# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed-Sized Group Formation Using a Modified K-Means Clustering Algorithm</td>
<td>1</td>
</tr>
<tr>
<td>Paul A Walcott &amp; Gail Rolle-Greenidge, The University of the West Indies, Cave Hill Campus, Barbados</td>
<td></td>
</tr>
<tr>
<td>Using the Flipped Classroom Model and Other Teaching Strategies to Promote Project-Based Learning in an Online Learning Environment</td>
<td>6</td>
</tr>
<tr>
<td>Seungoh Paek &amp; Catherine Fulford, University of Hawai‘i at M?noa, United States; Daniel Hoffman, University of Hawai‘i at M?noa, United States</td>
<td></td>
</tr>
<tr>
<td>The Influence of Relationship between an Educator and the Students on Preference for Watching Explanatory Videos</td>
<td>11</td>
</tr>
<tr>
<td>Ken Sato, Yoshinari Takegawa &amp; Keiji Hirata, Future University Hakodate, Japan</td>
<td></td>
</tr>
<tr>
<td>A Pilot Study of the MVP Support System using Google Glass</td>
<td>17</td>
</tr>
<tr>
<td>Yasumasa Yamaguchi, Taku Kawada, Toru Nagahama &amp; Tatsuya Horita, Graduate School of Information Sciences, Tohoku University, Japan</td>
<td></td>
</tr>
<tr>
<td>Google Slides as Digital Group-Portfolios to foster engagement in an Executive Education Program</td>
<td>29</td>
</tr>
<tr>
<td>Sonia Lara, Universidad de Navarra and Harvard Graduate School of Education, Spain; Dan Levy, Harvard Kennedy School, United States</td>
<td></td>
</tr>
<tr>
<td>The Integration of Personal Assistant Systems to K-12 Classrooms</td>
<td>36</td>
</tr>
<tr>
<td>Irene Linlin Chen, University of Houston Downtown, United States; Libi Shen, Concordia University Chicago, United States</td>
<td></td>
</tr>
<tr>
<td>Identifying Latent Traits of Questions for Controllable Machine Generation</td>
<td>42</td>
</tr>
<tr>
<td>Alexander Maas, Taku Kawada, Kazunori Yamada, Toru Nagahama &amp; Tatsuya Horita, Tohoku University, Graduate School of Information Sciences, Japan</td>
<td></td>
</tr>
<tr>
<td>Emotional Aspects of the of Mobile-Learning Adoption Process among Inservice Teachers in the COVID-19 Era</td>
<td>48</td>
</tr>
<tr>
<td>Yulia Muchnik-Rozanov, Rivi Frei-Landau &amp; Orit Avidov-Ungar, Achva Academic College, Israel</td>
<td></td>
</tr>
<tr>
<td>Raising Digitally Skillful Students: A study of Resource Availability, Teachers’ TPACK and Secondary School Students’ Attitude to Computer Studies</td>
<td>53</td>
</tr>
<tr>
<td>Israel Olasunkanmi, University of Ibadan, Nigeria; Yetunde Folajimi, Wentworth Institute of Technology, Boston, United States; Olusegun Aaladeboyeje, University of Ibadan, Nigeria</td>
<td></td>
</tr>
</tbody>
</table>
Innovative Use of 4IR Technologies for Virtual Teaching and Learning: The Perspective of School Pupils of Soweto in South Africa
Bridget Vulani Rikhotso & Samuel Ssemugabi, University of South Africa, South Africa

Using a WhatsApp social media as innovative instructional strategy for academic development
Johanna Setswe, Tshwane University of Technology, South Africa; Marinkie Madiope, University of the Free State, South Africa

Instructional video as perceived by students: Results of a survey
Pavel Samsonov, University of Louisiana at Lafayette, United States

A Preliminary Study on Data Collection from Video Sources for the Analysis and Observation of the Mental States of Learners
Takahiro Tagawa, Kyushu University, Japan; Osamu Yamakawa, Fukui Prefectural University, Japan

A Mixed-Methods Analysis of Students’ Attitudes Towards Innovative Game Design Project in an Economics Course
Salma Ali, Texas A&M: College of Education, United States; Shweta Kailani, Texas A&M University, United States; Kevin Lawanto & Miriam Sanders, Texas A&M University, United States

Alternative Assessment Practices, Grading Less, and Learning More in a Health Professions Skills Laboratory Course
Jeanne Frenzel & Dan Cernusca, North Dakota State University, United States

