



UNIVERSITY OF NOVI SAD
TECHNICAL FACULTY "MIHAJLO PUPIN"
ZRENJANIN
REPUBLIC OF SERBIA



INTERNATIONAL CONFERENCE ON
**INFORMATION TECHNOLOGY AND
DEVELOPMENT OF EDUCATION**
ITRO 2014
PROCEEDINGS



MEĐUNARODNA KONFERENCIJA
**INFORMACIONE TEHNOLOGIJE I
RAZVOJ OBRAZOVANJA**
ITRO 2014
ZBORNİK RADOVA

ZRENJANIN, JUNE 2014

Organiser of the Conference:

University of Novi Sad, Technical faculty „Mihajlo Pupin“, Zrenjanin, Republic of Serbia

Publisher:

University of Novi Sad, Technical faculty „Mihajlo Pupin“, Djure Djakovica bb, Zrenjanin, Republic of Serbia

For publisher:

Milan Pavlovic, Ph. D, Professor, Dean of the Technical faculty „Mihajlo Pupin“, Zrenjanin

Technical preparation and design:

Ivan Tasic, Ph. D, Assistant Professor
Dijana Karuovic, Ph. D, Assistant Professor
Marjana Pardanjac, Ph. D, Assistant Professor
Erika Eleven, M.Sc, Assistant
Dusanka Milanov

Lecturer:

Erika Tobolka, Ph. D, Professor

Printed by:

Printing office DIGINET ProStudio, Djure Jaksica street, no. 14, Zrenjanin

Circulation: **60**

ISBN: 978-86-7672-225-9

By the resolution no. 114-451-970/2014-03, Autonomous Province of Vojvodina Provincial Secretariat For Science and Technological Development donated financial means for printing this Conference Proceedings.

The Conference is supported by the Autonomous Province of Vojvodina, the City Administration of Zrenjanin, The National House of Mihajlo Pupin, Idvor and Organizing Committee for the Anniversary of the "Mihajlo Pupin year".

CIP – Каталогизacija u publikaciji
Библиотека Матице српске, Нови Сад

37.01:004(082)
37.02(082)

INTERNATIONAL Conference on Information Technology and Development of Education (2014 ; Zrenjanin)
Proceedings = Zbornik radova / International Conference on Information Technology and Development of Education, ITRO 2014, Zrenjanin, June 2014 = Međunarodna konferencija Informacione tehnologije i razvoj obrazovanja, ITRO 2014 ; [organiser] University of Novi Sad, Technical Faculty "Mihajlo Pupin", Zrenjanin. - Zrenjanin: Technical Faculty "Mihajlo Pupin", 2014 (Zrenjanin: Diginet ProStudio). - VII, 441 str. : ilustr. ; 30 cm

Tiraž 60. – Bibliografija uz svaki rad .

ISBN 978-86-7672-225-9

1. Technical Faculty „Mihajlo Pupin“ (Zrenjanin)
a) Информациона технологија – Образовање – Зборници b)

Образовна технологија - Зборници
COBISS.SR-ID 287020807

ITRO PARTNERS

**Chekhov Taganrog State
Pedagogical Institute
Russia**



**South-West University „Neofit Rilski“
Faculty of Education. Blagoevgrad,
Republic of Bulgaria**



**SOUTH WEST UNIVERSITY
“NEOFIT RILSKI”**

**Faculty of Electrical Engineering and Informatics
Department of Computers and Informatics of Kosice
Slovak Republic**



**University Goce Delcev Stip
Republic of Macedonia**



**УНИВЕРЗИТЕТ
„ГОЦЕ ДЕЛЧЕВ“
ШТИП**

THE SCIENCE COMMITTEE:

Milan Pavlovic, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia – Dean
Djordje Herceg, Ph.D, Professor, Faculty of Science, Novi Sad, Republic of Serbia
Marina Cicin Sain, Ph.D, Professor, University of Rijeka, Croatia
Anton Vukelic, Ph.D, Professor, Faculty of Philosophy, Croatia
Ion Dzitac, Ph.D, Professor, Department of Mathematics - Informatics, Aurel Vlaicu University of Arad, Romania
Sashko Plachkov, Ph.D, Professor, South-West University "Neofit Rilski"/Department of Education, Blagoevgrad, Republic of Bulgaria
Sulejman Meta, Ph.D, Professor, Faculty of Applied Sciences, Tetovo, Macedonia
Marta Takacs, Ph.D, Professor, Óbuda University, John von Neumann Faculty of Informatics, Budapest, Hungary
Nina Bijedic, Ph.D, Professor, Applied mathematics, Bosnia and Herzegovina
Viorel Negru, Ph.D, Professor, Department of Computer Science, West University, Timisoara, Romania
Mirjana Segedinac, Ph.D, Professor, Faculty of Science, Novi Sad, Republic of Serbia
Milka Oljaca, Ph.D, Professor, Faculty of Philosophy, Novi Sad, Republic of Serbia
Dusan Starcevic, Ph.D, Professor, Faculty of Organizational Sciences, Belgrade, Republic of Serbia
Dobrivoje Mihailovic, Ph.D, Professor, Faculty of Organizational Sciences, Belgrade, Republic of Serbia
Vesna Srdic, Ph.D, Training College in Kikinda, Republic of Serbia
Zvonko Sajfert, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia
Miroslav Lambic, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia
Miodrag Ivkovic, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia
Zivoslav Adamovic, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia
Momcilo Bjelica, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia
Dragica Radosav, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia
Dragana Glusac, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia
Dijana Karuovic, Ph.D, Assistant Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia
Ivan Tasic, Ph.D, Assistant Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia
Branislav Egic, Ph.D, Assistant Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia
Vesna Makitan, Ph.D, Assistant Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia
Marjana Pardanjac, Ph.D, Assistant Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia
Erika Tobolka, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia
Erika Eleven, M.Sc, Assistant, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia

