

E-learning

Vol. 11

E-learning and STEM Education

University of Silesia in Katowice,
Faculty of Ethnology and Sciences
of Education in Cieszyn

E-learning

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E-learning and STEM Education

Monograph

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Eugenia Smyrnova-Trybulska

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TABLE OF CONTENTS

INTRODUCTION.....

CHAPTER I. : E-LEARNING AND STEM EDUCATION IN DIGITAL SOCIETY

Theo Hug (Austria)

ROBOTS AS FRIENDS, CO-WORKERS, TEACHERS AND LEARNING MACHINES – METAPHORICAL ANALYSES AND ETHICAL CONSIDERATIONS

Piet Kommers (The Netherlands)

EDUCATIONAL TECHNOLOGIES FOR E-LEARNING AND STEM EDUCATION

Anna Ślósarz (Poland)

DEMOCRATIZING POTENTIAL OF DISTANCE LEARNING

Milena Janakova (Czech Republic)

E-LEARNING IN SUSTAINABLE SOCIETY

Olena Kuzminska, Nataliia Morze (Ukraine), Eugenia Smyrnova – Trybulska (Poland)

IN THE DIGITAL SPACE: PROGRAM DESIGN AND CASE IMPLEMENTATION

Asya Stoyanova-Doycheva, Todorka Glushkova, Vanya Ivanova (Bulgaria)

APPLICATION OF SUBJECT DOMAIN ONTOLOGIES

IN E-LEARNING

Nadiia Balyk, Galyna Shmyger, Yaroslav Vasylenko, Vasyl Oleksiuk, Anna Skaskiv (Ukraine)

STEM-APPROACH TO THE TRANSFORMATION OF

PEDAGOGICAL EDUCATION

CHAPTER II. : E-learning Methodology – Implementation and

Evaluation:.....

Todorka Glushkova, Stanimir Stoyanov, Irina Krasteva, Veneta Tabakova-Komsalova (Bulgaria)

INTELLIGENT SCHOOL EDUCATIONAL ENVIRONMENT FOR DISTANCE AND BLENDED LEARNING

Olena Sagan, Oksana Los, Olena Kazannikova, Iryna Raievska (Ukraine)
**SYSTEM OF THE EFFECTIVE TASKS IN BLENDED LEARNING
ON THE BASIS OF BY B. BLOOM**

Izabela Maleńczyk, Bartłomiej Gładysz (Poland)
**A FRAMEWORK FOR INTEGRATED ASSESSMENT OF
ACADEMIC E-LEARNING**

Svitlana Skvortsova, Yana Haievets, Oksana Onopriienko (Ukraine)
**ELECTRONIC EDUCATIONAL AND METHODOLOGICAL TEXTBOOK
"METHODS OF TEACHING TO SOLVE MATHEMATICAL
WORD PROBLEMS OF PUPILS 1-4 CLASSES"**

Iwona Mokwa-Tarnowska, Viviana Tarnowska (Poland)
**WEB-ENHANCED SECONDARY AND ACADEMIC EDUCATION
STRUCTURED AROUND EXPECTATIONS AND LEARNING
PREFERENCES OF GENERATION Z**

Mariusz Marczak (Poland)
**SUCCESSFUL E-LEARNING: INTERCULTURAL
DEVELOPMENT IN GPE'S GLOBAL UNDERSTANDING
PROJECT** ...

Miroslav Hrubý (Czech Republic)
MENTORING AS A SIGNIFICANT TOOL IN EDUCATION

Barbara Kołodziejczak (Poland)
**THE USE OF PORTALS AND LEARNING ENVIRONMENTS IN
NON-ACADEMIC TEACHING**.....