Online Self-assessment with Benchmarking and “Comparators”
Lan Li, Bowling Green State University, United States; Fang Wang, University of Findlay, United States; Dan Li, Guangxi University, China; Fei Gao, Bowling Green State University, United States

Optimal Group Size in Digital Peer Assessment
Lan Li & Fei Gao, Bowling Green State University, United States; Shuqing Guo, Xi’an International Studies University, China

Digital Assessment Reform Techniques for Improving Educational Effectiveness
Kim Moorning, Farmingdale State College, United States

The Showcase as an Authentic Learning and Assessment Tool
Miguel (Miko) Nino, University of North Carolina at Pembroke, United States; Alicia Johnson, Virginia Tech, United States
Adapt or perish: The evaluation of e-Assessment training of faculty at a South African University using Kirkpatrick’s model of training outcomes ...................................................... 130
Liandi Van den Berg & Verona Leendertz, Faculty of Economic and Management Sciences, North-West University, South Africa

Talking with technology: Using vlogs as assessment tool to improve sport students’ communication skills and content learning ................................................................. 143
Liandi Van den Berg, Faculty of Economic and Management Sciences, North-West University, South Africa; Koos De Villiers, Faculty of Humanities, North-West University, South Africa

Inferences Drawn from TIMSS 2019 Data Relevant to Computers in the Classroom .......................................................................................................................... 160
Ali Baykal, Bahcesehir University, Turkey

Rock Your Rubric: Calibration, Collaboration and Conversation ........................................ 166
Ellen Derwin, University of Massachusetts Global, United States

Strategies for the Design and Implementation of Authentic Assessments in Online Courses ........................................................................................................................ 169
Miguel (Miko) Nino, University of North Carolina at Pembroke, United States; Alicia Johnson, Virginia Tech, United States

Pedagogical challenges and effective practices of Online Assessment during Covid-19 ........................................................................................................................................ 174
Tami Seifert, Kibbutzim College of Education, Israel

VALUE is everything! Step up to Incorporate Essential Learning Outcomes .............................................................................................................................. 182
Ellen Derwin, UMass Global, United States

Developing a Maturity Model to support innovation in Higher Education. The case of Challenge Based Learning. ............................................................... 183
Leonie Chapel, Koen DePryck & Adina Imanbayeva, University of Twente, Netherlands; Ilse Wambacq, Montclair State University, United States; Gianluca Ambrosi & Luuk Buunk, University of Twente, Netherlands

Blockchain, ESCO, and the (r)evolution of continuing vocational education in Europe .................................................................................................................... 190
Jana Riedel, Björn Adelberg & Jörg Neumann, Technische Universität Dresden, Germany
Improving Grade 9 Mathematics performance within schools: A South African perspective ................................................................. 201
Maria Madiope, University of the Free state, South Africa; Blessing Chakavarika, University of South Africa, South Africa; Thandeka Mosholi, University of Free state, South Africa

Being Safe on the Internet: Preventing Dangerous Virtual Communication in Czech Schools ............................................................................................................................... 209
Dominik Vorac, Faculty of Education, Palacky University in Olomouc, Czech Republic

An Introduction of Trans-Scientific SSH program in the Miyagi Prefecture Sendai Daiichi High School .......................................................................................................... 214
Yasumasa Yamaguchi & Taku Kawada, Graduate School of Information Sciences, Tohoku University, Japan

Examining Teachers’ Perceptions of TPACK in culturally diverse classroom. .......................................................................................................................... 218
Salma Ali, Texas A&M: College of Education, United States; Nathan Hawk, Texas A&M, United States

Perceptions of senior academics in Israeli teacher education colleges regarding the integration of digital games during the COVID-19 pandemic ................................... 222
Orit Avidov-Ungar, Achva Academic College & Open University of Israel, Israel; Merav Hayakac, Achva Academic College & Ben Gurion University, Israel

Digital Play with Citizen DJ: Innovating with Music in Early Childhood Education ................................................................................................. 228
Ilene Berson & Michael Berson, University of South Florida, United States

Relationship of Innovation Attitudes to STEM Dispositions and Career Interest ................................................................................................................. 232
Rhonda Christensen & Gerald Knezek, University of North Texas, United States

Exploring Instructional Technology Leader’s Roles While Working with K-12 Teachers ........................................................................................................... 242
Keirah Comstock, University of Rochester, United States

