



**UNIVERSITY OF NOVI SAD
TECHNICAL FACULTY
"MIHAJLO PUPIN"
ZRENJANIN**



ITROCONFERENCE¹²

INFORMATION TECHNOLOGY AND EDUCATION DEVELOPMENT



ITROCONFERENCE¹²

INFORMATION TECHNOLOGY AND EDUCATION DEVELOPMENT



PROCEEDINGS

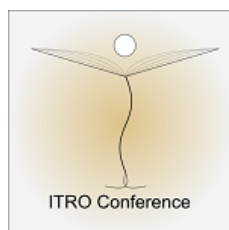
ZRENJANIN, November 2021



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



XII INTERNATIONAL CONFERENCE OF
**INFORMATION TECHNOLOGY AND
DEVELOPMENT OF EDUCATION**
ITRO 2021
PROCEEDINGS OF PAPERS



XII MEĐUNARODNA KONFERENCIJA
**INFORMACIONE TEHNOLOGIJE I
RAZVOJ OBRAZOVANJA**
ITRO 2021
ZBORNİK RADOVA

ZRENJANIN, NOVEMBER 2021

Publisher and Organiser of the Conference:

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

For publisher:

**Dragica Radosav, Ph. D, Professor,
Dean of the Technical faculty „Mihajlo Pupin“, Zrenjanin, Republic of Serbia**

Editor in Cheaf - President of OC ITRO 2021:

Snežana Jokić, Ph. D, Assistant Professor

Proceedings editor:

Snežana Jokić, Ph. D, Assistant Professor

Technical design:

**Maja Gaborov MSc, Assistant
Aleksandra Stojkov MSc, Assistant
Nemanja Tasić MSc, Assistant**

Circulation: **50**

ISBN: 978-86-7672-351-5

CIP - Каталогizacija u publikaciji
Biblioteke Maticе српске, Нови Сад

37.01:004(082)(0.034.2)

37.02(082)(0.034.2)

INTERNATIONAL Conference of Information Technology and Development of Education
ITRO (12 ; 2021 ; Zrenjanin)

Proceedings of papers [Elektronski izvor] / XII International Conference of Information
Technology and Development of Education ITRO 2021 = Zbornik radova / XII
međunarodna konferencija Informacione tehnologije i razvoj obrazovanja ITRO 2021,
Zrenjanin, November 2021. - Zrenjanin : Technical Faculty "Mihajlo Pupin", 2022. - 1
elektronski optički disk (CD-ROM) : tekst, slika ; 12 cm

Sistemske zahteve: Nisu navedeni. - Nasl. sa naslovnog ekrana. - Elektronska publikacija u
formatu pdf opsega IX, 238 str. - Tiraž 50. - Bibliografija uz svaki rad

ISBN 978-86-7672-351-5

а) Информационе технологије -- образовање -- Зборници б) Образовна технологија --
Зборници

COBISS.SR-ID 66049033

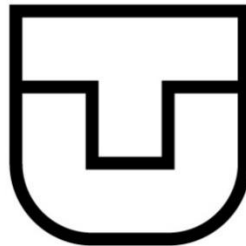
PARTNERS INTERNATIONAL CONFERENCE

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



SOUTH WEST UNIVERSITY
“NEOFIT RILSKI”

**Technical University of Košice
Faculty of Electrical Engineering and Informatics
Slovak Republic**



**University Goce Delcev Stip
Republic of Macedonia**



THE SCIENCE COMMITTEE:

