Bibliographic Information

Book Title
15th International Conference of Education, Research and Innovation

Book Series
ICERI Proceedings

Editors
Luis Gómez Chova
Agustín López Martínez
Joanna Lees

Publication Year
2022

Publisher
IATED Academy

Publisher Address
Valencia, Spain

Book ISBN
978-84-09-45476-1

Series ISSN
2340-1095

DOI
10.21125/iceri.2022

Conference Name
ICERI2022

Dates
November 7th-9th, 2022

Location
Seville, Spain

Copyright Information
This work is subject to copyright. All rights reserved.

Topics
Education
Educational Research
Educational Technology

Editorial policy and Publication ethics:

The papers published in these proceedings reflect the views only of the authors. The publisher cannot be held responsible for the validity or use of the information therein contained.

The International Academy of Technology, Education and Development (IATED) aims to publish conference proceedings that contain original research articles of high quality meeting the expected ethical standards. The publication guidelines are provided for authors who submit articles to IATED conferences in order to maintain high ethical standards.

IATED shall guarantee the high technical and professional quality of the publications and that good practices and ethical standards are maintained. If unethical behaviors are identified, an investigation will be initiated and pertinent actions will be taken.

More information about the publication ethics of IATED is available at iated.org/publication_ethics
Preface

The ICERI2022 Conference Proceedings contain selected and revised papers from the 15th International Conference of Education, Research and Innovation.

ICERI2022 was held in Seville, Spain, from the 7th to the 9th of November 2022. ICERI is an annual event in which lecturers and researchers from 79 different countries gather to share valuable research and information about education, pedagogical technologies, and educational innovations.

Keynote speeches, networking activities, plenary sessions, parallel thematic sessions and workshops were, among some of the events on offer, delivered by world-leading educational experts at the conference, which provided participants the opportunity of global networking. The keynote speeches are available at IATED Talks (iated.org/talks/).

The scope of ICERI covered the following topics: Digital & Distance Learning, Digital Transformation of Education, Innovative Educational Technologies, Active and Student-Centered Learning, Assessment, Mentoring & Student Support, Educational Stages and Life-Long Learning, Quality & Impact of Education, Teacher Training and Educational Management, STEM Education, Discipline-Oriented Sessions, Language Learning and Teaching, Inclusion and Multiculturality.

The ICERI2022 Proceedings include the accepted contributions presented at the ICERI2022 Conference. The ICERI2022 International Program Committee is composed of lecturers and researchers from all around the globe. A blind peer review process was followed in order to guarantee the quality of the final publication and during this process, the following points were evaluated: information content, relevance to the educational field, general structure, clarity of contents, originality, and relation to the conference topics and disciplines. The publication is solely in English.

Moreover, ICERI aims to publish conference proceedings that contain high-quality original research articles, meeting the expected ethical standards. All authors that published their papers in the ICERI2022 Proceedings signed the IATED copyright transfer form. IATED guarantees the high technical and professional quality of the publications, and that good practice and ethical standards are maintained. More information about the publication ethics of IATED is available at: https://iated.org/publication_ethics.

Finally, we wish to extend our most sincere thanks to all members and delegates who have contributed to these ICERI2022 Proceedings. We also wish to express our gratitude to all participants and attendees for their engagement, dedication and passion for education.

Luis Gómez Chova
Agustín López Martínez
Joanna Lees
Organizing and Program Committee

Organizing Committee

Program Chairs
Luis Gómez Chova, University of Valencia, Spain
Agustín López Martínez, University of Barcelona, Spain
Joanna Lees, CEU Cardinal Herrera University, Spain

Local Arrangements Chairs
David Martí, International Academy of Technology, Education and Development, Spain
Mª Jesús Suesta, International Academy of Technology, Education and Development, Spain
Javi Doménech, MSX International Techservices, Spain
Miguel Peiró, Progresa Vocational Training Center, Spain

Publication Chairs
Chelo González, Polytechnic University of Valencia, Spain
Ignacio Candel Torres, Capgemini, Spain

Publicity Chairs
Eladio Duque, International Academy of Technology, Education and Development, Spain
Juanan Herrero, Graphimage Graffor, Spain

Web Masters
Jose Luis Bernat, International Academy of Technology, Education and Development, Spain
Javier Martí, IVIRMA Global IT, Spain

Panel Chairs
Mairi Macintyre – University of Warwick, United Kingdom
Sylvia Sanders – Fontys University of Applied Sciences, Netherlands
Tracey Tokuhama Espinosa – Harvard University Extension School, United States
Wendy Gorton – Educational consultant, United States

Session Chairs
Achim Dannecker – University Northwestern Switzerland FHNW, Switzerland
Aiden Carthy – Technological University Dublin, Ireland
Akram Abu-aisheh – University of Hartford, United States
Amy Smith – Massachusetts Institute of Technology (MIT), United States
Anat Moshe – Beit Berl College, Israel
Andrea Dominguez – DeVry University, United States
Anna Isaksson – Halmstad University, Sweden
Ava Fujimoto-Strait – Sam Houston State University, United States
Bee-Yen Toh – Queen’s University Belfast, United Kingdom
Brian Garibaldi – Johns Hopkins University School of Medicine, United States
Camilla Gjellebæk – Østfold University College, Norway
Caroline Pullrey – EPFL, Switzerland
Carolyn Herrington – Florida State University, United States
Catherine Murphy – Munster Technological University, Ireland
Catherine O’Donnell – Ulster University, United Kingdom
Colin McFadden – University of Minnesota, United States
Cynthia Tomovic – Old Dominion University, United States
Dalun Zhang – Texas A&M University, United States
Daniel Bosmans – Haute École Pédagogique BEJUNE, Switzerland
Daniel Weaver – Messiah University, United States
David Facal – University of Santiago de Compostela, Spain
Deborah Romero – University of Northern Colorado, United States
Declan Qualter – Laois and Offaly Education and Training Board, Ireland
Diana Nicholas – Drexel University, United States
Donatella Persico – Consiglio Nazionale delle Ricerche, Italy
Donatella Persico – Consiglio Nazionale delle Ricerche, Italy
Dorota Gawryluk – Bialystok University of Technology, Poland
Elmar Krainz – FH JOANNEUM GmbH, Austria
Elvira G. Rincon-Flores – Instituto Tecnológico de Monterrey, Mexico
Eti Devries – Hanze University of Applied Sciences, Netherlands
Fabio Chacon – Bowie State University, United States
Geraldine Maughan – Tech. University of the Shannon: Midlands and Midwest, Ireland
Gwendell Foendoe Aubel – The Hague University of Applied Sciences, Netherlands
Heather McCune Bruhn – Penn State University, United States
Helen Neal – University of Warwick, United Kingdom
Jana Bérešová – Trnava University, Slovakia
Joaquin Villegas – Northeastern Illinois University, United States
Joseph Walsh – Munster Technological University, Ireland
Kaisa Oikarinen – Aalto University, Finland
Karel Němec – Czech University of Life Sciences Prague, Czech Republic
Kate Lister – Arden University, United Kingdom
Katrin Kivisild – Education and Youth Board of Estonia, Estonia
Kine Maridatter – UiT The Arctic University of Norway, Norway
Lela Kvinikadze – Ivane Javakhishvili Tbilisi State University, Georgia
Leonard Waleczky – Masaryk University, Czech Republic
Mairi Macintyre – University of Warwick, United Kingdom
Maria Daskolia – National and Kapodistrian University of Athens, Greece
Maria Ekström – Laurea University of Applied Sciences, Finland
Martin Žagar – RIT Croatia, Croatia
Matthew Andrew – Khalifa University, United Arab Emirates
Mercedes Valiente López – Universidad Politécnica de Madrid, Spain
Michael Green – University of Kent, United Kingdom
Mileta Tomovic – Old Dominion University, United States
Noemi Rodriguez – NYC College of Technology/CUNY, United States
Olga Bogdanova – LAB University of Applied Sciences, Finland
Paul Lane – Grand Valley/UNAN-MGA, United States
Peter Gorder – University of Colorado Colorado Springs, United States
Rasa Poceviciene – Sauliai State University of Applied Sciences, Lithuania
Rune Andersen – University of Agder, Norway
Sally Rule – University of Canberra, Australia
Sharon Hartle – University of Verona, Italy
Shelly Wyatt – University of Central Florida, United States
Sibel Erduran – University of Oxford, United Kingdom
Sigal Eden – Bar-Ilan University, Israel
Silvia Pisano – Laboratori Nazionali di Frascati - INFN & Centro Fermi, Italy
Susan Pawley – The Open University, United Kingdom
Vicky O’Rourke – Atlantic Technology University, Ireland
Viviana Fanti – University of Cagliari and INFN Sezione di Cagliari, Italy
Yehudith Weinberger – Kibbutzim College of Education, Israel