Svitlana Skvortsova, Oksana Onopriienko, Tetiana Britskan (Ukraine)
**TRAINING IN MATHEMATICS OF THE FUTURE PRIMARY
SCHOOL TEACHERS BY USING SERVICE H5P**

Jolanta Szulc (Poland)
**MODELS OF E-LEARNING SYSTEMS ARCHITECTURE USING
AI COMPONENTS**

Veronika Horváthová (Slovakia)
**EXPLORING ADDITION AND SUBTRACTION STRATEGIES
WITH VIRTUAL MANIPULATIVES ON TABLET DEVICES IN
SECOND GRADE**

Karima Slamti (Morocco)

THE ADOPTION OF DIGITAL INTERACTIVITY AS A MEDIATOR IN TEACHING AND LEARNING FOREIGN LANGUAGES IN HIGHER MOROCCAN EDUCATION

Soner Durmus, Sultan Eldekci (Turkey)

EVALUATION OF MATHEMATICS E-BOOKS FROM STEM STANDPOINT

CHAPTER III. : . E-learning in the Development of Key and soft Competences:

Nataliia Morze (Ukraine), Eugenia Smyrnova-Trybulska (Poland), Mariia Boiko (Ukraine)

THE IMPACT OF EDUCATIONAL TRENDS ON THE DIGITAL COMPETENCE OF STUDENTS IN UKRAINE AND POLAND

Tatiana Noskova, Tatiana Pavlova, Olga Yakovleva (Russia)

ANALYSIS OF STUDENTS' REFLECTION ON THEIR EDUCATIONAL BEHAVIOUR STRATEGIES WITHIN AN ELECTRONIC COURSE: PROSPECTIVE FOR THE XXI CENTURY COMPETENCES DEVELOPMENT

R. Robert Gajewski (Poland)

COMPUTATIONAL THINKING: MOTIVATION TO LEARN IN TERTIARY EDUCATION.....

Ján Gunčaga (Slovakia), Tomasz Kopczynski (Poland)

SUPPORTING MATHEMATICAL AND DIGITAL COMPETENCES USEFUL FOR STEM EDUCATION

Lyudmyla Khoruzha, Volodymyr Proshkin, Olga Kotenko (Ukraine), Eugenia Smyrnova-Trybulska (Poland)

DIGITAL COMPETENCE: ABILITIES OF A LECTURER AND EXPECTATIONS OF STUDENTS (UKRAINIAN-POLISH CONTEXT)

Anna Sajdak-Burska, Marek Kościelniak (Poland)

E-FORUM MODERATION AS AN ELEMENT OF BLENDED LEARNING COURSES FOR UNIVERSITY STUDENTS. CONCLUSIONS FROM ACTION RESEARCH

Marcin Szwed, Jarosław Krajka (Poland)

**TEACHING SKILLS IN THE AREA OF TERMINOLOGY AND
TERMINOGRAPHIC MODELLING VIA E-LEARNING AS PART
OF TRANSLATOR TRAINING PROGRAMMES**

Agnieszka Gadomska (Poland)

**APPLYING CEFR DESCRIPTORS FOR MEDIATION FOR THE
DESIGN OF MOODLE BASED MATERIALS FOR TEFL**

Katarína Žilková, Edita Partová, Ján Gunčaga, Jana Nemcová (Slovakia),
Tomasz Kopczyński, Dominika Zegzuła (Poland)

**DEVELOPMENT OF GEOMETRICAL THINKING VIA
EDUCATIONAL SOFTWARE BY PUPILS OF ELEMENTARY
SCHOOL**

Tetiana Simonenko, Yuliia Nikitska (Ukraine)

**FORMATION OF THE KEY LANGUAGE COMPETENCE OF
FUTURE TEACHERS OF THE UKRAINIAN AND LITERATURE
BY USING OF THE DIGITAL TECHNOLOGY OF MICRO-
LEARNING**

CHAPTER IV: ICT Tools – Effective Use in Education:

Irena Pulak, Martyna Szczotka (Poland)

**INTRODUCING THE YOUNGEST TO STEM EDUCATION ON
THE EXAMPLE OF THE "KITCHEN LAB FOR KIDS" PROJECT**

Oksana Strutynska, Mariia Umryk (Ukraine)

**LEARNING STARTUPS AS PROJECT APPROACH IN STEM
EDUCATION**

Radim Polasek (Czech Republic)