THE ORGANIZING COMMITTEE:

Dijana Karuovic, Ph.D, Assistant Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia- Chairman

Dragana Glusac, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia

Dragica Radosav, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia

Ivan Tasic, Ph.D, Assistant Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia

Vesna Makitan, Ph.D, Assistant Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia

Marjana Pardanjac, Ph.D, Assistant Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia

Erika Tobolka, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia

Erika Eleven, M.Sc, Assistant, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia

Dusanka Milanov, Technical Faculty "Mihajlo Pupin" Zrenjanin, Republic of Serbia

All rights reserved. No part of this Proceedings may be reproduced in any form without written permission from the publisher.

The editor and the publisher are not responsible either for the statements made or for the opinion expressed in this publication.

The authors are solely responsible for the content of the papers and any copyrights, which are related to the content of the papers.

With this publication, the CD with all papers from the International Conference on Information Technology and Development of Education, ITRO 2014 is also published.

We are very grateful to:

***Autonomous Province of Vojvodina
The National House of Mihajlo Pupin, Idvor
Organizing Committee for the Anniversary of the
"Mihajlo Pupin year"***



***for donated financial means which supported printing of the
Conference Proceedings and organizing of the Conference.***

INTRODUCTION

This Proceedings comprises papers from the **International conference on Information technology and development of education** that is held in the National House of Mihajlo Pupin, Idvor on June 27th 2014.

The International conference on Information technology and development of education has had a goal to contribute to the development of education in Serbia and in the region, as well as, to gather experts in natural and technical sciences' teaching fields.

The expected scientific-skilled analysis of the accomplishment in the field of the contemporary information and communication technologies, as well as analysis of state, needs and tendencies in education all around the world and in our country have been realized.

The authors and the participants of the Conference have dealt with the following thematic areas:

- Theoretical and methodological questions of contemporary pedagogy
- Personalization and learning styles
- Social networks and their influence on education
- Children security and safety on the Internet
- Curriculum of contemporary teaching
- Methodical questions of natural and technical sciences subject teaching
- Lifelong learning and teachers' professional training
- E-learning
- Education management
- Development and influence of IT on teaching
- Information communication infrastructure in teaching process

All submitted papers have been reviewed by at least two independent members of the Science Committee.

The papers presented on the Conference and published in this Proceedings can be useful for teacher while learning and teaching in the fields of informatics, techniques and other teaching subjects and activities. Contribution to science and teaching development in this region and wider has been achieved in this way.

The Organizing Committee of the Conference

CONTENTS

S. Plachkov, N. Tsankov, A. Tsvetkova STUDENTS' TRAINING THROUGH THE BLACKBOARD LEARN E-PLATFORM	1
M. Gogova, N. Koceska THE USE OF QR CODES IN EDUCATION	7
B. Sobota, F. Hrozek, Š. Korečko, Cs. Szabo EXPERIENCES WITH VIRTUAL REALITY TECHNOLOGIES IN EDUCATION PROCES	11
I. Stojanova, I. Kocev, N. Koceska, S. Koceski MOBILE INTERACTIVE APPLICATION FOR EDUCATION SUPPORT OF PRESCHOOL CHILDREN	16
T. Popkochev STANDARDS FOR DISTANCE LEARNING (EXPERIMENT OF THE SOUTH-WEST UNIVERSITY "NEOFIT RILSKI", BLAGOEVGRAD)	20
V. Bashovski, N. Koceska, S. Koceski MULTICAMPUS DISTANCE EDUCATION BASED ON VIDEO-CONFERENCING SYSTEM	25
Cs. Szabó, Z. Havlice, V. Szabóová, J. Vízi ON THE ROLE OF USER STORIES IN SOFTWARE ENGINEERING EDUCATION	29
M. Kocaleva, I. Stojanovik, Z. Zdravev RESEARCH ON UTAUT APPLICATION IN HIGHER EDUCATION INSTITUTIONS...	34
E. Panayotova Petkova EFFECTIVENESS OF THE EVALUATION BY COMPUTER TESTS	39
V. Vitanova, T. Atanasova-Pachemska, S. Pachemska STRUCTURAL EQUATION MODELING AND THEIR APPLICATION IN EDUCATIONAL RESEARCH - CASE STUDY OF ICT USAGE IN PRIMARY SCHOOLS IN SOUTH - EAST REGION IN MACEDONIA	44
T. Atanasova-Pacemska, R. Timovski QUALITY VALORIZATION OF UNIVERSITY STUDY PROGRAMS USING LINEAR PROGRAMMING APPLICATION	53
H. Telepovská, Cs. Szabó SWITCHING FROM INFORMIX TO ORACLE IN TEACHING DATABASE SYSTEMS	59
V. Bashovski, S. Koceski TEACHING MODULAR SOFTWARE ARCHITECTURES	64