Online Learning and Ultra-Orthodox teacher education students – do they align? ......................................................................................................................... 247
Alona Forkosh Baruch, Levinsky College of Education, Israel; Rivka Gadot, Jerusalem College of Technology, Israel

Instructional Designers in the Post-Pandemic World: Roles, Responsibilities, and Trends for Change Leadership ................................................................. 255
Heather Herstine, CineCraft Productions, United States
Impact of Product-Based Professional Development on Teachers’ Use of Technology Equipment and Instructional Technology Skills ................................................................. 261
Maduakolam Ireh, Prairie View A&M University, United States

Creating Change by Role Modelling and Practice .......................................................... 267
Oddlaug Marie Lindgaard, Nord University, Norway

What Teachers Really Need for Technology Integration Professional Learning ................................................................. 274
Ying Ma & Stephen Pape, Johns Hopkins University, Singapore

Effective Teaching through Multidisciplinary Lessons Adopting 3D Print – Preliminary Study ........................................................................................................ 286
Kamil Malinka, Libuše Vodová, Martina Jancová, Lenka Sobková & Vladimír Schindler, Masaryk university, Czech Republic

Measuring Pre-Service Teacher Self-Efficacy: Improving Instruction with Technology ........................................................................................................ 292
Alex Matthews, University of North Texas, United States

Measuring Pre-Service Teacher Self-Efficacy: Modeling and Facilitating Learning with Technology .................................................................................................... 298
Alex Matthews & Gerald Knezek, University of North Texas, United States

How Technology Supports Student-centered Learning ................................................ 304
Nelumdní Samaranayake, UNT, United States

What is the Actual Role of Technology in Education? .................................................. 310
Peter Serdyukov, National University, United States

Models of Technology Integration during Teacher Training ........................................ 317
Brooke Urbina & Aubrey Statti, The Chicago School of Professional Psychology, United States

Artificial Intelligence (AI) in Teacher Education: Technology Binds or Blinds? ................................................................. 323
Melda Yildiz, NYIT, United States; Jessica Varghese, New York Institute of Technology, United States

Emergence of the Readings Think Tank Online Discussion: Formative Design Research ........................................................................................................ 329
Joanne Beriswill, Mississippi State University, United States
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counting Courses: Assessing Postsecondary Video Game Programs in the United States and Canada</td>
<td>341</td>
</tr>
<tr>
<td>Anna Borynec, Concordia University of Edmonton, Canada; Kenzie Gordon, University of Alberta, Canada; Evgeny Kuznetsov, University of British Columbia, Canada; Antony Owino, Government of Alberta, Canada; Sean Gouglas, University of Alberta, Canada</td>
<td></td>
</tr>
<tr>
<td>Educational Technology Online Program Assessment for Accreditation: Integrating LMS Mastery Learning Gradebook to assess Program and Course Learning Outcomes</td>
<td>348</td>
</tr>
<tr>
<td>Benjamin Emihovich &amp; Manisha Javeri, California State University, Los Angeles, United States</td>
<td></td>
</tr>
<tr>
<td>Text Mining Analyses of Programming Education Papers Before vs. After 2006</td>
<td>354</td>
</tr>
<tr>
<td>Takahisa Furuta, Gunma University, Japan; Gerald Knezek, University of North Texas, United States</td>
<td></td>
</tr>
<tr>
<td>Learning analytics in teaching and learning processes in multiple contexts</td>
<td>359</td>
</tr>
<tr>
<td>Laura Hirsto, Erkko Sointu, Teemu Valtonen, Matti Turtiainen &amp; Sanna Väisänen, University of Eastern Finland, Finland</td>
<td></td>
</tr>
<tr>
<td>Learning Analytics Pedagogy - Possibilities and Challenges</td>
<td>362</td>
</tr>
<tr>
<td>Teemu Valtonen, Laura Hirsto, Erkko Sointu &amp; Sanna Väisänen, University of Eastern Finland, Finland</td>
<td></td>
</tr>
<tr>
<td>Can Seat Location Data Be Useful for the Prediction of Learners’ Learning Attitude and Performance?</td>
<td>367</td>
</tr>
<tr>
<td>Masanori Yamada, Kyushu University/University of Michigan, Japan; Hironori Egi, University of Electro-Communications, Japan; Yoshiko Goda, Kumamoto University/University of Michigan, Japan</td>
<td></td>
</tr>
<tr>
<td>An Essay on the Relationship between the Characteristics of Aggregated Learning Physiological Data and the Growth of Learning Communities</td>
<td>375</td>
</tr>
<tr>
<td>Koichi Yasutake, Graduate School of Humanities and Social Sciences, Hiroshima University, Japan; Yasukuki Nakamura, Graduate School of Informatics, Nagoya University, Japan; Takahiro Tagawa, Research Institute for Information Technology, Kyushu University, Japan; Momoko Kitao &amp; Yoshiko Tasaka, Faculty of Economics, Hiroshima University, Japan</td>
<td></td>
</tr>
<tr>
<td>An Augmented Reality-Based Learning Experience for Teacher Candidates</td>
<td>381</td>
</tr>
<tr>
<td>Md Alam &amp; Benjamin Gleason, Iowa State University, United States</td>
<td></td>
</tr>
<tr>
<td>Mixed Reality in Education, for any School Subject</td>
<td>388</td>
</tr>
<tr>
<td>Stefano Bauro, Cinzia Campanella &amp; Lorena Corinaldesi, VODAFONE Italy, Italy; Nicoletta Di Blas, Politecnico di Milano (Italy), Italy; Maria Teresa Faga &amp; Cristina Franch Arnau, VODAFONE Italy, Italy; Giuditta Pinotti &amp; Matteo Valoriani, Fifthingenium, Italy</td>
<td></td>
</tr>
</tbody>
</table>
Developing an AR language learning system: Comparing the effects of modality on reading comprehension, vocabulary acquisition and motivation .......................... 393
Tsuzuki Nagai, Tokyo Denki University, Japan; James York, Meiji University, Japan; Frederick Poole, Michigan State University, Japan; Hiroshi Nakayama, Tokyo Denki University, Japan

