessary to preserve the subjectivity in the increasingly common coupling of man with the device of technology. Then, according to Levinas' message, the dissemination of new technologies will be marked by responsibility for the personal safety and structural security of the global community.

IN THE SUMMARY – THE ANSWER TO THE TITLE QUESTION

The modern world is subject to two parallel and mutually stimulating processes, i.e. globalization and technologization (Schultz, 2010). The course and consequences of them should be considered together. If globalization were consistently harmonize the living conditions of individual populations, while maintaining only the current level of technology participation in the life of a particular man and community, the personal and social security would pose serious challenges such as those concerning the intercultural dialogue and the preservation of cultural identities or personal subjectivity in the present virtual world.

Uniforming the culture, as shaped in the network, transforming the process of cognition into the process of gathering information and manipulating of it, making the interpersonal relations more and more not real, appearing a new type of dependence on participation in the virtual world are just some of the already now visible problems. The manner and scope of their solutions translate into ensuring of personal safety (e.g. subjectivity, cultural identity, versatility of social communication, mental and physical health) and structural security (e.g. protection of human rights in the form of legal regulations in cyberspace, protection of diversity cultural heritage – especially intangible, responsibility for the decision-making and the independence of individual communities, protection of life and tangible structure).

The rapid development of GRIN technology and the ongoing process of virtualizing the relationship of man with the human environment and tangible and intangible infrastructure already requires shaping appropriate attitudes of existence in cyberspace. Not only military threats with the use of new technologies are real, but also non-military threats aimed at enslaving human consciousness with sophisticated information transfer in virtual space. This is not only the impact of traditional propaganda on consciousness, but the seemingly interactive creation of one's own subjectivity, soon being amplified by a remote influence on the nervous system. To prevent the new enslavement it is necessary to shape the system of values, and thus the foundations of ethics. If you appeal to Levinas, it is necessary to protect human subjectivity, and this should first and foremost be the goal of the ethics of responsibility in education for security.

The structural security is determined by an objective state of tangible and non-intangible devices that protect both individual human beings and whole populations, not only human, but also the environment of animate and inanimate nature. If the protection is to have a global scope, then the need for comprehensive education in the use of technologies and trends in technology development arises. However, learning how to handle procedures in a technologized environment can only help in the efficient operation of the products of technology. It is not enough, however, to protect human subjectivity in an ever closer coupling of man with a technical device, up to the ideal of human-machine interface (HMI). The creation and use of technology only then will serve the man when he makes the effort to create standards of behavior in a new environment, protecting subjectivity and its rich cultural dimension. This task can be performed as part of the ethics of responsibility as in the Levinas' proposal or in personalist ethics based on the *personalist norm* (Strhan, 2012; Brooks, 2018).

REFERENCES

- Aristotle. (2009). *Nicomachean Ethics*. Oxford: Oxford Univ. Press.
- Bostrom, N. (2005). Transhumanist Values. *Review of Contemporary Philosophy*, 4(1-2), 87-101.
- Bourdieu, P. (1984). *Distinction. A Social Critique of the Judgment of Taste*. Cambridge, MA: Harvard Univ. Press.
- Brooks, D. (2018). *Personalism: The Philosophy We Need*. Retrived from <https://www.nytimes.com/.../personalism-philosophy-collectivism-fragmentation.htm>
- Cecchetto, D. (2013). *Humanesis. Sound and Technological Posthumanism*, Minneapolis/London: Univ. of Minnesota Press.
- Chopra, A. (2014). Structural Violence. *International Journal of Multidisciplinary Approach & Studies*, 1(4), 19–23.
- Clarke, S., Savulescu, J., Coady, T., Giubilini, A., & Sanyal, S. (Eds.). (2016). *The Ethics of Human Enhancement: Understanding the Debate*. Oxford: Oxford Univ. Press.
- Ferrando, F. (2019). *Philosophical Posthumanism*. London/New York/Oxford/New Delhi/Sydney: Bloomsbury Academic.
- Galtung, J. (1969). Violence, Peace, and Peace Research. *Journal of Peace Research*, 6(3), 167–191.
- Grabińska, T. (2016). Personal Safety in the Light of Transhumanistic Ideology. *Security Dimensions. International & National Studies*, 19, 76-90.
- Grabińska, T. (2018). *Bezpieczeństwo osoby i wspólnoty. Ochrona bytu osobowego w obliczu ideologii i praktyki transhumanizmu*. Wrocław: Wydaw. AWL.
- Grabińska, T. (2019). *Bezpieczeństwo personalne: Koncepcja trzech warstw*, Wrocław: Wydaw. AWL.
- Horney, K. (1937). *Neurotic Personality of Our Time*. New York: Norton Comp.

- Human Security Centre. (2006). *Human Security Report 2005: War and Peace in the 21st Century*. New York/Oxford: Oxford Univ. Press.
- Human Security Report Project. (2010). *Human Security Report 2009/2010: The Causes of Peace and the Shrinking Costs of War*. Oxford: Oxford Univ.
- Ingarden, R. (1983). *Man and Value*, Muenchen: Philosophia Verlag.
- Jonas, H. (1984). *The imperative of responsibility: In search of an ethics for the technological age*, Chicago/London, The Univ. of Chicago Press.
- Kroeber, A. L. (1948). *Anthropology*, New York: Harcourt, Brace and Comp.
- Levinas, E. (1991). *Otherwise than Being or Beyond Essence*, Dordrecht/Boston/London: Kluwer Academic Publ.
- Levinas, E. (1993). *Outside the Subject*. Stanford, CA: Stanford Univ. Press.
- Manzocco, R. (2019). *Transhumanism – Engineering the Human Condition. History, Philosophy and Current Status*, Cham: Springer Nature Switzerland AG.
- Marcel, G. (1949). *Being and Having*. Westminter, UK: Dacre Press.
- Maritain, J. (1951). *Neuf leçons sur les notions premières de la philosophie morale*. Paris: Pierre Téqui.
- May, W. E. (2007). *Karol Wojtyla's „Love and Responsibility”: A Summary*. Retrieved from www.christendom-awake.org/pages/may/summaryoftl&r.htm
- Mounier, E. (2010). *Personalism*. New York: Routledge & Kegan Paul Ltd.
- National Research Council of the National Academies. (2014). *Convergence: Fasciliating Transdyscyplinary Integration of Life Science, Physical Science, Engineering, and Beyond*. Washington, DC: The National Academic Press.
- Picht, G. (1998). The concept of responsibility. *Religion*, 28(2), 185–203.
- Schultz, R. A. (2010). *Information Technology and Ethics of Globalization: Transnational Issues and Implications*, Hershey/New York: International Science Reference.
- Strhan, A. (2012). *Levinas, Subjectivity, Education: Towards an Ethics of Radical Reponsibility*. Malden MA/ Chichester/Oxford: Willey-Blackwell.
- Speamann, R. (2006). *Persons. The Difference between ‘Someone’ and ‘Something’* New York/Oxford: Oxford Univ. Press.
- United Nations Development Programme. (1994). *Human Development Report 1994*, New York/Oxford: Oxford Univ. Press.
- Wojtyla, K. (1979). *The Acting Person*. Dordrecht/Boston/London: D. Reidel Publ. Comp.
- Wojtyla, K. (1981). *Love and Responsibility*, London: Collins.

THE EFFECT OF BLOCK-BASED PROGRAMMING ON THE COMPUTATIONAL THINKING SKILLS OF MIDDLE SCHOOL STUDENTS

Mustafa Serkan GÜNBATAR

Department of Computer Education & Instructional Technology

Van Yüzüncü Yıl University , Turkey

mustafaserken@yyu.edu.tr

Bariş TURAN

Information Technology Teacher, Turkish Ministry of Education, Turkey

baris.turan.2276@gmail.com

ABSTRACT

The aim of the study was to determine the effect of the programming instruction process carried out by using mBlock programming tool on the students' computational thinking skills. The study design was one group pre-test-post-test experimental design. Study group was consisted of 82 students enrolled to a secondary school in Edremit district of Van province / Turkey. 39 of the participants were female and 43 of them were male. Participants were 6th grade students in three different classes. Instruction process was leaded in 2017-2018 academic year. MBlock tool was used in computer programming instruction process. Teaching sessions were two hours per week, 12 weeks in total. In the instruction process *concepts of software, the problem concept, algorithm concept, algorithm steps belonging to a problem, geometrical shapes in the flow chart, mBlock characters, events & control blocks, coordinate axis & scene section, perception blocks, operator blocks, and variable concepts* were handled respectively. Exercises about these subjects were done. Data were collected by Computational Thinking Levels Scale (CTLTS) developed by Korkmaz, Çakır & Özden (2015). CTLTS has five sub-dimensions, namely, Creativity, Algorithmic thinking, Collaboration, Critical thinking, and Problem solving. The collected data were corresponding to the normal distribution. The data were analyzed through paired samples t tests. According to the findings, post-test scores of the CTLTS were statistically higher than the pre-test scores. In addition to this, all scores for sub dimensions statistically differ in favor of post-tests except problem solving dimension. In other words, the development of higher order thinking skills such as computational thinking can be provided with programming courses where block based tools used. In 2018, Problem Solving and Programming Unit were added to Information Technology and Software curriculum in 5th and 6th grades in Turkey. In the lights of the findings, it seems that the decision taken by Turkish Ministry of Education is correct.

Keywords: computational thinking, block based programming, middle school students.

INTRODUCTION

Contemporary technological developments are used by all areas. These technologies make life easier. In addition to this, it is expected that Information and Communication Technologies (ICT) have a potential to improve higher order thinking skills (Korkmaz & Altun, 2014). At this point first higher order thinking skill that comes to mind is Computational Thinking (CT). "CT is the thought processes involved in formulating problems and their solutions so that the solutions are represented in a form that can be effectively carried out by an information processing agent" (Wing, 2011). There are some methods to bring higher order thinking skills to people via technology. One of them is orienting individuals' computer programming. Thus, they use various technologies, develop projects and products (Akpınar & Altun, 2014; Çakıroğlu, Sarı, & Akkan, 2011).

After discourses about computer programming by celebrity people, worldwide projects have been started. New projects have started concerning integration of computer programming to education systems. Private sector administrators also support this progress (Numanoğlu & Keser, 2017). Turkish Ministry of Education (MoE) also followed this process. In 2018, Problem Solving and Programming Unit has been added to Information Technology and Software curriculum in 5th and 6th grades in Turkey (MoE, 2018). With the aim of make popular and teach computer programming some programming languages, implementation software and virtual platforms have been emerged. Within the scope of Information Technology and Software curriculum usually free tools are used. Blockly, AppInventor, Alice, Code Org and mBlock, Scratch and KoduLab are some examples for these platforms. MBlock, a block based programming tool, consists of robotic platforms (e.g., Mbot, MegaPi and Arduino) and Scratch 2.0. Scratch has graphical interface and it is a visual programming language. mBlock has an easy programming property. Via mBlock, we can program robots, produce with Arduino or Mbot and we do not need cable connection. Thus, robots can be programmed with various ways. With the graphical interface property we can develop interactive applications (e.g., animations, games, stories) (Numanoğlu & Keser, 2017). mBlock is an open source tool. We can use it for programming circuit boards which is based on Arduino. Additionally, we can

use it with other Arduino compatible boards. Manufacturer Company stated that they will provide support for new platforms (Makeblock, 2017). New versions of mBlock are based on Windows, MAC, Linux, and Ipad. They support 20 languages and one of them is Turkish. It works independently and do not need additional application. It supports wireless communication protocols. Those are the reasons show why mBlock's range of use is wide.

To examine the effect of programming instruction leaded with mBlock in a certain period of time, on higher order thinking skills (e.g. Computational thinking) is important. Thus, programming instructors could observe the results and contribute to the literature about its effect.

THE STUDY

For Information Technology and Software course, coding has an important position. In the study, we aimed to determine the effect of mBlock based instruction on middle school students' Computational thinking skills. The study group consisted of 82 students enrolled to a secondary school in Edremit district of Van province / Turkey. Participants were 6th grade students in three different classes. Teaching activities were conducted in the 2017-2018 academic year. One sample pretest-posttest experimental design was used. In the one sample pretest-posttest experimental design, the effect of the experimental process was determined with the study of one group. In the design, the differences between participants' pre-test and post-test scores were considered (Büyükoztürk et al., 2009).

The computational thinking levels scale (CTLS) was used as a measurement tool. CTLS was developed by Korkmaz, Çakır & Özden (2015). CTLS has five sub-dimensions. Creativity, Algorithmic thinking, Collaboration, Critical thinking, and Problem solving are the names of sub-dimensions. Creativity has 4 items; Algorithmic thinking has 4 items; Collaboration has 4 items; Critical thinking has 4 items; Problem solving has 6 items, and CTLS has 22 items in total. Cronbach alpha reliability coefficient is 0.640 for Creativity, 0.762 for Algorithmic thinking, 0.811 for Cooperativity, 0.714 for Critical thinking and 0.867 for Problem solving. Cronbach alpha reliability coefficient is 0.809 for whole scale. Scales goodness of fit indexes are as [$\chi^2_{(d=195, N=241)}= 448.11628$, $p<0.01$, $CMIN/DF=2.298$, $RMSEA= 0.074$, $S-RMR= 0.078$, $GFI= 0.89$, $AGFI= 0.84$, $CFI= 0.91$, $NNFI= 0.91$, $IFI= 0.90$]. MBlock tool was used in computer programming instruction process. The computational thinking skills were measured before and after the instruction process.

The participants received 24-class hour training that took 12 weeks (i.e., each week two-hour training was provided). In the first week, concepts of software and the problem concept were explained. Daily life problems presented and problem solving steps were showed. It was highlighted that, computers also apply commands step by step and solve problems.

In the second week, algorithm concept was explained. Algorithm steps, belonging to example problem, were shown. The use of geometrical shapes in the flow chart and their purposes were expressed. Flowchart representation of sample algorithms was explained. Finally, a problem situation was given. The participant students were asked to write algorithm steps for the solution of the problem given and prepare the flow chart.

In the third week, the students started to study with mBlock. Other characters (e.g., puppets etc) from Character tab were shown. Events and control blocks were introduced. The name application was made by using letters in the puppets. Students wrote their names with the help of puppets. They gave simple movements to their names with simple commands (e.g. magnify, minimize, increase color effect).

In the fourth week, coordinate axis and scene section were introduced. Puppets motion on the X Y location, direction concepts and various motion commands were introduced.

In the fifth week, students created some characters. They gave motion to the characters. Finally, they made some studies about the characters' appearance.

In the sixth week, aquarium application was shown to the students. Fish character and how to change the scene was shown. Then how to give motion to fish with motion block commands was shown. Finally, teacher asked the students to prepare an aquarium application themselves. In this week Events, Control, Motion and Appearance block commands were used by students actively.

In the seventh week, Perception block commands were introduced. Labyrinth application was made. Owing to this application all commands from all blocks were used.

In the eighth week, all commands learned earlier weeks, were remembered. Small samples were made about them. Pinball application was shown to the students. How to characters motion, what do they do when they touch each other and etc. was explained. Then students realized similar pinball application.

In the ninth week, operator block commands were shown. Small samples were made about it. With this commands a question bank was prepared. The question bank consisted of 5 questions. Teacher wanted to the students enlarge the question bank with different questions. In this exercise, the final question bank must consist of 15 questions.

In the tenth week, variable concept was introduced. Variable block commands were shown. Teacher asked students to make a fish catch application. Within the scope of this application scores must be shown to the users. The scores must be saved in some variables.

In the eleventh week, pen object commands were shown. Small samples were made the commands. Then teacher asked the students to make a mBlock application that draws geometric shapes.

In the twelfth week, code blocks, are subject of earlier weeks, were recalled again. Teacher asked questions about them and students answered. A prepared table hockey application was presented as an example. Helpful questions were asked to the students for building the game's algorithm. With the answers, students could build the algorithm. Further, students created their games in collaborative learning environment.

FINDINGS

The paired samples t-test was used to analyze research data. 0.05 significance level was accepted in the interpretation of the results. Table 1 shows the comparison of CT scores before and after the instruction process of the students.

Table 1: t-test results for CTLS pre-test post-test scores

Measurement	N	\bar{x}	Sd	df	t	p
Pre-test	82	2.01	0.40894	81	-10.323	0.000*
Post-test	82	2.59	0.57299			

*p<0.01

When the Table 1 is examined, it is seen that there is a significant difference between CTLS' pre-test post-test scores ($t_{(81)}=-10.323$, $p<0.05$). According to the mean values, it is seen that the mean score of post-test is higher than that of pre-test. With this result, we can say mBlock based instruction process has a positive effect on students' computational thinking skills.

Table 2 below presents the details of the changes in Creativity sub-dimension scores of the CTLS before and after the instruction process.

Table 2: t-test results for CTLS creativity sub-dimension

Measurement	N	\bar{x}	Sd	df	t	p
Pre-test	82	2.17	0.805	81	-6.223	0.000*
Post-test	82	2.77	0.873			

*p<0.01

According to Table 2, there is a significant difference between the pre-test and post-test scores of the creativity sub-dimension of the CTLS ($t_{(81)}=-6.223$, $p<0.05$). Considering the change in mean values, it is concluded that mBlock programming tool has a positive effect on students' creativity skills within the scope of 6th grade information technologies and software course.

Table 3 below presents comparisons of the change in the Algorithmic thinking sub-dimension of the CTLS before and after the instruction process.

Table 3: t-test results for CTLS algorithmic thinking sub-dimension

Measurement	N	\bar{x}	Sd	df	t	p
Pre-test	82	1.65	0.702	81	-9.051	0.000*
Post-test	82	2.51	0.747			

*p<0.01

According to Table 3, there is a significant difference between the pre-test and post-test scores of the algorithmic thinking sub-dimension of the CTLS ($t_{(81)}=-9.051$, $p<0.05$). Considering the change in mean values, it is concluded

that mBlock programming tool has a positive effect on students' algorithmic thinking skills within the scope of 6th grade information technologies and software course.

Table 4 below presents comparisons of the change in the Cooperativity sub-dimension of the CTLS before and after the instruction process.

Table 4: t-test results for CTLS cooperativity sub-dimension

Measurement	N	\bar{x}	Sd	df	t	p
Pre-test	82	1.96	0.846	81	-8.037	0.000*
Post-test	82	2.83	0.766			

*p<0.01

According to Table 4, there is a significant difference between the pre-test and post-test scores of the cooperativity sub-dimension of the CTLS ($t_{(81)}=-8.037$, $p<0.05$). Considering the change in mean values, it is concluded that mBlock programming tool has a positive effect on students' cooperativity skills within the scope of 6th grade information technologies and software course.

Table 5 below presents comparisons of the change in the Critical thinking sub-dimension of the CTLS before and after the instruction process.

Table 5: t-test results for CTLS critical thinking sub-dimension

Measurement	N	\bar{x}	Sd	df	t	p
Pre-test	82	1.68	0.665	81	-7.725	0.000*
Post-test	82	2.45	0.762			

*p<0.01

According to Table 5, there is a significant difference between the pre-test and post-test scores of the critical thinking sub-dimension of the CTLS ($t_{(81)}=-7.725$, $p<0.05$). Considering the change in mean values, it is concluded that mBlock programming tool has a positive effect on students' critical thinking skills within the scope of 6th grade information technologies and software course.

Table 6 below presents comparisons of the change in the Problem-solving sub-dimension of the CTLS before and after the instruction process.

Table 6: t-test results for CTLS problem solving sub-dimension

Measurement	N	\bar{x}	Sd	df	t	p
Pre-test	82	2.38	0.638	81	-0.778	0.439
Post-test	82	2.46	0.826			

According to Table 6, there is no significant difference between the pre-test and post-test scores of the problem solving sub-dimension of the CTLS ($t_{(81)}=-0.778$, $p>0.05$). MBlock tool based instructional process did not contribute significant effect to the problem solving skills of the students.

CONCLUSIONS

The aim of the study was to examine the possible effect of mBlock based instruction to middle school 6th grade students' Computational thinking skills. According to the results obtained, a significant difference has occurred in the students' computational thinking skills. According to this result, it can be said that it is useful to perform computer programming instruction in middle school with block based and graphical interface tools like mBlock. At the same time, it is seen that the mean scores of creativity, algorithmic thinking, cooperativity, and critical thinking sub-dimensions of the CTLS increased significantly from pre to post-test.

According to the findings of the study, cooperativity and algorithmic thinking sub-dimensions of the CTLS have the highest mean values and they have significant difference from pre to post test. Pre-test mean values of cooperativity sub-dimension was $\bar{x}=1.96$; post-test average measurements of cooperativity sub-dimension was $\bar{x}=2.83$. Similarly, in the study of Korkmaz et al. (2015) with university students, the highest score was observed in the cooperativity sub-dimension. For the critical thinking dimension, while the pre-test mean score was $\bar{x}=1.68$, the post-test mean score was $\bar{x}=2.45$. This result shows that mBlock programming tool positively affects students'

critical thinking skills. Critical thinking is an important output of the National education system. Additionally, it is important for information literacy (MoE, 2005). At the end of the instructional process, there was no significant change in the problem solving sub-dimension of the CTLS, while all sub-dimensions of CTLS were improved. This result may suggest that 24-hour training may not be sufficient to develop problem-solving skill. In the future studies, it may be useful to give longer training to participants and pay specific attention to that sub-dimension. Finally, the results of this study are limited to 82 students who were 6th grade in Edremit district of Van. In the future studies, similar research should be conducted with larger groups in different parts of Turkey. In doing so, clearer and richer results will inform the literature.

REFERENCES

- Akpınar, Y. ve Altun, Y. (2014). Bilgi toplumu okullarında programlama eğitimi gereksinimi. *İlköğretim Online*, 13 (1), 1-4.
- Büyüköztürk, S., Çakmak, E. K., Akgün, Ö. E., Karadeniz, S., ve Demirel, F. (2009). *Bilimsel Araştırma Yöntemleri* (3. baskı). Ankara: Pegem Akademi.
- Çakıroğlu, Ü., Sarı, E., & Akkan, Y. (2011, September). The view of the teachers about the contribution of teaching programming to the gifted students in the problem solving. *5th International Computer & Instructional Technologies Symposium*. Elazığ/Turkey.
- Korkmaz, Ö., Çakır, R., & Özden, M. Y. (2015). Computational thinking levels scale (CTLS) adaptation for secondary school level. *Gazi Journal of Educational Science*, 1(2), 67-86.
- Korkmaz, Ö., Çakır, R., Özden, M. Y., Oluk, A., & Sarıoğlu, S. (2015). Investigation of individuals' computational thinking skills in terms of different variables. *Ondokuz Mayıs University Journal of Faculty of Education*, 34(2), 68-87.
- Makeblock (2017). *mBot V1.1-Blue (2.4G Version)*. Date of access: 13.01.2018. Retrieved from: <http://www.makeblock.com/mbot-v1-1-stem-educational-robot-kit>
- Ministry of Education [MoE]. (2015). *Milli Eğitim İstatistikleri, Örgün Eğitim*. Ankara: Yayınlar Dairesi Başkanlığı.
- Ministry of Education [MoE] (2018). *Bilişim teknolojileri ve yazılım dersi öğretim programı (5. ve 6. sınıflar)*. Date of access: 27.05.2019. Retrieved from: <http://mufredat.meb.gov.tr/Dosyalar/2018124103559587-Bili%C5%9Fim%20Teknolojileri%20ve%20Yaz%C4%B1%C4%B1m%205-6.%20S%C4%B1n%C4%B1flar.pdf>
- Numanoğlu, M., & Keser, H. (2017). Robot Usage in Programming Teaching - Mbot Example. *Bartın University Journal of Faculty of Education*, 6(2), 497.
- Wing, J. (2011). Research notebook: Computational thinking—What and why? The magazine of the Carnegie Mellon University School of Computer Science. The Link Magazine, Spring. Carnegie Mellon University, Pittsburgh. Date of access: 14.04.2019. Retrieved from <http://people.cs.vt.edu/~kafura/CS6604/Papers/CT-What-And-Why.pdf>.

THE IMPACT OF THE HUMAN FOUR DIMENSIONS ON STUDENTS' LIFE

Belahmer Zakia

Communication and Language Department, ENSIAS, University Mohammed V .Rabat .Morocco

belahmerzakia@gmail.com;z.belahmer@um5s.net.ma

ABSTRACT

We are always thinking of having new version of computer;mobile phone;sport wears;cars,houses....but we never think of having a new version of ourselves.It 's very necessary to undersatnd the four human dimensions of our students and to help them to discover which dimension do they have to improve in order to achieve their well being ,which will help them to be successful in their studies , in their life and achieve easily their target and realise their personal and professional projects.This a new way of teaching and making students to think outside the box.

This paper is a kind of analysis of the different strategies and techniques adopted with a new methodology of work in my classroom with a group of students who belong to ENSIAS ,a college of enginners on computer science.the analysis consisted on creating a kind of self awarness for each student by pushing him to discover which of the four dimensions did he neglect ;is it the emotional ,the mental one ;the spiritual one or the physical one.The student can't be performant and proactive if he doesn't make an equilibrium among the four dimensions.Hence the student has a new version of himself.

Keywords :New version ; four dimensions; spiritual,emotional,comportemental,physical,confort zone,soft skills,renewal,balance human conditions

INTRODUCTION

The well being of each human being and espescially students is greatly related and linked to the equilibruim of the four dimension of one's life ;because if we neglect one dimension it may affect the others dimensions and leads to Unbearable consequences that may disturb the good way of living and the social integration of the student .They are independent dimensions as all of them are essential to the fulfillement and the development of the well being of the human _The physical being involves knowledge and different skills related to health ,the body,the strength...The mental dimension is related to all skills needed for developing memory ,having critical thinking ,sense of analysis of evaluation ,metacognition ;creativity and problem-solving capacity.Emotional dimension is related to the ability to understand one's emotions ,to manage emotions,to self-evaluate ,to be empathetic and to increase self-efficacy Developing the spiritual being is shaving an inner peace with oneself and with the others ;this dimension creates an atmosphere of energy and a kind of connection to something greater by praying and practicing meditation.

This methodology process pushes the student to upgrade himself to be a better version of himself and make him aware that once everything is getting better around him he could get better too .By making clear that we are our worst ennemy ;hence some of us are self- destructive without realizing it and others are aware of the phenomenon but the lack of self-awareness ,tools and knowledge can be hundles to improve one's self_



LITERATURE REVIEW

To be a better version of oneself here are some quotes of some important authors that define human dimension and motivation “a lifestyle and a personalized approach to living life in a way that... allows you to become the

best kind of person that your potentials, circumstances, and fate will allow” [1] (1. 8)” Dimensions of Wellness Self regulations” It allows *us to* act in our short- and long-term best interests, consistent with our deepest values . [2] (6. Stosny S) There’s just one limitation: self-regulation requires mental energy, and the brain is always looking for ways to conserve energy (i.e., save effort) (7,8).. [3]” According to Goleman (1997) there are many paths to success in life, and many areas where other skills are rewarded. Emotional intelligence provides advantages in a complex society .In fact, and according to this author, it is important to understand the terms of motivation and work habits. [4] Stephen R. Covey said “But until a person can say deeply and honestly, "I am what I am today because of the choices I made yesterday," that person cannot say, "I choose otherwise.” As it is known students come from different environment and varied cultures so it ‘s not easy to convince all of them in the same way by adopting a similar behavior and identical methodology” [5] According to Nelson Laird et Al “... a single survey instrument spanning all disciplines is problematic when there is evidence that teaching and learning vary across disciplines. . The effects of discipline on deep approaches to student learning and college outcomes. Research in Higher Education, [6](49: 469–94 For example, how is the number of assigned readings or length of written assignments, both items in the academic challenge scale, relevant to a design or mathematics student? This problem has led to claims that mathematics and science students are less engaged [7]((Ahlfeldt, Sellnow; Ahlfeldt, S., Mehta, S. T. 2005.” Measurement and analysis of student engagement in university classes where varying levels of methods of instruction are in use. Higher Education, While others have argued that engagement is qualitatively different across disciplines”, [8]((Brint, Cantwell and Hanneman 2008 Brint, S., Cantwell, A. and Hanneman, R. 2008.” ..; engagement is both dynamic and situational behavior . (Bryson, Cooper, and Hardy 2010 Bryson, C., Cooper, G. and Hardy,.” [9]. Stephen Covey “Despite these issues, the psychological perspective has much to recommend it. Psychology in the past has tended to treat feeling and thinking as if they were entirely separate processes, but is more inclined now to see them as ‘inseparable, interwoven dimensions of human social life’ (Forgas 2000 Forgas, J. P. 2000). Feeling and thinking: The role of affect in social cognition, Edited by: Forgas, J. P. Cambridge: Cambridge University Press., [10]. Viewing student engagement as multi-dimensional recognizes this and enables a rich understanding of the individual's experience Fredricks, J.A., Blumenfeld, P. and Paris, A. 2004. School engagement: Potential of the concept, state of the evidence. Review of Educational Research, 74: 59–109.. “The final, and most important, benefit of the psychological perspective is that it does not conflate the state of being engaged with its antecedents or its consequences, a problem that is rife in other perspectives. However, in positioning engagement so clearly within the individual, there is a danger of downplaying the critical importance of the situation. Engagement is fundamentally situational – it arises from the interplay of context and individual.” [11] “First, the student emotions are the points of intersection between the university factors such as courses design and student variables such as motivation and background. Second ,the flow of influence between emotions, engagement, and learning reciprocal and complex and can spiral upwards towards ideal engagement or downwards towards disengagement and withdrawal. Pages 481-497

THE STUDY:

According to Stephen Covey [12] “Sow a thought, reap an action; sow an action, reap a habit; sow a habit, reap a character; sow a character, reap a destiny.” The most important habits that Steven Covey believes on and insists on adopting in order to reach wellness, peace, success, self-realisation and self-confirmation . Here are the key insights from The 7 Habits of Highly Effective People : list of the seven habit that all students have to follow to become a better version of himself, to go out of his zone of confort and accept the change.