International Program Committee
Adriana Agnes Repellin-Moreno – Universidad Panamericana, Mexico
Aileen Cotter – Cork Institute of Technology, Ireland
Akihiro Maeda – Ryukoku University, Japan
Alia Ammar – Drexel University, United States
Ana Paula Lopes – Polytechnic Institute of Oporto, Portugal
Anna Romagnuolo – University of Tuscia, Italy
Breno Deffanti – Graded - The American School of São Paulo, Brazil
Catherine O’Donnell – Ulster University, United Kingdom
Christopher Evans – Cardiff University, United Kingdom
Craig Loewen – University of Lethbridge, Canada
Craig Walker – Oklahoma State Department of Education, United States
Cynthia Rosas Magallanes – Instituto Mexicano del Seguro Social (IMSS), Mexico
Daniel Abrahams – University of Arkansas - Fayetteville, United States
David Jennings – University College Dublin, Ireland
Elmaziye Özgür – Eastern Mediterranean University, Cyprus
Ewa Bogacz-Wojtanowska – Jagiellonian University, Poland
Fedor Duzhin – Nanyang Technological University, Singapore
Filomena Soares – Polytechnic of Porto, Portugal
Frank Brosow – University of Education Ludwigsburg, Germany
Helmut Wöllik – Carinthia University of Applied Sciences, Austria
Hiroyuki Obari – Aoyama Gakuin University, Japan
Ineta Helmane – University of Latvia, Latvia
James Mackay – Otago Polytechnic, New Zealand
Jaroslav Kujański – University of Gdańsk, Poland
Joanna Richardson – City, University of London, United Kingdom
John Craft – Appalachian State University, United States
Joseph Agbenyega – Emirates College for Advanced Education, United Arab Emirates
João Monteiro – ISPGAYA - Instituto Superior Politécnico Gaya, Portugal
Kari Krell – MacEwan University, Canada
Kay Gallagher – Zayed University, United Arab Emirates
Laia Nordstrand Berg – Western Norway University of Applied Sciences, Norway
Luis Roseiro – Instituto Superior de Engenharia de Coimbra, Portugal
Luke Raeside – Technological University Dublin, Ireland
Maria Rudneva – RUDN University, Russian Federation
Martha Leal-Gonzalez – Institute of Innovation and Tech. Transfer of Nuevo Leon, Mexico
Matome Mashiapata – University of South Africa, South Africa
Mayaugust Finkenberg – Stevenson University, United States
Mike Hillis – California Lutheran University, United States
Orlando Belo – Universidade do Minho, Portugal
Paul Hunter – IMD, International Institute for Management Development, Switzerland
Peter Gabor – University of Calgary, Canada
Peter Haber – Salzburg University of Applied Sciences, Austria
Pia Palotie – Eezy Tyollisyyspalvelut, Finland
Remigijus Bubnys – Vilnius University, Lithuania
Rosa Cendros Araujo – Western University, Canada
Sinead McCotter – University of York, United Kingdom
Sylvia Dempsey – Cork Institute of Technology, Ireland
Taija Chaya Votkin – Aalto University, Finland
Taketoshi Yokemura – Shibaura Institute of Technology, Japan
Tammy Ladwig – University of Wisconsin Fox Valley, United States
Thomas Lavery – The Royal Academy of Engineering, United Kingdom
Victoria Kompanets – Lappeenranta University of Technology, Finland
Wendy Gorton – Educational consultant, United States
ICERI2022 Keynote Speakers

Keynote Speakers
Tracey Tokuhama-Espinosa – Harvard University Extension School, United States
Manu Kapur – ETH Zurich, Switzerland

Tracey Tokuhama-Espinosa – Harvard University Extension School (United States)

Keynote speech: What Every University Professor Should Know About Meaning Making
Over the years we have heard a lot about the important role of social-emotional learning within school settings. We have also learned something about how the brain learns in regular classrooms. What is less explored is how people make meaning out of their worlds by combining knowledge of how others feel and knowledge of how others think to construct reality. New neuroimaging technology now gives us a glimpse as to how people influence each other’s learning through a dynamic exchange of cognition and emotion. Meaning Making is a term used to describe how humans give context to their learning. In this keynote we will explain how humans learn from this perspective, and why and how higher education must shift to remain relevant in modern times.

Biography:
Tracey Tokuhama-Espinosa, Ph.D. is from Berkeley, California, is an alumna of the Harvard Graduate School of Education, and currently teaches a course at the Harvard University Extension School entitled The Neuroscience of Learning: An Introduction to Mind, Brain, Health, and Education Science. She is currently an educational researcher and serves as an Associate Editor of Nature Partner Journal Science of Learning and co-founder of Connections: The Learning Sciences Platform.

Tracey researches indicators to measure educational quality; learning in the digital age; transdisciplinary thinking; bilingualism and multilingualism; and the general improvement of teacher practices. Her most recent books are the Bringing the Neuroscience of Learning to Online Teaching: An Educator’s Handbook (2021); Neuromyths: Debunking False Ideas About the Brain (2019); and The Five Pillars of the Mind: Redesigning Education to Fit the Brain (2019). She has authored articles for UNESCO and was a member of the Organisation for Economic Co-Operation and Development (OECD) expert panel to redefine teachers’ new pedagogical knowledge in modern times.