Integrating WebXR into Teaching and Learning: Technology Affordances, Instructional Benefits, and Design Frameworks .......................................................... 401
Jennifer Qian, Louisiana State University, United States

Contextualizing Reflection in Experiential Learning Through an Embedded Reflection Series .................................................................................................................. 405
Samantha Groh, University of Cincinnati, United States

Dr. Thomas Hohstadt: Remembering a Colleague, Mentor, and Friend .................... 411
Dan Keast, The University of Texas Permian Basin, United States

Talk the Talk: Enhancing the Educational Chatbot Experience by Conversational Design ..................................................................................................................... 418
K M Asif Shahriar & Peter Weber, South Westphalia University of Applied Sciences, Germany

Storytelling—Authenticity in Learning During COVID-19 Pandemic ........................ 428
Fang Wang, University of Findlay, United States; Lan Li, Bowling Green State University, United States

Integrating Contextualized Learning within Online Teaching: Tensions Among Task Design, Students Performance, and Perspectives .................................................. 433
Wen Wen & Jill Castek, University of Arizona, United States

Museum-based Language Learning with Location-aware Services .......................... 443
Shiou-Wen Yeh & Yi-Shan Liu, Graduate Institute of TESOL, National Yang Ming Chiao Tung University, Taiwan

Design of an Instructional Material on SDGs for PBL in Mathematics .................... 447
Toshiki Matsuda, Tokyo Institute of Technology, Japan

Applying Agile Learning on Computer Science Laboratory: A Case Study ............... 455
Maria Francesca Roig-Maimó & Ramon Mas-Sansó, University of Balearic Islands, Spain

Future Educators’ Attitudes about Scratch and Makey Makey: Analysis with the Technology Acceptance Model .............................................................. 465
Junko Yamamoto, Slippery Rock University of Pennsylvania, United States

Building Online Learning Communities: Using an Online Module to Enhance Student Experience ............................................................................................................ 472
Jo Axe, Elizabeth Childs & Hannah Dahlquist-Axe, Royal Roads University, Canada
How Activities Related to Maker Education Contribute to Overcome Entry Barriers for Girls into Formal Technical Education Pathways – Case Study of Holiday Camps at a Technical Secondary Vocational School in Austria ................................................................. 478
Nanna Nora Sagbauer, Michael Pollak & Martin Ebner, TU Graz, Austria

“A Whole-School STEM Intensives” Curriculum Solution for Elementary-Aged Learners in Charter Schools in New York City .............................................................................. 485
Shilpa Sahay & Maaike Bouwmeester, New York University, United States; Kiera Nieuwejaar, Columbia University, United States

Creating A Sustainable Online Teaching Certification Program via a Community of Practice ............................................................................................................................... 491
Terry Locklear & Gene Deese, The University of North Carolina at Pembroke, United States