- “Habit 1: Sharpen the Saw
- Habit 2: Be Proactive
- Habit 3: Begin with the End in Mind
- Habit 4: Put First Things First
- Habit 5: Think Win/Win
- Habit 6: Seek First to Understand, Then to Be Understood
- Habit 7: Synergize”

[13]” 1. Sharpen the saw. Don’t work yourself to death. Strive for a sustainable lifestyle that affords you time to recuperate, recharge and be effective in the long-term.

2. Be proactive. You have a natural need to wield influence on the world around you so don’t spend your time just reacting to external events and circumstances. Take charge and assume responsibility for your life.

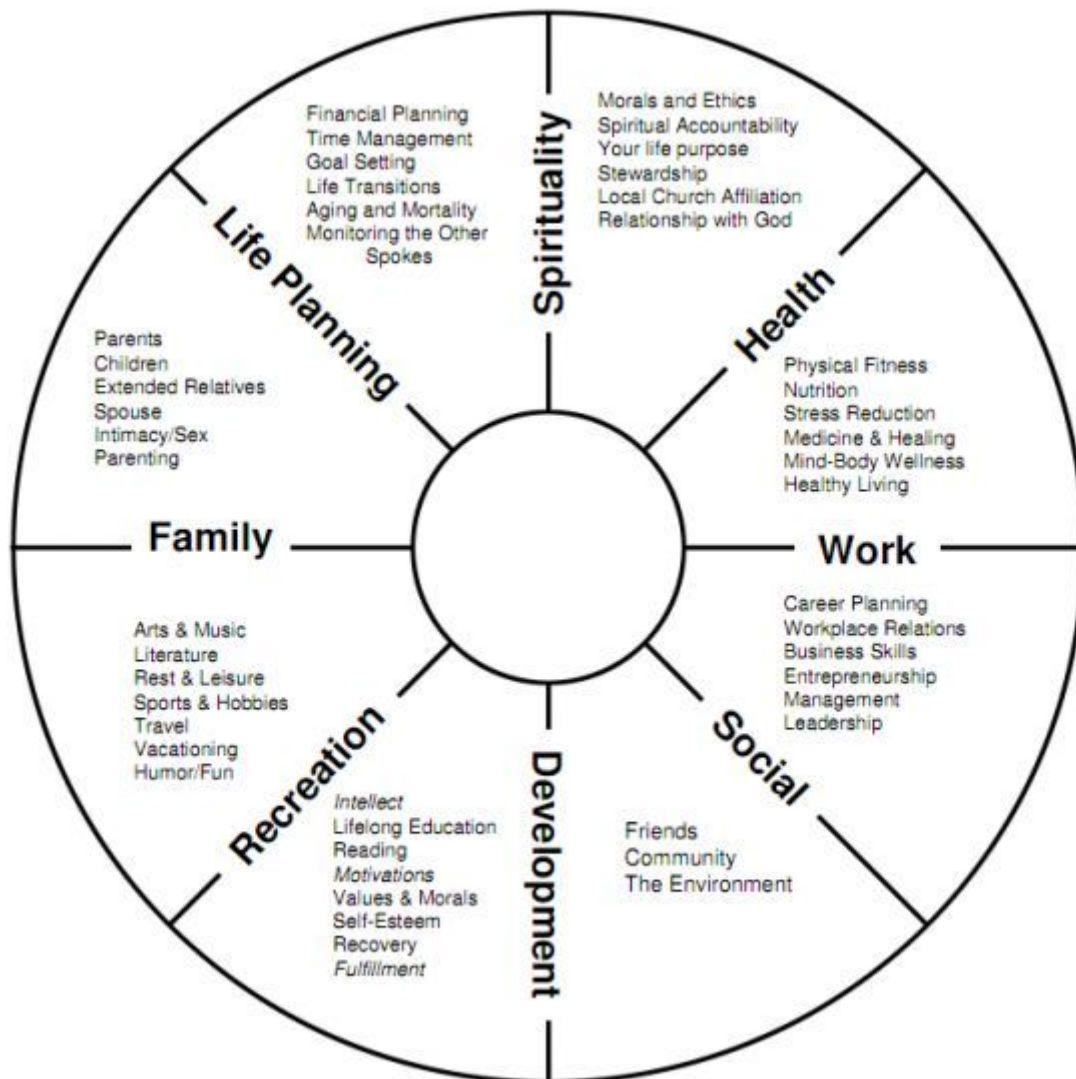
3. Begin with an end in mind. Don’t spend your life working aimlessly, tackling whatever job is at hand. Have a vision for the future and align your actions accordingly to make it into a reality.

4. Put first things first. To prioritize your work, focus on what’s important, meaning the things that bring you closer to your vision of the future. Don’t get distracted by urgent but unimportant tasks.

5. Think win-win. When negotiating with other, don't try to get the biggest slice of the cake, but rather find a division that is acceptable to all parties. You will still get your fair share, and build strong positive relationships in the process.
6. Seek first to understand, then to be understood. When someone presents us with a problem, we often jump right to giving a solution. This is a mistake. We should first take time to really listen to the other person and only then make recommendations.
7. Synergize. Adopt the guiding principle that in a group, the contributions of many will far exceed those of any individual. This will help you achieve goals you could never have reached on your own".

To motivate students to work this experience and to carry on finding one's weak dimension we explain to the students that the human being is like a car it has four wheels that must be well bumped ,because if one of the wheels is flat tyre the car can't be driven and can't go or travel; so by this metaphor we try to explain to the students the importance of the four dimensions in order to get well organized life and reach his target happily and successfully

We used the following wheel as a first step to familiarize students with the activity and to discover their potential, the lack of motivation and the axes where there are some problems and to think how to solve it and when to start and how long. Once the student discovers the weak dimension he evaluates it ,thinks about the causes and reasons and tries to find solution .To achieve his target he signs a contract with himself where he approves the procedures to follow and draws a deadline to respect .



<https://www.google.com/search?q=the+wheel+of+life&tbm=isch&source=iu&ictx=1&fir=LeKo5WfEE>



The Four Human Dimensions

How to become a better version of yourself.

2nd year students had to read two books that are useful and interesting and they could adopt them as a guide line for this experience the books are “Liberer votre cerveau “ written by Driss Aberkane and ” The 7th Habits of successful people” written by Stephen Covey and later make introspection on themselves and discover which of the four dimensions needs to be upgraded and reinforced .Things that many students found it difficult to discover and also they were shy to share it with their classmate at the beginning and nine weeks to work on the chosen skill .One of the most difficult things to teach.

The working strategies (ENSIAS ‘Students) To discover the weak dimension ;to establish a way of working using agenda ,and present each week to the other students the working strategies and the target they achieved .They had seven weeks to try to find a way to go out of their zone of confort and to adopt a new style and strategies of living by improving the weak dimension .

The two and most important pillars of of the procedureds of the methodology adopted are as follow :

1. Make a list of activities that would help you renew yourself: along each of the 4 dimensions. The student selected one activity for each dimension and lists it as a goal for the coming week. At the end of the week, he evaluated his performance. What led him to succeed or fail to accomplish each goal?

2. Commit to writing down a specific “sharpen the saw” activity in all four dimensions every week, to do them, and to evaluate his performance and results.

FINDINGS

After seven weeks of negociation with oneself and personal introspection, self analysis; the department of communication and languages at ENSIAS (Ecole Nationale Supérieure d’Informatique et d’Analyses des Systèmes) has established different techniques of evaluation: a team evaluation and individual evaluation. » Out of 120 Students:

80 students were able in the first week to detect the poorest dimension and started to work on themselves by carrying an innovative process and stuggling to get out of their zone of confort ; And each week we had a clear feedback which reinforces their self-confidence and boosts them to carry on nurishing the specific dimension

28 students found diffculties to clarify one of the aspects of the choosen dimension as they couldn’t make up their minds which aspect to start with .But after long negociations with oneself they were able to work by priorities and go through the process of renewal..

12 students were surprised to find that they had to work on more than one dimension, things that disturbed them and couldn't let them make the right choice the first three weeks. But after few days of reflection and self-analysis they were able to share with the others the dimension they have finally chosen to improve in the beginning as the first target.

After seven weeks of discovery, self-renewal, adaptation and acceptance ;all the students attended a seminar on the fourth human dimension hold by experts in the field of personal development and coaching. During the second part of the seminar the students shared their experience with the audience and The most common point among all the students their self- awareness and readiness to go through the process of change by being willing to leave their zone of comfort

This experience was successful at both levels personal level and professional level.

Personal level: it has a great impact on the life of our students. They gain their self-confidence and where satisfied as they were able to be faithful to their engagement and respectful to the deadline and the contract they have signed within themselves . Hence they congratulated themselves and celebrated their victory with their classmates .

Professional level ; Students developed a sense of responsibility and creativity which will impact their future career , decision-making and professional insertion .

CONCLUSION

This experience was conducted with 2nd year students of school of computer science engineers, it can be extended at the level of the faculties and schools of the university in Rabat (Morocco). The students' feedback was positive and they were satisfied with the change in their behavior and thinking and they were convinced that.

"It is not the strongest or most intelligent who will survive but those who can best manage change." – Charles Darwin. All the students were ready to sharpen the saw that is becomes more perseverant and enhancing to the greatest asset of each one in order to get a balanced program for self- renewal in the four dimensions of the areas of life. Sharpening the Saw is to regularly engage in the exercise of the dimensions which make up the human condition: body, mind, emotion and spirit. To conclude this quotation has become all students' **Motto** "Every morning in Africa, a gazelle wakes up, it knows it must outrun the fastest lion or it will be killed. Every morning in Africa, a lion wakes up. It knows it must run faster than the slowest gazelle, or it will starve. It doesn't matter whether you're the lion or a gazelle-when the sun comes up, you'd better be running "

This teaching methodology has a great impact on students' personal behavior, professional and social insertion and allowed them to be more proactive; they moved from dependence and independence; develop team work and sense of collaboration.

REFERENCES

- [1] (1. 8) Dimensions of Wellness, (UMD) University of Maryland's Your Guide to Living Well. [Last accessed June 27, 2017]). Available from: <https://umwellness.wordpress.com/8-dimensions-of-wellness/>
- [2] (6. Stosny S. Self-Regulation: To feel better, focus on what is most important. [Last accessed June 27, 2017].) Available from: <https://www.psychologytoday.com/blog/anger-in-the-age-of-entitlement/201110/self-regulation>
- [3] Goleman D. (1997). Inteligência Emocional. Temas e Debates, Círculo de Leitores, Lisboa The 7 Habits of
- [4] Stephen R. Covey, The 7 Habits of Highly Effective People: Powerful Lessons in Personal Change Highly Effective People Quotes Showing 1-30 of 911
- [5] Nelson Laird, T., Shoup, R., Kuh, G. and Schwarz, M. 2008
- [6] (doi:10.1007/s11162-008-9088-5)[Crossref], [Web of Science®], [Google Scholar].
- [7] (Ahlfeldt, Mehta, and Sellnow 2005 Ahlfeldt, S., Mehta, S. and Sellnow, T. 2005
- [8] (Brint, Cantwell and Hanneman 2008 Brint, S., Cantwell, A. and Hanneman, R. 2008. . Research in Higher Education, 49: 383–402. (doi:10.1007/s11162-008-9090-y)[Crossref], [Web of Science®], [Google Scholar])
- [9] Stephen Covey" The 7th Habits of successful people" - Chip Heath Infographic published by Neil Beyersdorf linkedin.com/in/neilbeyersdorf.
- [10] Stephen Covey" The 7th Habits of successful people"
- [11] Pages 481-497 | Received 20 Aug 2013, Accepted 10 Oct 2013, Published online: 21 May 2014
- [12] Stephen Covey" The 7th Habits of successful people" [13] https://www.blinkist.com/magazine/posts/read-seven-habits-highly-effective-people-3-minutes?utm_source=cpp

THE IMPACT OF THE PHENOMENON OF IMMIGRATION IN POLAND ON CHANGES IN EDUCATION FOR SECURITY

Jacek Dworzecki, prof.
Military University of Land Forces, Wrocław, Poland
jacekdworzecki@o2.pl

Izabela Nowicka PhD, Prof. at MULF, Associate professor
Military University of Land Forces, Wrocław, Poland
ibiza.n@wp.pl

ABSTRACT:

This article concerns the problems mentioned in the title by analyzing the Polish education system for security, with the aim to answer the question whether it meets the expectations in a situation of migrant crisis and related dysfunctions. The issue forced the necessity to emphasize the problem area of the education system for security in Poland, contemporary threats including illegal migration and its impact on a rise in crime. The threats faced by a person require (from him/her) constant exploration and learning about how to act when they occur. We should not underestimate the risks that have not existed yet or existed a long time ago, as it is possible to prepare for them and thus to ensure the security for the general public, a group or an individual. Education in this field becomes a guarantee of the above. Scientific exploration of the problem area indicates the essence of human awareness of the consequences of risks. Currently, security education is provided at school by means of the projects undertaken by individual services, guards and the army, as well as by means of associations and non-governmental organizations. There are many activities for security education, but no education system for security, which will comprehensively cover all social groups in the Republic of Poland, is noticed. The migrant crisis which started in 2015 and was initiated by the Middle East conflicts, and then – the opening of borders by Germany for refugees fleeing from the acts of war in September 2015, has caused a mass influx of migrants to various EU countries. This situation has increased the observed level of cultural diversity and more clearly outlined the social challenges, also for education.

INTRODUCTION

The presentation of the subject matter indicated in the title requires a certain consistency in the presentation of issues concerning both the security education and the problem of migration. There is no doubt that it is necessary to refer to the development of the mechanisms that have contributed to the current, so-called migrant crisis in Europe.

Migration processes can be either controlled or uncontrolled. They can have both positive and negative impact on society. They can pose a threat in themselves and initiate dysfunctional phenomena as well. At the national level, the tool for controlling the migration process is its migration policy, provided that its solutions are updated in the face of new threats. The effectiveness of undertaken control activities of the migration process not only requires a constant diagnosis of the phenomenon, but also the activation of such preventive processes as e.g. education.

The current situation, which is referred to as the "migration crisis," is the result of a set of political, legal and social factors. It may be concluded that it is a result of the obligations adopted by the EU States. In 1990, the European Union adopted the Dublin Regulation as amended in 2003 and 2014. The provisions of the Regulation outlined the Member States' liability rules for conducting proceedings for the refugee status. Other obligations concerned, inter alia, the establishment of a common asylum system. Since 2001, a number of legal acts have been adopted imposing on Member States the obligation to adapt and unify asylum legislation, and to create equal standards for the reception of refugees throughout the Community. The directive, stipulating minimum standards (such as access to housing, health care and education) for the reception of asylum seekers that must be ensured in the EU Member States, has also been ratified.

However, the common asylum system does not imply uniformity. Therefore, there are still significant differences between the EU States – both in terms of the refugees' protection and the reception conditions. In 1991, the Council of Europe received the Report on "Stosunki między wspólnotami i międzyetniczne w Europie" (concerning the relations between communities and interethnic relations in Europe – translator's note), which proposed a set of actions aimed at neutralizing the potential risks arising from the non-European population growth in individual Community Members States. These included: development of a multicultural society, possible actions to implement integration programmes by the central and local governments of individual states, and suggestions to amend national legislation aimed at guaranting equal opportunities for immigrants and condemning all forms of discrimination. In addition, the Council Directive on the establishment of a general framework for equal treatment in employment and occupation (November 2000) was adopted, and, above all, the Council Decision laying down the Community Action Plan to Combat Discrimination for the period 2001-2006 and the Council Directive on the principle of equal treatment between persons irrespective of racial or ethnic origin (the so-called

Race Directive, June 2000). The latter document implements the principle of equal treatment between persons irrespective of racial or ethnic origin and includes, beyond the issues concerning the work situation, all other aspects of racial or ethnic discrimination. Another act to be highlighted is the Council Directive 2003/109/EC of 25 November 2003 concerning the status of third-country nationals who are long-term residents. According to its contents:

The EU Member States should continue to be subject to the obligation to give minors access to the education system under conditions similar to those set out for nationals of these Member States. (15) The concept of study grants in the field of vocational training does not cover measures financed under social assistance systems. In addition, the access to study grants may depend on whether the person applying for such a grant meets their own conditions for obtaining long-term resident status. When providing study grants, the Member States may take into account the fact that Union citizens may benefit from the same advantage in their country of origin.

STATISTICS

Statistical data shows that there are currently 25 million refugees in the world. In 2014, 216 054 people arrived in Europe via the Mediterranean Sea. The following year was special – as many as 1 015 078 refugees and immigrants arrived by this route. In the next following year that number decreased almost threefold to 362 753 people, whereas for the eleven months of 2017 only 157 767 people arrived. In total, 28 Member States of the European Union (with a population of more than 500 million people) have received 1.75 million refugees.

According to the reached agreements regarding the discussions of the European Council, the Member States will receive 60.000 refugees from Africa and the Middle East (40.000 refugees from Greece and Italy and 20.000 from refugee camps outside the Union) in total. However, it has been decided that the decision on how many people will be sent to each country are to be made on the basis of declarations by governments. Poland has announced that within two years it will receive 2 000 refugees – 1 100 people from Italy and Greece and 900 people from refugee camps located outside the EU (11 287 people calculated with the Juncker' algorithm). These are prognoses for the future.

Since 1992, Poland has started receiving refugees without any significant changes in their national structure (Mazuś, 2015, p.16). These are mainly arrivals from the Caucasus (Chechnya, Georgia), Ukraine and Belarus. There were two waves of the inflow of Georgians to Poland in 2009 and 2012. 2014, in turn, was characterized by the high level of arrivals from Ukraine. The number of arrivals of people from the Middle East (Iraq, Afghanistan, and especially Syria) was quite infinitesimal at that time, reaching at most several hundred people. This national structure is likely to change within 2 years.

In 2016, 4 502 applications for international protection were filed in the Republic of Poland. There were 12 321 persons covered by those applications, which is a number comparable to the previous year, when 12 325 persons applied for protection (4 927 applications). The largest group of persons applying for international protection were citizens of the Russian Federation – 8 994 persons (about 73% of the total number) in 2016. The second largest group of foreigners were Ukrainian nationals – 1 306 persons (about 11% of the total number). Furthermore, the most frequent applicants for international protection were Tajik nationals – 882 persons, Armenian nationals – 344 persons and Georgian nationals – 124 persons. The analysis of the above data shows that in 2016, in comparison to the previous year, the nationalities of foreigners applying for international protection in the Republic of Poland did not change. However, the percentage share of persons coming from the Russian Federation increased from about 65% to 73% of the total number, and the number of foreigners coming from Ukraine decreased – from about 19% to 11% of the total number. The number of foreigners coming from Tajikistan (541 persons in 2015) and Armenia (195 persons in 2015) has increased, whereas the number of Georgian nationals has decreased (394 persons in 2015). Last year, decisions were issued in cases involving 11 997 applicants for international protection in 2016 and earlier.

In the first half of 2017, 99 persons were granted refugee status in Poland. Another 183 persons were granted subsidiary protection. Negative decisions with a refusal of the residence were received by 1.3 thousand persons, and 1.6 thousand of the proceedings were discontinued. In Poland, international protection was granted mainly to nationals of Ukraine (170 persons), Russia (43), Syria (19), Tajikistan (11) and Belarus (5). According to the Office for Foreigners, 93% of the foreigners applying for the refugee status came from the former Soviet Union countries, mainly from Russia, Ukraine, Tajikistan, Kyrgyzstan, Armenia, Georgia and Belarus.

EDUCATION

The above statistics indicate that societies are and will be increasingly multicultural, creating a complex and diverse process of social interaction and social change. Education plays an important role in this respect. In the context of migration, education aimed at integration of immigrants into the society as well as security education, as a rule concerning Polish nationals, is important.

Given the above, as part of integration policy, equal opportunities for immigrants should be ensured. This is possible by removing legal barriers to education access, housing, work, health care, etc. and by combating discrimination, in particular by developing and implementing anti-discrimination legislation. The mere fact of the

possibility for equal opportunities does not, however, determine that it will be used. Depending on the individual approach, the immigrant can choose between acting in accordance with their values and dissociating themselves from their own values. It may be a compromise adoption of existing norms and values or their rejection, which may result in social marginalization in the new home country. The latter approach is also reflected in the phenomenon of migrant crime, which has undergone not only qualitative but also quantitative changes in recent years. This problem is compounded by the fact that Poland, as part of the modern world, cannot be alienated from a clash of civilizations. This is also due to the fact that the main factor conditioning this comparison is the phenomenon of intercultural migration, i.e. the growing number of immigrants belonging to other civilizations (Błaszczczyńska, 2010). Given that Poland coexists in the context of the so-called "Western civilization." The fear of a 'cultural route' resulting from the reception of refugees is exacerbated by the fact that we do not have neither a full overview nor the scale of the phenomenon, nor orientation in our possible obligations as a result of this fact. This is why education is so important, both for the integration of immigrants into the society and for the security needs in the strict sense of the word.

As the representatives of the doctrine emphasize, Poland, in terms of multicultural approach in curricula (in the field of pre-school education and compulsory education) belongs to the countries taking into account cultural diversity in the context of the international social and economic situation, and becomes an area of shaping European identity. This approach has responded to a growing number of immigrants in our country. This has led to more and more widespread educational activities – those aimed at integrating immigrants into the society as well as those aimed at influencing security. As regards integration policy, the provisions indicate that children who are not Polish nationals may benefit from education and care in both state nursery schools, primary schools and lower secondary schools on the same conditions as Polish nationals. All categories of immigrants' children (children of immigrant workers, immigrants of Polish descent, permanent immigrants entitled to settle in Poland and to permanent residence, immigrants with refugee status) who attend state Polish schools (mainstream), are set as the objective of specialized programmes and assistance projects aimed at providing them with school-based support. The immigrants' children who are subject to compulsory education (aged 7-16 – primary and lower secondary education) and who do not speak / do not sufficiently speak the Polish language to participate in the school classes, have the right to receive additional, free of charge Polish language classes. An immigrant's child, who is subject to compulsory education, has the right to participate in additional classes on the language and culture of their country of origin, organized by diplomatic units or by, located in Poland, cultural organizations of their country (Torowska, 2016, pp.461-476). Education aimed at integration works best in relation to the controlled migration, when all mechanisms of migrant policy function.

On the other hand, the necessity to provide security education is conditioned by its real impact on the level of security. The analysis of security components and types of threats allows to distinguish several main areas under the framework of security education. These include: education for political security, education for military security, education for psychosocial security and education for ecological security. (Grabowska-Lepczak, Kwiatkowski, Tryboń, 2011, p. 183)

The situation of the migrant crisis, in which we are dealing with legal and illegal migration, has created new challenges for security education. It should be considered in a multi-stage and multifaceted way, because it is a long-term process and dependent on many components (Wiechetek, 2017, p. 127). It is "a system of teaching and educational activities created by the family, school, mass media, state institutions, social organizations and associations, which are responsible for disseminating ideas, values, knowledge and skills that are directly relevant for maintaining security." (Prońko, Wiśniewski, Wojtuszek, 2006, p. 164). The presentation of this aforementioned system requires, as a first step, a reference to documents providing the national security. *The National Security Strategy of the Republic of Poland* and the *White Paper on National Security of the Republic of Poland* are of particular importance, which is capable of obtaining a full view on security education in the national perspective. They are the ones that shape the direction of the basic assumptions of educational programmes concentrated on the activities aimed at improving security-related knowledge and skills. The objective of the *White Paper on National Security of the Republic of Poland* from 2013 translates into a mission set before the security education which comes down to "(...) deepening of knowledge and public awareness about the security of Poland and the Polish people."

The most systematized deepening of knowledge and public awareness regarding security takes place under the education system. The school subject *security education* is compulsory, thus every student must participate in the classes. Regardless education in the discussed area in primary schools, the institutes dealing with the activities related to security education are universities. They provide education at the level of bachelor's and master's degrees in such fields of study as national security, domestic security or public security.

The existing core curriculum, established in 2017 among the suggested assumptions, addresses such issues as "(...) adaptation to the changing threats of the modern world (including terrorist ones), facilitating the learning of theory by students through its reduction, providing the students with an authentic opportunity for practical exercises regarding life-saving" (Raczak, 2017, p. 3). Educational activities related to security and defining them as a collection of "(...) diverse pedagogical interactions undertaken by various institutions, (...) on ad hoc and

constant basis towards different social groups. The main task of these (...) institutions is to provide people with such competencies that will allow them to function effectively in a dynamic (...) reality, and thus, they will be the cause of a real increase in the sense of security for an individual, societies and communities." (Gawroński, 2013, p. 95) The relations between the elements of this system are also important. That is why, although there are many entities involved in security education, they do not constitute a coherent system, as they do not have a permanent and structured cooperation. The definition of educational activities related to security and defining them as a collection of "(...) diverse pedagogical interactions undertaken by various institutions, (...) on ad hoc and constant basis towards different social groups. The main task of these (...) institutions is to provide people with such competencies that will allow them to function effectively in a dynamic (...) reality, and thus, they will be the cause of a real increase in the sense of security for an individual, societies and communities" (Gawroński, 2013, p. 95). The relations between the elements of this system are also important. That is why, although there are many entities involved in security education, they do not constitute a coherent system, as they do not have a permanent and structured cooperation. Consistent security system as well as individual knowledge and skills of individual units are the most important guarantee for the state's sense of security. Only when a stable security situation is ensured can we talk about the possibility of the country's development in other areas. Consistent security system as well as individual knowledge and skills of individual units are the most important guarantee for the state's sense of security. Only when a stable security situation is ensured can we talk about the possibility of the country's development in other areas. "Raising public awareness of the understanding of security threats and the development of competences that in a deliberate and rational manner react to them, is a priority."

CONCLUSIONS

The question which does not have a clear answer is when security education should start. Since minors are very often the victims of crime and various types of crisis situations, according to the saying "*As the twig is bent, so is the tree inclined*," security education should start as early as possible. "The scale of the risks

and the degree of concern about them make it necessary to start education in this area as early as possible; to tell young people about the risks and to teach them how to cope with them from an early age." (Słoma, 2009) Unfortunately, it is not entirely clear when a young person is able to acquire knowledge of this field in such a way it will bring satisfactory results.