Marina Čičin Šain, Ph.D, Professor, University of Rijeka, Croatia
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
Márta Takács, Ph.D, Professor, Óbuda University, John von Neumann Faculty of Informatics, Budapest, Hungary
Nina Bijedić, Ph.D, Professor, Applied mathematics, Bosnia and Herzegovina
Mirjana Segedinac, Ph.D, Professor, Faculty of Science, Novi Sad, Serbia
Milka Oljača, Ph.D, Professor, Faculty of Philosophy, Novi Sad, Serbia
Dušan Starčević, Ph.D, Professor, Faculty of Organizational Sciences, Belgrade, Serbia
Josip Ivanović, PhD, Professor, Hungarian Language Teacher Training Faculty, Subotica, Serbia
Ivanka Georgieva, Ph.D, South-West University "Neofit Rilski", Faculty of Engineering, Blagoevgrad, Republic of Bulgaria
Miodrag Ivković, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia
Momčilo Bjelica, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia
Dragica Radosav, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia
Dragana Glušac, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia
Dijana Karuović, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia
Ivan Tasić, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia
Vesna Makitan, Ph.D, Assistant Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia
Marjana Pardanjac, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia
Snežana Babić Kekez, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia
Stojanov Željko, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia
Brтка Vladimir, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia
Kazi Ljubica, Ph.D, Assistant Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia
Berković Ivana, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia
Nikolić Milan, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia
Dalibor Dobrilović, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia
Anja Žnidaršič, Ph.D Professor, Faculty of Organizational Sciences, Kranj, Slovenia
Janja Jerebic, Ph.D Professor, Faculty of Organizational Sciences, Kranj, Slovenia
Mirjana Kocaleva, Ph.D Professor, Faculty of Informatics, University "Goce Delčev", Štip, North Macedonia
Tatjana Grbić, Ph.D Professor, Faculty of Technical Sciences, Novi Sad, Serbia
Slavica Medić, Ph.D Professor, Faculty of Technical Sciences, Novi Sad, Serbia
Gordana Jotanović, Ph.D Professor, Faculty of Transport and Traffic Engineering, Doboj, BIH
Đurđa Grijak, Ph.D Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia
Bojana Perić Prkosovački, Ph.D Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia
Snežana Jokić, Ph.D, Assistant Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia
Stojanov Jelena, Ph.D, Assistant Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia

THE ORGANIZING COMMITTEE:

Snežana Jokić, Ph.D, Ass. Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, R. of Serbia
- Chairman of the Conference ITRO 2020

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

Dragana Glušac, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, R. of Serbia

Dijana Karuović, Ph.D, Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, R. of Serbia

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

Jelena Stojanov, Ph.D, Ass. Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, R. of Serbia

Vesna Makitan, Ph.D, Ass. Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, R. of Serbia

Đurđa Grijak, Ph.D Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia

Bojana Perić Prkosovački, Ph.D Professor, Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia

Maja Gaborov, MSc, Assistant, Technical Faculty "Mihajlo Pupin" Zrenjanin, R. of Serbia

Nemanja Tasić, MSc, Assistant, Technical Faculty "Mihajlo Pupin" Zrenjanin, R. of Serbia

Aleksandra Stojkov MSc, Assistant, Technical Faculty "Mihajlo Pupin" Zrenjanin, R. of Serbia

All rights reserved. No part of this Proceeding 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 2020 is also published.

INTRODUCTION

This Proceedings of papers consists from full papers from the International conference "Information technology and development of education" - ITRO 2021, that was held at the Technical Faculty "Mihajlo Pupin" in Zrenjanin on November 26th 2021.

The International conference on Information technology and development of education has had a goal to contribute to the development of education in Serbia and the Region, as well as, to gather experts from 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 has been realized.

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

- Education in crisis situations
- Educational challenges
- Theoretic and methodology questions of contemporary pedagogy
- Digital didactics of media
- Modern communication in teaching
- Curriculum of contemporary teaching
- E-learning
- Education management
- Methodic questions of natural and technical sciences subject teaching
- Information and communication technologies

All submitted papers have been reviewed by at least two independent members of the Science Committee. There were total of 94 authors that took part at the Conference from 12 countries, 3 continents: 52 from the Republic of Serbia and 42 from foreign countries such as: Macedonia, Bosnia and Herzegovina, Hungary, Slovakia, India, Bulgaria, Rumania, Albania, USA, Canada, Malaysia. They were presented 49 scientific papers.

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

The ITRO Organizing Committee would like to thank the authors of papers, reviewers and participants in the Conference who have contributed to its tradition and successful realization.

Chairman of the Organizing Committee
Snežana Jokić, Ph.D, Ass. Professor

CONTENTS

INVITED LECTURE

| | |
|--|---|
| D. Sladić, A. Radulović, M. Zarić, B. Markoski IMPORTANCE OF LEARNING SOA IN MODERN GIS LECTURES..... | 2 |
|--|---|