**APPROACH TO CREATION OF MICROLEARNING COURSE OF
WEB PAGES' CODING WITHIN LMS ENVIRONMENT**

Olena Semenikhina, Volodymyr Proshkin, Marina Drushlyak (Ukraine)

**MATHEMATICAL KNOWLEDGE CONTROL AUTOMATION
WITHIN DYNAMIC MATHEMATICS PROGRAMS**

Zuzana Berger-Haladová, Andrej Ferko (Slovakia)

**TOWARDS AUGMENTED REALITY EDUCATIONAL
AUTHORING**

Olena Gulesha, Viktor Bahriy, Mykhailo Pyshnyi, Maryna Romaniukha (Ukraine)

AUTOMATED TESTING AS A LEARNING ASSESSMENT TOOL FOR UNIVERSITY STUDENTS

Anastasiia Ishchenko (Ukraine)

STEM EDUCATION: PRACTICAL ORIENTED TOOLS FOR TEACHERS OF MATHEMATICS

Yurii Horoshko, Hanna Tsybko, Evhenii Vinnychenko, Andrii Kostiuchenko, Nataliia Priadko (Ukraine)

IMPACT OF CHANGES IN TEACHING COMPUTER SCIENCE IN UKRAINIAN SCHOOLS ON FORMING THE CONTENT OF COMPUTER SCIENCE COURSES AT NON-CORE SPECIALTIES IN UNIVERSITIES

Nataliia Morze, Viktoriia Vember, Liliia Varchenko-Trotsenko (Ukraine)

HOW TO CREATE AN EFFECTIVE FLIPPED LEARNING SEQUENCE IN HIGHER EDUCATION

CHAPTER V. Humanities, Social and Scientific Potential of E-learning and STEM Education

Ani Epitropova, Alexander Petrov, Stanimir Stoyanov, Asya Stoyanova-Doycheva (Bulgaria)

THE PROJECT "INCLUSIVE CLASSROOM-PLAY AND LEARN"-CONCEPTION, DESIGN AND SOFTWARE ARCHITECTURE

Oksana Shelomovska, Liudmyla Sorokina, Maryna Romaniukha, Natalya Sorokina, Iryna Machulina (Ukraine)

EDUCATIONAL POTENTIAL OF MASS MEDIA: REALITY AND PROSPECTS FOR E-LEARNING

Anna Porczyńska-Ciszewska (Poland)

THE USE OF E-LEARNING IN EDUCATION FOR PEOPLE WITH MILD INTELLECTUAL DISABILITY IN THE CONTEXT OF THEIR MENTAL WELL-BEING

INTRODUCTION

The theme of the conference is: “*E-learning and STEM Education*”.

“Skills in Science, Technology, Engineering and Mathematics (STEM) are becoming an increasingly important part of basic literacy in today's knowledge economy. To keep Europe growing, we will need one million additional researchers by 2020.” (<http://www.eun.org/focus-areas/stem>)

The monograph “*E-learning and STEM Education*” includes articles based on the best papers prepared and presented by authors from nine European countries and from more than twenty universities during the scientific conference entitled “Theoretical and Practical Aspects of Distance Learning”, subtitled: “*E-learning and STEM Education*”, which was held on 14-15 October 2018, organized by the Faculty of Ethnology and Sciences of Education in Cieszyn, University of Silesia in Katowice, Poland.

Experts on STEM and robotics in education from 10 countries, in particular Austria, Bulgaria, Czech Republic, Morocco, the Netherlands, Poland, Slovakia, Ukraine, Russia, Turkey reflect on how STEM education is currently viewed and implemented in their country, drawing on the legislation and funding focus and using local data to predict how the future will unfold for STEM education.