REFERENCES

- Aleteia, accessed : <https://pl.aleteia.org/2017/11/24/co-trzeba-wiedziec-o-obecnym-kryzysie-migracyjnym-podajemy-twarde-dane/> (23 July 2019).
- Biała Księga Bezpieczeństwa Narodowego Rzeczypospolitej Polskiej [The white Paper on National Security of the Republic of Poland], (2013) Warszawa, BBN.
- Błęszyńska, K., (2010), Migracje międzykulturowe jako wyzwanie dla polskiego systemu edukacji, accessed: <https://migracjemidzykulturowajakowyzwaniedlapolskiegosystemuedukacji.drhabkrystynabeszyska.pdf>, Warsaw (3 November 2015).
- Dąbrowska, M., Dobrowolski, P., Kaczmarczyk, B.(ed.) (2018). *Wybrane aspekty edukacji dla bezpieczeństwa*, Marszałek.
- defence24.pl, accessed: <https://www.defence24.pl/kryzys-migracyjny-zagrozeniem-dla-systemu-obronnego-polski> (23 July 2019).
- defence24.pl, accessed : <https://www.defence24.pl/kryzys-migracyjny-zagrozeniem-dla-systemu-obronnego-polski> (23 July 2019).
- Gawroński, P., Grzyb, J. Wawrzusiszyn, A., (2013), *Edukacja dla bezpieczeństwa – analiza jej zakresu przedmiotowego*, [in:] Podstawowe problemy bezpieczeństwa i edukacji dla bezpieczeństwa, volume 2, Elk MODN.
- Grabowska-Lepczak, I., Kwiatkowski, M., Tryboń, M., (2011), *Transformacja oraz perspektywy rozwoju edukacji dla bezpieczeństwa w Polsce*, Zeszyty Naukowe (Scientific Papers) SGSP, no. 41, (p. 183).
- Information of the Head of the Office for Foreigners on applying in 2016 the Act of 13 June 2003 on granting protection to foreigners within the territory of the Republic of Poland* [i.e. Polish Journal of Laws [Dz.U.] 2016 item 1836] in terms of the implementation of the obligations of the Republic of Poland resulting from the Geneva Convention on the status of refugees and the New York Protocol relating to the status of refugees (2016), Warszawa.
- Mazuś, M. (2015), *Bilet bez miejscówki. Raport Polska przed wyborem*, Tygodnik Polityka, no. 38 (3027).
- Prońko J., Wiśniewski B., Wojtuszek, T. (2006), *Kryzys i zarządzanie*, Bielsko-Biała, WSA.
- Raczak G, (2017), *Edukacja dla Bezpieczeństwa, Podstawowe założenia, filozofia zmiany i kierunki działania, Szkoła podstawowa, Podstawa programowa 2017*, Warszawa, ORE.

Raport 5. Wspólne wyzwanie – członkowie i kandydacie wobec przyszłej polityki migracyjnej UE, Warszawa, (2001) accessed: <https://pl.aleteia.org/2017/11/24/co-trzeba-wiedziec-o-obecnym-kryzysie-migracyjnym-podajemy-twarde-dane><https://pl.aleteia.org/2017/11/24/co-trzeba-wiedziec-o-obecnym-kryzysie-migracyjnym-podajemy-twarde-dane> przyszłości Europy, (21 July 2019).

Słoma J. (2009), *Program nauczania dla edukacji dla bezpieczeństwa dla gimnazjum*, Warszawa, Nowa Era.

Torowska, J. (2016), Sytuacja edukacyjna dzieci imigrantów w Polsce – raport a refleksje na marginesie spotkania poświęconego aktualnej sytuacji uchodźców w Krakowie i Polsce – wybrane aspekty, *Prace naukowe Akademii im. Jana Długosza w Częstochowie , Pedagogika*, volume XXV, no. 1.

tvn24, Spór o "falę uchodźców" z Ukrainy. Co mówią oficjalne liczby, accessed: <http://www.tvn24.pl> (23 July 2019).

uchodzcy.info, accessed : <http://uchodzcy.info/infos/obecny-kryzys-migracyjny/> (23 July 2019).

Wiechetek M., *Teoria długofalowości edukacji dzieci z zakresu bezpieczeństwa między innymi na przykładzie "Bezpiecznego domu"*, [in:] Gikiewicz, M., Tryboń, M., Prędecka A., Bralewski, A. (ed.) (2017) *Interdyscyplinarność Bezpieczeństwa teoria-praktyka-edukacja*, Warszawa, SGSP.

THE IMPACTS OF SOCIAL MEDIA ON CONSUMER BEHAVIOR: THE CASE OF COMMUNICATION FACULTY AT SAKARYA UNIVERSITY

Prof. Dr. Aytekin İŞMAN

Communication Faculty, Sakarya University, Sakarya / Turkey

isman@sakarya.edu.tr

Hüseyin SERBES

**Master Student at Sakarya University, Media and Communication School, Sakarya / Turkey

hserbes@yahoo.com

ABSTRACT

During this time period called social media age, online platforms that shape the lives of individuals and allow users to interact are becoming very popular. While social platforms have a great impact on individuals as news or information sources, they also transform marketing strategies in the context of entertainment, social sharing and content creation. In this context, this study aims to measure the behavioral changes in the purchasing processes of consumers in many ways by addressing the social media platforms that become an indispensable part of the daily lives of individuals. The opportunity to be included in the communication and sharing network by communication facilities makes social media sites the tool of a new generation of marketing. In this way, the social networks, which take the majority of their time under the influence of individuals, attract the interest of companies. Companies actively use social media platforms to attract attention to their products, brands or customers. The research plans to explore the perceptions of university students based on the idea that social media platforms are an effective tool for young consumers. The present study also aims to reveal the impact levels of social media platforms, which are the strong sources of digital transformation, on individuals. In this context, this thesis tests the hypotheses with a quantitative strategy applied to students of the Faculty of Communication who focuses on new media studies. In the scope of the study, a questionnaire was developed with 38 items consisting of 11 demographics and 27 social networks and a sample group of 300 students was applied. The data obtained from the survey with the contribution of SPSS program were analyzed by using Analysis of Variance (ANOVA), LSD Multiple Comparison Test and Independent Sample t Test and Pearson Moment Correlation Coefficient. The results of the research show that it is more possible to choose brands, products or services that are aware of the social media. In addition, the findings show that the individuals considered within the scope of the sample tend to use social media platforms as much as possible in their purchasing processes. For this reason, research shows that social media platforms have become a daily life practice and they contribute significantly to the attitudes of individuals to their behavior.

INTRODUCTION

As the technology has been changed in an incredibly difficult way, mass media, respectively, newspapers, radio and television were put into service for humanity and in this way, individuals had the possibility of visual and audio communication (Icirgin, 2018, p. 4). With the spread of mass media, social communication has improved, so individuals have contributed to their experiences and knowledge in many fields.

In recent years, the development of technology has pushed individuals to change over time in mass media. According to Kaplan and Haenlein (2009), through Web-based practices, individuals maintain to share their experiences through social media channels. For individuals who continue to socialize by sharing their experiences, social media is becoming increasingly important. The way in which social media allows sharing of knowledge and experience, allowing interaction, has changed the direction of communication in many ways.

The rapid use of social platforms allows the consumer to conduct a product or service survey. In this way, the behavior of consumers through social networks is changing. Especially, considering that young people are actively using social media, the impact of social media on the behavior of young consumers needs to be examined. The aim of this study is to examine the effects of social media usage habits on consumer behaviors in purchasing and decision making processes by considering the students of Faculty of Communication.

UNDERSTANDING CONSUMER BEHAVIOR

Mangold and Faulds (2009) argue that the media has undergone a massive conversion over the last decade of communication. Together with all the tools they contain, communication and media continue to change from year to year. The beginning of mass communication is based on the “print revolution” seen in Europe in the 15th century (Aggarwal & Gupta, 2001, p. 6).

The fact that, individuals who are included in all consumption processes become dynamic as a consumer, has made attention to consumption concepts. Individuals, regardless of their life practices, are entirely consumers. According to Walters (1974), the term of “consumer” may be called as an individual who buys or has a tendency to acquire products or services to meet the needs, wishes or desires of a personal or household (p. 4). Consumers, moreover,

can be regarded as individuals who care about their personal interests and make reasonable decisions in accordance with those interests (Schifman & Kanuk, 1987; Zinkhan, 1992). Consumers who have different needs and requirements from each other have different consumption behaviors independently from each other. The concept of “consumption”, which includes the use of a product or the purchasing process, uses a number of structures to address the needs. Although there is no consensus about what the concept of behavior means, human behavior is an experimental phenomenon that does not conform to the traditions in order to understand the concepts. Yet, “behavior” is also often known as the definition of the individual's movements.

In recent years, the Web has been widely used in a variety of ways, including obtaining, creating and sharing information. Darwish and Lakhtaria (2011) indicate that, in a closed period, Web technology, which has inspired new social networking networks, has undergone a significant change in the way communities use it in communication and development tools (p. 205). Therefore, Web 2.0 gives prominence as a technology platform for Internet users to turn the Web into a participatory area, not only to utilize content.

In the era of social media, in which the Internet and technology quickly participate in the lives of individuals, people are exposed to millions of advertisements far and wide. Each brand or organization brings its products to people through various ways such as billboards, websites, social media or traditional media. In this flow, consumers find it difficult to choose between many options. While the ads that individuals are exposed to affect the decision-making process of consumers, similar advertisements of each brand appear to be not internalized by consumers. In these cases, similar experiences of others stand out. In this sense, user-generated content is gaining value. User-generated content, which can be defined as content produced by the consumer or the user himself, is enriched by the experience, moreover, it increases the relationship between the user and the brand.

Social media networks have not only been the voice of the consumer but have also become a medium where consumers come together and communicate. Consumers have the opportunity to share their experiences and experiences in social media networks with each other. According to Mihalcea and Savulescu (2013), consumers use various social media sites in order to share their experiences, either positive or negative. Moreover, the increase in the use of social media sites by consumers has attracted the attention of brands and firms.

THEORETICAL BACKGROUND

This study directs to reveal individuals' perceptions and attitudes from different perspectives based on the idea that advertisements exposed to social networks have a strong and effective part in the lives of the users on social media platforms.

Theory of Reasoned Action (TRA) is a widely used model in the field of social psychology to measure the acceptance of new generation technologies by the user. Ajzen and Fishbein (1980) interpret the TRA model as one of the most striking frames in the theoretical field that define the connections between individuals' intentions and behaviors.

The study which deals with the example of the social advertisements in the context of young consumers, in this sense, has been analyzed within the TRA in order to investigate the behavioral intentions of consumers. The TRA developed by Ajzen and Fishbein (1969) is a model that foresees the behavior of individuals based on their attitudes and beliefs (Southey, 2011, p.43). Ajzen (1991) argues that this model was later expanded and that the approach obtained as a result of these variables is a theory of planned behavior. Despite the widespread use of this model by similar studies, there are also some studies arguing that they are not suitable for their complexity (Thompson & Panayiotopoulos, 1999). Nevertheless, the predictions in this model may be effective in determining the decisions between advertisements on social networks and the behavior of consumers.

In this study, it is aimed to understand whether external factors affect the behavioral intentions of young people through social media sites based on the model. Burton-Jones and Hubona (2006), in addition, emphasize external variables and suggest that traditional TRA structures mediate their effects on their behaviors. Therefore, the present thesis gives importance to two external structures as the individual's beliefs and level of awareness. Moreover, the study plans to systematically analyze the extent to which social sites perform this on the basis of the impact of positive intentions on behavior.

LITERATURE REVIEW

According to Lee (2013), it is very difficult to gather all the data in only one study in order to inquire into the behaviors of the consumers (p. 8). Therefore, the researcher narrows the data and findings slightly. The research aims to understand the ways in which social networks affect consumers during the decision-making process. The study showed that individuals have an active role in consumption processes and social sites. According to the findings of the current research, social networks, although they are a specific factor on consumers, cannot be considered as a very powerful tool in any purchasing process. Specifically, the data generated by the participants within the sample group and the content generated by users on social media platforms can produce a data; moreover, it is likely that the data presented contributes to the current study.

Duque (2017) argues that it is necessary to specifically understand marketing, which affects various sectors of a developing country (p. 2). The research is planned to examine the contribution and impact of social media on this

issue by focusing on consumers' intention and perception of furniture purchase. The findings of the study show that all of the participants are familiar with social networks, take into consideration the goals of their social platforms and actively use them. The results also suggest that social media networks are widely used for information. It leads to the findings and results in a positive way of understanding the intentions and behaviors of consumers in addition to the current study.

Heikkinen (2015) wished to explore the evolving marketing and the opportunities it offers through social media platforms (p. 74). The study plans to give an idea of how social networks are developing in popular marketing. The results also ensure that social media is a powerful tool for acquiring information, making it the easiest place to reach consumers. In this respect, the study, which argues that the content created on social networks is also an important resource for both the other consumers and the related sector, leads to the current study.

Merivirta (2014) focuses on consumers by examining one of these communities. The research plans to explain the needs of consumers to have a remarkable community. The findings of the study suggest that motivation is one of the most important reasons why members of the community share their experiences as members of social media platforms. Through this study, new dimensions derived from the relationship between communities and consumer motivations on social platforms can guide the current study.

Nolcheska (2017) examined consumers' purchasing processes and also wanted to measure the perceptions. The research paper aims at discovering the consumer's intention to buy, focusing on individuals. The findings of the study show that there is no statistically significant relationship between the time spent by consumers on online networks and the effect of social networks on decision making. This study guide the understanding of consumer perceptions in the social network age with this sample.

Schivinski and Dabrowski (2013) conducted a study to measure the brand value of social platforms through an online survey in the Polish sample. The study has aimed to observe consumers' brand attitudes and purchasing intentions on 504 Facebook users. The empirical findings of the study found that the interactions and opinions on social platforms have a positive effect on the attitude and value of the brands. The recommendations, discussions and results in the article give the opportunity to expand the views more deeply along the current work.

Hoogstins (2007) conducted a study to examine the impact of social media on food preferences. The main purpose of the study is to determine how frequently consumers in a particular age range use social media in their food preferences. The results show that, in the example of eating behavior, consumers do not behave in a particular model. The research helps with the suggestions made by social modelling to perceive consumers' buying behavior. While advertising on social platforms pushes consumers towards buying behavior, it also draws attention among marketers and researchers (Chiang, Lo & Wang, 2017, p. 193). . The research focuses on the relationship of consumers with social media through advertising on these platforms. According to the research findings, social ties have a great impact on participation in social media advertising. Limitations and recommendations provide a reference to research in social media advertising.

The study is mainly to examine the content of users on social networking sites and to get an idea of the motivations of consumers (Alsubagh, 2015, p. 209). The study, which is organized in five sections, aims to reveal the effects of social media platforms on user motivation. The results of this study reveal that there is a significant relationship between the attitudes of the consumers and the variables. The results obtained in this study also guide the faster provision of the information expected in the current study.

The study (Sudha and Sheena, 2017) focuses on the retail world of clothing and tries to find out whether decision makers are affected. The study also deals with the marketing techniques that lead the clothing industry. Consumers argue that, according to research, blogs are seen as a way to verify a purchase. The research that makes the importance of social networks, in this sense, guide this and subsequent research.

METHOD

Problem Statement

This study seeks to reveal how people in the selected age group are affected by various social media platforms in the decision-making process. This study tries to find the answer to the following research question: "In an age in which the digital world is advancing rapidly, how does social media platforms affect the younger generation in decision making?"

Statistical Hypotheses

The following hypotheses are looking for answers to questions in the research process:

Hypothesis 1: There is a positive relationship between the behavior of young consumers and attitudes towards social networks.

Hypothesis 2: There is a positive relationship between the behavior of young consumers and advertising in social networks.

Hypothesis 3: There is a positive relationship between the behavior of young consumers and communication in social networks.

Hypothesis 4: There is a positive relationship between the behavior of young consumers and understanding consumer behavior sub-scale scores.

Scope and Limitations

Within the scope of the research, the sample was selected in a cosmopolitan structure and factors such as personality, value, promotion were not taken into consideration. There are several factors that determine and adjust the limitations encountered in the conduct of this research. At first glance, the study aims at concluding on the attitudes that affect consumer and user behavior in the context of social media platforms. Therefore, this study states that it will not take into account individual personality and differences, especially in the habit and sensitivity of using online in internet users. In particular, there is no disaggregation like female and male consumers; in addition, this study does not take into account demographic, geographical, cultural and social differences.

Sample

The population to be the subject of the research covers all areas of interest in a study (Ramsunder, 2011, p. 76). It is thought that a sample group including the population ($n = 300$) of the students in the Faculty of Communication at Sakarya University ($\alpha = 1130$) would represent a level of 0.05 significance and a 5% acceptable margin of error with a 95% confidence level (Balci, 2004, p. 95).

Instrument

A questionnaire provides the researcher with a great chance to respond to the questions of the participants (Trochim and Donnelly, 2008), and it is also a tool that provides the opportunity of the participants involved to convey their opinions on the research topic.

During the development of the questions to be carried out, a thesis published examining consumer attitudes towards advertising in social networks (Cretti, 2015) and a thesis published which investigates the social platforms and consumer relations in the tourism sector conducted between university students (Wen, 2018) have been referred. According to Ben (2018), the validity of a study reveals whether an instrument measures what it means (p. 33). In distinguishing the ideas and opinions of the participants, validity is very important for the research instrument. In the sub-dimensions of the developed scales, the alphas are listed as follows: Social network use 0,520 (when two items are evaluated, it is acceptable if the alpha is greater than 0,5), advertising in social media platforms 0,745, social media interactions 0,866, community of brand 0,868 (Cretti, 2015, p.27) and lastly consumer behavior 0,814 (Wen, 2018, p. 35).

There are 11 questions in total in the personal information form prepared by the researcher. “The Behavior of Young Consumers in the Age of Social Media Scale” has a total of 27 items. The developed questionnaire has a Likert five point scale to find meaningful answers to the sub-factor questions of the sample group.

Data Collection

The research was carried out in Sakarya University, especially among the students of the Faculty of Communication, where digital media was taught as a course tool. The survey was conducted between February and April 2019 for randomly selected students for approximately 15 minutes.

Data Analysis Procedures

The data were coded in parallel with the hypotheses and analyzed with the help of the SPSS program. Analysis of Variance (ANOVA), Fisher's Least Significant Difference (LSD) Multiple Comparison Test, Independent Sample t Test, and Pearson Correlation Coefficient were applied and findings have been presented in tables.

Definition of Terms

In this context,

“*The Consumer*” is a name given to an individual who is capable of purchasing in accordance with personal or environmental needs and wishes.

“*Behavior*” includes actions that can be seen or heard by an individual.

“*Consumer Behavior*” refers to a dynamic interaction of the feeling and attitude of individuals or groups during their decisions and activities in choosing, buying, and using actions and products in order to meet their desires and needs.

“*Attitude*” is the tendencies gained through the behaviors acquired by the individual's past experiences, and moreover, the individual creates a connection to his or her new behavior through these experiences.

“*Consumer Attitude*” is a behavioral tendency that individuals acquire and maintain events or concepts.

“*The Web 2.0*” is a set of online applications that allow users to interact with their experience and knowledge as an exhibitor on Internet platforms.

“*User-generated content*” is the content that is generated by the participants without any charge.

“*Social Media*” means an online network which information, experience and observations can be quickly and easily produced and shared by users.

“*eWOM*” clearly means that consumers share their views, reports, feelings and perceptions about products or services by interacting with each other through electronic or digital communications.

FINDINGS

Demographic Features of Participants

In order to clarify the study, demographic variables related to individuals in the research group have been illustrated in the tables below.

Table 5.1
Demographic Distribution of Participants for Age (N=300)

Age	Frequency (n)	Percentage (%)
Under 20	83	27,7
Between 20 – 25	121	40,3
Between 26 – 30	45	15,0
Between 31 – 35	24	8,0
Between 36 – 40	19	6,3
40 and above	8	2,7
Total	300	100,0

When the distribution of the sample according to the age variable is considered, the percentage of the participants under 20 years of age is 27.7% (n: 83); the percentage of participants between 20 and 25 is 40.3% (n: 121); the percentage of participants between 26 and 30 was 15.0% (n: 45); the percentage of participants between 31 and 35 was 8.0% (n: 24); 36 to 40% of the participants (n: 19); the percentage of participants with 40 or more is 2.7% (n: 8).

Table 5.2
Demographic Distribution of Participants for Gender (N=300)

Gender	Frequency (n)	Percentage (%)
Female	161	53,7
Male	139	46,3
Total	300	100,0

The sample consists of 300 participants, as clearly indicated in the above chart and table. While 53.7% of the participants (n: 161) are women, the participation rate of men is 46.3% (n: 139). According to the gender distributions of the surveys conducted to obtain the data, it is observed that the female participants are slightly higher than the male participants.

Table 5.3
Distribution of Social Media Platforms (N=300)

Social Media Platforms	Frequency (n)	Percentage (%)
Facebook	36	12,0
Twitter	70	23,3
Instagram	121	40,3
Linkedin	12	4,0
Pinterest	4	1,3
Tumblr	9	3,0
Google +	3	1,0
Youtube	38	12,7
Other	7	2,3
Total	300	100,0

In the sample group, the percentage of users who prefer Facebook is 12.0% (n: 36). Twitter is selected with a percentage of 23.3% (n: 70). Consumers' percentage of using Instagram is 40.3% (n: 121). Linkedin is preferred

with 4.0% (n: 12); Pinterest uses 1.3% (n: 4). Consumers use 3.0% (n: 9) of Tumblr. Google+ is preferred at 3.0% (n: 9) of social media platforms. The percentage of participants using YouTube is 12.7% (n: 38). The percentage of participants using other accounts is 2.3% (n: 7).

Table 5.4
Time Spent on Social Media Sites (N=300)

Time (approximately) spent on social media sites per day	Frequency (n)	Percentage (%)
0 hour	0	0,0
1 – 3 hours	85	28,3
4 – 6 hours	142	47,3
7 – 9 hours	46	15,3
10 hours and more	27	9,0
Total	300	100,0

In Table 5.4, the participant rate of 0 hours is observed at 0.0% (n: 0). The ratio of participants who spend 1-3 hours in social media networks is 28.3% (n: 85). The rate of participants with 4-6 hours is 47.3% (n: 142). The percentage of those who spend 7 to 9 hours on social media sites is 15.3% (n: 46). Participants in the sample prefer 10 hours or more in social media platforms at a rate of 9.0% (n: 27).

Table 5.5
Time Spent on Mass Media (N=300)

Time (approximately) spent on mass media per day	Frequency (n)	Percentage (%)
0 hour	27	9,0
1 – 3 hours	220	73,3
4 – 6 hours	51	17,0
7 – 9 hours	1	0,3
10 hours and more	1	0,3
Total	300	100,0

Table 5.5 shows the time spent by social media users in the sample on a daily basis such as TV, radio, newspaper and magazine. The sample group prefers 0 hours with 9% (n: 27) according to the time variable used in mass media. The proportion of participants with a duration of 1-3 hours is 73.3% (n: 220). 17.0% (n: 51) of the participants in the sample stated that they spend 7 to 9 hours daily in mass media. 0.3% of the participants (n: 1) mark 7-9 hours in this choice of the survey. According to the table, the percentage of participants with 10 hours and more is 0.3% (n: 1).

Table 5.6
Access of Social Media Sites (N=300)

Access social media and networking sites application	Frequency (n)	Percentage (%)
Access via IT gadget	191	63,7
Access via home PC	78	26,0
Access via office PC	31	10,3
Total	300	100,0

Table 5.6 examines the sample group and the access variable to social media sites. In this table, it is tried to reveal how consumers are connected to social networking sites with the help of devices. According to the variable of the access social media and networking sites application, the percentage of participants who is able to reach through small devices is 63.7% (n: 191).

Table 5.7
Comments about the Product (N=300)

Comments about the Product	Frequency (n)	Percentage (%)
Always	51	17,0
Often	140	46,7
Sometimes	70	23,3
Not Really Often	29	9,7
Never	10	3,3
Total	300	100,0

Table 5.7 shows that the rate of “Always” is 17.0% (n: 51). 46.7% (n: 140) of the respondents say it “Often”. 23.3% (n: 70) of respondents says “Sometimes”. The “Not Really Often” rate of participants is 9.7% (n: 29). “Never” is at a rate of 3.3% (n: 10).

Table 5.8
The Function of Social Media (N=300)

The Function of Social Media	Frequency (n)	Percentage (%)
Contacting with others	65	21,7
To gain informative advertising	15	5,0
Refer opinion from experts	13	4,3
Collect opinion about product or services	58	19,3
Purchase goods	83	27,7
Connecting among university friends	66	22,0
Total	300	100,0

Table 5.8 shows the data in terms of the function variable of social media. In the context of this variable, 21.7% of the participants in the sample group (n: 65) indicate the possibility of communicating with others. The proportion of participants who say they gain information from advertisements is 5.0% (n: 15). In this sample, 4.3% (n: 13) participants would like to receive opinions from the experts. The percentage of respondents who discuss that they would like to gather opinions about the products or services is 19.3% (n: 58). 27.7% (n: 83) of the participant, in this variable, they tend to buy products. The percentage of participants who connect among their university friends is 22,0% (n: 66).

Table 5.9
Social Media Facilitates in “University Life” (N=300)

Social Media Facilitates in “University Life”	Frequency (n)	Percentage (%)
As a Main Platform of E-Learning	30	10,0
Knowledge-Sharing with Friends	41	13,7
Communication	93	31,0
Convenience	58	19,3
Collect information	24	8,0
Entertainment	49	16,3
Others	5	1,7
Total	300	100,0

The sample group is asked the question of “What social media think facilitates in your university life?” and when the distribution of responses is considered, the rate of participants who say that “As a Main Platform of E-Learning” is 10.0% (n: 30). 13.7% of the participants (n: 41) state “Knowledge-Sharing with Friends”. 31.0% (n:

93) of the participants in the sample responded to the communication response. 19.3% of participants (n: 58) seems to mark the option of “Convenience”. The rate of participants who “Collect information” is 8.0% (n: 24).

Table 5.10
The Experience through Social Media (N=300)

The Experience through Social Media	Frequency (n)	Percentage (%)
Effortless Communication	62	20,7
Get a Sense of Belonging	19	6,3
Socializing	139	46,3
Allows Interactivity with Other Online Users	70	23,3
Others	10	3,3
Total	300	100,0

Table 5.10 aims to emphasize the importance of social media platforms among university students by focusing on the experience of individuals through social media. In this context, the question of “What is your experience in Social Media?” is asked as a variable. The rate of the participants who say that the “Effortless Communication” is 20.7% (n: 62). Participants give an answer to create a sense of belonging at a rate of 6.3% (n: 19). 46.3% of the participants who answer socialization (n: 139).

Table 5.11
Usage Social Media to Search for Information (N=300)

Usage Social Media to Search for Information	Frequency (n)	Percentage (%)
Easy	75	25,0
Reliable	54	18,0
Get distinct solutions	40	13,3
Higher level of trust in responses	68	22,7
Get replies from people with similar interests	54	18,0
Others	9	3,0
Total	300	100,0

Table 5.11 focuses on the reasons why Internet users in the sample group can access information on any issue on social media platforms. In this variable, the percentage of users who deem it “Easy to Access” is 25% (n: 75). 18% of the respondents say that information is “Reliable” (n: 54). 13.3% of the respondents (n: 40) are seeking information on social networks due to higher confidence in responses. The percentage of users aiming to respond from people with similar interests is 18.0% (n: 54). The proportion of participants who say “Others” is 3.0% (n: 9).

The Results of Factors

In this section, the scores taken from the scale and sub-dimensions are compared in terms of the various variables of the sample group.