V. Sarac, T. Atanasova-Pacemska, Z. Trifunov ELECTRONIC TESTS IN HIGH EDUCATION- OPPORTUNITIES AND CHALANGES	68
A. Kotevski, N. Koceska MOBILE AUDIENCE RESPONSE SYSTEM AS A SUPPORT TOOL IN EDUCATION	73
B. Sobota, F. Hrozek, Š. Korečko, P. Ivančák VIRTUAL USER INTERFACE	77
A. Kotevski, C. Martinovska – Bande IMPROVED ALGORITHM FOR TAG-BASED COLLABORATIVE FILTERING	81
I. Lazarevski, N. Koceska, S. Koceski SOFTWARE SYSTEM FOR AUTOMATED SUPPORT OF END-USERS	86
Cs. Szabo, A. Bollin ON A MIXED-UP SCHEDULE FOR TEACHING SOFTWARE QUALITY AND PROJECT MANAGEMENT – AN EXPERIENCE REPORT	90
Z. Zlatev, R. Golubovski, V. Gicev DATA PROCESSING OF RECORDED MOTION AT SEVEN-STORY HOTEL IN VAN NUYS, CALIFORNIA DURING NORTHRIDGE EARTHQUAKE 1994	98
A. Risteska, V. Gicev APPLYING THE FUNDAMENTAL LEMMA OF VARIATIONAL CALCULUS TO THE PROBLEM OF THE SMALLEST SURFACES IN ROTATION	104
B. Petkovska, B. Delipetrev, Z. Zdravev MOOCS IN HIGHER EDUCATION – STATE OF THE ART REVIEW	108
A. Fedorov COMPUTER GAMES’ STUDIES IN RUSSIA	113
E. Yashchuk, E. Zankova ABOUT THE IMPORTANCE OF MONITORING OF TEACHERS’ READINESS TO WORK WITH E-LEARNING TECHNOLOGIES	117
V. Aleksic, M. Ivanovic DIGITAL DIDACTIC GAMES IN ELEMENTARY SCHOOL.....	121
T. Sasic, E. Eleven, D. Milanov THE APPLICATION OF INTERACTIVE EDUCATIONAL SOFTWARE IN PRESCHOOL AGES.....	124
D. Danilov, N. Matkovic, D. Karuovic INTERACTIVE WHITEBOARD INFLUENCE ON EDUCATION	131

M. Lutovac, V. Grbic, N. Lutovac, J. Jankov SIGNIFICANCE OF WEB -ORIENTED INFORMATION SYSTEMS FOR E-BUSINESS IN SERBIA	135
G. Berati, F. Kroni, J. Bushati ADVANCED PARALLEL COMPUTING METHODS FOR MATRIX MULTIPLICATION	140
G. Jausevac, G. Jotanovic ANALYSIS ICT KNOWLEDGE OF STUDENTS: FACULTY OF TRANSPORT AND TRAFFIC ENGINEERING	146
M. Lutovac, N. Lutovac, J. Jankov, I. Tasic STABILITY SAFETY and ABUSE of BUSINESS INFORMATION SYSTEM	152
I. Stetsenko, E. Zankova BLENDED LEARNING AS THE INTEGRATION OF TRADITIONAL AND ELECTRONIC EDUCATIONAL MODELS	156
A. Fedorov ANALYSIS OF THE STEREOTYPES OF SOVIET FILM IMAGE OF THE WAR IN A MEDIA EDUCATION CLASSROOM	160
B. Zvizdak, D. Karuovic, I. Tasic, D. Glusac THE USE OF SCHOOL WEBSITE FOR MOTIVATION LEVEL IMPROVEMENT	166
K. Dunjic Mandic, R. Karanac, Z.M. Papic EXPOSURE STUDENTS FROM HIGH SCHOOL IN CACAK TO DIGITAL VIOLENCE	172
J. Simic, G. Mijatov, N. Durakovic, J. Tucakov, Lj. Popovic, D. Sakulski, S. Popov MODELING AND SIMULATION IN DISASTER RISK MANAGEMENT EDUCATION	177
N. Bubica, I. Boljat TEACHING OF NOVICE PROGRAMMERS: STRATEGIES, PROGRAMMING LANGUAGES AND PREDICTORS	180
I. Boljat EXPERIMENTAL EXAMINATION of STRUCTURED-MODULAR INSTRUCTION ...	186
Z. Namestovski, B. Arsovic WEB 2.0 TOOLS IN EDUCATION, THE GAP BETWEEN THE CURRICULUM AND SCHOOL PRACTICE	192
M. Adedeji Oyinloye DIGITAL REVOLUTION: SCOPE AND INDUSTRIAL APPLICATION OF DATA WAREHOUSING AND DATA MINING	196