Tracey’s current focus is on understanding What Kids Want to Know About Their Own Brains, a book coming out with Columbia University’s Teachers College Press next year. She is also writing a book called ThinkWrite: The Neuroscience of Writing, which explains why writing is the highest form of thinking. Finally, she is co-editing a new Handbook on Brain, Neuroscience and Education, which is a collection of work looking at the future of educational practice. Tracey has lived and worked professionally in Tokyo, Geneva, Lima, and Boston, and is currently in New York and works with teachers, schools, governments, and NGOs in 40 different countries.
Manu Kapur – ETH Zurich (Switzerland)

Keynote speech: Productive Failure

If learning from failure is intuitively compelling, how can we intentionally design for it, and bootstrap it for deep learning? In my talk, I will describe my research on Productive Failure, and its implications for how we design powerful learning environments, innovation and creativity.

Biography:
Manu holds the Professorship for Learning Sciences and Higher Education at ETH Zurich, Switzerland, and directs The Future Learning Initiative (FLI) at ETH Zurich. An ETH+ funded initiative, the FLI brings together more than 20 professors from 10 departments at ETH to advance research on the science of teaching and learning in higher education contexts, and translate it into the practice of teaching and learning at ETH Zurich.

Prior to this, Manu was a Professor of Psychological Studies at the Education University of Hong Kong. Manu also worked at the National Institute of Education (NIE/NTU) of Singapore as the Head of the Curriculum, Teaching and Learning Department, as well as the Head of the Learning Sciences Lab (LSL).

As a learning scientist, Manu makes a commitment not only to advancing understanding of human learning, but doing so in ways that make an impact in the actual ecologies of learning. Drawing on his engineering mindset for design, Manu conceptualized and developed the theory of Productive Failure to design for and bootstrap failure for learning mathematics better. He has done extensive work in real-field ecologies of STEM classrooms to transform teaching and learning using his theory of productive failure across a range of schools and universities in around the world.

His research on Productive Failure has been taken up by the Singapore’s Ministry of Education for wide-scale re-design and implementation of its pre-university mathematics (statistics) curriculum and pedagogy.
Conference Tracks & Sessions

The ICERI2022 conference program is available online at https://iated.org/iceri2022

**ORAL SESSIONS MONDAY**

Virtual & Augmented Reality  
Tutoring & Coaching  
Entrepreneurship Education (1)  
Robotics in Education  
Flipped Learning  
Best Practices in Maths Education  
Students and Teachers Wellbeing  
Exchange & Mobility Programmes  
Technology Enhanced Learning  
Rethinking Assessment in COVID-19 Times  
University-Industry Collaboration (1)  
Responsible Research and Innovation in STEM  
Gender Issues in Education  
Trends in Maths Education  
Special Education (1)  
New Technologies in Language Learning  
Design Thinking  
e-Assessment  
Employability Trends and Challenges  
Architecture Education Experiences  
Pedagogical Innovations  
Computer Science and Programming in Higher Education  
Inclusion of Learners with Special Educational Needs  
Teaching and Learning Foreign Languages  
21st Century skills  
Assessment & Feedback  
Entrepreneurship Education (2)  
Engineering Education  
Project and Problem Based Learning  
Coding at Schools  
Special Education (2)  
Second Language Learning & Bilingual Education

**POSTER SESSIONS MONDAY**

Pedagogical Experiences in Teaching and Learning  
Emerging Technologies and Distance Learning

**ORAL SESSIONS TUESDAY**

Digital Transformation of Education  
From Face-to-Face to Remote Learning  
Universal Design for Learning & Learning Space Design  
Media & Information Literacy  
Blended and Hybrid/Hyflex Education  
Professional Development of STEM Teachers  
Educational Leadership and Management  
Students Wellbeing during and after COVID-19  
Online Teaching and Learning  
Lessons learned from the COVID-19 pandemic
Student Support
Diversity Issues & Inclusive Education
Active & Experiential Learning
Professional Development of Teachers (1)
International Experiences
Remote and Virtual Laboratories
e-Learning
Quality Assurance & Learning Analytics
Inclusion & Multiculturality
Student Engagement and Motivation
Service Learning & Community Engagement
ICT Skills among Teachers
How to better match the language proficiency needs? The Kielibuusti project
Cooperative & Problem Based Learning in Computer Science
Research on Educational Technologies
University-Industry Collaboration (2)
Educational Software
Digital Literacy
Gamification & Game-based Learning
Pre-Service Teacher Education
How to Build an Entrepreneurship Education System across Educational Levels?
STEM Experiences
Social Media in Education
Workplace & Vocational Training
Curriculum Design Experiences
Engagement and Motivation during COVID-19 Pandemic
Sustainable Development Goals in Education
Professional Development of Teachers (2)
Educational Management
Health Sciences Education

POSTER SESSIONS TUESDAY

Innovations and Quality in Education
New Trends in Education and Research

VIRTUAL SESSIONS

DIGITAL TRANSFORMATION OF EDUCATION
Data Science & AI in Education
Learning Analytics & Educational Data Mining
Digital Technologies and Resources for Learning under Lockdown
Digital Transformation
21st Century Skills
Educational Programming & Robotics

DIGITAL & DISTANCE LEARNING
Distance Education in COVID-19 Times
MOOCs & Open Educational Resources
Blended & Mobile Learning
e-Learning Experiences
Learning Management Systems & Virtual Learning Environments
Post-Pandemic Scenarios in Education

INNOVATIVE EDUCATIONAL TECHNOLOGIES
AI, Chatbots & Robots
Virtual & Augmented Reality
Social Media in Education
Technology Enhanced Learning
TEACHER TRAINING & ED. MANAGEMENT
ICT & Digital Skills
Professional Development of Teachers
Educational Management

ACTIVE & STUDENT-CENTERED LEARNING
Gamification & Game-based Learning
Active & Experiential Learning
Problem & Project-Based Learning
Developing Soft and Transversal Skills
Pedagogical Innovations

ASSESSMENT, MENTORING & STUDENT SUPPORT
Assessment & Evaluation
Rethinking Assessment in COVID-19 Times
Mentoring & Tutoring
Student Support & Motivation
Student Engagement & Wellbeing in COVID-19 Times

EDUCATIONAL STAGES & LIFE-LONG LEARNING
From Pre-school to Secondary Education
Vocational Training
Transition to the Job Market
Developing Entrepreneurship in Education
Life-Long & Workplace Learning
Libraries and Museums as Learning Spaces

QUALITY & IMPACT OF EDUCATION
Quality in Education
Experiences and Challenges in Curriculum Design
Sustainability & Environmental Awareness
Social Impact of Education
University-Industry Collaboration
Education and Research

MULTICULTURALITY & INCLUSION
Multicultural Education
Diversity Issues
Special Educational Needs
Inclusive Education

STEM EDUCATION
Mathematics & Statistics
Engineering Education
STEm Experiences
Computer Science Education

LANGUAGE LEARNING AND TEACHING
Foreign Languages
New Technologies in Language Learning
Language Learning & Translation Studies

DISCIPLINE-ORIENTED SESSIONS
Architecture & Interior Design
Health Sciences Education
Business and Marketing Education
Military Education
Table of Contents