Table 5.12
Comparison of the Scale and Sub-Dimensions in the context of Age Variable

Factors	Groups (Age)	N	\bar{x}	sd	F	P	Sig. Dif.
Attitude towards Social Networks	Under 20	83	7,90				1-6
	20 – 25	121	8,85				2-6
	26 – 30	45	7,71	5	4,223	.001	3-6
	31 – 35	24	8,45	294			4-6
	36 – 40	19	9,21				5-6
	40	8	11,62				1-2
							2-3
Advertising on Social Networks	20	83	15,08				3-5
	20 – 25	121	16,93				1-2
	26 – 30	45	15,28	5	4,245	.001	1-4
	31 – 35	24	18,29	294			1-5
	36 – 40	19	18,00				2-3
	40 and above	8	17,75				3-4
							3-5
Communication on Social Networks	Under 20	83	23,81				
	20 – 25	121	25,30				
	26 – 30	45	23,28	5	1,216	.302	
	31 – 35	24	25,37	294			-
	36 – 40	19	25,36				
	40 and above	8	23,87				
Understanding Consumer Behaviour	Under 20	83	18,31				
	20 – 25	121	20,32				
	26 – 30	45	19,04	5	2,348	.041	1-2
	31 – 35	24	18,37	294			
	36 – 40	19	18,84				
	40 and above	8	21,00				
Total Point	Under 20	83	65,12				
	20 – 25	121	71,42				
	26 – 30	45	65,33	5	4,058	.001	1-2
	31 – 35	24	70,50	294			1-5
	36 – 40	19	71,42				1-6
	40 and above	8	74,25				

Table 5.12 shows the average score of Young Consumers Behavior Scale and sub-dimensions of this scale. The difference between these scores was examined with “Analysis of Variance (ANOVA)” in the context of “age variable”.

According to the data analysis, “Young Consumer Behavior Scale” and “Attitude towards Social Networks” scores of the sample group significantly differ based on the age variable ($f_{(0,05;5-294)}:4,223$, $p<0.05$). According to the data analysis, “Young Consumer Behavior Scale” and “Advertisements on Social Platforms” scores of the sample group significantly differ based on the age variable ($f_{(0,05;5-294)}:4,245$, $p<0.05$). According to the data analysis, “Young Consumer Behavior Scale” and “Communication on Social Networks” scores of the sample group significantly do not differ based on the age variable ($f_{(0,05;5-294)}:1,216$, $p<0.05$). According to the data analysis,

“Young Consumer Behavior Scale” and “Understanding Consumer Behaviors” scores of the sample group significantly do not differ based on the age variable ($f_{(0,05;5-294)}:2,348$, $p<0.05$). The results of data analysis show that the individuals in the sample group differ significantly according to the age variable of the Young Consumers' Behavior Scale scores ($f_{(0,05;5-294)}:2,348$, $p<0.05$).

Table 5.13
Comparison of the Scale and Sub-Dimensions in the context of Gender Variable

Sub-Dimension	Groups	N	\bar{x}	SS	t	p
Attitudes towards Social Networks	Female	161	8,34	2,80	-,913	.362
	Male	139	8,64	2,86		
Advertising on Social Networks	Female	161	16,18	4,26	-,826	.410
	Male	139	16,59	4,47		
Communication on Social Networks	Female	161	24,42	5,90	-,418	.676
	Male	139	24,71	6,11		
Understanding Consumer Behaviour	Female	161	19,40	5,01	,237	.812
	Male	139	19,27	4,40		
Total Point	Female	161	68,36	12,08	-,614	.540
	Male	139	69,23	12,62		

According to the gender variable of the sample group included in the research, the N numbers, the arithmetic averages of the points and the standard deviations are given. In addition, the Young Consumers Behavior Scale and the subscale scores of this scale are seen. The differences between these scores were examined by “Independent Sample t Test” depending on gender variable. The results reveal that there is no significant difference between the groups.

Table 5.14
Correlations between Scale and Sub-Dimensions

	Total Score	Attitudes towards Social Networks	Advertising on Social Networks	Communication on Social Networks	Understanding Consumer Behavior
Total Score	1				
Attitudes towards Social Networks	,551**	1			
Advertising on Social Networks	,682**	,297**	1		
Communication on Social Networks	,782**	,244**	,367**	1	
Understanding Consumer Behaviour	,656**	,255**	,212*	,286**	1

* $p<.05$, ** $p<.01$

Table 5.41 shows the correlation coefficients between the scores of the consumers' behavior scale obtained from the university students in the sample group and the subscales of this scale. These coefficients were examined by Pearson Correlation Coefficient. There is a positive correlation between the scale of “Young Consumers' Behavior in the Age of Social Media” and the subscale scores of “Attitudes towards Social Networks”. Table reveals that there is a positive correlation between the scale of “Young Consumers' Behavior in the Age of Social Media” and the subscale scores of “Advertising on Social Networks”. It can be observed that there is a positive correlation between the scale of “Young Consumers' Behavior in the Age of Social Media” and the subscale scores of “Communication on Social Networks”. It can be seen that there is a positive correlation between the scale of “Young Consumers' Behavior in the Age of Social Media” and the subscale scores of “Understanding of Consumer Behaviors”.

DISCUSSIONS, CONCLUSION AND RECCOMENDATIONS

The study has the method of analyzing and expanding social media advertising with the results obtained from the individuals in the sample group, along with the necessary literature study. The findings from previous researches show that the Internet has an important place in human life in an acceptable way, and it also offers companies a great and unique marketing opportunity (Cretti, 2015, p. 34). When the studies conducted in this sense are examined, it is seen that social media and decision-making processes have been tested in different ways, but it is clear that research has not reached an adequate result. Although social media platforms are an extension of daily life, it has been determined that the studies in this area have some deficiencies especially in terms of individuals in the sample group. Moreover, in addition to its economic dimension, the sociological and psychological aspects of people's behavior and orientation are an important issue for social media marketing, which are the main reasons why this issue is deemed appropriate for research.

The research revealed that all the individuals in the sample group actively used it as a member of at least one of the social platforms. While it is observed that young people often use social networks, the findings show that the population is concentrated between 4-6 hours daily (47.3%). On the other hand, it was observed that consumers spent less time on mass media in the same time period (17.0%). This situation shows that social media platforms, where consumers can create their own content and make shares, are now preferred more than mass media. For this reason, companies have had to allocate a large portion of their advertising budget to social platforms. Research results also indicate that young users' participation in those platforms is mostly through small devices (63.7%). Due to the change and development of data, the importance of small devices is increasing. In this context, social networking applications need to be designed in accordance with small devices. In line with these results, advertisers need to make their visibility more suitable to reach consumers.

The results of the research announce that one of the most important factors affecting the decision-making process of the young population in online purchasing processes is the criticism of the online networks. Through the developed questionnaire, the sample group was asked whether they read the comments of the products or services in the online networks. The majority of respondents (n: 161) have always emphasized their options and emphasized that they place great emphasis on criticism on the Internet (63.7%). In this context, it is seen that consumers attach great importance to the criticism and comments of other consumers, so firms or companies must take into account the evaluations made by the consumers for the products or services. Clients perceive the examinations carried out by other consumers are more beneficial than experts do. (Li et al., 2007).

Social networks may tend to enable university students to collaborate with each other by sharing their experiences through interaction (Liccardi et. al., 2007, p. 224). Research results show that the experience shared on social networks affects socialization (46.3%). Internet users who share their knowledge and experience in social networks have drawn attention to the ease of social media through surveys. The data indicate that young consumers prefer social sites as the social networks are particularly easy (25.0%).

As a result of the research, some suggestions have been related with the help of the findings obtained from the participants in the university sample. Recommendations related to the descriptive and inferential statistical results of the thesis are given below through the analysis of the data.

- Myers (2012) draws attention to the social dimension of learning, suggesting that mirror neurons are the basis for simulated and observational learning (as cited in Snyder, 2016, p. 7). Thus, it can be concluded that behaviors are acquired through observation in social networks. Individuals have the ability to be influenced by the behaviors of other users in social platforms. Therefore, it can be stated that consumer behavior is enhanced by observation or imitation. Consumers, in this case, should try to reduce the exposure to unwanted individuals on social media sites. In addition, companies that want to market their products or services need to effectively evaluate social learning.
- The results revealed that the ratio of university students' frequency of using social networking networks is quite high. While the effective use of social platforms is perceived as positive for many areas, it is seen that such high utilization rates exceed the other social areas when the negative effects on the individuals are considered. Therefore, this intensive use should be considered once again and necessary precautions should be taken.
- The findings suggest that university students in social media sites are highly likely to be affected in decision-making processes. In order to avoid possible negative situations, consumers should be more careful in the case of behavior.
- According to the findings of research, Instagram and Twitter are two social media platforms that attract attention among young people and marketers who want to influence consumers should use those networks effectively, especially in visual and textual dimensions.

REFERENCES

Aggarwal, V., B. & Gupta, V., S. (2001). Handbook of Journalism and Mass Communication. New Delhi: Concept Publishing Company.

- Ajzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behavior. Englewood Cliffs, NJ: Prentice-Hall.
- Alsubagh, H. (2015). The Impact of Social Networks on Consumers' Behaviors. *International Journal of Business and Social Science*, Vol. 6, No. 1, pp. 209-216.
- Balcı, A. (2004). Sosyal bilimlerde araştırma. Yöntem, teknik ve ilkeler (4. Baskı). Ankara: Pegem A.
- Ben-Shakhar, G., & Nahari, T. (2018). The external validity of studies examining the detection of concealed knowledge using the Concealed Information Test. *Recent developments* (pp. 59-76).
- Burton-Jones, A., & Hubona, G. S. (2006). The Mediation of External Variables In The Technology Acceptance Model. *Information & Management*, 43(6), 706–717. <http://doi.org/10.1016/j.im.2006.03.007>
- Chiang, I., P., & Lo, S., H., & Wang, L., H. (2017). Customer Engagement Behaviour in Social Media Advertising: Antecedents and Consequences. *Contemporary Management Research*, Vol. 13, No. 3, pp. 193-216.
- Cretti, C. (2015). *Consumers' attitude towards social media advertising: An empirical study*. (Bachelor dissertation, Faculty of Economics and Social Sciences, University of Fribourg).
- Darwish, A., & Lakhtaria K., I. (2011). The Impact of the New Web 2.0 Technologies in Communication, Development, and Revolutions of Societies. *Journal of Advances in Information Technologi*, Vol. 2, No. 4, pp. 204-216. doi:10.4304/jait.2.4.
- Duque, J., S. (2017). *Social media influence: Qualitative study of Colombian consumer attitude toward social media and its influence*. (Master's thesis). School of Business & Economics, Linnaeus University, Växjö, Sweden.
- Heikkinen, S. (2015). *Social Media Marketing Case: Hostel Company X*. (Bachelor's Thesis). Lahti University of Applied Sciences Degree Programme in International Business.
- Hoogstins, E., S. (2017). *Modelling on Social Media: Influencing Young Adults' Food Choices*. (Master's Thesis). Department of Psychology, Lunds University.
- Icirgin, O. (2018). *Social Media Usage Habits and Motivations of University Student*. (Master's thesis, Selcuk University, Social Sciences Institute). Retrieved from <http://acikerisim.selcuk.edu.tr/>
- Kaplan, A. M. & Haenlein, M (2009). Consumer Use and Business Potential of Virtual Worlds: The Case of "Second Life". *The International Journal on Media Management*, 11: 93-101.
- Lee, E. (2013). *Impacts of Social Media on Consumer Behavior - Decision Making Process*. (Bachelor's thesis). Turku University of Applied Sciences.
- Li, R., Kim, J. & Park, J. (2007). The Effects of Internet Shoppers' Trust on Their Purchasing Intention in China. *Journal of Information Systems and Technology Management*, 4 (3), 269-286.
- Liccardi, I., & Ounnas, A., & Pau, R., & Massey, E., & Kinnunen, P., & Lewthwaite, S., & Midy, A., & Sakar, C. (2007). The role of social networks in students' learning experiences. *ACM SIGCSE Bull*, 39(4), pp. 224-237.
- Mangold, W.G., & Faulds, D.J. (2009). Social Media The New Hybrid Element of the Promotion Mix. *Business Horizons*, 52, 357-365.
- Merivirta, A. (2014). *Understanding consumer motives in social media community participation: Case Quality Hunters*. (Master's thesis). Department of Marketing, Aalto University School of Business.
- Mihalcea, A., D. & Savulescu, R., M. (2013). Social Networking Sites: Guidelines for Creating New Business Opportunities through Facebook, Twitter and LinkedIn. *Management Dynamics in the Knowledge Economy*, Volume 1 (2013) no. 1, pp. 39-53.
- Nolcheska, V. (2017). The Influence of Social Networks on Consumer Behavior. *Balkan and Near Eastern Journal of Social Sciences*, 2017: 03 (04), 75-87.
- Ramsunder, M. (2011). 'The Impact of Social Media Marketing on Purchase Decisions in the Tyre Industry' (Master dissertation). Nelson Mandela Metropolitan University Business School.
- Schiffman, L.G., & Kanuk, L.L. (1987). "Consumer Behaviour"; Third Edition; Prentice Hall International, Inc.
- Schivinski, B., & Dabrowski, D. (2013). The Effect of Social Media Communication on Consumer Perceptions of Brands. GUT FME Working Paper Series A 12, Faculty of Management and Economics, Gdansk University of Technology.
- Snyder, N., A. (2016). Mirror Neurons and Their Effect on Social-Emotional Learning Medford Public School, *Mirror Neurons and Social-Emotional Learning*, pp. 1-22.
- Southey, G. (2011). The Theories of Reasoned Action and Planned Behaviour Applied to Business Decisions: A Selective Annotated Bibliography. *Journal of New Business Ideas & Trends*, 2011, 9(1), pp. 43-50.
- Sudha, M. & Sheena, K. (2017). Impact of Influencers in Consumer Decision Process: the Fashion Industry. *SCMS Journal of Indian Management*.
- Thompson, K., E., & Panayiotopoulos, P. (1999) Predicting behavioural intention in a small business context. *Journal of Marketing Practice: Applied Marketing Science*, Vol. 5 Issue: 3, pp.89-96.

- Trochim, W.M. and Donnelly, J.P. (2006) *The Research Methods Knowledge Base*. 3rd Edition, Atomic Dog, Cincinnati, OH.
- Walters, C. G. (1974) “Organizational Behavior - Human Behavior at work”, 9th edition New Delhi: Tata McGraw Hill.
- Wen, B., S. (2018). *The Effects of Social Media on Consumer Behavior in Tourism: Study among University Students*. (Bachelor thesis). Faculty of Information and Communication Technology, University of Tunku.
- Zinkhan, G. M. (1992). “Human Nature and Models of Consumer Decision Making”, *Journal of Advertising*, 21 (4) II-III, 1992.

THE INTEGRATION OF POE METHOD TO CHEMISTRY II COURSE LABORATORY APPLICATIONS IN SCIENCE TEACHER TRAINING PROGRAM

Gülseda Eyceyurt Türk
Sivas Cumhuriyet University
geyceyurt@cumhuriyet.edu.tr

Hatice Güngör Seyhan
Sivas Cumhuriyet University
hgunsey@gmail.com

ABSTRACT

In terms of education, argumentation can be considered as a process in which students work in small groups through collaborative problem-solving to support a result or refute counter claims. Can the argumentation which has become very important in terms of scientific literacy or science teaching in the Turkish education system be taught to the students or can the students' argumentation skills be improved? For this purpose, in the General Chemistry Laboratory applications of Chemistry-II course, activities were designed according to the “Predict-Observe-Explain” technique which is one of the activities that can be used for the argumentation based teaching method in science classes and carried out with the prospective teachers. Within the scope of the study, the stages of this technique were determined by the researchers and all activities related to the subjects determined by the Council of Higher Education were designed. In the fall semester of the 2018-2019 academic year, the laboratory practices of Chemistry-I course were conducted with the prospective teachers according to the traditional teaching method. In addition to the data obtained within the scope of the study, prospective teachers' opinions about laboratory applications according to argumentation based teaching method were collected and recommendations which could be considered as basis for further researches were presented.

Keywords: Argumentation based laboratory applications, POE technique, Chemistry II course, prospective science teacher.

INTRODUCTION

Since the beginning of existence, as well as trying to meet many needs which can be considered as basic, human beings have been trying to understand the universe and solve all the negative situations that create / will create problems for themselves. Therefore, human beings have had to keep up with the life required by the age. Since science and technology are in the forefront in the 21st century, the needs of this era have been differentiated, deficiencies, incompetencies have been noticed and / or expected to develop. There is also a need in the forefront to change the characteristics of the people of this century to meet these needs. In this context, 21st century learners need to have more 21st century skills such as being researchers, questioning, critical thinking, innovation, continuous self-improvement, more effective communication or more entrepreneurship. Especially when considered in terms of curricula, 21st century skills are gathered under general titles such as learning and renewal skills, life and professional skills and knowledge, media and technology skills (Karamustafaoğlu, 2018). Therefore, by integrating all these skills into the course contents, in addition to specific objectives in the curriculum, students are expected to use these skills more frequently and as a result, acquire these skills (Karamustafaoğlu, 2018).

Together with all these developments in information and communication technology that direct the human life, the developments that envisage the use of the 21st century skills required by the age more by the learners of this age especially reveal the difference of science from other disciplines (Tezel, 2018). It is a fact that there is a need for learning-teaching environments that will enable students to make the right decisions quickly and correctly in the face of negative situations that they define as problems for themselves, allow them to know how to use the current technology required by the age, and to investigate, question and think critically (Tezel, 2018). We often encounter such environments in argumentation (scientific debate) media. Especially in the studies conducted in recent years in science education, with the integration of these environments into learning-teaching environments, we notice the existence of -alternative approaches- that encourage students to enter into the scientific debate process by evaluating their claims with data and reasons, to think critically, to make judgments and to make scientific decisions by using scientific thinking skills. (Tüccaroğlu & Şimşekli, 2018; Karakaş, 2019; Varinlioğlu, 2018; Kaya, 2018; Kalemkuş, 2018; Şengül, 2017; Demirel, 2017; Çakan Akkaş, 2017; Çekbaş, 2017; Aydoğdu, 2017; Tucel, 2016; Güler, 2016; Tola, 2016; Doğru, 2016; Şahin, 2016; Balcı, 2015; Kınık Topalsan, 2015; Koçak,

2014; Demirel, 2014; Polat, 2014; Hasacebi 2014; ztrk, 2013). In all these studies which are taken into the scope of the research, the effectiveness of the argumentation-based learning approach, which is one of the learning-teaching approaches particularly aiming at revealing the 21st century skills of the students, is examined. In recent years, MEB makes improvements to create learning and teaching environments in which students can easily express their ideas, support their ideas with many justifications, refute the claims of their classmates and thus develop counter arguments (Meb, 2018).

The concept of argument was first introduced into literature by Toulmin in 1958. Toulmin, in his book about the use of argumentation, defined the argument as “a claim and its justification,” as a complex or variable means of communication. For the concept of “argument”, many researchers have made many different definitions during the years of entry into the literature: a concept that includes a valid claim, reasons or evidence combined in a systematic way (Habermas, 1984), an interactive scientific discussion in the teaching process (Chinn & Anderson, 1998), a sentence an individual produces to say a combination of claim and reason (supporting-justification) sentences in support of a claim (O’Keefe, 1977), a process of discussion involving two or more individuals to exchange ideas or to make opposing claims (Rieke & Sillars, 1984). Based on all these definitions, the argument can be defined as the sentence that the individual says and / or puts forward, and argumentation can be defined as a dynamic status of discussion involving two or more individuals, ie, a social process (Nussbaum, 2008). Argumentation is an important part of science education which is supported and evaluated by scientific claims, empirical or theoretical evidences (Erduran & Jimenez-Alexandre, 2008), which includes thinking and writing activities individually or as a group (Driver, Newton & Osborn, 2000; Osborne, Simon & Erduran, 2004).

Together with the arrangements made in the science course curriculum by the Ministry of National Education in 2013, the concept of argumentation was introduced in the Turkish education system for the first time. While the strategies and methods adopted in the program retain their importance and place as in previous years, argumentation has also taken its place as a method in this program. Tezel (2018) underlines that a change has been made in the science course curriculum of MEB by including learning based on research and questioning as “explaining and forming arguments” (Meb, 2013) rather than defining it merely as exploring and experimental. Perhaps the most important issue that reveals the importance of the argumentation method that is frequently used in science courses in recent years is that it is the most effective method that can put the individuals in action for learning (Aldağ, 2006). In this method, students will try to analyze and evaluate alternative perspectives and alternative solutions in order to solve the problems at hand and to make decisions about subjects. The cognitive imbalance and incompatibility created by the alternative perspectives in the learner already provides the driving force for thinking to begin.

When the studies in which the effectiveness of this method, which MEB frequently included in the curricula of science courses particularly after 2013, are examined, it was determined that the use of the argumentation based teaching method increased the social understanding and environmental sensitivity in students (Fettahlioğlu, 2016; Kırbağ-Zengin, Keçeci, Kırılmazkaya & Şener, 2011), it developed their argument skills (Topçu & Atabey, 2017) and high-level thinking skills (Yıldırım & Nakiboğlu, 2014), it made positive effects on their academic success (Aslan, 2012; ğreten & Uluınar, 2014) and conceptual understanding levels (Acar, Tola, Karaam & Bilgin, 2016; Tezel & Yılmaz, 2017) and it also affected positively their meta-cognitive strategies (Aydın & Kaptan, 2014; Ulu & Bayram, 2014), and it was effective in settling of science culture in the students, activating their scientific judgment and logic skills and acquiring scientific literacy (Erduran & Jimenez-Alexandre, 2008). In the studies examining the effectiveness of the argumentation-based teaching method, there are studies that result in negative feedback as well as positive feedback from the students. In some studies, it was observed that there was no development of argument skills in the students at the expected level or that students were not very active in the process (Demirel, 2014; Namdar & Demir, 2016; zdemir, 2015). In a study conducted, Kuhn (2010), summarizes the reason why students did not show the expected level of behavior and / or skill in science classes in which they frequently use argumentation-based teaching method, as that especially students in lower education levels have difficulty in managing and structuring the relationship between argument elements such as data and claim. In order to avoid the difficulties experienced by the learners at these stages, it is necessary to use appropriate teaching strategies to develop students' these skills in science classes (Osborne, Erduran & Simon, 2004). In this context, the strategies that can be used for the argumentation-based teaching method that are frequently used in science classes are as follows:

- Table of Statements
- Concept map consisting of student ideas

- Samples of science experiment reports prepared by the students
- Competing theories-concept comics
- Competing theories-stories
- Forming a discussion
- Predict-Observe-Explain
- Designing an experiment

Predict-Observe-Explain: Students are introduced to the expected experiment. They are asked to discuss their predictions about what will happen at the end of the experiment in small groups and provide reasons to justify their thoughts. Students are then expected to perform their experiments and record their observations during this process. At the end of the experiment, the students are asked to compare their pre-experiment estimates with the results they have achieved through the observations they record in the experimental process. If the estimation and the results do not match, the students are asked to evaluate their previous and subsequent new thoughts and make an explanation with the evidence (White & Gunstone, 1992).

Purpose of the Research

Can argument structuring skills develop in students after the argumentation-based teaching method activities proved to be a very useful method for science teaching by various studies?

Based on this basic aim, the aim of the activities prepared by the laboratory applications based on the Predict-Observe-Explain (TGA) strategy, which is one of the strategies that can be used in the argumentation in Chemistry II course taught within the scope of Science Teacher Training Program, is to investigate the effect of the activities on the understanding of prospective science teachers on certain chemistry subjects and take their opinions regarding the method.

Method

Case study pattern, one of the qualitative research methods, was used in the study.

Study Group

The participants of the research consist of 24 prospective science teachers who continue their education in a state university in Turkey in 2018-2019 academic year and who take Chemistry II course. These prospective teachers, who participate in the study, have traditionally carried out the laboratory practices of Chemistry I course which they took in the fall semester of the related academic year.

Process of Application

Within the scope of the study, the chemistry subjects that are expected to be realized for one semester and which the Higher Education Council envisages for the Science Teacher Training Program were examined by the researchers, the related experiments were designed and the chemistry subjects for a total of 8 weeks were designed and prepared according to the argumentation-based teaching method according to the strategies that can be used in science classes.

In this study, the results of a lesson plan prepared according to the POE strategy, which is one of the strategies that can be used for argumentation based teaching method, is presented. To be used in the activities designed within the scope of the POE strategy, the relevant literature has been examined by the researchers and the NPL Worksheets have been prepared in three stages as “Let’s Predict, Let’s Observe and Let’s Explain”. The pilot application of the study was conducted with prospective teachers who were studying in different academic year than the prospective teachers with whom the actual application would be carried out. Pilot applications were carried out before the main applications in order to detect possible negative situations and to take precautions. It was observed that some problems were experienced during the pilot implementation, the prospective teachers had difficulty in understanding the arguments (claim, data, justification, support, limitation and rebuttal) and had difficulty in the group discussions, this situation decreased with increasing number of activities and considering the expert opinions the POA worksheets and the contents of the activities were organized and the main implementation was started.

Before starting the POE activities, which is one of the strategies that can be used for the argumentation based teaching method, preliminary studies which will activate their argument skills (Activity of putting the egg

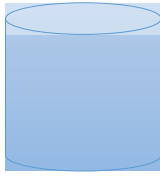
into the glass bottle) were carried out with the prospective teachers in the study group. These preliminary activities started with a problem situation that would enable prospective teachers to use their preliminary information and predictions more frequently. Afterwards, they were made to perform an experimental activity to make observations and thus, their skills for recording their observations were tried to be activated. In the final stages of the preliminary study activities, an environment was provided in which they compared their predictions and the results obtained from the data obtained during their observations. During all these pre-activity stages, prospective teachers worked as a group. Together with the prospective teachers, who had knowledge about the stages of an argument structuring process during the preliminary study, the teaching of the targeted chemistry subjects within the scope of the study was started.

During the Let's Predict phase, which aims to reveal pre-knowledge and / or misconceptions of prospective teachers about related chemistry subjects before the activities, the prospective teachers wrote their opinions by discussing and making a joint decision. During the Let's Observe phase of POE activities, prospective teachers carried out the related experiments in accordance with the instructions in the POE worksheets. During this process, they were asked to make the expected observations and record them if necessary. In the last stage of the POE activities, which is "Let's Explain", the prospective teachers were asked to discuss in detail how the predictions that they were asked to write before the activities were in agreement with the results they reached after the experiments and then they wrote these individually on the relevant places of the POE worksheets that were redistributed. They were also asked by the researches to justify the reasons for possible disagreements between their predictions for the questions directed to them before the activities and the results they reached after the activities.

8 chemistry subjects were determined for the strategies that can be used for a total of 8 weeks of argumentation based teaching method. Within the scope of this study, the POE worksheet prepared by the researches for teaching the subject of "ionization in acid, base and salt solutions and the effect of concentration on electrical conductivity" prepared for POE activities, which is one of these strategies, is below:

Prospective teachers were asked to prepare samples of acid-base and salt solutions at different concentrations first and then to check the electrical conductivity of these solutions. For this purpose, the students were asked to create a claim and justification about the lamp brightness to test the conductivity of these solutions before the activities for the Let's Predict stage of POE-Conductivity worksheet. In addition to acid, base and salt solutions, pure water and sugar solution samples were given to the students for this chemistry subject and comparison was made for all solutions.

LET'S PREDICT



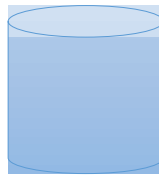
NaCl Solution

I



C₆H₁₂O₆ Solution

II



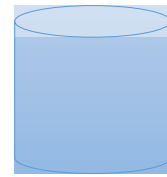
H₂SO₄ Solution

III



NaOH Solution

IV



Pure Water

V

Let's think that electrolytic conductivity experiments are made for 1M, 3M and 5M concentration samples of each solution explained above. Comments can be made according to whether the lamp is on or off in this experiment. Discuss conductivity and lamp brightness for each solution with your group, write your claims and justifications. For lamp brightness, put the solutions in order as in group (1,3,5M) and inter-groups (NaCl, C₆H₁₂O₆, H₂SO₄, NaOH, Pure Water)

Your claim

- Lamp is on / off in 1 M NaCl solution
- Lamp is on / off in 1 M C₆H₁₂O₆ solution
- Lamp is on / off in 1 M H₂SO₄ solution
- Lamp is on / off in 1 M NaOH solution
- Lamp is on / off in 1 M pure water
- Lamp is on / off in 3 M NaCl solution
- Lamp is on / off in 3 M C₆H₁₂O₆ solution
- Lamp is on / off in 3 M H₂SO₄ solution
- Lamp is on / off in 3 M NaOH solution
- Lamp is on / off in 3 M pure water
- Lamp is on / off in 5 M NaCl solution
- Lamp is on / off in 5 M C₆H₁₂O₆ solution
- Lamp is on / off in 5 M H₂SO₄ solution
- Lamp is on / off in 5 M NaOH solution
- Lamp is on / off in 5 M pure water

Your Justification

- * Because,
- * Because,
- * Because,
- * Because,
- * Because,
- * Because,
- * Because,
- * Because,
- * Because,
- * Because,
- * Because,
- * Because,
- * Because,
- * Because,
- * Because,

- Considering the concentration difference of each solution (I_{1M}, I_{3M} ve I_{5M}), order the conductivity level from high to low and write your justification.