E. Yashchuk, E. Zankova E-LEARNING TRAINING IN THE SYSTEM OF CONTINUOUS PEDAGOGICAL EDUCATION	201
I. Stetsenko, E. Yashchuk FORMATION OF INFORMATION CULTURE OF PUPILS OF ORGANIZATIONS OF GENERAL EDUCATION	204
S. Maravic Cisar, R. Pinter, P. Cisar THE GAMIFICATION OF EDUCATION	208
S. Stankovic I LEARN WITH FUN – EDUCATION FOR THE FUTURE	212
M. Simic, P. Svircev, N. Tasovac, E. Eleven FACEBOOK IN THE FUNCTION OF IMPROVEMENT OF TEACHING.....	217
A. H. Trtovac, S. Sehovic, A. Konicanin LEARNING MANAGEMENT SYSTEM USING COMPUTERS	222
E. Tobolka, D. Mihaljica INFLUENCES OF SOCIAL NETWORKS ON LEARNING ENGLISH.....	225
A. Felbab, M. Pardanjac, S. Jokic SAFETY AND SECURITY OF CHILDREN ON THE INTERNET	230
M. Jovanovic, D. Todosijevec, V. Ognjenovic OPEN SEMANTIC ASSESSMENT: A MULTIPLIED CHOICE APPROACH TO E-ASSESSMENT	233
E. Tobolka, M. Knezevic HOW TO PROTECT ELEMENTARY SCHOOL CHILDREN ON THE INTERNET	237
M. Seslija WEB APPLICATION FOR DOCUMENT MANAGEMENT SUPPORT IN HIGHER EDUCATION INSTITUTION	240
D. Lacmanovic, D. Dobrilovic, Z. Stojanov, J. Pekez, A. Tomovic MODELLING SOFTWARE APPLICATION FOR MONITORING ENERGY EFFICIENCY OF PUBLIC BUILDINGS	245
V. Odadzic, B. Odadzic EFFECTS OF EDUCATIONAL COMPUTER SOFTWARE ON MOTIVATION AND PERFORMANCE OF STUDENTS IN BIOLOGY	251
T. Davidov, S. Bosnjak THE SOFTWARE COMPONENTS IN THE BUSINESS APLICATIONS DEVELOPING	256

V. Ognjenovic, M. Jovanovic, I. Berkovic APPLICATION OF THE DSI FRAMEWORK IN TEACHING GRAPH SEARCH ALGORITHMS	262
M. Milenkovic, K. Vukadinovic, T. Neznanovic, E. Eleven EDUCATIONAL SOFTWARE FROM TRAFFIC	266
T. Krizan, M. Pardanjac, S. Jokic GARDEN SOLAR ENERGY	270
D. Maravic., N. Tesic, E. Tobolka E-LEARNING AND ONLINE CERTIFICATES FOR ENGLISH AS A FOREIGN LANGUAGE.....	273
S. Vranjes, Z. Zarin, Lj. Pavlovic, M. Pardanjac, D. Letic, S. Milosavljevic EDUCATIONAL COMPUTER SOFTWARE AS A SIMULATION TECHNIQUE- EXAMPLES IN TECHNICAL AND IT EDUCATION	277
Z. Senti, M. Zivkovic, M. Samolovcev, R. Vasic, D. Karuovic THE USE OF ALGODOO IN TEACHING TECHNICAL AND IT EDUCATION - AREA OF TRAFFIC SAFETY	283
B. Popovic, I. Djurovka, J. Dudas, M. Pardanjac INTERACTIVE SIMULATIONS IN TEACHING TECHNICAL AND INFORMATION TECHNOLOGIES EDUCATION	288
I. Grujic, D. Radosav ANALYSIS OF INFORMATION TECHNOLOGY APPLICATION IN THE MUSIC PRODUCTION	294
E. Tobolka, I. Zdrakanovic, D. Danilov APPLICATION AND IMPORTANCE OF INFORMATION TECHNOLOGY IN TEACHING.....	297
V. Filipov, E. Eleven, Z. Eremic IMPLEMENTATION OF „MOODLE“ IN THE SCHOOL SYSTEMS	300
N. Pilipovic, S. Stanisic, S. Babuskov, N. Tatomirov, E. Eleven DEVELOPMENT OF INFORMATION TECHNOLOGIES INFLUENCE ON TEACHING.....	304
J. Babic, A. Terek, S. Miskovic, E. Eleven CHILDREN SAFETY ON SOCIAL NETWORKS	309
E. Tobolka, U. Gmizic, A. Vlaskalic USE OF MICROSOFT POWERPOINT IN EDUCATION	312
O. Iskrenovic Momcilovic, B. Miljkovic MOODLE - TOOL FOR E-LEARNING	315