A MIXED METHODS STUDY OF LEARNING CHALLENGES: PERCEPTIONS OF FOUNDATION STUDENTS AT AN INTERNATIONAL BRANCH CAMPUS IN QATAR  
R. Bendriss  
1

ATTITUDES OF SOCIAL MEDIA USERS TOWARDS ONLINE PRIVACY IN TIMES OF A PANDEMIC: PRIVACY CONFIGURATION AND PROFILE DISCLOSURE ON FACEBOOK  
L. Andrade, L. Faria, M. Andersen  
11

SOCIAL MEDIA PRESENCE IN EMPLOYER BRANDING: CONSIDERATIONS FOR HIGHER EDUCATION INSTITUTIONS  
L. Andrade, J. Pimenta, L. Faria  
21

MIGRATION AND PERCEPTION OF RELIGIOUS PLURALISM: A CASE OF TURKISH COMMUNITY IN AMERICA  
B. Gürer  
31

UNIVERSITY STUDENTS’ MOBILITY AND ITS ASPECTS  
E. Nacházelová  
38

THE IMPACT OF THE MIND, EMOTIONAL, AND SPIRITUAL (MES) PROGRAM ON QUALITY OF LIFE AMONG NATIONAL HIGH-SCHOOL TEACHERS IN EASTERN THAILAND  
T. Julvanichpong, K. Piboon, T. Yinggratanasuk, W. Julvanichpong, C. Singhnoy, P. Inchai  
45

SUCCESSFUL TEACHER PREPARATION PROGRAM CHARACTERISTICS  
R. Spangler  
50

PLAYING CATCH UP: ALIGNING CREDIT RECOGNITION AND TRANSFER WITH MICRO-CREDENTIALS  
R. McGreal, K. Perris  
51

DIGITAL TRANSFORMATION IN LANGUAGE EDUCATION DURING THE COVID-19  
H. Obari, S. Lambacher, H. Kikuchi, H. Kojima  
52

PRE-SERVICE MATH & SCIENCE TEACHERS’ VIEWS ON UTILIZING MOBILE TECHNOLOGY IN EARTH SCIENCE COURSE: A PHENOMENOGRAPHIC STUDY  
F. Ornek  
53

JOURNEY THROUGH LIMINALITY: FROM TEACHER, TO STUDENT, TO TEACHER  
I. Ntonia, M. Pazio  
54

SIX SIGMA RE-CERTIFICATION  
D. Gonzalez  
55

‘HOW SHOULD SOCIAL WORK EDUCATION IN ENGLAND RESPOND TO THE 2020 BLACK LIVES MATTER CAMPAIGNS?’ KEY THEMES FROM THE LITERATURE  
A. Higgs  
56

IMPROVING ONLINE LANGUAGE LEARNING INTERACTIVITY WITH MULTIUSER VIRTUAL REALITY ENVIRONMENTS: PREPARING FOR THE METAVERSE  
P. Mourtzis, S. Mystakidis  
57

TECHNOLOGY AND THE INSTRUCTOR: WHERE TO NOW?  
L. Whisenant  
66

INFORMATION SECURITY AND DIGITAL RIGHTS MANAGEMENT: A BRIEF LITERATURE REVIEW  
L. Whisenant  
76

TELECENTRES AS PROMOTERS OF DIGITAL CITIZENSHIP AMONGST POOR POPULATIONS IN BELO HORIZONTE, BRAZIL  
S. Rodrigues Haddad, A. Oliveira, A.F. Beaufils  
81

PREPARING TEACHERS TO SUPPORT EMERGENT BILINGUALS IN THE US & GLOBALLY: AN INSTITUTIONAL OVERVIEW  
D. Romero, M. Milian  
91

TRANSITIONING EARLY FIELD EXPERIENCES FOR PRESERVICE TEACHERS INTO ONLINE OPPORTUNITIES IN TIMES OF CRISIS  
D. Romero, A. Romero de la Torre  
92
CONCERNS OF PRE-ADOLESCENT CHILDREN IN PRIMARY SCHOOLS IN CHINA: FOCUSING ON CONSULTING PARTNERS AND FACTORS INHIBITING CONSULTATION
M. He, F. Inuzuka, I. Chung

ENCOURAGING COURSE DESIGNER ENGAGEMENT WITH DATA ANALYSIS METHODS IN VIRTUAL LEARNING ENVIRONMENTS
S. Smith, D. Cobham, K. Jacques

COMPLEMENTARITY BETWEEN MANAGERS’ VOCATIONAL TRAINING, MANAGEMENT CONSULTING AND COMPANY’S INNOVATION ACTIVITY
M. Baltov, E. Nikolova, M. Neycheva

MENTORING PROGRAM FOR THE INTEGRATION OF INTERNATIONAL STUDENTS INTO HIGHER EDUCATION
P. Alves, C. Morais, L. Miranda

GREEN TRANSITION – CHANGING THINKING PATTERNS AND ACTIONS IN PRACTICE
M. Ekström, K. Hytönen

INTERNATIONALIZED ENGLISH MEDIUM INSTRUCTION PROGRAMMES IN HIGHER EDUCATION INSTITUTES
N. Wang

BUILDING STUDENT-CENTERED SOFTWARE BY ACTUALLY TALKING TO STUDENTS
C. McFadden

RESULTS OF THE INCORPORATION OF THE STRUCTURAL CODE IN THE TEACHING OF STRUCTURAL SUBJECTS FOR THE DEGREES IN MECHANICAL ENGINEERING, AGRICULTURAL ENGINEERING AND MASTER'S DEGREE IN INDUSTRIAL ENGINEERING
J. Ferreiro-Cabello, E. Fraile-Garcia, J. Los-Santos Ortega, C. Gonzalez-Gonzalez

DIGITAL RESOURCES TO ENHANCE EMPLOYABILITY FOR STUDENTS OF INDUSTRIAL CONSTRUCTION IN THE INDUSTRIAL ENGINEERING MASTER'S DEGREE
J. Ferreiro-Cabello, E. Fraile-Garcia, J. Los-Santos Ortega, C. Gonzalez-Gonzalez

DEVELOPING PROFESSIONAL IDENTITY IN FIRST YEAR OF UNIVERSITY
S. Dempsey

PERFORMANCE MEASUREMENT SYSTEM DECOUPLING
R. Vancelee, R. Kelly

TUTORSHIPS TO PROMOTE UNIVERSITY EDUCATIONAL INCLUSION
B.A. Naranjo Sánchez, F. Potes Duque

THE DEVELOPMENT-FORMATIVE FUNCTION OF EDUCATIONAL EVALUATION
I. Szőköl, O. Kováč

INTERIOR DESIGN EDUCATION IN SEARCH OF MEANING
D. Hasirci

A BILINGUAL PROGRAM AT PRE-UNIVERSITY LEVEL (17-19 YEAR OLD): THE CASE OF COLLEGIAL INTERNATIONAL SAINTE-ANNE
H. Rompre

DESIGNING FOR CREATIVE RESEARCH IN GRADUATE EDUCATION
T. Hurwich, D. Nicholas, F. Fleming, P. Gondek, J. Katz-Buonincontro, D. King, E. Perignat