NaCl :
C₆H₁₂O₆ :
H₂SO₄ :
NaOH :
Pure Water :

Your justification:

- Order the conductivity of 5M NaCl, C₆H₁₂O₆, H₂SO₄, NaOH solutions and pure water from high to low and write your justification

During the Let's Observe phase of the POE activity for conductivity, students were asked to conduct the experiment themselves and record it as a table in order to make them dissatisfied with possible misunderstandings. In the second stage of the POE-Conductivity activity, which is "Let's Observe", the prospective teachers were asked to prepare the solutions specified in the relevant worksheet at the desired concentrations. Then, the prospective teachers respectively observed the conductivity of the solutions they prepared in different concentrations and wrote the data obtained at the end of the observation to the relevant places in the worksheet.

LET'S OBSERVE

Check the electrical conductivity of the solutions by installing the necessary devices for the solutions you have prepared and record your observations in the table below.

		Lamp On/Off	Conducts/Doesn't Conduct Electricity
NaCl	1 M		
	3 M		
	5 M		
C ₆ H ₁₂ O ₆	1 M		
	3 M		
	5 M		
H ₂ SO ₄	1 M		
	3 M		
	5 M		
NaOH	1 M		
	3 M		
	5 M		
Pure water	1 M		
	3 M		
	5 M		

At the Let's Explain phase, which helps the students reconstruct their concepts, the students were asked to discuss in their groups by comparing their claims and experimental observations in order to construct the concepts themselves.

LET'S EXPLAIN

Are your claims compatible with your experiment? Correct the wrong claims by comparison. Write your results and comments regarding the experiment.

The effectiveness of POE activities was evaluated by the researchers through qualitative observations during the activities and fully structured interview forms made after the activities.

FINDINGS AND RESULTS

Before and after the TGA activities related to the electrical conductivity of acid-base and salts, students from 10 different groups were asked to fill the worksheets before and after the experiment. The relevant arguments are presented in the tables below by performing content analysis. While analyzing, the arguments were evaluated based on the following definitions.

- Acids, bases and salts dissolve in water by decomposition to ions.

- Conductivity increases as ion concentration (concentration is the amount of material in a certain volume) increases.
- Increasing the temperature often means increasing the solubility and thus the ion concentration in the solution. Then you can increase the conductivity by heating the solution.
- Pure water decomposes to ions a small extent. However, since the amount of ionization is very low, its conductivity is also very low. Therefore, the LED and / or lamp do not light.

Five tables were presented in order to demonstrate the relative conductivity of (1) NaCl solution, (2) C₆H₁₂O₆ solution, (3) H₂SO₄ solution, (4) NaOH solution and (5) Pure water mentioned in the activities separately.

Table 1. Content analysis results for *NaCl* solution

ARGUMENT STRUCTURING	Before POE Activities			After POE Activities	
	Scientific (Claim + justification)	Unscientific (Claim + justification)		Scientific (Claim + justification + data + explanation + refutation)	Unscientific (Claim + justification + data + explanation + refutation)
	Claim-CORRECT Justification-CORRECT	Claim-INCORRECT Justification-INCORRECT	Claim-CORRECT Justification-INCORRECT	Claim-CORRECT Justification-CORRECT Data-CORRECT Explanation-CORRECT Refutation(If Any)-CORRECT	Claim-INCORRECT Justification-INCORRECT Data-INCORRECT Explanation-INCORRECT/E EMPTY
1st Group			Salt increases the electrolyte of water.	The NaCl solution dissolves in water in ionic form and conducts electricity. The higher the concentration, the higher the brightness of the lamp	
2nd Group	The NaCl solution contains Na ⁺ and Cl ⁻ ions. So it transmits electricity. The higher the concentration, the higher the lamp brightness.			Predictions were correct.	
3rd Group		It does not conduct electricity because NaCl is a base. Bases do not conduct electricity.		NaCl is a salt. Since it is an ionic compound, it decomposes into ions in water. Ionic solutions conduct electricity. The higher the concentration, the higher the lamp brightness.	
4th Group	NaCl is an ionic solid. The lamp illuminates because the ionic solutions conduct electricity.			The lamp turns on. Because NaCl is ionic. The particles are dispersed ionically. Ions carry charge. Therefore, they transmit electricity. As the concentration increases, the brightness of the	

			lamps increases as the ionization increases.
5th Group	The NaCl solution conducts electricity. The higher the molarity of the salt solution, the higher the lamp brightness.		The higher the concentration of salt solutions, the higher the brightness of the lamps.
6th Group		The lamp does not light in this solution. Because sufficient conductivity cannot be achieved.	Before the experiments, we thought that the salt solution did not conduct electricity, but it did. Because it is an ionic compound, its aqueous solution conducts electricity. The higher the concentration, the higher the conductivity.
7th Group	Since salt dissolves ionic in water, it conducts electricity.		The salt water solution is an ionic solution and conducts electricity as there are positive and negative charges in the solution. The higher the concentration, the higher the lamp brightness.
8th Group	It conducts electricity		Electrical conduction was observed in aqueous solutions of ionic soluble compounds. The lamp lights up and the brightness increases as the concentration increases.
9th Group		Only 1M solution does not conduct electricity. However, the 3 and 5M solutions will transmit electricity because they are stronger.	The salt solution conducts electricity and conducts electricity at all concentrations. Because it dissolves in water by decomposing into ions.
10th group	It has conductivity because it is electrolyte.		Salt water is a solution of electrolyte. NaCl is ionically soluble in water, and the higher the concentration, the higher the lamp brightness.

Table 2. Content analysis results for $C_6H_{12}O_6$ solution

ARGÜ	BEFORE POE ACTIVITIES		AFTER POE ACTIVITIES	
	Scientific	Unscientific	Scientific	Unscientific

	(Claim + justification)	(Claim + justification)	(Claim + justification + data + explanation + refutation)	(Claim + justification + data + explanation + refutation)
	Claim-CORRECT Justification-CORRECT/EMPTY	Claim-INCORRECT Justification-INCORRECT/EMPTY	Claim-CORRECT Justification-CORRECT Data-CORRECT Explanation-CORRECT Refutation(If Any)-CORRECT	Claim-INCORRECT Justification-INCORRECT Data-CORRECT/INCORRECT Explanation-INCORRECT/EMPTY
1st Group		Sugar Reduces the electrolyte of water. Conductivity will decrease as the concentration increases.	The lamp does not light. Because glucose is soluble in molecular form and does not conduct electricity.	
2nd Group	The sugar solution is molecularly soluble and does not conduct electricity.		The lamp does not light because the sugar solution is molecularly dissolved. Since there are no ions in the environment, no electricity is transmitted. Lamp brightness cannot be mentioned.	
3rd Group	The sugar solution does not conduct electricity.		The sugar solution does not conduct electricity and the lamp does not light because it dissolves molecularly and there are no ions in the environment.	
4th Group	Sugar is not conductive so the lamp does not light		The sugar solution is molecular, the lamp does not light. It will not conduct electricity because it dissolves in molecular structure and no ions are formed. Since there is no mention of lamp lighting, it will have no effect on the brightness as the concentration increases.	
5th Group	Sugar does not transmit electricity.		The lamp does not light in the sugar solution. Because the sugar in this solution is molecularly soluble, no brightness can be mentioned.	
6th Group	Sugar cannot conduct electricity, and in none of them the lamps will light.		Since sugar dissolves in water in molecular structure, it will not conduct electricity. The lamp brightness will not be affected by the concentration.	

7th Group	Sugar does not decompose into ions and does not conduct electricity.	Since sugar is dissolved in water in molecular structure, there will be no anion and cation to transmit electricity in the medium. Therefore, it cannot conduct electricity and the lamp does not light.
8th Group	The sugar solution does not conduct electricity. (No justification submitted)	Compounds that are soluble by dissolving into ions in water conduct electricity, while molecular soluble compounds do not dissolve into ions and do not conduct electricity and the lamp is not lit.
9th Group	It does not conduct electricity. (No justification submitted)	Since the sugar solution does not decompose to ions, it does not conduct electricity.
10th Group	The glucose solution is not electrolyte. The lamp does not light..	Since sugar is molecularly dissolved in water, it does not conduct electricity.

Table 3. Content Analysis Results for H_2SO_4 solution

ARGUMENT STRUCTURING	BEFORE POE ACTIVITIES			AFTER POE ACTIVITIES	
	Scientific (Claim + justification)	Unscientific (Claim + justification)		Scientific (Claim + justification + data + explanation + refutation)	Unscientific (Claim + justification + data + explanation + refutation)
	Claim-CORRECT Justification-CORRECT/EMPTY	Claim-INCORRECT Justification-INCORRECT/EMPTY	Claim-CORRECT Justification-INCORRECT/EMPTY	Claim-CORRECT Justification-CORRECT Data-CORRECT Explanation-CORRECT Refutation(If Any)-CORRECT	Claim-INCORRECT Justification-INCORRECT Data-INCORRECT Explanation-INCORRECT/EMPTY
1st Group			Acids conduct electricity / No justification presented)	As aqueous solutions of acids contain ions, they conduct electricity. The higher the concentration, the higher the number of ions and the higher the lamp brightness.	
2nd Group	Acids conduct electricity. Because acids dissolve ionically.			Acids dissolve in aqueous solutions by decomposition into ions as H^+ and SO_4 . Therefore, since there are ions in the environment, it will conduct electricity. The higher the concentration, the higher the number of ions, the higher the lamp brightness.	

3rd Group		Acids conduct electricity..	Because acid gives H + ion to water, H ₂ SO ₄ is an acid and dissolves into H + and SO ₄ ⁻ ions and dissolves and therefore conducts electricity. The higher the concentration, the higher the number of ions and the higher the lamp brightness.
4th Group	Acids are semiconductor materials they neither do nor do not transmit electricity. Their molarity does not affect their conductivity.		H ₂ SO ₄ is an acid and acids conduct electricity. Because it dissolves in water by decomposing into ions. The higher the concentration, the higher the brightness of the lamp.
5th Group	Acids do not have conductivity.		Acids conduct electricity. Because it dissolves by ionizing in water, as the concentration increases, the lamp brightness increases.
6th Group		Acids conduct electricity (no justification presented)	Since H ₂ SO ₄ is acid, it dissolves into water as ions. Since there are ions in the medium, it conducts electricity and as the concentration increases, the conductivity will increase.
7th Group		Acids conduct electricity. (No justification submitted)	This solution has electrical conductivity since it will dissolve in H + and SO ₄ form. Increasing the concentration will also increase the brightness of the lamp.
8th Group	1M acid solution will not conduct electricity, while 3 and 5M solutions will conduct electricity.		Since H ₂ SO ₄ dissolves ionically in water, it transmits electricity, and as the concentration increases, the brightness increases.
9th Group		Acids conduct electricity (no justification submitted)	As H ₂ SO ₄ dissolves ionically in water, it transmits electricity, and as the concentration increases, the brightness increases.
10th Group	H ₂ SO ₄ is not electrolyte.		Acids conduct electricity in aqueous solutions. Because they dissolve ionically. Electrical conductivity is present in the ionic medium. The higher the

concentration, the higher the brightness.

Table 4. Content analysis results for *NaOH* solution

ARGUMENT STRUCTURING	BEFORE POE ACTIVITIES			AFTER POE ACTIVITIES	
	Scientific (Claim + justification)	Unscientific (Claim + justification)		Scientific (Claim + justification + data + explanation + refutation)	Unscientific (Claim + justification + data + explanation + refutation)
	Claim-CORRECT Justification-CORRECT	Claim-INCORRECT Justification-INCORRECT/EMPTY	Claim-CORRECT Justification-INCORRECT/EMPTY	Claim-CORRECT Justification-CORRECT Data-CORRECT Explanation-CORRECT Refutation(If Any)-CORRECT	Claim-CORRECT Justification-INCORRECT Data-CORRECT/INCORRECT Explanation-INCORRECT/EMPTY
1st Group		The ions of this material do not conduct electricity because it is base and the bases do not conduct electricity.			The lamp was lit in NaOH solution. The higher the concentration, the higher the brightness.
2nd Group	The lamp turns on. Because bases are also soluble in water as ions. (Na + and OH-)			Bases, like acids, decompose in aqueous solutions in ions. The number of ions will increase with concentration. Conductivity will therefore increase with concentration.	
3rd Group		Bases do not conduct electricity. Because it gives OH-ion. It is not a sufficient condition for electrolyte.		The NaOH solution also conducts electricity. Because it dissolves into ions. The ions in the medium provide electrical conductivity.	
4th Group	Bases conduct electricity because NaOH is electrolyte			Since it is ionic, it conducts electricity and its brightness increases as the concentration increases.	
5th Group		The lamp does not light. Because the bases do not		Bases dissolve in water and give ion to the medium, conductivity exists in ionic environment. Bases also provide conductivity and the lamp lights.	

		conduct electricity.	
6th Group		Bases do not conduct electricity.	Bases conduct electricity. NaOH also conducts.
7th Group	Bases are an ionic solution, conducting electricity.		Our material is a basic material and it gives ions to the environment in its aqueous solution and has conductivity. The higher the concentration, the higher the brightness.
8th Group		NaOH does not conduct electricity.	The solution conducts electricity, there is conductivity in ionic dissolution. The present solution is a basic solution and is ionic soluble.
9th Group		Our solution does not conduct electricity.	In the NaOH solution, the lamp will light and the solution will dissolve into water as ions. And the solutions of dissolved substances that dissolve into ions conduct electricity well.
10th Group		Bases conduct electricity.	Since the present solution is ionic, it conducts electricity.

Table 5. Content analysis results for *pure water*

ARGUMENT STRUCTURING	BEFORE POE ACTIVITIES			AFTER POE ACTIVITIES	
	Scientific (Claim + justification)	Unscientific (Claim + justification)		Scientific (Claim + justification + data + explanation + refutation)	Unscientific (Claim + justification + data + explanation + refutation)
	Claim-CORRECT Justification-CORRECT	Claim-INCORRECT Justification-INCORRECT/ EMPTY	Claim-CORRECT Justification-INCORRECT/ EMPTY	Claim-CORRECT Justification-CORRECT Data-CORRECT Explanation-CORRECT Refutation(If Any)- CORRECT	Claim-CORRECT Justification-INCORRECT Data-CORRECT/ INCORRECT Explanation-INCORRECT/EMPTY
1st Group			Pure water does not conduct electricity	Pure water does not conduct electricity. The ions of water are not high enough to conduct electricity.	
2nd Group		Pure water conducts electricity.		Pure water does not conduct electricity. Pure water has ions but can be neglected because of its low electrical conductivity. So the lamp does not light	
3rd Group			Pure water does not		The lamp does not light in pure

		conduct electricity. Because no ionization is observed in water.	water. It did not conduct electricity because there was no ionization.
4th Group	Because pure water ionizes, it conducts electricity.	Pure water does not conduct electricity. Due to ionization, ions are present in the medium, but not at enough concentration to conduct electricity.	
5th Group		Because pure water is neutral, it does not conduct electricity.	Pure water does not conduct electricity
6th Group		Pure water does not conduct electricity because it is pure.	Pure water does not conduct electricity
7th Group	The lamp is lit because pure water conducts electricity.	The lamp does not light in pure water. Ions are not sufficient for electrical conduction.	
8th Group	Pure water conducts electricity. Because it decomposes into ions		Pure water does not conduct electricity
9th Group		Pure water does not conduct electricity	Pure water does not conduct electricity
10th Group	Pure water conducts electricity.	Pure water ionizes. However, there is not enough ionization to conduct electricity, so it cannot conduct electricity. No lamp lighting can be observed.	

As it can be seen from the tables, the most important finding after POE activity is that before the activity teachers generally construct non-scientific arguments before the activity, after the activity they change their false and / or missing / inadequate arguments, they construct scientific arguments and correct misconceptions by realizing them. In addition, prospective teachers were not able to justify many of their arguments before conducting experiments during activities (pure water does not conduct electricity, NaCl is a base so conducts electricity, acids conduct electricity, etc.), and they were able to write their reasons and refutes for many arguments, including sample arguments given after the experiments.

CONCLUSIONS AND DISCUSSION

After the qualitative observations made by the researchers during the implementation of the POE activities carried out with the prospective teachers and the activities based on the strategies prepared according to the 8-

week argumentation-based teaching method, the results obtained as a result of the fully structured interview forms given to the prospective teachers are as bellow:

- POE activities attracted the attention of the students and increased their motivation towards the course,
- The application of the method positively affected students' attitudes towards the laboratory and chemistry.
- Students enjoyed the application of the method,
- Students actively participated in the learning process,
- The method was effective in revealing the students' alternative concepts.
 - o NaOH does not dissolve into ions and does not conduct electricity.
 - o Acids conduct electricity better,
 - o NaCl is a base and does not conduct electricity,
 - o Pure water conducts electricity
 - o When acids are combined with pure water, it increases the conductivity of water,
 - o Bases are weaker than acids, so conductivity of electricity is less etc.
- The method has helped students to learn some basic concepts in depth.
 - o Before the activities, it was seen that many prospective teachers did not fully understand the concepts of acidity-basicity-conductivity and the relationships between them, and after the activity it was seen that these concepts and the relationships between them were more accurately and firmly structured.

One of the questions asked in the fully structured interview form was what prospective teachers think about the implementation of the laboratory practices of the related chemistry courses according to two different methods. 92% of the prospective teachers stated that there was a difference and the biggest difference was that the experiments were given as ready in the first period, and a paper was distributed including all information including how to set up the experiment setup and what was requested at the end of the experiment. It was observed that 8% of the prospective teachers were content to say that there wasn't any difference and what that they did were experiments again. Another question in the form was about how often they needed basic chemistry knowledge in their traditional laboratory activities and whether they experienced any difference in their activities during this period. 98% of the prospective teachers stated that they were not asked any theoretical information about the experiment that they were expected to perform in the first term laboratory applications and that the questions were mostly related to the results of the experiments and findings they obtained from their observations. Therefore, they stated that they did not need chemistry knowledge very much, because even how they should carry out the experiment was given to them in writing. Another question of the fully structured form was on the POE strategy they carried out this semester. Prospective teachers were asked at which stage of the POE strategy they had more difficulty, and how well the results obtained after the experiment were consistent with their predictions, and 78% of prospective teachers noticed that they had difficulty in making predictions expected from them individually before the experiment, but when they discussed together with their group friends, it was quicker and more accurate for them to reach the answer and/or expected target. 84% of the prospective teachers said that they realized that what they knew before was actually wrong. As an example, a few students said that they had learned that the base solution (NaOH), which they never thought to conduct electricity before, actually conducts electricity and they were very happy. Finally in the fully structured interview form, prospective teachers were asked to evaluate both semesters according to their own opinions. 95% of the prospective teachers stated that the experiments in the first semester were already ready, that they were given by the responsible researchers what they should do in writing and it was enough for them to come to the school. The most important finding of 99% of prospective teachers for this semester was that they needed a lot of basic chemistry knowledge. They stated that they did not have any problems about time during the laboratory week, which was related to correct and sufficient chemistry knowledge, and that they answered the questions researchers asked during the process in an accurate and acceptable level.

In the light of all the data obtained within the scope of the study, the activities carried out for the purpose of POE strategy is an effective argumentation based teaching method which is easy to apply and which reveals alternative concepts of students, provides meaningful learning by enabling them to construct various science concepts in their own minds, leads to more positive attitudes towards science and increases motivation. When all these features are taken into consideration, it is seen that the POE strategy will be beneficial for teachers in applying

the principles revealed from constructivist learning theory in the teaching process. Studies in the literature support this situation. Köseoğlu et al. (2002) reached similar results after POE activity with prospective chemistry teachers about boiling and vapor pressure. Özdemir (2011) showed that activities prepared with POE-based laboratory applications on acid base had a positive effect on conceptual achievements of science prospective teachers and did not have a positive effect on their scientific process skills. Güngör and Özkan (2017) stated that prospective science teachers find TGA applications in the biology laboratory more enjoyable than other methods. In addition, it has been determined that it allows the prospective teachers to demonstrate their level of knowledge and their cognitive skills in using them.

REFERENCES

- Karamustafaoğlu, S., 2018, 21. yüzyıl becerileri ve fen öğretimi,
- Karamustafaoğlu, O., Tezel, Ö. & Sarı, U., 2018, Güncel yaklaşım ve yöntemlerle etkinlik destekli fen öğretimi, Pegem Akademi.
- Tüccaroğlu, E.P. & Şimşekli, Y., 2018, Effects of argument-based science inquiry (ABSI) approach used in the unit of "Reproduction growth development in living beings" on the success levels of students, Universal Journal of Educational Research 6(10): 2379-2383.
- Karakaş, H. (2018). Çevre-enerji konularına yönelik gerçekleştirilen argümantasyon temelli öğretimin sınıf öğretmenleri adaylarının eleştirel düşüncelerine, akademik başarılarına ve argüman oluşturma becerilerine etkisi. Yayınlanmamış Doktora Tezi, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.
- Varinlioğlu, S. 2018. Bilimsel tartışma etkinliklerinin 7. sınıf öğrencilerinin çevreye yönelik tutumlarına ve bilgi düzeylerine etkisi, Yayınlanmamış Yüksek Lisans Tezi, Erciyes Üniversitesi Eğitim Bilimleri Enstitüsü, Kayseri.
- Kaya, M., 2018. Argümantasyon yaklaşımının öğrencilerin akademik başarı ve tutumlarına etkisi, Yayınlanmamış Yüksek Lisans Tezi, Fırat Üniversitesi Eğitim Bilimleri Enstitüsü, Elazığ.
- Kalemkuş, J., 2018. Deneylerle fen öğretimi ve argümantasyona dayalı fen öğretiminin bazı değişkenler üzerindeki etkilerinin incelenmesi, Yayınlanmamış Yüksek Lisans Tezi, Necmettin Erbakan Üniversitesi, Eğitim Bilimleri Enstitüsü, Konya.
- Şengül, Ö., 2018. Science teachers' epistemological beliefs, PCK of argumentation, and implementation: An exploratory study, Yayınlanmamış Doktora Tezi, Georgia State University / Yurtdışı Enstitü.
- Demirel, T., 2017. Argümantasyon yöntemi destekli artırılmış gerçeklik uygulamalarının akademik başarı, eleştirel düşünme becerisi, fen ve teknoloji dersine yönelik güdülenme ve argümantasyon becerisi üzerindeki etkisinin incelenmesi, Yayınlanmamış Doktora Tezi, Çukurova Üniversitesi Sosyal Bilimler Enstitüsü, Adana.
- Çakan Akkaş, B.N., 2017. Argümantasyon tabanlı bilim öğrenme (ATBÖ) yaklaşımının temel alındığı öğrenme ortamının 5. sınıf öğrencilerinin akademik başarılarına ve eleştirel düşünme becerilerine etkisi, Yayınlanmamış Yüksek Lisans Tezi, Kastamonu Üniversitesi Fen Bilimleri Enstitüsü, Kastamonu.
- Çekbaş, Y., 2017. Argümantasyon tabanlı astronomi öğretiminin fen bilgisi öğretmen adaylarının bilimin doğasına, sözde-bilim ve epistemolojik inançlarına etkisinin değerlendirilmesi, Yayınlanmamış Doktora Tezi, Pamukkale Üniversitesi Eğitim Bilimleri Enstitüsü, Denizli.
- Aydoğdu, Z., 2017. Argümantasyon tabanlı öğretimin öğrencilerin fene yönelik akademik başarı, motivasyon, ilgi ve tutumlarına etkisinin incelenmesi, Yayınlanmamış Yüksek Lisans Tezi, Sakarya Üniversitesi Eğitim Bilimleri Enstitüsü, Sakarya.
- Tucel, S.T., 2016. Argümantasyon tabanlı bilim öğrenme yaklaşımının 8. sınıf öğrencilerinin fen başarılarına, üst bilişlerine ve epistemolojik inançlarına etkisi, Yayınlanmamış Yüksek Lisans Tezi, Orta Doğu Teknik Üniversitesi Sosyal Bilimler Enstitüsü, Ankara.
- Güler, Ç., 2016. Fen laboratuvarı derslerinde kullanılan 'Argümantasyon tabanlı bilim öğrenme' yaklaşımının, fen bilgisi öğretmen adaylarının akademik başarılarına etkisi ve yaklaşım hakkındaki görüşleri, Yayınlanmamış Yüksek Lisans Tezi, Akdeniz Üniversitesi Eğitim Bilimleri Enstitüsü, Antalya.
- Tola, Z., 2016. Argümantasyon öğretiminin ortaokul 6. sınıf öğrencilerinin madde ve ısı ünitesine yönelik kavramsal anlama, bilimsel düşünme ve bilimin doğası anlayışları üzerine etkisi, Yayınlanmamış Yüksek Lisans Tezi, Kocaeli Üniversitesi Fen Bilimleri Enstitüsü, Kocaeli.
- Doğru, S., 2016. Argümantasyon temelli sınıf içi etkinliklerin ortaokul beşinci sınıf öğrencilerinin akademik başarılarına, mantıksal düşünme becerilerine ve tartışmaya istekliliklerine olan etkisi, Yayınlanmamış Yüksek Lisans Tezi, Mustafa Kemal Üniversitesi Sosyal Bilimler Enstitüsü, Hatay.