Z. Micic, N. Stankovic, M. Blagojevic CLUSTERING OF KNOWLEDGE INNOVATION IN STANDARDIZED “HARDWARE’S” SUBFIELDS OF INFORMATION TECHNOLOGY	319
E. Tobolka, S. Stanisic, D. Gabor TECHNOLOGIES THAT ARE BEING USED IN E-LEARNING AND ITS EVOLUTION..	326
N. Chotaliya, Lj. Kazi, V. Jevtic, I. Berkovic, D. Cockalo, D. Glusac ACCREDITATION OF HIGHER EDUCATION INSTITUTIONS IN INDIA AND SERBIA: COMPARISON OF AUDIT FORMS.....	330
Lj. Kazi, B. Radulovic, M. Ivkovic, V. Makitan, B. Markoski WEB APPLICATION FOR PROJECT MANAGEMENT SUPPORT IN INFORMATION SYSTEMS HIGHER EDUCATION	340
S.Vlacic, S.Rodjenkov-Milinkovic, A.Knezevic, I.Vlacic USE OF THE COMMERCIAL SOFTWARE TOOLS IN THE PREPARATION PHASE OF MILITARY PILOT EDUCATION AND TRAINING	346
J. Lukic, A. Teofilovic, D. Nedeljkovic, ALIGNING EDUCATION WITH INDUSTRY REQUIREMENTS: BIG DATA ERA	352
E. Tobolka, M. Simic STUDYING WITH TABLETS	358
N. Chotaliya, Lj. Kazi HIGHER EDUCATION INSTITUTIONS ACCREDITATION IN INDIA AND GUJARAT STATE OF INDIA	362
D. Rac THE SCHOOL PRINCIPAL AS A MANAGER AND A LEADER.....	367
N. Aleksic, A. Miskovic THE DIFFERENCES BETWEEN THE ATTITUDES AND KNOWLEDGE OF THE BOLOGNA PROCESS AND STUDENT OF ALTERNATIVE PROGRAMS IN ACADEMIA	373
M. Runic Ristic, S. Mirkov, I. Ristic THE PROCESS OF RECRUITMENT FOR MANAGEMENT AND ENGINEERING PROFESSION: COMPARATIVE ANALYSIS.....	380
I. Tasic, D. Mihaljica, V. Srdic, D. Cvetkovic IMPORTANCE OF INFORMATION SYSTEMS IN DECISION-MAKING.....	385
M. Grahovac, I. Tasic, D. Cvetkovic, J. Jankov INFORMATION QUALITY IN BUSINESS LOGISTIC SYSTEMS	390

V. Vela	
INCIDENTAL VOCABULARY LEARNING THROUGH READING, A SYNTHESIS OF THE RESEARCH AND BASIC ASSUMPTIONS IN THE LITERATURE	394
T. Sali, A. Sali	
THE EFFECTIVENESS OF SONG LYRICS IN MOTIVATING STUDENTS IN ACQUIRING VOCABULARY	398
R. Osmani	
THE WORDS YOU NEED: TARGET VOCABULARY TEACHING STRATEGIES TO BASIC ENGLISH SKILLS STUDENTS AT SOUTH EAST EUROPEAN UNIVERSITY	402
R. Serdukov	
THE IDEAS OF LEN MASTERMAN AS PHILOSOPHICAL AND METHODOLOGICAL BASIS OF MEDIA EDUCATION	406
B. Blagojevic, D. Solesa, N. Kojic	
TREND INTERACTION BETWEEN PEOPLE - INTELLIGENT SOPHISTICATED CONTEXTUAL ENVIRONMENT	410
J. Jankov, I. Tasic, M. Cockalo-Hronjec	
WORK WITH GIFTED STUDENTS IN TEACHING OF TECHNICAL AND IT EDUCATION	416
G. Bilic Prijic	
CHARACTERISTICS OF ONLINE CURRICULUM AND ITS GROUNDING IN CONTEMPORARY LEARNING THEORIES	421
S. Vranjes, D. Radosav, D. Vajic, I. Tasic, D. Letic, E. Eleven	
TEACHERS' ADVANCED TRAINING OF TECHNICAL EDUCATION AND COMPUTER SCIENCE.....	427
D. Glusac, D. Milanov, D. Karuovic	
E-LEARNING THROUGH KHAN'S EIGHT-DIMENSIONAL FRAMEWORK.....	433
M. Kojadinovic	
BASICS OF WINDOWS PHONE DEVELOPMENT	438

MOOCS IN HIGHER EDUCATION – STATE OF THE ART REVIEW

B. Petkovska, B. Delipetrev, Z. Zdravev

“Goce Delcev” University, Stip, Republic of Macedonia

bisera.petkovska@gmail.com, blgoj.delipetrev@ugd.com.mk, zoran.zdravev@ugd.com.mk

Abstract - This paper discusses a new trend in education, so-called Massive Open Online Courses - MOOCs and their implementation in higher education. MOOC courses are designed for an unlimited number of users, they are usually free and they are available exclusively online. MOOCs arise from so-called OER movement, i.e. the movement of open educational resources promoted on the UNESCO Forum in 2002. The application of these courses is differentiated in two types: cMOOCs and xMOOCs. MOOCs have been developed to support multiple platforms and with that, their massive use began. Students and professors very well accept the use of MOOCs in higher education. Professors agree about MOOCs usefulness and successful, but disagree about their formal acceptance on Universities.

I. INTRODUCTION

With the continuous development of technology, new challenges for the higher education emerge. The Internet and its wide and unlimited use has brought new trends, most of all in the way people communicate and share information. The e-mail, the social networks, the blogs, the discussion forums and similar platforms are now part of the everyday lives of ordinary people and have significantly improved the availability of data from all fields.

These trends have had their impact in the development of higher education. One of the newest and most interesting outbreaks is the appearance of massive open online courses (MOOCs). Our research has the goal of introduction with the meaning of these courses and the implications they have for higher education.