ETHICS IN EDUCATION AND THE USE OF TECHNOLOGY
M. Ben-Jacob, A. Glazerman, D. Wang

THE PROFESSIONAL LEARNING COMMUNITIES IMPERATIVE: HOW SCHOOLS NAVIGATE THE DYNAMICS OF SYSTEMIC AND SCHOOL-BASED DEMANDS IN PLC IMPLEMENTATION
S. Rule, T. Wang

CELL BIOLOGY EDUCATION WITH ADVANCED 3D TECHNOLOGIES FOR K-12 STUDENTS
S. Tanabashi

THE EVOLUTION OF HIGHER EDUCATION - INSTITUTION-TO-INSTITUTION MUTUAL-EXCHANGE
E. Arnold

A SUDDEN SHIFT FROM FACE-TO-FACE TO DIGITAL: WHAT CHALLENGES DID TUTORS FACE WHILE TUTORING DURING COVID-19?
L.M. Langesee, L. Franke, J. Heller
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMUNICATION IN ENGLISH AS A LINGUA FRANCA: CHALLENGES FOR</td>
<td>353</td>
</tr>
<tr>
<td>TEACHING ENGLISH AS A FOREIGN LANGUAGE</td>
<td></td>
</tr>
<tr>
<td>P. Vettorel, M. Antonello</td>
<td></td>
</tr>
<tr>
<td>COVID-19 CHALLENGES ON STUDENTS’ ONLINE LEARNING: SOUTH AFRICAN</td>
<td>361</td>
</tr>
<tr>
<td>HIGHER EDUCATIONAL INSTITUTIONS PERSPECTIVES</td>
<td></td>
</tr>
<tr>
<td>R. Minty, R. Brink, A. Alao</td>
<td></td>
</tr>
<tr>
<td>FEEDBACK PRACTICES: HOW CAN COACHING ADDRESS THE NEED FOR DEEP</td>
<td>371</td>
</tr>
<tr>
<td>COMMUNICATION TO SUPPORT STUDENT LEARNING AND WELL-BEING?</td>
<td></td>
</tr>
<tr>
<td>I. Langseth</td>
<td></td>
</tr>
<tr>
<td>PHENOMENA TRIGGERING HEURISTIC STRATEGIES IN SOLVING ATYPICAL WORD</td>
<td>380</td>
</tr>
<tr>
<td>PROBLEMS</td>
<td></td>
</tr>
<tr>
<td>K. Mottlová, J. Slezáková</td>
<td></td>
</tr>
<tr>
<td>PERSONAL, PROFESSIONAL, AND COMMUNITY TRANSFORMATIONS THROUGH</td>
<td>386</td>
</tr>
<tr>
<td>INTERNATIONAL TEACHER EXCHANGE PROGRAMS</td>
<td></td>
</tr>
<tr>
<td>M. Milian</td>
<td></td>
</tr>
<tr>
<td>OPEN EDUCATIONAL RESOURCES AND PRACTICES PROMOTING COLLABORATIVE</td>
<td>387</td>
</tr>
<tr>
<td>CONSTRUCTION AND SHARING OF KNOWLEDGE AT LAUREA UNIVERSITY OF</td>
<td></td>
</tr>
<tr>
<td>APPLIED SCIENCES</td>
<td></td>
</tr>
<tr>
<td>A. Helariutta, M. Fred</td>
<td></td>
</tr>
<tr>
<td>OURROUTE: CREATING A NEW GENERATION OF CULTURAL AMBASSADORS</td>
<td>388</td>
</tr>
<tr>
<td>THROUGH EDUCATION AND TRAINING</td>
<td></td>
</tr>
<tr>
<td>C. Castro Díaz, D. Pina, P. Costa</td>
<td></td>
</tr>
<tr>
<td>SCHOOL AND SOCIAL INCLUSION OF GIPSY ETHNIC YOUTH: THE INTERVENTION</td>
<td>397</td>
</tr>
<tr>
<td>OF SPECIALIZED TECHNICIANS IN THE INTEGRATED PROGRAM OF EDUCATION</td>
<td></td>
</tr>
<tr>
<td>AND TRAINING</td>
<td></td>
</tr>
<tr>
<td>S. Almeida</td>
<td></td>
</tr>
<tr>
<td>DIGITAL PEDAGOGIES IN TEACHER EDUCATION POST COVID-19</td>
<td>408</td>
</tr>
<tr>
<td>Y. Weinberger, M. Shonfeld</td>
<td></td>
</tr>
<tr>
<td>FINANCIAL LITERACY IN INVESTING: INTERACTIVE METHODS FOR BACHELOR’S</td>
<td>415</td>
</tr>
<tr>
<td>PROGRAMS</td>
<td></td>
</tr>
<tr>
<td>S. Bekareva, A. Getmanova, A. Ivanova</td>
<td></td>
</tr>
<tr>
<td>INVESTIGATING THE RELATIONSHIP BETWEEN SPATIAL SKILLS AND</td>
<td>421</td>
</tr>
<tr>
<td>ENGINEERING DESIGN</td>
<td></td>
</tr>
<tr>
<td>G. Raju, S. Sorby, C. Reid</td>
<td></td>
</tr>
<tr>
<td>BARRIERS TO THE UTILIZATION OF EDUCATIONAL SOFTWARE</td>
<td>427</td>
</tr>
<tr>
<td>R. Garrote Jurado, T. Pettersson, M. Zwierewicz</td>
<td></td>
</tr>
<tr>
<td>POST-PANDEMIC ARCHITECTURAL DESIGN PEDAGOGY</td>
<td>434</td>
</tr>
<tr>
<td>J. Kroft, L. De Bartolo, S. Agma, A. Weiss, V. Hui, L.D. Díaz</td>
<td></td>
</tr>
<tr>
<td>INVESTIGATING THE BENEFITS OF TRANSITIONING FROM FIXED-POINT TO</td>
<td>440</td>
</tr>
<tr>
<td>NAVIGABLE VR</td>
<td></td>
</tr>
<tr>
<td>L. De Bartolo, A. Weiss, A. Huang, V. Hui</td>
<td></td>
</tr>
<tr>
<td>PLANNING AND TEACHING DEMO LESSONS TO DEVELOP ONE OF THE COMPETENCIES</td>
<td>450</td>
</tr>
<tr>
<td>OF THE EXIT PROFILE IN THE ENGLISH LANGUAGE TEACHING (ELT) TRAINING</td>
<td></td>
</tr>
<tr>
<td>PROGRAM AT UNAE, ECUADOR</td>
<td></td>
</tr>
<tr>
<td>U. Recino, D. Villagomez, J.C. Fajardo</td>
<td></td>
</tr>
<tr>
<td>WHAT IS BEHIND ARCHITECTURAL EDUCATION? SOFT SKILLS COMPETENCES IN 6</td>
<td>459</td>
</tr>
<tr>
<td>EUROPEAN SCHOOLS OF ARCHITECTURE</td>
<td></td>
</tr>
<tr>
<td>C. Sentieri Omarrementeria</td>
<td></td>
</tr>
<tr>
<td>USING UNIVERSAL DESIGN GAME AS AN EDUCATIONAL TOOL – CASE RUFFPROTO</td>
<td>468</td>
</tr>
<tr>
<td>J. Lahti</td>
<td></td>
</tr>
<tr>
<td>PROBLEMS BASED LEARNING TO ESTIMATE FUTURE WATER AVAILABILITY DUE</td>
<td>476</td>
</tr>
<tr>
<td>TO CLIMATE CHANGE</td>
<td></td>
</tr>
<tr>
<td>G. Ibarra-Berastegi</td>
<td></td>
</tr>
<tr>
<td>FAREWELL TO THE PANDEMIC AND FACING THE WAR: CONTEMPORARY</td>
<td>477</td>
</tr>
<tr>
<td>CHALLENGES FOR HIGHER EDUCATION IN ROMANIA</td>
<td></td>
</tr>
<tr>
<td>G.A. Necula</td>
<td></td>
</tr>
<tr>
<td>EDUCATION AS A GREEN SOLUTION FOR REDUCING THE ECOLOGICAL FOOTPRINT</td>
<td>478</td>
</tr>
<tr>
<td>H. Fridman, I. Banner, Y. Sitbon, Y. Einav, N. Shaked</td>
<td></td>
</tr>
</tbody>
</table>
GAMIFICATION AND CONTINUOUS LEARNING – ON A QUEST FOR MORE ENGAGING EDUCATION
P. Tapala