- Şahin, E., 2016. Argümantasyon tabanlı bilim öğrenme yaklaşımının (ATBÖ) üstün yetenekli öğrencilerin akademik başarılarına, üstbiliş ve eleştirel düşünme becerilerine etkisi, Yayınlanmamış Doktora Tezi, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.
- Balcı, C., 2015., 8. sınıf öğrencilerine 'Hücre bölünmesi ve kalıtım' ünitesinin öğretilmesinde bilimsel argümantasyon temelli öğrenme sürecinin etkisi, Yayınlanmamış Yüksek Lisans Tezi, Adnan Menderes Üniversitesi Fen Bilimleri Enstitüsü, Aydın.
- Knık Topaslan, A., 2015. Sınıf öğretmenliği öğretmen adaylarının kuvvet ve hareket konusundaki kavram yanılgılarının ontolojik açıdan incelenmesi ve bulunan yanılgıların oluşturulan argüman ortamları ile giderilmesi, Yayınlanmamış Doktora Tezi, Marmara Üniversitesi Eğitim Bilimleri Enstitüsü, İstanbul.
- Koçak, K., 2014. Argümantasyon tabanlı bilim öğrenme yaklaşımının öğretmen adaylarının çözeltiler konusunda başarısına ve eleştirel düşünme eğilimlerine etkisi, Yayınlanmamış Yüksek Lisans Tezi, Hacettepe Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.
- Demirel, O.E., 2014. Probleme dayalı öğrenme ve argümantasyona dayalı öğrenmenin öğrencilerin kimya dersi başarılarına, bilimsel süreç becerilerine ve bilimsel muhakeme yeteneklerine etkilerinin incelenmesi, Yayınlanmamış Yüksek Lisans Tezi, Mustafa Kemal Üniversitesi Sosyal Bilimler Enstitüsü, Hatay.
- Polat, H., 2014. Atomun yapısı konusunda argümantasyon yönteminin ilköğretim 7. sınıf öğrencilerinin başarıları üzerine etkisi, Yayınlanmamış Yüksek Lisans Tezi, İnönü Üniversitesi Eğitim Bilimleri Enstitüsü, Malatya.
- Hasançebi, F., 2014. Argümantasyon tabanlı bilim öğrenme yaklaşımının (ATBÖ) öğrencilerin fen başarıları, argüman oluşturma becerileri ve bireysel gelişimleri üzerine etkisi, Yayınlanmamış Doktora Tezi, Atatürk Üniversitesi Eğitim Bilimleri Enstitüsü, Erzurum.
- Öztürk, A., 2013. Sosyo-bilimsel konularla argümantasyon becerisi ve insan haklarına karşı tutum geliştirmeye yönelik bir eylem araştırması, Yayınlanmamış Doktora Tezi, Çukurova Üniversitesi Sosyal Bilimler Enstitüsü, Adana.
- M.E.B., (2018). Fen Bilimleri Dersi (3, 4, 5, 6, 7 ve 8. Sınıflar) Öğretim Programı. Ankara: Devlet Kitapları Müdürlüğü Basımevi.
- Habermas, J., 1984., Chapter 3, Social Action, purposive activity and communication, p.273ff.
- O'Keefe, D. J. (1977). Two Concept of Argument. The Journal of The American Forensic Association, 13(3), 121-128.
- Rieke, R. D., & Sillars, M. O. (1984). Argumentation and the decision making process .Glenview, IL: Scott, Foresman and Company.
- Nussbaum, E. M. 2008., Collaborative discourse, argumentation, and learning: Preface and literature review. Contemporary Educational Psychology, 33(3), 345-359.
- Erduran, S., & Jimenez-Aleixandre, M. P. (Eds.) (2008). Argumentation in Science Education: Perspectives from Classroom-Based Research. Dordrecht: Springer.
- Driver, R., Newton, P., & Osborne, J. (2000). Establishing the norms of scientific argumentation in classrooms. Science Education, 84, 287-312.
- Osborne J., Simon S. & Erduran S. 2004., Enhancing the quality of argumentation in school science. Journal of Research in Science Teaching. 41(10), 994-1020.
- Milli Eğitim Bakanlığı. 2013. İlköğretim Kurumları (İlkokullar ve Ortaokullar) Fen Bilimleri Dersi (3, 4, 5, 6, 7 ve 8. Sınıflar) Öğretim Programı. Talim ve Terbiye Kurulu Başkanlığı. Ankara.
- Namdar, B. & Demir, A. (2016). Örümcek mi böcek mi? 5. sınıf öğrencileri için argümantasyon tabanlı sınıflandırma etkinliği. Araştırma Temelli Etkinlik Dergisi, 6(1), 1-9.
- Özdemir, H. (2011). Tahmin et- Gözle- Açıkla Stratejisine Dayalı Laboratuvar Uygulamalarının Fen bilgisi öğretmen Adaylarının Asitler ve Bazlar Konusunu Anlamalarına Etkisi (Yayınlanmamış Yüksek Lisans Tezi). Pamukkale Üniversitesi Fen Bilimleri Enstitüsü.
- Özdemir, O. (2015). Sınıf öğretmen adaylarının kalıtsal benzerlik ve farklılıklarla ilgili argümanları. Pamukkale Üniversitesi Eğitim Fakültesi Dergisi(38), 143-155.
- Aydın, Ö., & Kaptan, F. (2014). Fen-teknoloji öğretmen adaylarının eğitiminde argümantasyonun biliş üstü ve mantıksal düşünme becerilerine etkisi ve argümantasyona ilişkin görüşleri. Eğitim Bilimleri Araştırma Dergisi, 4(2), 163-188.
- Ulu, C., & Bayram, H. (2014). Araştırma Sorgulamaya Dayalı Bilim Yazma Aracı Kullanımının Üstbilişsel Bilgi ve Becerilere Etkisi. Turkish International Journal of Special Education and Guidance & Counseling, 3(1), 68-80.

- Acar, Ö., Tola, Z., Karaçam , S., & Bilgin , A. (2016). Argümantasyon destekli fen öğretiminin 6. sınıf öğrencilerinin kavramsal anlamalarına, bilimsel düşünme becerilerine ve bilimin doğası anlayışlarına olan etkisi. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi*, 16(3), 730-749.
- Fettahlıoğlu, P. (2016). Çevirim içi argümantasyon uygulaması ile destekli argümantasyona dayalı öğrenme yaklaşımının çevreye yönelik bilgi ve farkındalık becerisi üzerine etkisi. *Eğitimde Kuram ve Uygulama Dergisi*, 12(6), 1311-1336.
- Kırbağ Zengin, F., Keçeci, G., Kırılmazkaya G. & Şener, A. (2011). İlköğretim Öğrencilerinin Nükleer Enerji Sosyobilimsel Konusunu On-line Argümantasyon yöntemi ile Öğrenmesi. 5th International Computer & Instructional Technologies Symposium, 22-24 September 2011, Elazığ, Turkey.
- Yıldırım, H. E., & Nakiboğlu, C. (2014). Kimya öğretmen ve öğretmen adaylarının derslerinde kullandıkları argümantasyon süreçlerinin incelenmesi. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi*, 14(2).
- Topçu, M. S., & Atabey, N. (2016). Sosyobilimsel konu içerikli alan gezilerinin ilköğretim öğrencilerinin argümantasyon nitelikleri üzerine etkisi. *Bartın Üniversitesi Eğitim Fakültesi Dergisi*.

THE STUDY OF MATHEMATICAL PROBLEM SOLVING FOR GRADE 6 STUDENTS USED LESSON STUDY AND OPEN APPROACH

Metta MARWIANG

Faculty of Education, KhonKaen University, Thailand
metmaw@kku.ac.th

Kemmika SUWANNATHADA

Faculty of Education, KhonKaen University, Thailand
Kemmika.thoy@gmail.com

Maneenapa SANGCHOMPU

Faculty of Education, KhonKaen University, Thailand
Manee.sang2539@gmail.com

Putcharee JUNPENG

Faculty of Education, KhonKaen University, Thailand
jputcha@kku.ac.th

ABSTRACT

Assessment and evaluation in education has been developed so that the results can be useful for development of learners and for teaching and learning management. This study aims to 1) study mathematical problem-solving efficiency in numbers and operations of students, and 2) evaluate mathematical problem-solving efficiency of sixth grade student learning with lesson study and an open approach. This study was conducted at Non Chan Tuek Huai Gae Wittaya School in Khon Kaen. Purposive sampling was applied to identify the sample group of this study, which included students in Grade 6 who were taught with lesson study and an open approach. The sample group consisted of six male and eight female students (n=14). Mixed-method was applied and the data was collected from observations including an individual observation log, a group work observation log, classroom observation, and a mathematics efficiency test with open-ended questions. Qualitative analysis was then conducted on the data obtained from the observations and the test.

The results revealed that 1) students can understand and analyze the problem and apply mathematical procedures as grounds to solving a complicated problem which required more than one process. This can indicate that learners can solve a mathematical problem at a basic level applying appropriate reasoning and methods. Additionally 2) the results from the evaluation of mathematical problem-solving efficiency development of the students ranked the mathematics strategies applied by the students as follows: non-response, unrecalled memory, basic memory and reproduction, simple skills and concept, and strategic/extended thinking. The levels of efficiency according to the Progress Map in problem-solving showed that six students (42.85%) were in Level 0, three students (21.42%) in Level 1, and five students (35.71%) in Level 2

Keywords: Problem Solving, Mathematical Procedure, Mathematical Strategies

INTRODUCTION

Advanced technology has brought changes to humans' lifestyles. To be able to survive, not only do we have to dominate natural challenges but we also must develop skills and abilities to compete and survive the changing conditions of the world. Hence, developing skills of a learner is crucial. Education is the first step that can pave the way for Thai students to enter the 21st century confidently, so developing "21st Century skills" in learners, especially problem-solving skills which are considered basic skills for development of other facets, is significantly important. Educational policies and guidelines have been changed in many educational institutes (Metta Marwiang et al., 2017) to respond to the needs of society, and the focus is now on problem-solving skill development.

Incorporation of problem-solving culture to class management is to teach students how to solve a problem through doing activities that provide an opportunity for students to learn in a process, to be able to solve a problem, and to promote autonomous learning. In this kind of activity, students can learn content and develop learning skills from engaging in a task. Chanapha Chaiprong (2011) organized classroom activities for her Grade 10 students in a mathematics class, fostering various problem-solving strategies that are useful for learning mathematics. It was found that problem-solving strategies are an important tool because effective ways in solving a problem require

instantaneous application of an appropriate problem-solving strategy. Also, the results from the evaluation can be applied to improve a lesson plan in order to enhance learning development of learners (Metta Marwiang et al., 2017). Hence, it is very important that these skills are cultured in a class. The Programme for International Student Assessment (PISA), which is a worldwide study, evaluated educational systems to gauge how well the students are prepared for real-life situations in the adult world, and the results showed that there is an urgent need for developing Thai students in this area. The low-level of evaluation of the Thai educational system resulted in the adjustment on educational policies. Therefore, the Project of Development of Student's Mathematics Higher-Order Thinking in Northeast Thailand was launched with the aim to develop human resources, to enhance national competitiveness and to respond to global and market needs. In this project, lesson study and an open approach are the two main educational innovations required for a reform of mathematics education in Thailand. These educational innovations are being used in 68 schools across the Northeastern region. In this study, the effectiveness of this educational method was investigated among the students studying in this program, hoping that the results could be useful for the development of students.

OBJECTIVES

This study investigated mathematical problem-solving efficiency of students learning with lesson study teaching in an open approach method at Non Chan Tuek Huai Gae wittaya School in Khon Kaen. The two objectives of this study were:

1. To study mathematical problem-solving efficiency in numbers and operations of students learning with lesson study and open approach.
2. To evaluate mathematical problem-solving efficiency in numbers and operations of students learning with lesson study and open approach.

SCOPE OF THE STUDY

The target population of this study was sixth-grade students learning with lesson study and an open approach in the Project of Development of Student's Mathematics Higher-Order Thinking in Northeast Thailand at Non Chan Tuek Huai Gae wittaya School in Khon Kaen. Fourteen students consisting of six males and eight females were selected by purposive sampling.

Variables in this study were mathematical problem-solving efficiency of students, which consisted of two facets: 1) mathematical procedures and 2) mathematical strategies.

The phases of study were divided into two parts:

Phase 1 covered four weeks of the subject content for a mathematics class taught in Grade 6 at Non Chan Tuek Huai Gae wittaya School, which included numbers and operations such as greatest common divisor (G.C.D.) and lowest common multiple (L.C.M).

Phase 2 included the mathematics efficiency test in open-ended questions for numbers and operations. The test consisted of six sections with a total of nine questions.

CONCEPTUAL FRAMEWORK

Lesson study and an open approach aim at transforming mathematics classes from a passive classroom to a classroom that engages students in various kinds of thinking procedures and rationales. Therefore, the researcher conducted this study to investigate and evaluate mathematical problem-solving efficiency of students learning with these innovations, and to learn the effectiveness of this teaching and learning method (Maitree Inprasit, 2014; Metta Marwiang et al., 2017; Patcharee Chanpeng et al. 2015). The study investigated two key areas: mathematical procedures and mathematical strategies.

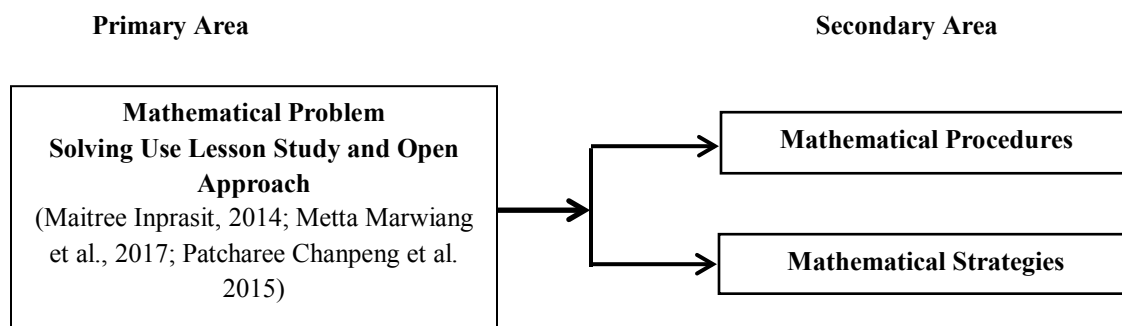


Figure 1: Conceptual Framework

THE STUDY

5.1 Research Methodology

This study applied mixed methods and the process was divided into two phrases based on the operation and significance of the study (Creswell & Plano, 2007). Exploratory sequential design was adopted by using qualitative and quantitative methods. The qualitative data was collected during the first phrase of the study, and rich data from the first phrase was analyzed using a quantitative method.

5.2 Research Instruments

Observation forms were designed to collect the data during classroom activities. The areas being observed were three key domains including 1) Cognitive Domain for the observation of students' behaviors and verbal and written interactions, 2) Affective Domain and morals shown in students' verbal and non-verbal expressions, and 3) Psychomotor Domain that was observed when students were doing an activity or group work. Task completion was also part of the evaluation. Moreover, the data was recorded in an individual observation form, a group work observation form, a classroom observation form, and items that were nested in 6 open-ended questions.

5.3 Data Collection

Data was collected at Non Chan Tuek Huai Gae wittaya School in Khon Kaen. The class was observed and video-taped by the researcher and the assistant for four weeks in a sixth-grade mathematics class.

5.4 Data Analysis

The quantitative and qualitative data from Phase 1 were analyzed based on Construct Modelling (Wilson, 2005) to be used as a guideline for development of evaluation framework, as shown below. Standards and indicators for numbers and operations for the mathematics class of Grade 6 were reviewed for a Progress Map and research instruments. The instruments were tested before data collection. Finally, the data was analyzed.

Information on standards and indicators of numbers and operations of Grade 6 were reviewed prior to the development of research instruments. The instruments were tested before the data collection procedure. Then, the collected data was analyzed using a Progress Map for Mathematical Procedure and Mathematical Problem-Solving Strategies developed by Patcharee Chanpeng and Mark Wilson (2015) as shown in Table 1 and Table 2.

Table 1: Progress Map for Mathematical Problem-Solving in Mathematical Procedure

Level	Level of Efficiency	Name
4	Excellent	Strategic/Extended Thinking
3	Good	Simple Skills and Concepts
2	Average	Basic Memory and Reproduction
1	To be improved	Unrecalled Memory
0	Low	Non-Response

Table 2: Progress Map for Mathematical Problem-Solving in Mathematical Strategies

Level	Level of Efficiency	Name
4	Excellent	Abstract (The ability to move from concrete to abstract representations)
3	Good	Visual (A variety of strategies for representing an algorithm)
2	Average	Concrete (Procedure with the minor part of a mathematical basis)
1	Fair	Novice (Unable to use strategies with mathematical basis)
0	Low	Non-Response (Does not answer)

The data gained in the second phase of the study was analyzed by ConQuest 2.0 for statistical analysis and found that the estimate value was 0.52, discrimination value (r_{pb}) was 0.38, and internal validity was 0.82 (Cronbach's Alpha Coefficient; α). These statistical results were used to analyze level of efficiency according to the Progress Map to provide further explanation and suggestion for the improvement of each student.

CONCLUSION

The results of the study and a discussion are divided into two parts according to the objectives of the study, as follows.

Part 1. Analysis of mathematical problem-solving efficiency of students from classroom observations at Non Chan Tuek Huai Gae wittaya School in Khon Kaen, where lesson study and an open approach were incorporated.

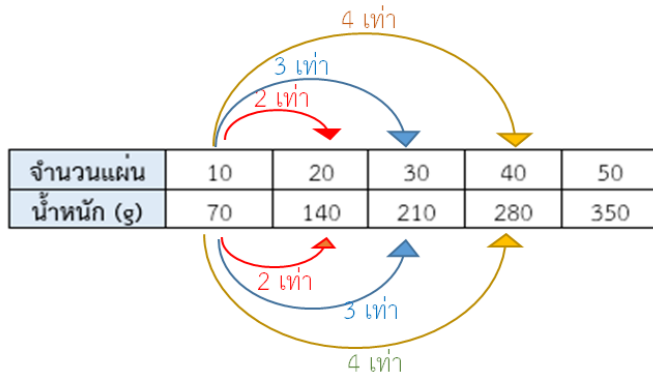
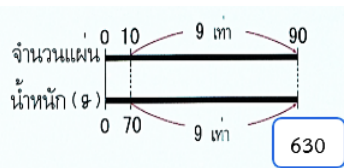
Part 2. Evaluation of mathematical problem-solving efficiency of students learning with lesson study and an open approach at Non Chan Tuek Huai Gae wittaya School in Khon Kaen, from an efficiency test on numbers and operations.

The results are presented below.

Objective 1: Mathematical problem-solving efficiency in numbers and operations of students learning with lesson study and an open approach. The results are shown in Table 3.

Situation: From last time weighing the papers, 10 sheets of paper weigh 50g, but when weighing 10 sheets of a new type of paper, the result was 70g.

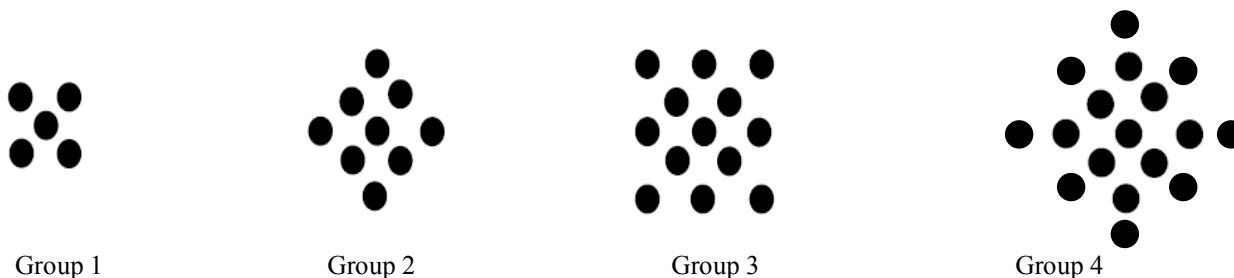
Table 3: Problem-Solving Efficiency in Mathematical Procedures

Instructions	Student Procedures												
1. When the number of sheets increases 2 times, 3 times, 4 times and so on, how will the weight change?	<p>When the number of sheets increases 2 times, 3 times, 4 times and so on, the weight would also increase 2 times, 3 times, 4 times, accordingly.</p> <p>When the number of sheets increases 2 times, 3 times, 4 times and so on, the weight would also increase 2 times, 3 times, 4 times accordingly. The more the number of sheets, the more weight there is.</p> <p>Students multiplied 2, 3, 4 and so on in the table showing relationship of the number of paper and the weight.</p>  <table><tr><th>จำนวนแผ่น</th><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td></tr><tr><th>น้ำหนัก (g)</th><td>70</td><td>140</td><td>210</td><td>280</td><td>350</td></tr></table>	จำนวนแผ่น	10	20	30	40	50	น้ำหนัก (g)	70	140	210	280	350
จำนวนแผ่น	10	20	30	40	50								
น้ำหนัก (g)	70	140	210	280	350								
2. How many grams will 90 sheets of paper weight?	<p>Students kept the list in the table going; the number of sheets was listed up to 90 and the weight added 70 each time.</p> <p>The information of the table showing the relationship of the number of paper and the weight was used. When finding the weight of 90 sheets, the students looked for the information of 40 sheets and 50 sheets ($40+50=90$). So, the weight of 90 sheets equals the weight of 40 sheets (280g) plus 50 sheets (350g). The answer is $280 + 350 = 630g$.</p> <p>Multiple increases in the number of sheets and weight was applied; 10 sheets of paper weighs 70g, so the weight of 90 sheets of paper was 9 times more than the weight of 10 sheets. Hence, the equation is $70 \times 9 = 630g$.</p> 												
3. How many sheets of paper were there if the weight is 700g?	<p>The table showing the relationship of the number of paper and the weight was used. The total weight of 700g is a result of adding 350g to 350g ($350 + 350 = 700g$ or $350 \times 2 = 700g$). So, the total sheets of the 700g weight equals the weight of paper with 350g (50 sheets). The equation is $50+50 = 100$ or $50 \times 2 = 100$. The answer is 100 sheets.</p> <p>Multiple increase in the number of sheets and weight was applied; 19 sheets weighs 70g, so 700g of paper is 10 times of the weight of 70g. Hence, the number of sheets must be 10 times more as well. The equation is $10 \times 10 = 100$ sheets.</p>												

The results revealed that the mathematical problem-solving efficiency of the students was at a basic level, which means that they had simple skills and concepts of mathematics to solve the problem and could apply mathematical procedures to solve a complex problem and generate a reasonable answer and method.

Objective 2: Evaluation of mathematical problem-solving efficiency of students learning with lesson study and an open approach. The results are presented in Table 4.

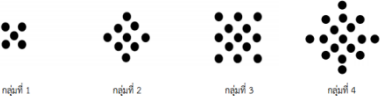

Question 1: Students in class 6/4 at Sukjai School are trying to group class members for an exercise. The number of group members in each group increases as shown in the photo.



From the situation provided, if there are 7 groups, how many members are in Group 7?

Table 4: Mathematical Procedures

Level	Score	Name	Description of Respondent	Example
4 AB	4	Abstract	Students create an understanding of the question using various mathematical strategies and could applied appropriate strategies to solve a complex problem i.e. creating a diagram, making a prediction and testing hypothesis, making a chart or table, reversing the thinking step, giving a reason with logic, and looking for or creating a pattern of a model. Lastly, students can transform concrete images into abstract ideas.	<p>e.g. Question 1</p> <p>1. นักเรียนห้อง ป.6/4 โรงเรียนบ้านหนองสาหร่าย จัดกลุ่มออกกำลังกาย โดยจะมีสมาชิกเพิ่มขึ้นเรื่อยๆ ตามลำดับกลุ่ม ดังนี้</p> <p>Students understood the question and tried to solve the problem in various ways such as creating a table, making a diagram, and drawing. They also provided explanation using mathematic symbols, and could conclude the pattern of the given situation; with more group members in each group, the equation was</p> $a_n = 5 + (n-1)4.$
3 NO	3	Visual	Students can apply various mathematic problem-solving strategies, solve a problem in a systematic way, and can explain concepts using specific mathematic symbols in their explanations, i.e. drawing, making a prediction and testing a hypothesis. Also, students can exclude unrelated or incorrect parts which helps them understand	<p>e.g. Question 1</p> <p>1. นักเรียนห้อง ป.6/4 โรงเรียนบ้านหนองสาหร่าย จัดกลุ่มออกกำลังกาย โดยจะมีสมาชิกเพิ่มขึ้นเรื่อยๆ ตามลำดับกลุ่ม ดังนี้</p> <p>Students created a diagram showing the relationship, and drew images for Groups 5,</p>

Level	Score	Name	Description of Respondent	Example
			the situation more clearly.	6, and 7. They were able to make a conclusion and provided a systematic explanation of the relationship using various calculation methods.
2 CO	2	Concrete	Students can apply basic mathematical problem-solving strategies in solving some parts of the problem. They can explain their ideas and method, and also use simple mathematic equations to solve a few steps of the problem that they are familiar with.	<p>e.g. Question 1</p> <p>1. นักเรียนห้อง ป.6/4 โรงเรียนบ้านหนองสาหร่าย จัดกลุ่มออกกำลังกาย โดยจะมีสมาชิกเพิ่มขึ้นเรื่อยๆ ตามลำดับกลุ่ม ดังนี้</p>  <p>กลุ่มที่ 1 กลุ่มที่ 2 กลุ่มที่ 3 กลุ่มที่ 4</p> <p>Students understood that the number of the members increases by 4 in each group. They could calculate in a simple process by adding 4 to each group step by step; Group 1 was 5, Group 2 was $5+4=9$, Group 3 was $9+4=13$ and so on until they got the correct answers for all the groups.</p>
1 VI	1	Novice	Students cannot apply a basic strategy for mathematical problem-solving. Explanation is given in a word or a sentence level to explain ideas, yet it is unrelated to the answer.	<p>e.g. Question 1</p> <p>1. นักเรียนห้อง ป.6/4 โรงเรียนบ้านหนองสาหร่าย จัดกลุ่มออกกำลังกาย โดยจะมีสมาชิกเพิ่มขึ้นเรื่อยๆ ตามลำดับกลุ่ม ดังนี้</p>  <p>กลุ่มที่ 1 กลุ่มที่ 2 กลุ่มที่ 3 กลุ่มที่ 4</p> <p>Students understood that the number of students in Group 2 is higher than Group 1. They provided some explanation to the increasing number but could not find the correct answer to the question.</p>
0 NR	0	Non-Response	No response from students. Students do not try to answer or give an unrelated answer.	Students do not respond to the question or give an unrelated answer.

According to the results of the study, the levels of efficiency according to the Progress Map in problem-solving were as follows: six students (42.85%) in Level 0, three students (21.42%) in Level 1, and five students (35.71%) in Level 2.

SUGGESTIONS FOR FURTHER RESEARCH

In this paper, the researcher would like to offer some suggestions, listed below:

1. More studies should be done in a classroom where lesson study and open study are not incorporated so that the two types of teaching and learning methods can be compared and contrasted in order to gain more information on positive and negative effects of these innovations.
2. The data being used for classroom research must be credible; that is, the study period should be at least more than one session so that more elements of an actual mathematical problem-solving efficiency of a student can be drawn and collected. This process can increase validity of the study.

REFERENCES

- Chayabha Jaiprong (2011). **A Mathematics Instructional Activities Adapting and Applying a Variety of Problem Solving Strategies to Enhance Ability to Solve Mathematical Problems on Functions for Mathayomsuksa IV Students.** Department of Mathematics, Faculty of Science, Srinakharinwirot University.
- Creswell, J., & Plano Clark, V. (2007). **Designing and Conducting Mixed Methods Research.** Thousand Oaks, CA: Sage.
- Inprasitha, M. (2014). **Preparing ground for the introduction of lesson study in Thailand. Lesson Study Challenges in Mathematics Education.** Editor by Inprasitha, M., Isoda, M., Wang-Iverson, P., & Yeap, B. H. 109-122 *Singapore: World Scientific real world situations.*
- Junpeng, P., Wilson, M., Inprasitha, M., & Marwiang, M. (2016). **Developing the framework for assessing cognitive process of Thai students' mathematical problem solving.** Unpublished manuscript. California: Graduate School of Education, University of California at Berkeley.
- Marwiang, M, Klaharn, J, Saree, L and Junpeng, P. (2017). Assessing Students' Mathematical Problem Solving Skill Through the Innovative Lesson Study and Open Approach. [Special Issue]. **The Turkish Online Journal of Educational Technology. (October)**, 385 – 395.
- Wilson, M. (2005). **Constructing measures: An item response modeling approach.** Mahwah, NJ: Lawrence Erlbaum Assoc.

THE THOUGHTS OF UNIVERSITY STUDENTS ABOUT PARTICIPATION OF THE EUROPEAN UNION AND THE BOLOGNA EDUCATION PROCESS

Asc.Prof. Dr. Murat GÖKALP
Ondokuz Mayıs Üniversitesi, Samsun Eğitim Fakültesi
gokalpm@yahoo.com
Asc.Prof. Dr. Sabit MENTEŞE
Tunceli Ün. İktisat fakültesi
smentese@tunceli.edu.tr

ABSTRACT

The aim of this study is to determine and evaluate what university students think about the European Union and Bologna Education Process. The research includes 800 female and 850 male 1650 students in various faculties of the University of Ondokuz Mayıs University. The research was conducted in quantitative screening method. The data was obtained by a 5-point Likert-type scale developed by the researcher. At the end of the study, students' perspectives on European Union and Bologna Education Process were evaluated according to one-way analysis of variance, t-test, LSD test and percentage values according to the personal characteristics of the participants. According to the findings of the research, the positive opinions of the students were determined about participation in European Union and Bologna process. While there is no difference of opinion between the students according to their age and class, differences of opinion have been determined according to the faculties they study.