In the paper, we first give the definition and short history of MOOCs. Then we make a difference between different types of MOOCs and give overview of the most successful platforms for these courses. At the end, we present the advantages and disadvantages of MOOCs and the motivation for their use from individuals and Universities.

The paper is based on multiple researches and publications from electronic sources, most of

which are from reputable researchers whose specific field of interest are the MOOCs.

II. MASSIVE OPEN ONLINE COURSES AND THEIR IMPLICATIONS IN HIGHER EDUCATION

A. What are Massive Open Online Courses?

According to Wikipedia [1], Massive open online courses (MOOCs) are courses aimed at unlimited participation and open access via the web. Simpler is the Oxford Dictionary definition [2], which says MOOC is a course of study made available over the Internet without charge to a very large number of people. The main goal of MOOCs comes from their definition. For the needs of this paper, we give our definition: MOOCs are courses, which are designed for unlimited number of users; they are usually free and available exclusively over the Internet.

B. Short History

The beginnings of MOOCs are not so far in the past. It is considered that they have emerged from the Open Education Resources (OER) movement. Open Education Resources are freely accessible, openly licensed documents and media that are useful for teaching, learning, educational, assessment and research purposes. The term has been coined on the UNESCO forum in 2002, which had explored the implications of the initiative for developing countries at MIT University. Ten years later at the World Congress for OER of UNESCO, the Paris Declaration was signed. The Declaration among other things recommends fostering awareness and using of OER and encouraging the open licensing of educational materials produced with public funds [3].

The first official MOOC is the course of George Siemens (Alabaska University) and Stephen Downes (National Research Council), called “Connectivism and connective knowledge”, which was created at Manitoba University in Canada. Besides the 25 students of this University,

the course was followed via the web from additional 2300 students from the general public. All content of the course was available through RSS feeds and online students could participate via collaboration tools, including blog posts, threaded discussions in e-learning system Moodle [4] and through meetings via social platform Second Life [5]. Because of this course Dave Cormier from Prince Edward Island University and Bryan Alexander from National Institute coined the term MOOC for technology in liberal education [1].

C. Types of MOOCs

In the short development cycle of MOOCs, two types are differentiated until today: cMOOCs and xMOOCs. One type is not better than the other is, they are simply different.

In the cMOOC term, “c” means conectivism and the first MOOC created is part of this group. The theory of the creator of the course is based on the idea that the learning happens in a network, where students use digital platforms like blogs and social networks to connect with the content of the course, other learning communities and other learners with the goal of creating knowledge [6]. In cMOOCs, students are encouraged to contribute actively to learning by using digital platforms. The course organizers, who later share them through e-mail or newsletters, are summarizing the students’ contributions daily. cMOOCs are usually not sponsored by higher education institutions, but are organized by individuals with passion for a specific subject. The organizers devote time for creating a framework for learning, where students from all around the world can connect and share, contribute and collaborate, while simultaneously learn about specific subject and expand their network of professional and personal contacts. Despite being open, cMOOCs are also flexible, which means they fully match the needs of their participants and provide learning customized for these needs [7]. Its visionaries George Siemens and Stephen Downes are explaining this type of learning the best, who in his new book explains the learning, as “Learning is the creation and removal of connections between the entities, or the adjustment of the strengths of those connections. A learning theory is, literally, a theory describing how these connections are created or adjusted”[6].

Even though the first MOOC is a cMOOC, the massive open online courses truly gained their popularity with the appearance of the first xMOOC course in 2011. Creators of this course on

the topic “Artificial intelligence” were Sebastian Thrun and Peter Norvig from Stanford University [8]. They expected a few thousand students, but the course was enrolled by 160.000 students from 190 countries around the world, which made it massive in the true meaning of the word. After finishing this course, Thrun founded Udacity.com, a platform that offers mainly science and technology courses. Soon after that Coursera.com and edx.com, which is a platform for free online courses of the Harvard and MIT Universities, were also opened [7]. Since then the number of similar platforms, sponsored by higher education institutions, but also from different profit and non-profit organizations, has been constantly growing. These types of MOOCs, which are offered on University platforms, are based on traditional studying materials and higher education methods of learning. They frequently involve video lectures and quiz-tests as a method of evaluation. Usually they include content available on the Internet, outside the learning platform.

All this being said, the basic difference between cMOOC and xMOOC is that in cMOOCs learners are in the center of attention and they are the main contributors to the learning, while in xMOOCs in the center of attention is the professor who leads the course and gives directions to learners. Although the digital platforms for communication are of crucial meaning for cMOOCs, their use is also encouraged in xMOOCs. For higher education, xMOOCs are more significant, because they are closer to the traditional education.

D. The most popular platforms

In their paper “MOOCs and open education: Implications for higher education” [9], Li Yuan and Stephen Powell from the Centre for Educational Technology and Interoperability Standards, analyze the most popular MOOC platforms, their functions and their interests. One of the best known is edx.com, which has already mentioned is a joint non-profit platform of MIT and Harvard Universities. These Universities use MOOCs to understand how students learn, with the goal of improving learning and teaching on the traditional campus. Coursera.com, Udacity.com and Udemy.com are for-profit platforms, which usually make money from course certificates, but they also work on development of other business models like selling information to students, advertising of sponsored courses, charging fees for credited courses etc. P2pu.org and

khanacademy.org are platforms sponsored by foundations and their goal is to provide opportunities for everyone who wants to learn online, allowing them free access.