MOTIVATION STRATEGIES TO KEEP TRAINEES ENGAGED
E. Ciani, A. Laus

THE E-CLASSROOM EXPERIENCE OF INTERDISCIPLINARY CONTENT: SPANISH LANGUAGE SUPPORT
M.C. Santana-Rogers

IN-SERVICE EDUCATION OF TEACHING ASSISTANTS FOR PUPILS WITH INTELLECTUAL DISABILITIES SUPPORTED BY AUTO-ETHNOGRAPHIC RESEARCH
K. Becirovic, Z. Bagaric, D. Cerepinko

DIGITAL EDUCATIONAL CONTENT: INCLUSIVE PEDAGOGY AS A PUBLIC INNOVATION SCHEME TO STRENGTHEN CITIZEN LEARNING PROCESSES
J. Garcia, L. Pacheco, L. Alarcón, N. Parra, M. Silva, J. Bula

THE IMPACT OF FAMU SMART ACADEMIES 21ST CENTURY COMMUNITY LEARNING CENTER ON STUDENT PERFORMANCE: AN INNOVATIVE EDUCATION MODEL FOR ADDRESSING ACADEMIC DISPARITY
R. Ellis, Jr., T. McGriff, V. Wilson

THE INCLUSIVE CURRICULUM WORKGROUP: AFFIRMING ANTI-RACISM AND DIVERSITY IN THE WRITING PROGRAM
C. Wastal

IMPLEMENTATION OF INNOVATIVE METHODS IN THE TEACHING OF LITERARY EDUCATION FROM THE PERSPECTIVE OF TEACHERS AND UNIVERSITY STUDENTS
M. Mašát, K. Smakalová, A. Štěpánková, L. Nosková, E. Marková, J. Hřívnová, J. Sladová

DESIGN THINKING SPRINTS IN HIGHER EDUCATION - THREE CASES AND APPROACHES
L. Wallenius

DO WE STILL NEED FULLY EQUIPPED LAB COMPUTERS AFTER THE PANDEMIC?
C. Pang, C. Anton

WOMEN AND STEM CAREERS: A CURRENT DIAGNOSIS OF THE SITUATION IN ECUADOR BASED ON LABOR MARKET INDICATORS
A. Guerrero, M.A. Ruano, C. Avilés, J. Mazzini

ONLINE MUSEUMS: A PEDAGOGIC TOOL TO FACILITATE OBJECT-ANALYSIS AND AN ENRICHED DECOLONISED LEARNING EXPERIENCE FOR FASHION DESIGN STUDENTS IN HIGHER EDUCATION DURING THE COVID-19 PANDEMIC
C. O’Shea

THE CHANGING CONDITIONS OF THE UNIVERSITIES—FROM THE FACE-TO-FACE EDUCATIONAL EXPERIENCE TO VIRTUAL LEARNING ECOSYSTEMS—HOW THIS AFFECTS THE DEVELOPMENT OF DEEP LEARNING AND CRITICAL REFLEXIVE THINKING
G. Sart

THE ADOLESCENT FOREIGN LANGUAGE CLASSROOM ANXIETY SCALE (AFLCAS) – PRELIMINARY RESULTS OF ITS APPLICATION AMONGST FRENCH-SPEAKING STUDENTS OF EFL IN SWISS SECONDARY SCHOOLS AND IMPLICATIONS FOR PRE-SERVICE TEACHER TRAINING
D. Bosmans, E. Jenny

HOW TO IMPROVE IT-BASED ENTREPRENEURSHIP EDUCATION COURSES AT THE UNIVERSITIES AND PREPARE THE STUDENTS FOR THE COMING ECONOMIC CRISSES?
G. Sart

AN APPROACH TO FORMATION OF COMPETENCIES OF TEACHERS IN COMPUTER SCIENCE AND PHYSICS FOR IMPLEMENTATION OF ONLINE TRAINING
E. Goranova

HIGHER EDUCATION TEACHING TRANSFORMATION WITH EDUCATIONAL NEUROSCIENCE PRACTICES
M. Fragkaki, S. Mystakidis, K. Dimitropoulos

EXPERIENCES IN CREATING ONLINE LANGUAGE OFFERINGS IN INTERNATIONAL COOPERATION
M. Ohinen-Salvén, T. Hämäläinen
CHANGING THE CURRICULUM TO ENHANCE STUDENT LEARNING
J. Greeff, E. Taylor

LEADING A DEPARTMENT AT A HIGHER EDUCATION INSTITUTION DURING COVID:
THE IMPORTANCE OF GROUP REFLECTION
E. Taylor, J. Greeff

TOWARDS A GENUINE STUDENT CENTERED APPROACH TO LEARNING
R. Andersen, C. Simonsen

NETWORK TESTING ENVIRONMENT BASED ON VIRTUALIZATION TECHNOLOGY -
LAB SOLUTION
V. Šac, L. Havaš, D. Srpk, D. Godec

HERE WE GO AGAIN: DIDACTIC SUITABILITY ANALYSIS OF A STATISTICAL-GRAPHS TASK
H. Bogas, E. Morais, M.M. Nascimento

ALTERNATIVE ASSESSMENT IN THE EYES OF UNIVERSITY TEACHERS: EXPLORING
THE RELATIONSHIPS BETWEEN TEACHERS' ATTITUDES, TEACHING ENVIRONMENT
AND BEHAVIOUR
S.C. Kong, C.N. Yuen