Key Words: Europe, Education System, Bologna Process, University Students

INTRODUCTION

Turkey aims to join the European Union, the European citizens who were concerned that the political, the economic, political, cultural, technological, scientific, and in particular has made many innovations in the field of education. Turkey also joined the Bologna Process, the common European Higher Education Area's aims the creation and mobility in the European Higher Education institutions of restructuring in the context of European dimension, including the recognition and lecturers and students exchange of academic degrees include all relevant measures and programs. At the end of the 20th century, Europe made a series of decisions to be implemented in the field of education in order to establish the Europe of Knowledge, considering that the 21st century will be the information age. In Information Europe, which will derive its power from knowledge and science, it was aimed to establish a higher education system that would make the countries in the European geography both compatible and complementary and superior to their competitors. The Sorbon Declaration, the first step taken to determine the nature and scope of the structural change envisaged for higher education systems in European Union countries, was signed by the German, French, British and Italian Ministers of Education on 25 May 1998. This was followed by the Bologna Declaration signed on 19 June 1999 by the Ministers of Education of 31 countries in Europe. The aim of the European Union in the 21st century is to create the United States of Europe by creating a single European market. The states that make up the European Union do not have a homogeneous structure like the United States. The cultures, languages, education systems and the thinking of the citizens of these countries are quite different. With the information age, significant changes are taking place in university orientations. This as much as understanding and applying change, it is important to create systems that will ensure sustainability. It is gaining (Elmas, 2012). In addition to economic cooperation in the world with globalization important cooperations in social, cultural and educational fields. Training collaborations to increase quality in education, to ensure equality of opportunity and to extend education various agreements have been made. Higher education, which is a part of education is an important part of this process. Largest in the field of higher education one of the initiatives is undoubtedly the Bologna agreement (Terzi, Kıymetli Şen and Solak, 2013). Higher education, which reflects the relationship between university and society, differs from one country to another shows. However, the homogeneity of higher education is It seems to be the primary tendency of the field of education; opportunities for information, as well as the establishment of criteria for increased mobility opportunities (Kaya, 2015). The external dimension of the Bologna process, the mentioned changes of the universities in the new member states gain the autonomy with the institutional capacity necessary to implement It assumes. The Bologna process thus helps universities sensitive, academic and local communities (Soltys, 2015). Bologna process to ensure the degree of comparability between subjects and countries its aim is to cover all academic disciplines (Hoell, Lentsch and Litta, 2015) The educational system of a country is an expression of the cultural self of that country. There are significant structural differences in higher education systems in the European Union (EU) and European Economic Area (EEA) countries. Current situation before the Bologna Declaration, Erasmus Program (1987), Bologna 'Magna Charta Universitatum' (1988), Socrates Program I (1995-1999), Sorbonne Declaration (1998) Bologna Process; Bologna Declaration (1999) 'New power AN (ANew Impulse), Salamanca Congress (2001)' EUA '(European Universities Association), Prague (2001), Graz Congress (2003, Berlin (2003), Bergen (2005).

It is certain that the Bologna process will have important benefits for us; universities will be introduced to themselves, the universities will be better recognized by the national and international academic world, and the competitiveness of universities in Europe and the world will increase. Stating that the Bologna process is the management of higher education institutions in Europe through common standards, Fejes (2006) states that this process is a very important step in the project of becoming the most competitive and most developed information society in Europe. According to Fejes, the Bologna process is a voluntary structure in which a free choice can be left inside or outside the countries.

Benefits of the Bologna Process

Grants to Universities Provides better recognition of our higher education system abroad and increases the interest in higher education institutions. Fulfills its responsibilities to students and other stakeholders (autonomous) higher education institutions. Establish the national qualifications framework as a whole to be connected to each other in the system and progress and transition between different levels of education Easier. New qualifications in line with changing social needs helps improve. Explaining the relationship between competences and recognition and mobility awareness of citizens and employers at national and international level It raises. Developing quality assurance systems and competing with the World contribute to the creation of a higher education system.

Teaching Staff

Facilitates the creation and updating of curriculum. Learning outcomes of measurement and evaluation processes success and effectiveness of the courses. help them improve. The content of the courses will be easier on national and international level. provides understanding and recognition. Students as a result of the student-centered teaching system faculty members will be more actively involved in the process. Allows them to find more conscious and active students. The program in which the students are studying the objectives of the courses and successfully complete them help them know the qualifications they will gain. A student in the scope of mobility, which is the main pillar of the Bologna Process and exchange of academic staff to the teaching process of higher education it adds significant riches. Short term work for academic staff in different countries and universities joint projects and scientific studies in other countries makes them easier to do.

Students

Bologna Process envisages a student-centered approach ensures the active participation of students in their education. Students are more aware of their education programs and courses. Which courses and programs they have chosen have qualifications; what they will know, what and which social, professional and communication help them know in advance that they may have competencies It happens. Course credits will be created based on student workload. Encourages and encourages students' extracurricular activities. transferred to the degree they receive. Horizontal and vertical transitions between education and training levels makes it understandable and easy. Quality assurance in all higher education institutions quality difference between institutions. Providing quality education to students improves equality of opportunity. Graduates from programs created with qualifications and quality assurance employability rates of students who have increased. Recognition instruments such as Diploma Supplement and European Credit Transfer System Thanks to the education of students abroad professional and academic mobility. It increases. Encourages student mobility and barriers to mobility It decreases. Lifelong learning not only for formal learning but for all learning encourages learning. Bologna Process in the official documents of higher education in Turkey. It is defined as an opportunity to increase the quality (YOK, 2010). Scholars have positive meanings to the Bologna process found that it would positively affect the quality of higher education and even required the implementation of this Process. Moreover, technical regulations on the creation and implementation of joint curricula, quality assurance have positive meanings in their work (see Süngü, 2009).

PURPOSE OF THE RESEARCH

The aim of this study; To determine the opinions of university students about the European Union and Bologna Education Process and to obtain findings.

PROBLEM

Will university students' prior knowledge of the European Union Bologna Process provide sufficient contribution to this process?

SUB PROBLEMS

- 1- What are the University Students' Opinions on European Union and Bologna Education Process?
- 2- What are the University Students' Opinions on European Union and Bologna Education Process According to their faculties?

- 3- What are the Students' Perceptions of the European Union and Bologna Education Process According to their Age?

ASSUMPTIONS

1. The most appropriate data collection tool for the subject is survey.
2. University students gave sincere answers to the questionnaire.
3. The most suitable method for the evaluation of the data is the SPSS program.

METHOD

Research Model

The research was carried out with the Survey method. First of all, a field research has been carried out on the subject, the previous researches have been examined and theoretical information has been obtained to shed light on this study. In this research, general screening methods were used. General screening methods are the screening arrangements made on a whole, a group, sample or sample of the universe in order to make a general judgment about the universe in a universe consisting of many elements (Karasar,1991). The sample is a numerical multiplicity obtained by taking a cross-section of the study universe as the study area. This section should be representative of the study universe. Because the results will be generalized to the study universe (Aysel, 1990).

Working Group

The population of the study was 52000 students studying at Ondokuz Mayıs University in the second semester of 2017-2018 academic year. The sample consisted of 1650 students (800 girls, 850 boys) from the Faculty of Education, Engineering, Agriculture and Economics. For the research, 48.5% of the students participating in the research are girls and 51.5% are boys. 18.8% of the students are 17-18, 62.4% are 19-20, 18.8% are 21 and over.

Data Collection Tool

20-item 5-point Likert-type questionnaire questions were prepared by researchers, item factor loads of the questions were evaluated by factor analysis and the factor load of a item was found to be insignificant. Cronbach Alpha reliability analysis was performed for the questionnaire and Alpha value was found as: 89.

Data Analysis

Data were analyzed using SPSS 17 Windows Package Program. One-way anova was used for statistical analysis as a percentage, frequency, arithmetic means, standard deviation and t-test, LSD test. Significance level was accepted as. 05.

Results and Interpretation

Findings on the First Sub-Problem

Table 1. University Students' Opinions on European Union and Bologna Education Process

	I Totally Agree %	I Agree %	Undecided %	I Do Not Agree %	Never Agree %
I think it will make positive contributions to our cultural cooperation.	14,5	23,6	36,4	14,5	10,9
I think that our country will create job opportunities for young brains.	18,2	29,7	21,8	18,2	12,1
I think it will contribute to improve our education and training level.	10,3	13,9	24,2	29,7	21,8
I think it will contribute to the University.	17,6	23,0	25,5	22,4	11,5
I think it will contribute to universal thinking.	17,0	23,6	20,6	21,2	17,6
I think it will contribute to university students.	21,8	24,8	20,6	17,6	15,2
I think it will contribute to the developments in contemporary education.	21,8	24,8	20,6	17,6	15,2
I think it will give students confidence and courage	11,5	15,2	22,4	29,1	21,8
I think it will ensure the closeness between the countries.	10,3	11,5	23,6	20,6	33,9
I think it will contribute to our learning motivation.	24,8	21,8	22,4	13,9	17,0
I think it will contribute to make a positive change in our eating habits.	26,1	24,8	18,8	15,2	15,2
I think it will contribute to the fact that education is universal.	26,1	31,5	19,4	9,7	13,7
I think it will increase our chances of working in European countries.	23,6	22,4	24,2	14,5	15,2
I think it will contribute to our country and European peace.	18,8	24,8	22,4	14,5	19,4
I think it will contribute to the development of democracy awareness.	24,8	21,8	23,0	17,0	13,3
I think it will contribute to the globalization process.	17,0	13,9	15,8	23,6	29,7
I think it will contribute to the continuity of information flow.	15,8	24,2	20,6	22,4	17,0
I think it will tolerate cultural differences.	24,2	27,9	22,4	15,2	10,3
I think it will provide more useful communication in teacher and student relations.	9,7	14,5	24,8	16,4	34,5

The results in Table 1 are shown as a percentage. In particular, “I think it will make positive contributions to our cultural cooperation” 36.4% undecided, 25% disagree. “I think it will contribute to improving our level of education and training.” The rate of undecided and disagree is 75%. “I think it will contribute to the globalization process.” The rate of unstable and disagree with the article is 69% thought provoking. “I Think It Will Provide Tolerance to Cultural Differences.” The rate of 52% participation is perceived as positive. I think it will provide more useful communication in teacher and student relations, the results of this article are quite thought provoking. 76% of those who disagree and are undecided are quite thought-provoking.

Table 2. Means of Survey Participants

Number of Students	1650
Average	59,31
Standard deviation	13,74
Lowest Score	19,00
Highest Score	95,00

According to the percentages in Table 2, 1650 people participated in the survey. According to the survey results, average 59,3152 were found.

Findings on the Second Sub-Problem

Table 3. One-way ANOVA Findings of University Students' Opinions about European Union and Bologna Education Process According to the Faculties

Whether to go outside the curriculum	Sum of squares	F.D	Mean Square	F	level of importance
Between Groups	1628,395	3	542,798	2,980	,033 p<0.000 meaningful
Within Groups	29321,217	1647	182,119		
Total	30949,612	1650			

In Table 3, it is seen that there are significant differences according to the One-Way Analysis of Variance Findings regarding whether there is a difference between the faculties of the university students and their opinions about the European Union and Bologna Education Process. $p < 0.000$ significant.

Table 4. Findings of LSD (Least Significant Difference) Test on University Students' Opinions about European Union and Bologna Education Process according to the faculties they attend.

Difference between faculties		Difference Between Means	level of importance
Faculty of Education	Engineering Faculty	-10,7049	p<0.05
Faculty of Agriculture	Faculty of Economics	-8,7809	p<0.05

F.D 1647

According to the data in Table 4, LSD (Least Significant Difference) Test Findings on whether there is a difference between the faculties of university students in their thoughts about European Union and Bologna Education Process. Significant differences were observed between the students of the faculty of education and the students of the faculty of engineering. There was a difference between the faculties of education and engineering faculties (- 10,7049), The difference between the averages of the Faculty of Agriculture and the Faculty of Economics (- 8,7809) was observed. ($P < 0.05$).

Findings on the Third Sub-Problem

Table 5. One-way ANOVA Findings of University Students' Perceptions of the European Union and Bologna Education Process According to their Age

Whether to go outside the curriculum	Sum of squares	F.D	Mean Square	F	level of importance
Between Groups	1617,978	2	808,989	4,468	,013 p<0.000 meaningful
Within Groups	29331,634	1647	181,059		
Total	30949,612	1650			

In Table 5, it is seen that there are significant differences according to the One-way Analysis of Variance Findings regarding whether there is a difference between the students' age and their opinions about the European Union and Bologna Education Process. $p < 0.000$ significant.

Table 6. LSD (Least Significant Difference) Test Findings of University Students' Perceptions of European Union and Bologna Education Process According to Age Differences

Age Ranges of Students		Difference Between Means	level of importance
17-18 age	19-20	-6,9552	p<0.05
17-18 age	21 and up	-9,6452	p<0.05

F.D 1647

According to the data in Table 6, according to the LSD (Least Significant Difference) Test Findings on whether there is a difference in the opinions of university students about the European Union and Bologna Education Process according to their ages, the average difference between 17-18 years and 19-20 years (-6,9552) , The average difference between the ages of 17-18 and 21 and older (-9,6452) was found. ($P < 0.05$).

CONCLUSION, DISCUSSION AND SUGGESTIONS

The evaluation of university students' thoughts about the European Union and Bologna Education Process was very interesting and surprising. It is aimed that students learn about the participation of stakeholders in the Bologna process. they agree. The majority of the participants had sufficient knowledge about the process. they do not have information. In researches, students in higher education It is emphasized that there are problems about participation. The findings of the research have enough information about the Bologna process show that they are

not. In our country, the universities brought about the age of education follow innovative movements. In this context, within the scope of Bologna process competencies, student, academic staff mobility, ECTS, quality, student workforce, program competences and so on. especially teacher candidates and instructors should be informed in detail. When the students' views on the creation of the European Higher Education Area were examined, the participants were asked to create a common European Higher Education Area. They expressed a positive approach to their work. Related research generally perceive the creation of a common European higher education area, this process will positively affect the Turkish Higher Education System and They believe that the implementation of the necessary institutions. Gornitzka and Langfeldt (2005) also determined that academicians' perceptions and opinions about the Bologna process. As a result of the research, the participants have positive opinions about the Bologna process stated. Teaching which plays an important role in the successful implementation of the Bologna process elements of the process can be reflected in the positive perceptions of the process. The findings of the study can be considered as important data for the success of the process. University students should be informed more about the European Union. The importance of the European Union and globalization and its contributions to our country should be clarified. Bilateral communication of university students in the process of European integration should be ensured. The number of university students who can participate in the Erasmus program should be increased. Cultural exchanges and relations should be maintained and mutual interaction should be ensured. Further information about the European Union, education and training is required for students of the universities. Negative approaches of the students studying in the Department of Physical Education should be eliminated and social activities related to these issues should be organized. It is necessary to increase the sporting encounters with the universities of the European Union and to ensure social communication.

REFERENCES

- Aziz, Aysel. 2000. Araştırma Yöntemleri- Teknikleri ve İletişim, İletişim Araştırmaları Derneği, Ankara, İletişim Yay.
- Calhoun, Donald W. (1987): "Sports Culture and Personality", Second Edition, Illinois.
- Coubertin, P. (2000): "Olympic Selected Writings", International Olympic Committee, Lausanne.
- Doğan, Orhan (2004): « Spor Psikolojisi », Cumhuriyet Üniversitesi Yayınları, No. 97, Sivas.
- Elmas, M. (2012). Bologna süreci: Uygulama veya uygulayamama, 2(3), 137-141
- Erkan, E. (1992): "Toplum Sağlığı Açısından Spor", Editör: Ergen, E , TTB Merkezi Konseyi Spor Hekimliği Kolu Yayın No 1, Ankara.
- Fer, Seval & Cırık, İlker (2007): "Yapılandırmacı Öğrenme Kuramdan Uygulamaya", Morpa Yayınları, İstanbul.
- Fejes, A. (2006). The Bologna process-governing higher education in Europe through standardization. Revista Espanda Education Comparada, 12, 203-231
- Gornitzka, Å., & Langfeldt, L. (2005). The role of academics in the Bologna Process—a survey of participation and views (Results from a survey among EI-member organisations in Europe). Oslo: EI.
- Hoell, R., Lentsch, J., & Litta, S. (2015). The Bologna process: A weary leap forward. International Higher Education.
- Kaya, A. (2015). Critical voices against the Bologna Process in Turkey: Neo-liberal governance in higher education. New Perspectives on Turkey, 52, 105-133.
- Soltys, D. (2015). Similarities, divergence, and incapacity in the Bologna process reform implementation by the former-socialist countries: the self-defeat of state regulations. Comparative Education, 51(2), 179-195
- Süngü, H. (2009). Türkiye’de eğitim fakültesi öğretim elemanları ile üniversite uzmanlarının Avrupa yükseköğretim alanının oluşturulmasına ilişkin görüşleri. Yayımlanmamış doktora tezi. Ankara Üniversitesi, Eğitim Bilimleri Enstitüsü, Eğitim Yönetimi ve Politikası Anabilim Dalı, Eğitim Yönetimi ve Teftişi Doktora Programı, Ankara.
- Terzi, S., Kıymetli Şen, İ., & Solak, B. (2013). Bologna sürecinin muhasebe eğitimine etkisi: üniversitelerin işletme bölümlerinin ders programları üzerine bir inceleme. Muhasebe ve Finansman Dergisi, Temmuz 2013, 83-99.
- Yükseköğretim Kurulu. (2010). Yükseköğretimde yeniden yapılanma: 66 soruda Bologna Süreci uygulamaları. Erişim: <http://bologna.yok.gov.tr/files/ce63c4b383ae852dce0a9b17bac57c6e.pdf>

THE TRAINING OF FUTURE LEADERS THE PARADIGM OF TRUST

José M. Ortiz Ibarz
Dean Law&Business School

Beatriz Vila Ramos
ViceDean Law&Business School
University Francisco de Vitoria. Madrid (Spain)

Sometimes it is worth taking a break, pausing for a moment and thinking about the important things in our lives. Taking a step back to analyze our environment, asking ourselves whether this is the best possible world, a world we are happy to be part of.

If we take a close look we will certainly find things that all of us would like to change. For example, we will see a society that continues placing great importance on what a person has, rather than what a person is. In many cases, it is believed that victory only belongs to the fittest, necessarily at the expense of the weakest groups, which entails a selfish behavior promoted as a sort of defense mechanism. Others also want us to believe that the truth only depends on what we feel at any given moment, so that all actions can be justified if we achieve the goals that we had previously set. Right now there is only one truth, but it might change later.

Thus, it is easy to understand that economic crises are basically crises of moral values¹.

If the most important thing for a person is what he has and not what he is, then he will seek to improve his status above anything else, inevitably leading to power struggles. When we accept that the fittest are the ones with the highest chance of survival, we encourage aggressive competitiveness and those unable to destroy their rivals will put themselves at risk of becoming the next victim. If we use the truth as a tool to promote our interests, it is easy for the end to justify the means, therefore fostering corruption and a lack of commitment to anything beyond own personal profit².

These values have affected all sorts of organizations, but particularly companies. Internal power struggles have made employees fight for their interests instead of pursuing the common good. Aggressive competitiveness often leads to the inability to work together. And as regards the lack of respect for the truth, the result is the incapacity of companies to find solid principles on which to base their businesses. In the absence of these great principles, employees do not find sufficient reasons to commit themselves.

The result of the aforementioned problems is a world populated by people who are not happy, since the prevailing values promote fears³. Real fears that can be seen in very specific behaviors. First, there is the fear of losing everything we own. If material goods is what matters to us most of all, how will we feel if have to face the risk of losing everything? Second, we find the fear of being subjected. By understanding relationships as a balance of power we will see other people as rivals and not being at the same level as them will make us anxious. And third, the fear of the truth being known. We will spend the life pretending, disguising the truth depending on what we need at each moment.

Faced with this situation, as a university we have spent much time reflecting, analyzing the approaches suggested by the best researches and main managers and we have come to the conclusion that it is essential to move from the paradigm of fear towards the paradigm of trust.

To trust or not to trust, that is the question. Trust is becoming the main connecting element in a global economy in which it is impossible to control every single aspect. Multiculturalism and diversity have become the ideal environment for trust to flourish, bringing positions closer and making people open up to others

¹ FUKUYAMA, F., *Trust: The Social Virtues and The Creation of Prosperity*, Free Press 1995.

² ORTIZ, J.M., *Organizaciones con ética. Un buen lugar para trabajar*. En “Liderazgo Humanista y de Servicio”, Foro Europeo 2009.

³ LYUBOMIRSKY, S., KING, L., DIENES, L., *The benefits of frequent positive affect: does happiness lead to success? Psychological Bulletin* 131(6), 2005.

through curiosity, without generating suspicion or mistrust. Innovation, a significantly valuable element in this new context, will only be achievable if trust has previously been fostered⁴.

This leads us to the statement that trust is the necessary element –and will be more so in the future⁵– to train the type of leaders that companies, political parties, institutions and society need. The managers of the largest companies in the world agree on the fact that this new environment calls for people who are able to build up trust.

Along with trust and closely related to it, recent studies on the behavior within organizations (for example, the surveys carried out by Professor Peter Capelli, Wharton University) show the difficulty of finding professionals with the features that future leaders will need: strong ethical values, teamwork, innovative thinking and, especially, reliability and a proper self-assessment (strengths and weaknesses)⁶.

Unfortunately, these professionals are not available in the market. These people, able of changing the world and understanding the leadership as previously described cannot be found. Companies spend large amounts of money in their selection processes to then realize that their new employees have the very features that they wanted to avoid in the first place: fear, fear and more fear.

And in this whole situation, universities seem to be looking the other way. Programs have not been designed to change any paradigms, but rather to explain to future professionals what they need to do to achieve their individual goals, with no regard for other contexts.

In most cases, universities believe that the future success of their students will be based on the common elements, that is, individual recognition and status. Precisely because of this, training focuses on results, being proactive, working under pressure, promoting self-control and self-sufficiency. As Daniel Goleman has shown, these skills are sound for managers seeking quick, short-term results, based on reliability itself⁷.

This is the type of professionals that companies can easily find. Unlike them, HR managers are unable to find people with a capacity for empathy, confident and capable of set up teams. It is logical for them to not find these professionals, since achieving results with no emotional intelligence, instead of empathy, leads to harshness and loneliness. Being hard on oneself and others can show self-esteem, but never trust on oneself. And the pursuit of self-interest can hardly ever make anyone give their best and get the best out of other team members.

To train this type of professionals that companies need and are unable to find, that is, people who promote long-term results and foster changes that require vision and clarity, universities and business schools need to go beyond what has been offered so far, which is mere specialized knowledge, a significant amount of quantitative thinking and more or less demanding language skills.

This is what has led our University to take a step back and reflect: what role do we want to play in this crisis of values? How can we contribute to restore trust in our sector? Are we training the future leaders to drive this change? How can we make sure that every one of our students becomes a generator of trust?

And this is how we have come to define the three key elements of this kind of leadership. Building on the work of the two professors of the University of Notre Dame, which are considered the main reference in this matter, we asked among the managers of the most important companies, consultant and law firms and concluded that the differentiating features of the people who generate trust are professionalism, integrity and generosity⁸.

⁴ ORTIZ, J.M., La confianza, la gasolina para mover la sociedad, en “Claves de Razón Práctica”, mayo-junio 2016.

⁵ BOSTMAN, R., Who Can You Trust? How Technology Brought Us Together – and Why It Could Drive Us Apart. Penguin UK 2017.

⁶ CAPELLI, P. Why Good People Can't Get Jobs: The Skills Gap and What Companies Can Do About It, Warthon Digital Press 2012.

⁷ GOLEMAN, D., Leadership That Gets Results, Harvard Business Review, March-April 2000.

⁸ SCHOORMAN, D.; MAYER, R.; DAVIS, J., An Integrative Model of Organizational Trust: past, present and future. Academy of Management 32, 2007.

Professionalism, since it is easier to trust people who have the necessary expertise and skills to carry out their duties. Professionalism does not merely involve knowing much about a specific area of knowledge, but to have a highly self-demanding attitude as regards any tasks entrusted to you. Generosity, because when we no longer seek to merely maximize our profits but try to help others, we establish a bond of unwavering loyalty. Generosity introduces a different logic into society, the logic of valuable assets; the type of assets in which the more you give, the more you get: joy, understanding, knowledge... And finally, integrity, since people who are consistent with their values are predictable persons and therefore reliable.

The great question is whether Universities can promote the three aforementioned points in their training programs, creating a new culture in our society and organizations. We at the Universidad Francisco de Vitoria think it is certainly possible. For a training program to promote professionalism it is necessary to strengthen the virtuous cycle comprised of implementation capacity, openness to innovation, multicultural management and personal leadership. In our training programs for leaders, these skills are acquired through learning methodologies of several areas covering political, legal, business, international relations and leadership issues. The feedback from teachers and mentors is essential to develop the abilities to achieve results and communicate, to promote adaptability and creativity, global vision and conflict management.

In addition to the official Law, Business Administration, Business Analytics or International Relation Degrees, students also complete a leadership program (Integral Leadership Program, "ILP").

Through workshops (LABs) on Art and Aesthetics, Dramatic Art, Scientific Research, Impact, Negotiation and Cooperation, Politics, Communication Groups, Social Networks, Coaching, Mentoring, etc. students understand what influencing and innovating means. The aesthetic experience, for example, enables students to appreciate the beauty of the world, going beyond a pragmatic and utilitarian view. In "Scientific Research" they experience what it means to see what others cannot see, which is inherent in any innovation process. Other subjects (such as Dramatic Art, Impact, Negotiation and Cooperation or Organizational Psychology) develop skills that enable students to better interact in order to implement strategies and achieve results.

The core of the ILP is a Personal Development Project in which each student is assigned a mentor and has the opportunity to work with the best 360 evaluation tools used by many companies for the development of their leaders (Myers-Briggs Type Indicator), FIRO B (Fundamental Interpersonal Relations Orientation) and Career Leader. Being part of this project teaches students how to develop a long-term mindset as well as the capacity to sow the seeds of something that might take some time to grow⁹. And this ability to postpone rewards is essential to help students enhance their ability to cope with frustration.

The experience of being guided by a mentor (seeing how we improve thanks to external help) is fundamental for those who will have to be prudent throughout their lives, since it is a practical knowledge: only those who have been accompanied know how to accompany and advise other people (customers, other employees...). Likewise, being able to listen and accept help makes the difference between prudent knowledge and the cunning of people who give themselves the capacity to decide what is true or false because they only care about imposing their point of view.

As part of the ILP, our students have the chance to travel every year to the roots of our civilization. In Greece, Rome, Jerusalem and the "Camino de Santiago" pilgrimage students get to see the pillars of a western culture that has been forged thanks to the dialogue between science, law, philosophy and religion. We are well-aware that in a context marked by a lack of dialogue, specialization becomes isolation and absolutization.

However, it is Humanism that promotes a more comprehensive and inclusive approach in relation to many fields of knowledge (including economic, political and legal expertise). That is why, in order to develop an integral training, it is necessary to design a syllabus in which professional ethics are not only an isolated element but the core of every single subject, always taking into account that the student must have an open vision to truth, good and beauty.

Politics and economics tend to be blamed for all social ills. But, in fact, while some people try to stay in power and others make efforts to increase their benefits, both share an instrumental and short-term vision of

⁹ COVEY, S., *The 8th Habit: From Effectiveness to Greatness*, Free Press 2004.

the human reason, which is allowed to do everything. As long as we are not convinced that reality has limits and that it is worth to work for others to reap the rewards, professional ethics will not stop being another opportunistic instrument. Thus, we consider it very important that our students behave honestly (for instance, as regards writing papers and exams) and face the consequences of their acts, for them to learn that not everything is allowed in order to achieve a specific result. Honesty shows us that, in addition to its utility, each thing has a value in itself.

Humanist subjects taught since the first year (anthropology, history, great books, ethics, social responsibility, deontology, introduction to theology) do not only offer an open dialogue to issues concerning the legal or business curriculum, but also provide a new scenario which makes students rethink their value and give a deeper meaning to them. Criticizing the “myths” of modernity (individualism, consumerism and pragmatism) enables students to discover a new paradigm of reflection based on the acceptance of reality as a gift we have received and need to improve.