SCIENTIFIC PAPERS

| | |
|--|----|
| Ž. Namestovski, A. Buda, G. Molnár, Z. Szűts SOCIAL ASPECTS OF DISTANCE LEARNING DURING THE COVID-19 PANDEMIC..... | 9 |
| M. Gaborov, D. Karuović, M. Kavalić, D. Milosavljev, S. Stanisavljev, J. Bushvati COVID 19 AND ONLINE LEARNING PLATFORMS..... | 13 |
| M. Majstorović, D. Radosav DISTANCE LEARNING FROM THE PERSPECTIVE OF STUDENTS DURING THE COVID-19 PANDEMIC..... | 16 |
| A. Mamić, M. Blagojević, T. Đuričić ANALYSIS OF LMS USED IN THE PROCESS OF DISTANCE LEARNING IN PRIMARY EDUCATION, DURING THE COVID 19 PANDEMIC..... | 20 |
| R. Zamurović, D. Radosav VIDEO GAMES AS A PROMISING EDUCATIONAL OPTION FOR ALL AGES..... | 27 |
| E. Karamazova, M. Kocaleva CASE STUDY: WHICH MATH TOPICS STUDENTS HAVE A PROBLEM WITH WHEN THEY START UNIVERSITY STUDYING..... | 34 |
| D. Bikov, B. Shterjev, D. Siracheski USE OF EDUCATIONAL HARDWARE AND SOFTWARE TO ENCOURAGE CHILDREN TO CODE..... | 38 |
| M. Kavalić, M. Pečujlija, S. Stanisavljev, D. Milosavljev, M. Gaborov, M. Bakator LOCUS OF CONTROL IN THE FUNCTION OF STUDENTS' ACADEMIC SUCCESS..... | 43 |
| B. Saliu DISCUSSION THREAD ON GOOGLE CLASSROOM AND GROUP COMMUNICATION: A CASE STUDY OF LANGUAGE CENTER STUDENTS..... | 48 |
| D. Kreculj, M. Gaborov, N. Ratkovic Kovacevic, V. Nikolic, S. Minic, N. Cvorovic IMPLEMENTATION OF DRONES IN TEACHING..... | 53 |
| E. Pavlova Tosheva THE EVOLUTION OF WEB BASED LEARNING PLATFORMS..... | 60 |
| M. Kocaleva, E. Karamazova, B. Zlatanovska, D. Karuović MOBILE TEACHING AND LEARNING – BENEFITS, PERSPECTIVE AND CHALLENGES..... | 64 |
| G. Škondrić, I. Hamulić, E. Junuz LMS CONCEPTUAL MODEL THAT RECOGNIZE ALL FORMS OF LEARNING OUTCOMES..... | 67 |
| S. Šević, D. Glušac PEDAGOGICAL DIMENSION OF TEACHING INFORMATICS AND COMPUTING..... | 70 |
| S. Jokić, V. Srdić, I. Kostovski THE INFLUENCE OF ETOS ON THE QUALITY OF SCHOOL WORK..... | 75 |

| | |
|---|-----|
| C.M. Bande, A.Stojanova, N.Stojkovikj, M.Kocaleva, L.K.Lazarova, B. Zlatanovska LEARNING DATA MINING COURSE USING LANGUAGE R..... | 79 |
| N.Stojkovikj, A. Stojanova , L. K. Lazarova, M. Miteva AGENT-BASED MODELLING AND SIMULATION..... | 87 |
| M. Kocaleva, B. Zlatanovska, E. Karamazova, N. Stojkovikj, A. Stojanova USING WEKA FOR FINDING OUTPUT FOR GIVEN FUNCTION..... | 93 |
| A. Mamić, M. Blagojević, T. Đuričić ANALYSIS OF THE REPRESENTATION OF OBJECT-ORIENTED PROGRAMMING LANGUAGES IN PRIMARY EDUCATION..... | 97 |
| D. Krstev, A. Krstev, S. Dimitrov DATA PROCESSING USING ANALYTICAL HIERARCHICAL PROCESS IN REAL CIRCUMSTANCES..... | 104 |
| S.Mrđen, E. Brtka, V. Makitan COMPARISON OF C ++ AND PYTHON PROGRAMMING LANGUAGES IN TEACHING..... | 108 |
| I. Borjanovic THE VIRTUAL PHYSICS LABORATORY..... | 112 |
| S. Jokic, A. Ilic, M. Hadzic, V. Srdić METHODOLOGICAL APPROACH TO ELECTRICITY PRODUCTION WITHIN THE FIELD 'RESOURCES AND PRODUCTION' IN 8 TH GRADE OF PRIMARY SCHOOL..... | 115 |
| L.K. Lazarova, M.Miteva , A.Stojanova MODERNIZATION OF MATHEMATICS EDUCATION BY USING EDUCATIONAL E-PLATFORMS..... | 121 |
| I. Hamulić, G. Škondrić, E. Junuz DYNAMIC SOCIAL NETWORK ANALYSIS VISUALIZATION SOFTWARE: A COMPARATIVE REVIEW..... | 126 |
| Lj. Kazi, D. Radosav, N. Chotaliya USABILITY EVALUATION FRAMEWORK FOR WEB PORTALS OF TECHNICAL SCIENCES HIGHER EDUCATION INSTITUTIONS: A CASE STUDY WITH SERBIAN STATE UNIVERSITIES..... | 129 |
| S. Mrđen, E. Brtka, V. Makitan, M. Sisak EXAMPLE OF AN APPLICATION IN THE PYTHON PROGRAMMING LANGUAGE.... | 135 |
| M. Živić, M. Pardanjac, J. Barbarić APPLICATION OF 3D PRINTING IN EDUCATION..... | 139 |
| N. Koceska, S. Koceski VIRTUAL LABORATORY AS PROGRESSIVE WEB APPLICATION..... | 142 |
| S. Dimitrov, D. Krstev, A. Krstev IMPROVEMENT OF THE STATIC CHARACTERISTICS OF PILOT OPERATED PRESSURE RELIEF VALVES..... | 147 |
| M. Kocaleva, B. Petrovska, N. Stojkovikj, A. Stojanova, B. Zlatanovska REVIEW OF SENTINEL-2 APPLICATIONS..... | 155 |