RESEARCH AND ANALYSIS OF WORKING INDICATORS OF ONLINE LEARNING AS A
DIFFERENT EDUCATIONAL ENVIRONMENT
V. Doneva, S. Tsankov

VIRTUALIZATION AS A TOOL TO ENCOURAGE ACTIVE LEARNING IN PRACTICAL
LABORATORY CLASSES
G. Turnes, M. Bauzà, N. Crespí, C. Palomino

WHAT IS THE PURPOSE OF HIGHER EDUCATION IN ELECTRICAL ENGINEERING?
HARD SKILLS OR SOFT SKILLS?
H. Friman, H. Ragones, M. Balberg

EXPLORING THE PEDAGOGIC PRACTICES OF TEACHING STAFF IN THE IRISH
TECHNOLOGICAL HIGHER EDUCATION SECTOR USING TEACHING AND LEARNING
REGIME THEORY
N. Harding

LANGUAGE, CULTURE AND FEEDBACK – AN EXPLORATION OF EUROPEAN
STUDENTS’ EXPERIENCES AND UNDERSTANDING OF FEEDBACK
M. Pazio

NOVICE TEACHERS – RETROSPECTIVE REFLECTIONS AT FIRST YEARS OF
TEACHING
A. Moshe, P. Shavit

A MULTIDIMENSIONAL ASSESSMENT OF SELF-DETERMINATION IN STUDENTS WITH
INTELLECTUAL DISABILITIES
P. Shavit

CREATION OF LEARNING SCENARIOS IN IMMERSIVE WORLDS WITH MINECRAFT
EDUCATION EDITION
S.A. Casanova Valencia, M.A. Valenzo-Jiménez

MULTIDISCIPLINARY COLLABORATIVE APPROACH TO SYSTEMS CHANGE FOR
SCHOOL MENTAL HEALTH
J. Freeny, A. Fulgium Thurston, S. Haddad

DEVELOPMENT OF EMPLOYABILITY IN HIGHER EDUCATION: ADAPTATION THE
EAS METHOD AND ITS IMPLEMENTATION

SOCIAL AND LABOUR INCLUSION. THE INSERTION ENTERPRISE AS DRIVERS OF
DEVELOPMENT OF EMPLOYABILITY
L.I. Linares-Insa, P. González-Navarro, S. Colomer-Cornejo

TRANSFORM-EDU: INCREASING GRADUATE EMPLOYABILITY THROUGH
EMOTIONAL AND SOCIAL SKILLS DEVELOPMENT
A. Carthy, M. O'Regan, W. Chalmers, O. Philip

EDUCRO SUMMER CAMP FOR CULTURE AND TOURISM STUDENTS: BEST PRACTICES
AND LESSONS LEARNT
O. Bogdanova

xviii
A PROPOSAL FOR EVALUATING EMERGENCY REMOTE EDUCATION BY CREATING A
DIGITAL PORTFOLIO

CROSS-LINGUISTIC INTERFERENCE IN MULTILINGUAL ACQUISITION:
CHALLENGES, EXPERIENCE AND STRATEGIES FOR LEARNERS
O. Maximova, T. Soloveva

GROUP INFOGRAPHICS, PREPARATION, PRESENTATION AND DEBATE.
COLLABORATIVE WORK IN THE UNIVERSITY CLASSROOM

FOCUS GROUP AS A QUALITATIVE EVALUATION TOOL OF A UNIVERSITY
TEACHING PROJECT BASED ON INFOGRAPHICS, IN THE HERITAGE CONSERVATION
AND RESTORATION AREA
M.A. Carabal-Montagud, M. De Miguel-Molina, V. Santamarina-Campos, M.B. De Miguel-Molina

NEW CHALLENGES FOR HIGHER EDUCATION: THE CASE OF DATING VIOLENCE
P. Nelas, C. Chaves, M. Ferreira, E. Coutinho, S. Campos

ENTREPRENEURIAL SELF-LEADERSHIP AND MINDFULNESS: CURRICULA OUTLINE
AND EDUCATOR GUIDELINES
O. Bogdanova

EXAMINING THE AFFORDANCES OF VIDEO ANNOTATION SOFTWARE (VAS) TO
ENHANCE ASSESSMENT PROCESSES
D. Shore, A. Ahmad, A. Amry, B. Cleaver, G. Bailey, N. Hu

PLAYING AT LEARNING DESIGN
K. Maridatter, J. Weines

INVOLVING THE LEARNERS IN HYBRID UNIVERSITIES: USE OF STUDENT´S
GENERATED VIDEOS
A. Mendieta-Aragón, J. Navio-Marco

APPLICATION OF DIGITAL BOARDS AS AN INNOVATION FOR TEACHING IN
BIOCHEMISTRY AND MOLECULAR BIOLOGY
M.J. Álvarez, M. Cuadros, C. Torres, V. Sánchez, L.J. Martínez, M.I. Rodríguez, V. Arenas-Rodríguez,
S. Cuenca-López, P. Porras-Quesada, P. Sánchez

INVESTIGATION OF TEACHERS’ ATTITUDES TOWARDS THE USE OF SPECIAL
PROGRAMS, METHODS AND FORMS OF WORK WITH GIFTED STUDENTS IN THE
REPUBLIC OF CROATIA
P. Nikolaus, M. Dželalija, N. Marangunić

EDUCATION OF SECURITY MANAGERS OF MEDICAL FACILITIES IN THE SLOVAK
REPUBLIC
T. Loveček, L. Hadaček

USE OF VIRTUAL TOOLS IN THE DISSEMINATION OF DNA AND ITS APPLICATIONS
M.J. Álvarez, L.J. Martínez, M. Cuadros, C. Torres, V. Sánchez, M.I. Rodríguez, V. Arenas-Rodríguez,
S. Cuenca-López, P. Porras-Quesada, P. Sánchez

PODCAST PRODUCTION AS A STUDENT-ACTIVE LEARNING ACTIVITY IN TEACHER
EDUCATION
O. Hembre, S. Soensthagen

AN INTRODUCTION TO THE TOPIC OF NON-FUNGIBLE TOKENS FOR THE
EDUCATIONAL SECTOR
A. Pfeiffer, S. Bezzina, N. Denk, V. Vella, A. Dingli

RETHINKING VISUAL ARTS EDUCATION WITH NEW TECHNOLOGIES AND
RESOURCES DURING THE COVID PANDEMIC
L. Stefan, M. Motaianu, C. Motaianu

DELIVERING THE COMPUTING CURRICULUM ONLINE: CHALLENGES AND
OPPORTUNITIES
O. Pishchukhina

GENDER DIFFERENCES IN SPATIAL THINKING ONLINE TRAINING
N. Segura Caballero, G. Maresch

FLIPPED-ICT METHODOLOGICAL EXPERIENCE FOR THEORETICAL AND
PRACTICAL SUBJECTS OF DIFFERENT ENGINEERING DEGREES
S. Mateo Quero, M. Cuevas Aranda, S. Peinado Serrano, H. Silva de Araujo, A.J. Moya López
TEACHING PHRASAL VERBS: A PROJECT IMPLEMENTING H5P  
L. Prades-Yerves  
819