As Pope Francis stated, we have too many resources for very poor and scarce purposes¹⁰. We are now facing an educational challenge in which we cannot accept that the paradigms of thinking will not change behaviors or that small efforts will not change the world. In order to teach generosity, we must develop our ability to listen and to promote the belief that, by ourselves, we might arrive faster, whereas with other people’s help, we can arrive further. We also must help our students develop a different and more open look towards other people and give them the value of empathy with the suffering of others. Lastly, we also aim at promoting specific experiences that give us a first-hand view of what happens with the aforementioned valuable assets: the more we give, the more we possess.

Developing the capacity to open up to other people and foster solidarity and responsibility values with the appropriate motivations is what shapes a new lifestyle. Hence the importance that the subject of Social Responsibility has for our students, as it gives them the opportunity to interact with people who suffer. In this volunteering project, they discover (or re-discover) that, regardless of how much they have given to the people they have taken care of, they always receive much more.

The service leadership has its roots in the discovery of the gift, what makes us unique and, according to Sir Ken Robinson, being aware of it changes everything¹¹. Recognizing what we have received radically changes the way we look at others¹². During their internships in social action programs and through the societies in which they participate, our students experience the logic of the gift: we only discover the best thing we have when we give it away, when we make it available for other people, when we give ourselves. In addition to this, they also acquire an essential knowledge: social problems can only be solved through community networks.

Likewise, gratitude and gratuity go hand in hand with the belief that “less is more”. Enjoying little things, making life simple without creating necessities and no longer trying to look for what we do not have all lead to a joyful temperance to fight unhealthy anxiety. However, these attitudes based on the satisfaction obtained from helping other people can only appear if we admit that it is not our subjectivity that determines what is right and wrong. By means of certain projects carried out by teams or by a whole group, our students learn how to build a new social fabric based on an identity that seeks and builds the common good.

Since the first year, all teachers show their students the need to achieve results through others. Teamwork (in spontaneously-formed groups or in groups made up by people with complementary skills) are an important part of the assessment methods of each subject; throughout our professional lives we all see that our performance depends, to a significant extent, on the job of other people that we have not chosen and yet work with us¹³. This is another sign that the harmony we create in our environment is a consequence of being at peace with ourselves.

Giving our best is undoubtedly a very tough task. That is why our training programs for future leaders have a very rigorous selection process in which we appreciate both the candidates’ academic record and their attitudes that allow them to take advantage of their experience at our University. Moreover, the conditions to

¹⁰ FRANCISCO, Pope, *Laudato Si!* Roma: Vatican Press 2015.

¹¹ ROBINSON, K., *The Element: How Finding Your Passion Changes Everything*, 2009.

¹² BENEDICT XVI, Pope, *Caritas in Veritate*, Roma: Vatican Press 2009.

¹³ ZAMAGNI, S., *L' economia del bene comune*, Città Nuova 2007.

avoid academic probation are the strictest rules compared to other universities in the area. Studying at the highest level is a means to being able to better serve other people. And this is an “experiential learning” that is best understood when we try to live it.

Thus, we have realized that we do not want programs to train leaders according to the dominant paradigm, but what we want is to train leaders for a new paradigm. And this can only be achieved through a training program aimed towards driving this change. If we continue along the same path, we will always obtain the same results. We are not experiencing a period of rapid changes, but rapidly experiencing the start of a new era.

VIRTUAL LEARNING: VOCATIONAL SCHOOL MATHEMATICS LECTURES

Sinan AYDIN
Accounting and Task Department
Kocaeli Vocational School
Kocaeli University
sinanaydin1704@yahoo.com

ABSTRACT

In mathematics, teacher usually use virtual learning environment (VLE) in their teaching at high school or university level lectures that they believe this kind of teaching can help students' understanding of math. In this experimental case study, we try to see the effect of VLE on vocational school students' mathematics. Virtual learning environment application was introduced in teaching mathematics lecture among forty-five students of a vocational school education. The data collection tools used in this study was the questionnaire, observation and interview. According to the results, students were more interactive by VLE as emotionally and educationally. Also, exams were efficient activity and lecture videos were most preferred materials for the students. Students' personal computers, internet connection and effective using of ICTs tools in lectures turned out to be main positive ways of VLE. We can say that math courses of vocational schools should be given adopting of VLE in an efficient and necessary way.

Keywords: virtual learning environment, mathematics teaching and learning, vocational school

INTRODUCTION

Educational studies and application in all part of teaching and learning are widely affected by using of technological materials to all over the sector at last two decades. The interlock between information communication technology (ICT) and education has led radical changes at the learning and teaching way in all steps of education, for example, online learning distance education and e-learning (Khanal, 2015; Dhakal and Sharm, 2016). According to many studies in this area, the combination of education and technology has made more positive effects, especially in math education, as more quality education, more global education, faster reach to educational materials than the negative ways as decreasing of using paper- pencil in math lectures (Khanal, 2015; Kozma, 2008; Beard and Harper, 2002). It can be said that the mean aim of this renewing education is to enhance teachers' teaching and students' learning.

Many educational projects as World Bank Higher Education Reform Project provided information communication technology to enhance the level of academic presentations to students (Paul, Peter and Paul, D., 2005). As a main scientific area, math education plays a big role in education of math teachers and math education persons (Lindner and Murphy, 2001). Theoretical education at mathematics education departments usually conducted well but some problems could be seen in practical ways of the theory at many developing countries (Dhakal and Sharm, 2016; Breen, Cohen and Chang, 2003). As a result of this situation, the problems living at the mathematics education departments of the universities in teacher training reflects to elementary and high school mathematics teaching and learning. Math education departments personals of the universities should be aware of the big important of the innovative technological tools on the preparing of math teachers. According to many math education researchers, Virtual Learning Environment (VLE) could be helper the adaptation of information communication technologies to the education systems (Siragusa, 2002; Brace-Gowan and Culalow, 2002). In this paper, it was focused to express the students' adaptation to VLE to enhance their math learnings.

VLE are used and preferred rarely at vocational school level because of that many university math lecturers shares the idea that the application format could cause the decreasing of students' mathematical thinking times when they spend time with any mathematical activity such as solving a math problem and learning a math subject. (Bonner, 1999; Reese, 2015; Bryant and Hunton, 2000). Many math education researchers stressed that math education without using VLE could be decreasing of students' motivation to math lectures (Petty and Farinde, 2013; Dhakal and Sharm, 2016). University math teachers should add ICTs applications as a supplementary model of their teaching by which students could turn out to be more comfortable with the technological education systems. In this context, it is focused VLE model in this study to understand the effect of the approach in interactive learning between teachers and students at university level, and to determine the difficulties that teachers and students experience when they use the model.

METHOD

An experimental case study method is used in this study. Case study is a qualitative research method that a deeply analyze of special situation (Creswell, 2014). VLE model is the case element of this study. In this study, the data was collected with a closely connection between the researcher (the author) and researched (the teachers and the students) to see the students' behaviors in learning mathematics with VLE (Dhakal and Sharm, 2016; Lindner and Murphy, 2001).

Kocaeli vocational school is one of the biggest vocational schools (about 3500 students) in Turkey with fifteen departments such as marketing, business and accounting and task departments (social programs), and computer, constructor, electronic and machine (technical programs) The participants coming from all over the city of the country to this school. Almost all of the departments are using technological laboratories, computer classrooms and internet connection in the classes to e-learning. And, some of the departments give distance education. The teachers and the students in this school have chance to use ICTs tools for their teaching and learning. So, mathematics lectures of these departments were determined for the data unit of this study.

VLE tools were used in math lectures as a supported part of teaching in the departments. The VLE tools were presented to the students from the department webpages in the academic year 2017-2018. Some mathematics lectures of the departments were presented in the interactive model using the software as Mathematica and the video files selected from the other university lectures. The students could access the all kinds of materials at any times and at anywhere by login. The courses in which the all supplementary technological materials were used when the students needed were modified for 14 weeks (one semester). The lecturers took an assistant role to help their students during the lectures. The students' experiences such as their group discussions and using VLE were observed with a special observation list (modified from the Perkins and Murphy's scale (2013) as a basic data collection tool, and archive analyze method were used to examine the data collected during the semester.

The students' access to VLE tools, the opportunities presented to the students during the lectures were the main items in the checklist. The reliability and validity of the questions in the check list was made with a special pilot group out of the study group. The archive was the students' documents which generated during the mathematics courses. students from the construction and computer departments at a vocational school in Turkey taking mathematics I course participated to this study. During the lectures, students used android mobile phone.

FINDINGS

The main observation was that students used ICT tools efficiently and continuously during the semester because of their teachers' motivation to this way. Using a proxy measurement students' access was determined for their motivation and adaptation on VLE tools. The data coming from the archived showed that three different level of access in the system was classified that low-level access, intermediate level access and high-level access. 13 students were in the low-level access that their access to the system was 21 times during the semester. The lectures were conducted at the classrooms and at the math laboratory. If this reality is considered, the situation of these students is not bad. According to these students' archive generated by the researcher, they didn't have their special computer or android mobile phone. Also, these students used Mathematica when the lectures were conducted in math laboratory. According a student from these group;

"Sometimes, I used my classmate mobile phone to complete my exams or educational activities. I am not well in using of technological materials and, I don't have laptop and computer at home. For this reason, I dint used the technological sources much. Maybe that is a reason for my low-level participation to this digital system that I only well understand mathematics lecture listening from teacher".

30 students were in the intimidate-level access that their access to the system was 112 times during the semester. It could be said that the students in this category were sometimes willingly and in some weeks of the semester interested in VLE tools. 17 students from this group had their own android mobile phone or computer. According to this data, we can say accept that the participants in this group were supplementary to the VLE tools. The video files, activities and materials registered and operated with the system provide sometimes positive effect students' using to VLE. The connection to the system for some of the students in this group was made every time and everywhere with their mobile or personal computer which they had at their homes. A student from this group expressed that;

“The technological system gave us a big advantage to understand our mathematics lecture well. It was very helpful, and it was very nice to connect or to learn at home. Sometimes, I accessed the system with my classmates at the same time and we talked on the materials in the system via a chatting line. Also, I had some difficulties to connect to the school system from my hostel”

18 students were in the high-level access that their access to the system was 136 times during the semester. It could be said that the students in this category were very happy and interested in VLE tools. When we consider that the half of the lectures were conducted at the classrooms, we can say accept that the participants in this group were highly motivated to the VLE tools. The video files, activities and materials registered and operated with the system provide positive effect students’ using to VLE. The archived documents showed that the all students of this group had their special android mobile phone. The connection to the system for these students was made every time and everywhere with their mobile. According a student from these group;

“The connection to the system with my mobile phone was very easy and highly exciting. The registered material in the system help me to understand the course well. Also, the best point was the connect to the system when I want. Sometimes I used my laptop to connect to the webpage of mathematics lectures when I was studying mathematics or doing homework.”

Shortly, we can express the general situation of this tree level group that the students were generally engaged in the system and motivated to VLE tools. The main indicating point between the group was to have an android mobile phone/computer or not to have this technological material. Also, the main reason of the lower level accessing to the mathematics webpage was the lack of mobile phone or laptop/computer of the vocational school students.

The finding about using of VLE in education system to teach and to learn mathematics could be expressed based on the archived material in the system and the author observation as that; VLE tools provided the students to learn mathematics more technological ways and to integrate their learning to the technology. The student’s mathematics final exam scores were better than the old years students of the departments. Teacher supporting for using of VLE tools had big effect to enhance of students’ motivation on VLE. Using of VLE turned out to be a positive effect on mathematics lectures in all departments of the vocational school. The alternative sources of the mathematics lectures gave to the students using of the materials for their mathematical level and for understanding of more difficult math subjects. By the VLE tool, the reach learning and teaching environment caused the enhancing of students’ study habits, the developing of their learning styles and the active participation to the lectures. According to the analyze of the data, it can be said that students of the technological century prefers collaborative learning environment, free thinking approach on the mathematical subjects and the courses that they are enrolling interactively with the learned subject.

RESULT

By the view of the analyze and the findings of this study, VLE has positive effect on developing of student’s motivation to learning mathematics and taking good scores with exams in vocational school mathematics. VLE could be accepted as a basic supportive teaching and learning model for vocational school mathematics. As the needed for many educational method, teachers or lecturers in vocational schools should have seriously concentration on the collaboration of ICTs tools with mathematics lectures applying the necessities of the teaching and learning methods. The main point of this education method is to coordinate the basis elements which are necessary to effectively manage of VLE and the professional design of the lecture’s environments. For vocational school student in Turkey, we can say that they are coming from lower lever science and math education environment as technical high schools and socio-economical parts of the cities of the country. For this reason, VLE could provide good opportunities to these students. And finally, using of ICT could provide more participation of students to develop their educational level.

REFERENCES

- Beard, L. A., & Harper, C. (2002). Student Perceptions of Online Versus On Campus Instruction. *Education*, 122(4), 658-663.
- Benson, R. (2010). *Online learning and assessment in higher education: a planning guide*. Oxford: Chandos Publishing
- Bonner, S. E. (1999). Choosing teaching methods based on learning objectives: An integrative framework. *Issues in Accounting Education*, 14(1), 11-39.

- Brace-Govan, J., & Clulow, V. (2000). Varying expectations of online students and the implications for teachers: Findings from a journal study. *Distance Education*, 21(1), 118.
- Breen, L., Cohen, L., & Chang, P. (2003). Teaching and learning online for the first time: Student and coordinator perspectives. Paper presented at the Partners in Learning: 12th Annual Teaching Learning Forum, Edith Cowan University, Perth.
- Bryant, S. M., & Hunton, J. E. (2000). The use of technology in the delivery of instruction: Implications for accounting educ
- Creswell, J.W. (2014). Research design: qualitative, quantitative, and mixed methods approaches. 4th ed. Thousand Oaks: SAGE Publications.
- Dhakal, B.P and Sharm L. (2016). Virtual Learning Environment (VLE) in Mathematics Education. *Education Journal*. Vol. 5, No. 6, 2016, pp. 126-135. doi: 10.11648/j.edu.20160506.11.
- Khanal, P. (2014). Making virtual learning interactive and meaningful: Implications of constructivism for adult students. *Inter. J. Res. Stud. Educ.*, vol. 3, (1), pp 81-102.
- Kozma, R.B (2008). Comparative analysis of policies for ICT in education. in *International handbook of information technology in primary and secondary education*, Springer, pp. 1083–1096.
- Lindner, J. R., & Murphy, T. H. (2001). Student perceptions of WebCT in a websupported instructional environment: Distance education technologies for the classroom. *Journal of Applied Communication*, 85(4), 36-47.
- Paul, W., Peter, F., and Paul, D.L. (2005). The Virtual Learning Environment: Student Use and Perceptions of its Usefulness.
- Perkins, C and Murphy, E. (2013). Identifying and measuring individual engagement in critical thinking in online discussions: An exploratory case study. *Educ. Technol. Soc.*, 9(1), pp. 298–307.
- Petty, T. and Farinde, A.A. (2013). Investigating Student Engagement in an Online Mathematics Course. *J. Online Learn. Teach.*, 9, (2), pp. 47-43.
- Reese, S. A. (2015). Online learning environments in higher education: Connectivism vs. dissociation. *Educ. Inf. Technol.*, 20(3), pp. 579–588.
- Siragusa, L. (2002). Research into the effectiveness of online learning in higher education: Survey findings. Paper presented at the 2002 West Australian Institute for Educational Research Forum, Edith Cowan University, Perth.

VOCATIONAL SCHOOL STUDENTS' DIFFICULTIES WITH FRACTIONS

Sinan AYDIN

Kocaeli University , Kocaeli Vocational School

Accounting and Task Department

sinanaydin1704@yahoo.com

ABSTRACT

Students' difficulties with fractions in mathematics has been an important theme of the mathematics education researchers. In this study, we are focusing to analyze the vocational school students' skills and performance with fractions in order to give a perspective for teaching and learning of this subject. The sample of the study consisted of 74 first year vocational school students from business, accounting and marketing departments at a university in Turkey. The Scale had 18 items, containing multiple choice questions. One of the main findings of the study was that vocational school students enrolled business, marketing and accounting departments showed poorly in numeracy skills. The average point 48.9% could be accepted as a problem for concern because of the simple level of the questions in the test. Another result of the study was that participants tried to apply proportional actions when focusing the word questions. So, we can say that mathematics teachers should be aware of their students' difficulties with this subject and need to focus to help their students to overcome this learning problem. We hope that this study could be helpful to math curriculum designs at elementary school level, high school level and universities.

Key words: fractions, teaching mathematics, vocational school

INTRODUCTION

Fractions as a mathematics subject had always been a widely searched item at the mathematics education studies by the name "students' difficulties with fractions" (Bobis and Way, 2011; Booth et al., 2014; Goldin, and Shteingold, 2001; Gabaldon, 2015; Livy & Herbert, 2013). Especially for social program students and vocational school students this difficulty could be more deeply or dramatics. One of the main reasons of the insufficient background of students is that teacher usually accept that their students have not problem with this subject (Booth et al., 2014). But the research studies stressed that this assumption is a problematic situation (Livy and Herbert, 2013). In this point, some researchers believe that mathematics teacher must be aware of their students' problems on this subject to transform current math subjects painlessly and truthfully and to make active their students' abilities in a coordinate manner with the math subjects (Barwell, 2004; Wilson and MacGillivray, 2007).

In every platform, Mathematicians or other scientific man could be talk on the important of mathematics but this is not sufficient to explain the importance of mathematics and mathematics education. According to many mathematicians, mathematics is the language of science or the basis language to explain the world or galaxies. For this reason, to have a powerful background for students is very important to develop their mathematical knowledge and to understand the relation between math and life. Every subjects of mathematics have a powerful relation and power understanding of a subject need to powerful understand the linked math subjects (Rivera-Batiz, 1992). For example, some researchers expressed and analyzed that there is a powerful relation between strongly understanding fractions and learning mathematics well (Lesh et al., 2003; Booth & Newton, 2014; Siegler et al., 2012; Booth et al., 2014; Siegler & Lortie-Forgues, 2015). According to Siegler and Lortie-Forgues (2015), learning of algebraic subjects, geometric and trigonometric concepts needs to understand of fractions. In the interest of brevity, every concept of mathematics is more or less linked with fractions. So, teaching and learning of the subject couldn't be sloppiness (Kamii, Kirkland, and Lewis, 2001; Lamon and Susan, 2001). In this study, it was aimed to determine social programs of vocational school students prior background in fractions.

METHOD

This study conducted with marketing, business and accounting – task department social program 74 students that have basic mathematics lecture at a vocational school in Turkey. The students, voluntarily participated in this study, were

at the 1st year of 2 – year programs. The gathered with a quantitative research method. With the scale, which has 18 items on fractions, gender and high school last year math scores were gathered. The scale was developed by the author who analyzed related literature. The scale questions were focused the five subtopics about fractions as follows (Coetzee and Mammen, 2017);

- F1: operations on fractions
- F2: notation and magnitude
- F3: ratio and proportion
- F4: operations with SI unit conversions
- F5: percentage

Additionally, necessary mathematical skills are searched in this study. It was determined 4 type skills as expressed below (Coetzee and Mammen, 2017);

- S1: namely knowing
- S2: operating classic procedures
- S3: using mixed procedures
- S4: solving problems

The scale was examined by two mathematicians for the validity. With the help of these expertise, the questions in the scale were classified as follow

- Very easy
- Easy
- Moderate
- Difficult
- Very difficult

The number of easy, very easy and moderate questions in the questionnaire is 13 and the rest of the question (3) is difficult or very difficult.

FINDINGS

The students' percentages gender was 63% female and %37 male. The delivery of the students' number was 21 students from marketing department (%28.4), 25 students from business department (33.8%) and 28 students from accounting and task department (37.8%). Basic mathematics scores of the students were presented Table 1.

Table 1. Basic Mathematics scores of the students

Scores	Departments						Total	
Basic Mathematic	Accounting and Task		Business		Marketing			
0-29	0	0%	0	0%	0	0%	0	0%
30-39	1	0.4%	2	0.8%	2	9.5%	5	6.8%
40-49	7	25%	5	20%	4	19%	16	21.6%
50-59	11	30.8%	12	48%	10	47.6%	33	44.6%
60-69	6	21.4%	5	20%	4	19%	15	20.3%
70-79	2	0.7%	1	0.4%	1	4.8%	4	5.4%
80-100	1	0.4%	0	0%	0	10%	1	1.4%
Total	28	100%	25	100%	21	100%	74	100%

According to table 1, 54 students (72.3%) students were failed at basic mathematics course. 15 students of the total number (20.3%) were at the risk level as score. Only 4 students (5.4%) had satisfactory scores and 1 student (1.4%) has perfect score at basic mathematics lecture. So, we can say that the general situation of vocational school students

in mathematics lecture could be accepted as failure. Also, accounting and task students' math score level was a little better than the other departments. Finally, the average score of the students in basic mathematics lecture was 48.9.

Table 2: The questionnaire analyzes of the students (n=74)

Question Number	Skills level	Topics	Accounting and Task		Business		Marketing		Total	
1	S1	F2	21	75%	20	80%	17	81%	58	78%
2	S2	F3	18	64%	17	68%	12	57%	47	64%
3	S2	F2	19	68%	21	84%	19	90%	59	83%
4	S2	F2	22	79%	16	64%	13	62%	41	58%
5	S1	F1	23	82%	22	88%	20	95%	65	88%
6	S3	F4	18	64%	14	56%	10	48%	42	57%
7	S2	F3	13	46%	16	64%	15	71%	44	59%
8	S1	F5	17	61%	22	88%	20	95%	59	83%
9	S3	F3	16	57%	14	56%	11	52%	41	58%
10	S3	F1	19	68%	16	64%	18	86%	53	72%
11	S3	F1	21	75%	15	60%	10	48%	46	62%
12	S3	F4	13	46%	9	36%	6	35%	28	38%
13	S2	F2	15	54%	18	72%	14	67%	47	64%
14	S4	F5	9	32%	10	40%	9	43%	28	38%
15	S1	F1	19	68%	18	72%	16	76%	53	72%
16	S4	F3	8	29%	7	28%	6	29%	21	28%
17	S2	F5	12	43%	11	44%	12	57%	35	47%
18	S4	F4	10	36%	8	32%	10	48%	28	38%

The average scores of the students for every question registered in Table 2 with representing from F1 to F5. The meaning of this letters expressed in the Method section. The skills level of the students for every question in Table 2 represented with the symbols from S1 to S4 and meaning of this symbol explained in the section Method. According to table 2, there was a direct relation between the skill level of the questions, the topic's difficulty level of the questions and the number of the students giving true or false answer. For example, if skill level of any question was S1 or S2 and difficulty level of it was F1 or F2, then almost all of the students' answer for this question was true. But, if skill level of any question was S3 or S4 and difficulty level of it was F3 or F4, then the number of the students with true answer was highly lower level.

Figure 1: The relationship between Students' basic mathematics scores and Questionnaire scores of the fraction scale

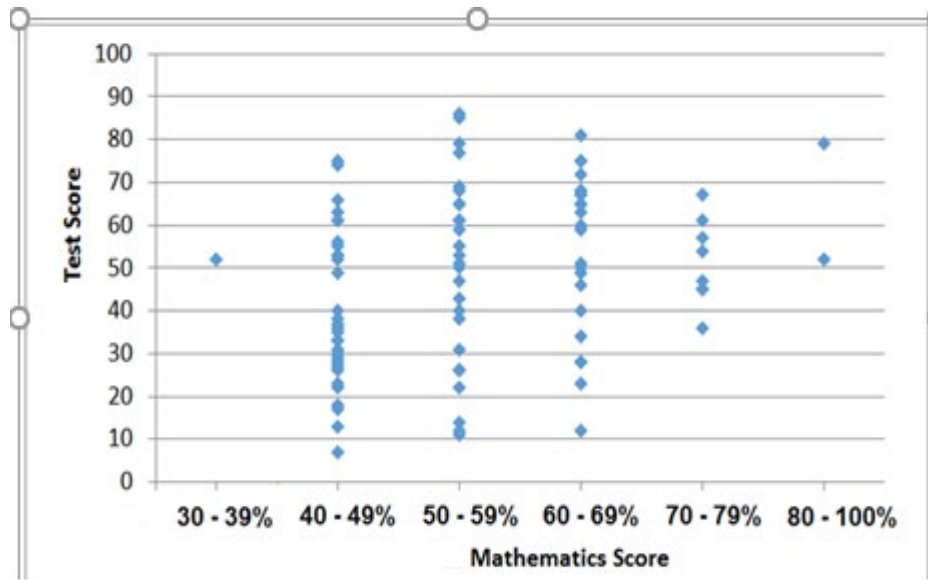


Figure 1 clearly showed that there was a significant relationship between basic mathematics score, S skill abilities and F fraction background knowledge of the students.

RESULT

Briefly stated, students were failed at basic mathematics course. We believe that almost all of the social program students in the vocational school was coming vocational elementary school and mathematics lectures was lower level in the teaching program of these school. There was a significant relationship between basic mathematics score, S skill abilities and F fraction background knowledge of the students. that was the expected result for this study.

REFERENCES

- Barwell, R. (2004). What is Numeracy? For the Learning of Mathematics, 24(1), 20-22.
- Bobis, J. and Way, J. (2011). Fractions: teaching for understanding.
https://www.researchgate.net/publication/261987862_Fractions_teaching_for_understanding
- Booth, J.L., Newton, K.J. & Twiss-Garrity, L.K. (2014). The impact of fraction magnitude knowledge on algebra performance and learning. *Journal of Experimental Child Psychology*, 118, 110-118.
- Coetzee, J. and Mammen, J. (2017). Science and Engineering Students' Difficulties with Fractions At Entry-Level To University. *International Electronic Journal of Education*, 12(3), 281-310.
- Gabaldon, T.A. (2015). Strength in Numbers: Teaching Numeracy in the Context of Business Associations. *St. Louis University Law Journal*, 59, 701709.
- Goldin, G. & Shteingold, N. (2001). Systems of representations and the development of mathematical concepts. In A. A. Cuoco & F. R. Curcio (Eds), *The roles of representation in school mathematics* (pp. 1-23). Reston, VA: National Council of Teachers of Mathematics.
- Kamii, C., Kirkland, L., & Lewis, B. A. (2001). Representation and abstraction in young children's numerical reasoning. In A. A. Cuoco & F. R. Curcio (Eds), *The roles of representation in school mathematics* (pp. 24-34). Reston, VA: National Council of Teachers of Mathematics.
- Lamon, Susan J. (2001). Presenting and representing: From fractions to rational numbers. In A. A. Cuoco & F. R. Curcio (Eds), *The roles of representation in school mathematics* (pp. 146-165).
- Lesh, R., Cramer, K., Doerr, H., Post, T., & Zawojewski, J. (2003). Model development sequences. In R. Lesh & H. Doerr, (Eds), *Beyond constructivism: Models and modeling perspectives on mathematics problem solving, learning, and teaching* (pp. 35-58). Mahwah, NJ: Lawrence Erlbaum Associates.
- Livy, S. & Herbert, S. (2013). Second-Year Pre-Service Teachers' Responses to Proportional Reasoning Test Items. *Australian Journal of Teacher Education*, 38(11), 17-32.

- Rivera-Batiz, F.L. (1992). Quantitative Literacy and the Likelihood of Employment among Young Adults in the United States. *The Journal of Human Resources*, 27(2), 313-328.
- Siegler, R.S., Duncan, G.J., Davis-Kean, P.E., Duckworth, K., Claessens, A., Engel, M., Susperreguy, M.I. & Chen, M. (2012a). Early Predictors of High School Mathematics Achievement. *Psychological Science*, 23(7), 691-697.
- Siegler, R.S. & Lortie-Forgues H. (2015). Conceptual Knowledge of Fraction Arithmetic. *Journal of Educational Psychology*, 107(3), 909-918
- Wilson, T.M. & MacGillivray, H.L. (2007). Counting on the basics: mathematical skills among tertiary entrants. *International Journal of Mathematical Education in Science and Technology*, 38(1), 19-41.