The speakers from the University of Innsbruck (Austria), University of Twente (the Netherlands), the Comenius University in Bratislava (Slovakia), Plovdiv University “Paisii Hilendarski” (Bulgaria), Borys Grinchenko Kyiv University (Ukraine), Gdańsk Technical University (Poland), Herzen State Pedagogical University of Russia, St. Petersburg (Russia), Jagiellonian University (Poland), Warsaw University (Poland), Silesian University in Opava (Czech Republic), Jesuit University of Philosophy and Education “Ignatianum”, Cracow, (Poland), University of Silesia in Katowice (Poland), University of Defence in Brno (Czech Republic), K. Ushynskiy South Ukrainian National Pedagogical University (Ukraine), Maria Curie-Skłodowska University in Lublin (Poland), Lublin University of Technology (Poland), Mykhailo Drahomanov National Pedagogical University, Kyiv, (Ukraine), Kazimierz Wielki University in Bydgoszcz (Poland), Taras Shevchenko National University “Chernihiv Collegium” (Ukraine), Dniprovsk State Technical University (Ukraine), University of Ostrava (Czech Republic), Pedagogical University of Krakow (Poland), University of Social Sciences and Humanities in Warsaw (Poland), Makarenko Sumy State Pedagogical University (Ukraine), Poznań University of Medical Sciences (Poland), Ternopil University (Ukraine), Kherson State University (Ukraine), Warsaw University of Technology (Poland), University of Social Sciences and Humanities in Warsaw (Poland), Izmail State University of Humanities (Ukraine), Adam Mickiewicz University in Poznań, (Poland), and other educational institutions delivered lectures providing insights into interesting studies, presented their recent research results and discussed their further scientific work.

The authors include experts, well-known scholars, young researchers, highly trained academic lecturers with long experience in the field of e-learning, PhD students, distance course developers, authors of multimedia teaching materials, designers of websites and educational sites.

I am convinced that this monograph will be an interesting and valuable publication, describing the theoretical, methodological and practical issues in the field of E-learning in STEM education offering proposals of solutions to certain important problems and showing the road to further work in this field, allowing exchange of experiences of scholars from various universities from many European countries and other countries of the world.

This book includes a sequence of responses to numerous questions that have not been answered yet. The papers of the authors included in the monograph are an attempt at providing such answers. The aspects and problems discussed in the materials include the following:

1. E-learning and STEM Education

- STEM education trends
- Robots and coding in education.
- Immersive learning environments. Blockchain.
- Internet of things. 3D printing

2. E-environment and Cyberspace

- E-environment of the University.
- SMART-Universities. SMART Technology in education
- E-learning in a sustainable society.

3. E-learning in the Development of Key and soft Competences:

- Effective development of teachers; skills in the area of ICT and e-learning
- Key competences in the knowledge society,
- Use of e-learning in improving the level of students' digital competences,
- Distance Learning and Lifelong Learning
- Self-learning based on Internet technology
- **4. E-learning and Intercultural Competences Development in Different Countries:**
- Legal, social, human, scientific, technical aspects of distance learning and e-learning in different countries,
- Psychological and ethical aspects of distance learning and e-learning in different countries,
- Collaborative learning in e-learning,

5. E-learning Methodology – Implementation and Evaluation:

- European and national standards of e-learning quality evaluation,
- Evaluation of synchronous and asynchronous teaching and learning, methodology and good examples,
- MOOCs – methodology of design, conducting, implementation and evaluation,
- Contemporary trends in world education – globalization, internationalization, mobility.

6. ICT Tools – Effective Use in Education:

- Selected Web 2.0 and Web 3.0 technology,
- LMS, CMS, VSCR, SSA, CSA,
- Cloud computing environment, social media, Multimedia resources
Video-tutorial design.

7. Alternative Methods, Forms and Techniques in Distance Learning:

- simulations, models in distance learning,
- networking, distance learning systems,
- m-learning.

8. Theoretical, Methodological Aspects of Distance Learning:

- Successful examples of e-learning,
- Distance learning in humanities and science,
- Quality of teaching, training programs and assessment,
- E-learning for the disabled.

Publishing this monograph is a good example of expanding and strengthening international cooperation. I am very grateful for valuable remarks and suggestions which contributed to the quality of the publication. Here I especially want to thank Ryszard Kalamarz and Andrzej Szczurek for their assistance in editing this publication. Also, I would like to say 'thank you' to the authors for the preparation and permission to publish their articles. I wish all readers a pleasant read. Thank you.

Eugenia Smyrnova-Trybulska