According to the research of the site openeducationeuropa.eu, made in December 2013, Europe is also following the trend with MOOCs, the leader being Spain with the greatest number of courses, and UK, Germany and France are following on the list. Until now, approximately 400 courses have been created, the most common topics being science and technology, social sciences, applied sciences and business. The best-known European providers of MOOCs are the European higher education institutions and the platforms UnX, Miriada X, OpenupEd, OpenCourseWorld, Iversity, FutureLearn etc. [10].

E. Advantages and disadvantages

According to Dr. Shelley Kinash from Bond University, Australia [11], there are many characteristics of MOOCs, which differentiate them from traditional education, some of them being considered as advantages. MOOCs are usually independent subjects, and students around the world can enroll from anywhere in anytime. They balance between synchronous and asynchronous way of learning, which means that sometimes both the teachers and students are online, but most activities are designed so students can pay attention to them in the time that suits them the most. The time for enrolling and finishing the course is usually not limited. MOOCs use the concept of customized learning which means that the weight and the challenge of the content and exercises are adjusted to the level of knowledge of the learners. Most of the MOOCs take advantage of newest technologies to provide and enhance learning. Lots of them have multimedia content, use video lectures, games, quizzes etc., which represents more entertaining way of learning. The first advantage Universities consider when offering MOOCs is marketing. MOOCs are in a way an ad for the University that offers them, and a free opportunity for potential students to try the course, without being officially enrolled at the institution. Besides that, MOOCs are used for research of the new pedagogical platforms, to experiment with new approaches to learning and new technologies. According to many professors, MOOCs and the open approach to education are an important modern day value.

Despite the many advantages, there are also problems that emerge about MOOCs, the first

being the dropout rate. According to the most relevant research so far, conducted by Katie Jordan, as a part of her doctoral thesis, MOOCs usually end up finished by less than 13% of the enrolled students, which means that the failure rate reaches over 90% [12]. In addition, many employers consider that MOOCs produce sub-standard students with lower level of knowledge as opposed to traditional education. Another important disadvantage is the problem with accreditation. The most of the MOOCs are not accredited at all, and the ones, which are, usually charge fees for the credits. At the same time, these fees are not standardized. Many professors believe that the accreditation of MOOCs should not be rushed, because of the difficulty of evaluation of students and the increased opportunity of cheating while taking exams online. The platform Udacity.com has offered one way for solving this problem, by offering students to pay \$80 so they can take the exam in test-centers of the global education company Pearson [13]. There is also the concern that with accrediting MOOCs, the big, well-funded Universities will align or lead to extinction the smaller Universities, with the introduction of so-called global education. Quality MOOCs also require significant resources, primarily in the design, administration and staff, who should have experience in adaptive learning. Considering that these courses are still young in their development, significant investment of time and finances is required to be up-to-date with modern technology and new content. Last, but not least important problem with MOOCs is the intellectual property, which is not exactly defined with online materials.

Given the above advantages and disadvantages of MOOCs, the thoughts for their future differ. While some professors think that MOOCs will slowly replace Universities, as we know it, others believe they will extinct and remain to be an interesting page in the history of higher education [11].

F. Motivation for MOOCs

When it comes to MOOCs there are multiple stakeholders, each with their own motivation. There are tutors whose task is to facilitate MOOCs, institutional managers who help in determining the place of MOOCs alongside the traditional education, the policymakers who consider the long-term implications for education and the capital investors who are interested in the return-on-investment rate [14]. However, the most

important stakeholders remain to be the students who enroll in these courses and the professors who design and teach them.

There are multiple factors that motivate students to enroll in MOOCs. They include economic benefits, development of personal and professional identity, challenge and achievement, as well as fun and enjoyment. Polls conducted by researchers at Duke University, in relation to their first MOOC, showed that there are four main student motivations for enrolling in online courses [15]:

- To gain understanding about the subject without specific expectations for completion or achievement;
- For fun, pleasure, social interaction and intellectual stimulation;
- Convenience, often in combination with barriers to traditional education and
- To experience and explore online education.

Although polls conducted before the start of the course showed fun and pleasure to be quite important, in the polls conducted after the end of the course most students said they had a general interest in the topic. They reported that they used the online course to help them decide if they want to enroll at University, while a significant minority said they could not afford formal education. This is only one research about the motivation of students enrolling MOOCs, but this subject is very wide and should be thoroughly researched in the future.

As for teachers, the largest survey of MOOCs teaching experience and the professors' motivation was conducted in early 2013 by the Chronicle of Higher Education and includes 103 professors as respondents [16]. The results generally showed that although the process of creating MOOCs is extremely time-consuming (average 100 hours per course); professors believe that these courses are successful. The maintenance of the course and the answering of students questions took extra time. For the evaluation 74% of the respondents said, they used automatic technology system, which they consider reliable. The most used materials for the courses were their own video lectures and open educational resources. Although teachers invest a lot of time in preparing the course, 72% believe that formal accreditation should not be allowed. As motivation for creating and maintaining MOOCs, they cite several reasons, the most common being:

- To assist in the availability of higher education (71.8%);
- To increase their impact as an instructor (40.8%);
- To increase their reputation in their own discipline (37.9%);
- To collect tips for enhancing the traditional lectures (36.9%);
- To increase their visibility in the media and the general public (33%).