| | |
|---|-----|
| S. Arsovski, B. Markoski, V. Premceviski, P. Vasiljevic, A. Sofic REVIEW ON DEEP LEARNING ARCHITECTURES..... | 160 |
| M. Bakator, D. Radosav. N. Đalić, S. Stanisavljev, D. Milosavljev, E. Terek Stojanović THE ROLE OF ADVANCED ICTS IN EFFECTIVE CRM..... | 168 |
| D. Banović, Z. Kazi ELECTRONIC APPLICATION OF CHILDREN FOR ENROLLMENT IN PRESCHOOL INSTITUTION..... | 173 |
| T. Milić, I. Berković, E. Brtko, I. Vecštejn, K. Ivanović THE USE OF WEB TOOLS 2.0 IN EDUCATION..... | 178 |
| B. Sobota, P. Lovas, Š. Korečko, M. Mattová VIRTUAL REALITY TECHNOLOGIES USAGE IN THE AREA OF MANAGEMENT AND THERAPY OF PHOBIAS AND COGNI-TIVE ABILITIES..... | 182 |
| B. Sobota, M. Mattová, J. Bogušćiak, M. Hudák, Š. Korečko WHEELCHAIR SIMULATOR IN WEB VIRTUAL REALITY..... | 187 |
| S. Stanisavljev, D. Radosav, Z. Košut, S. Jokić, J. Vukajlović, S. Zec IMPORTANCE OF EMPLOYEE TRAINING FOR INDUSTRY 4.0..... | 192 |
| A. Krstev, A. Velkova Krstev THE IMPACT OF AUGMENTED REALITY IN ARCHITECTURAL DESIGN USING COMBINED METHOD OF DATA AGGREGATION AND SEGREGATION..... | 196 |
| D. Krstev, S. Dimitrov, A. Krstev* VEHICLE ROUTING PROBLEM WITH DISTANCE CONSTRAINTS AND CLUSTERING USING MATLAB..... | 200 |
| A. Velinov, N. Koceska, S. Koceski APPLICATION OF THE MQTT PROTOCOL IN TELEPRESENCE ROBOTS..... | 205 |
| R. Timovski, S. Koceski, N. Koceska CREATING 3D OBJECTS USING PHOTOGRAMMETRY..... | 210 |
| M. Gaborov, S. Popov, D. Karuović, D. Radosav, D. Milosavljev, E. Terek-Stojanović THE APPLICATION OF SCRUM IN COMPANIES: A SYSTEMATIC LITERATURE REVIEW..... | 216 |
| M. Knežević, N. Bobinac DIGITAL MARKETING OF AGRICULTURAL HOLDING IN REPUBLIC OF SERBIA.... | 221 |
| M. Knežević, N. Bobinac TESTING USING SELENIUM..... | 224 |
| M. Kavalić, M. Pećujlija, Ž. Stojanović, S. Stanisavljev, M. Bakator THE EFFECTS OF LOCUS OF CONTROL ON ENTREPRENEURIAL BEHAVIOR..... | 228 |
| M. Knežević APPLICATION FOR GRAPE SALES..... | 233 |
| M. Knežević, N. Bobinac GRAPE VINE PROTECTION RECORD OF AN AGRICULTURAL HOLDING IN REPUBLIC OF SERBIA..... | 236 |