LEARNING TO PLAY AND PLAYING TO LEARN: AN ACCOUNT OF INTERCOMPREHENSIVE GAME-BASED LEARNING WITH MULTILINGUAL STUDENTS  
K. Steil  
826

INNOVATIVE ASSESSMENT AND FEEDBACK STRATEGIES IMPACTING KEY STAKEHOLDERS IN RELATION TO THE INDUSTRY PLACEMENT MODULE IN THE SCHOOL OF BUSINESS UNDERGRADUATE PROGRAMMES  
C. Murphy, D. McSweeney, M. Collins, E. O’Brien  
835

HOW DO LEARNERS PERCEIVE TEAM TEACHING? DEVELOPMENT AND VALIDATION OF THE LEARNERS’ TEAM TEACHING PERCEPTIONS QUESTIONNAIRE (LTTPQ)  
M. Simons, D. De Weerdt  
843

MOBILE SENIOR: A NEW SENIOR PROFILE FOR MOBILE DEVICE USE  
852

FORMATION OF CONVERSATION SKILLS AMONG SECONDARY SCHOOL STUDENTS IN FOREIGN LANGUAGE CLASSES  
E. Nazmieva, G. Chumartina, N. Pershina  
861

THE ROLE OF USER-GENERATED CONTENT IN BRAND COMMUNICATION AND THE TACTICS TO ENCOURAGE IT  
T. Limba, A. Sildauskas, E. Juozenaite  
865

EXPERIENTIAL LEARNING WHEN TEACHING THE TOPIC “IMPLEMENTATION OF HAMMING ENCODERS AND DECODERS USING COMPUTER-BASED TRAINING TOOLS”  
A. Borodzhieva, I. Tsvetkova  
872

IMPROVING THE RISK CULTURE BY EDUCATING MANAGERS IN THE ENTERPRISE  
M. Hudáková, K. Kardaš  
882

PROJECT-BASED LEARNING APPROACH USED FOR TEACHING AND LEARNING THE TOPIC "DESIGN OF INFINITE IMPULSE RESPONSE FILTERS IN MATLAB" IN THE COURSE "DIGITAL SIGNAL PROCESSING" DURING COVID-19 PANDEMIC  
A. Borodzhieva, I. Tsvetkova  
892

INNOVATION OF THE SECURITY MANAGEMENT PROGRAM OF THE FACULTY OF SECURITY ENGINEERING  
K. Kampová  
901

THE STUDY ON THE PROCESS OF INDIGENOUS KNOWLEDGE BASED TEACHING MATERIAL DEVELOPMENT IN TAIWAN  
J.Y. Yang  
905

INTEGRATING RESEARCH INTO STEM EDUCATION: APPLICATION TO WIND ENGINEERING  
J. Estephan, A. Gan Chowdhury, E. Salma, J. Erwin, H. Landorf, R. Dou  
910

ESCAPE PASSIVE LECTURES: AN INTERACTIVE, MULTI-THEMED DIGITAL ESCAPE ROOM ON MEDICINAL CHEMISTRY TOPICS  
A.S. Abdul Rahim, K.M. Chuah  
915

SPECIAL EXPONENTIAL DIOPHANTINE EQUATIONS  
T. Riemel  
920

BUILDING A SENSE OF LEARNING COMMUNITY DURING THE ENGLISH CLASSES AT THE “NICOLAE BALCESCU” LAND FORCES ACADEMY OF SIBIU  
G. Mihaila Lica  
926

TECHNICAL TRANSLATION IN TRANSLATOR TRAINING  
G. Kovács  
930

STUDYING BRITISH CULTURE – VISIT TO A LIBRARY  
G. Kovács, I. Gönczi  
938

CAN THE TRANSTHEORETICAL MODEL OF CHANGE BE USED TO MODIFY ORGAN DONATION BEHAVIOR IN NURSING STUDENTS?  
S. Coronil-Espinosa, P. Bas-Sarmiento, M. Fernandez-Gutierrez, M. Poza-Méndez  
946

THE IMPERATIVE OF STUDENTS AND TEACHERS' WELL-BEING IN FINNISH UNIVERSITY: A BIBLIOMETRIC APPROACH  
S. Olaleye, E. Olaleye  
953
ESCAPE PASSIVE LECTURES: AN INTERACTIVE, MULTI-THEMED DIGITAL ESCAPE ROOM ON MEDICINAL CHEMISTRY TOPICS

A.S. Abdul Rahim ¹, K.M. Chuah ²

¹Universiti Teknologi MARA (MALAYSIA)
²Universiti Malaysia Sarawak (MALAYSIA)

Introduction:
During the COVID-19 endemic, delivering synchronous lectures and video lectures in the manner of the traditional lecture method seems to trigger low attendance, hinder peer interactions and encourage passive learning in Generation Z students. To overcome such problems, innovative approaches like game-based learning are often employed. Educational games are widely incorporated into teaching and learning process in order to enhance collaboration, critical thinking and communication skills. An escape room is a type of educational, puzzle-based game that puts student teams in charge of problem-solving scenarios before escaping. Previous studies have shown its effectiveness in providing overall positive learning experience, though investigations involving pharmacy students in a medicinal chemistry course remain scant.

Objective:
This paper investigates pharmacy students’ perceptions on an interactive, multi-themed medicinal chemistry escape room activity that was employed as an educational intervention in lieu of a synchronous lecture during the COVID-19 pandemic.

Method:
To escape passive learning in a 2-hour synchronous lecture session, a digital escape room activity was designed and implemented using interactive, multi-themed puzzles for medicinal chemistry topics. The multiple themes in the escape room activity was created in Genially and hosted in the Miro board and Cisco Webex breakout rooms. Out of 184 students, 100 students participated in the escape room activity that took place in the first hour of the synchronous lecture session covering topics on peptic ulcer drugs, anti-emetics, H1-antagonists and non-steroidal anti-inflammatory drugs (NSAIDs). These were arranged in a linear game structure combining easy and difficult challenges and featured:
1) Where in the world is?,
2) MedChem Superheroes,
3) Find C-19X vaccine code,
4) Stop the Alien invasion and
5) Final challenge: Baek Hyun’s First Date. Upon completion of the activity, students rated their experience and overall perception of the escape room game.

Results:
The survey results indicated that the interactive, multi-themed escape room activity was positively perceived by students (n=80) with average scores above 3.70 in a 1-5 Likert scale. It was considered as fun and interesting (4.53) by the third-year pharmacy students who described it as “exciting”, “awesome” and “…definitely wake me up from feeling sleepy in the morning”. Students also viewed the escape room game as an effective way to learn new information related to medicinal chemistry (4.36). They also perceived that they learned better in a game format than a live lecture (3.83) or a video lecture (3.70).

Conclusion:
Third-year pharmacy students positively perceived the multi-themed digital ER game in helping them improve their understanding in medicinal topics. It has the potential to serve as an educational intervention to escape passivity in the traditional lecture method and enhancing students’ autonomy in fostering the acquisition of 21st century skills.

Keywords: escape room, medicinal chemistry, educational games, active learning, pharmacy education.