When it comes to enthusiasm over MOOCs, the professors change their opinion from being skeptical (before the MOOC experience), to being more enthusiastic (after the MOOC experience).

G. MOOCs in practice

Although MOOCs seem to be revolutionary, they are just the next logical step in higher education, following the appearance of online education and including open education resources.

When it comes to MOOCs in practice, almost all platforms follow similar path of organization. The courses are usually prepared from University professors, who engage in recording video materials and preparing reading materials for the students. Once the course begins students are offered weekly plan of videos, readings and assignments they are supposed to finish until the beginning of the next week. Most of the assignments have immediate feedback, but there are also some, which are evaluated by peers, and results are given in few days. Professors send weekly newsletters to students introducing to them the topic of the week and encouraging them to take part in the discussion forums. Forming study groups (whether face-to-face or online) is also encouraged. Courses are usually 6 to 8 weeks long, and at the end of each there might be an exam or just summary of the weekly assignments score. To pass the course 70% score is the minimum required.

As an example, we did a research on how coursera.org works [17]. They motivate students to enroll into their courses by offering them learning at their own pace with the end result of achieving their goals. The four ideas that were crucial in shaping the platforms' idea are effectiveness of online learning, mastery learning, peer assessments and blended learning. Professor Maha Bali from the American University in Cairo after taking few courses offered from coursera.org concludes that the designers of these courses

should focus more on promoting deeper learning, than on designing easy assessments that encourage course completion, because even if completion rates can be improved in the short term, this trend can harm the reputation and future development of MOOCs in the long term [18].

To write about MOOCs in practice and stay up-to-date is a difficult task, because as it is the case with all of the new trends, new researches emerge every day. Even at the time, we are writing this paper and until it is published, there will certainly be some revolutionary things happening in the MOOCs world.

III. CONCLUSION

The purpose of this paper was introduction to MOOCs and elaboration of the implications they have. From what has been stated in the paper it can be concluded that with the increasing availability of technology, these courses will expand and the interest for them tends to rise. In order to follow the trends, relevant institutions in the Balkan countries should take seriously the MOOCs, fit them in their plans and create conditions for their introduction as part of formal and non-formal education. With this, in addition to inclusion of more students, employees in higher education will gain significant experience in the use of new technologies and obtain ideas for enhancing the traditional ways of teaching.

REFERENCES

- [1] http://en.wikipedia.org/wiki/Massive_open_online_course. (n.d.).
- [2] <http://www.oxforddictionaries.com/>. (n.d.).
- [3] UNESCO, 2. W. (2012, June 22). <http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CI/C>

- I/pdf/Events/Paris%20OER%20Declaration_01.pdf. Retrieved December 10, 2013, from <http://www.unesco.org>.
- [4] www.moodle.org. (n.d.). Retrieved from www.moodle.org
- [5] www.secondlife.com. (n.d.). Retrieved from www.secondlife.com.
- [6] Downes, S. (2012). *Connectivism and Connective Knowledge*. Creative Commons License .
- [7] Morrison, D. (2013, April 22). The Ultimate Student Guide to xMOOCs and cMOOCs <http://mooconewsandreviews.com/ultimate-guide-to-xmoocs-and-cmoocs/>. Retrieved from <http://mooconewsandreviews.com/ultimate-guide-to-xmoocs-and-cmoocs/>.
- [8] Saenz, A. (2011, August). 100,000+ SIGN UP FOR STANFORD'S OPEN CLASS ON ARTIFICIAL INTELLIGENCE. CLASSES WITH 1 MILLION+ NEXT?
- [9] Yuan, L., & Powell, S. (2013). *MOOCs and Open Education: Implications for Higher Education*. <http://publications.cetis.ac.uk/2013/667>.
- [10] <http://openeducationeuropa.eu>. (2013, December 2). Retrieved December 19, 2013, from http://openeducationeuropa.eu/en/european_scoreboard_moocs.
- [11] Kinash, S. (2013, January 11). <http://epublications.bond.edu.au/tls>. Retrieved December 19, 2013, from <http://epublications.bond.edu.au/tls/70>.
- [12] Jordan, K. (2013, May). <http://www.katyjordan.com/MOOCproject.html>. Retrieved December 2013, from <http://www.katyjordan.com/MOOCproject.html>.
- [13] Lewin, T. (2012, July 17). Universities Reshaping Education on the Web. *New York Times*.
- [14] Conole, G. (2013, December 15). MOOCs as disruptive technologies: strategies for enhancing the learner experience and quality of MOOCs. *Revista de Educación a Distancia. Número 39*.
- [15] Belanger, Y., & Thornton, J. (2013). *Bioelectricity: A Quantitative Approach; Duke University's First MOOC*. Durham, North Carolina: Duke University.
- [16] Kolowich, S. (2013). *The Professors Who Make the MOOCs*. *The Chronicle of Higher Education*.
- [17] <https://www.coursera.org/about/>
- [18] Bali, M. (2014). MOOC Pedagogy: Gleaning Good Practice from Existing MOOCs. *MERLOT Journal of Online Learning and Teaching*, 44-56.