A Comparative Study of Students’ Mathematics Knowledge in the Foundation Phase Programme ................................................................................................................................. 493
Simon Adjei Tachie, North-West University, South Africa

Intertwined Narratives of Design and Development: Conceptualizing an Online Course through Instructional Designer-Faculty Partnership and Storytelling ......................... 504
Madalina Tincu, Johns Hopkins University, United States

KidCitizen: A Digital Interactive to Develop Historical Inquiry with Young Learners ............................................................................................................................................................................. 506
Ilene Berson & Michael Berson, University of South Florida, United States; Bert Snow, Snow & Co, United States

Game-based Learning: An Interdisciplinary Approach to Language and Technology .............................................................................................................................................. 508
Tamrah Cunningham, Reneta Lansiquot, Micheal Lewis, Kimberly Ramgopal & Cindy Veliz, CUNY New York City College of Technology, United States

The Effect of a Virtual Escape Room Final Exam for a Face-to-Face Low Brass Pedagogy Course ................................................................................................................................. 517
Dan Keast, The University of Texas Permian Basin, United States

Long Term Retention: A Case Study of a Serious Game ......................................................................................................................................................................................... 525
Andreea Molnar, Swinburne University of Technology, Australia

Participatory Gamification Design: Navigating Diverse Perspectives ............................................. 534
Larysa Nadolny, Qapital, United States; Lauren Malone, Trinity University, United States; Jared Chapman, Utah Valley University, United States; Md Alam, Iowa State University, United States
Systematic Explanation of Mathematical Ways of Viewing and Thinking of Develop Gaming Instructional Materials based on the New Backward Design Method ................................................................. 541
Kentaro Nagahara, Tokyo Institute of Technology, Japan

Development of Gaming Materials for Metacognitive Knowledge Retention in Interpersonal Problem Solving and Evaluation of Learning Effectiveness .............. 547
Yoshiko Okada, College of Engineering, Teacher Certification Program, Shibaura Institute of Technology, Japan; Toshiki Matsuda, Institute for Liberal Arts, Tokyo Institute of Technology, Japan

Towards a Theoretical Serious Game Design Framework for Accountancy Education .................................................................................................................. 557
Veruschka Pelser-Carstens & Verona Leendertz, North West University, South Africa, South Africa

Designing, Co-Creating, and Leading the Play of Environmental (In)Justice Games .................................................................................................................. 577
Nancy Sardone, Georgian Court University, United States

Integrating History of Computing into a Software Engineering Course Using a Retro Game Development Laboratory .......................................................... 587
Paul A Walcott, The University of the West Indies, Cave Hill Campus, Barbados

Perceptions of Fourth grade students on technology enabled self-directed learning and collaborative learning activities in English writing lessons in Singapore .................. 593
Doris Choy, National Institute of Education, Nanyang Technological University, Singapore; Yin Ling Cheung, National Institute of Education, Singapore

‘Does Blended Learning Support Self-Regulated Learning?’: A Literature Review .................................................................................................................. 597
Tsoi Kern Choy & Choon Lang Quek, Nanyang Technological University (NTU Singapore), Singapore

A Longitudinal Study on Learner-centered Courses in Graduate Research .......... 601
Kathleen Klinger, National University, United States

Instructional Visual Communication: Bullet Points (alone) Are Not Learner-Centered ........................................................................................................ 610
Cecily McKeown, Hudson County Community College, United States; Lucy Appert, New York University, United States

No One-Size-Fits-All in Online Learning ................................................................ 616
Maryam Mullenix, Julia Lehman & Genava Deckert, Outlier.org, United States
Self-regulated learning: The review of the Motivated Strategies for Learning Questionnaire (MSLQ) instrument and its reliability in the Hungarian version ......................................................................................................................................................... 620
Sounantha Phavadee, PPK, ELTE University, Budapest, Hungary, Hungary

BlackBoard Learn Supporting Building Community within a Grant-Funded Project ........................................................................................................................................................................... 629
Mary Parker, University of Houston-Downtown, United States

Building Online Learning Communities for Teacher Support in a Cross-Classroom Collaborative Project-Based Learning Environment .................................................................................................................. 637
Paul A Walcott & Gail Rolle-Greenidge, The University of the West Indies, Cave Hill Campus, Barbados

Identification of Feature Values and Proposal of an Evaluation Model for Assessing Skillfulness of Illustrations Composed of Geometric Figures .......................................................................................................................... 643
Ayane Sasaki, Yoshinari Takegawa, Asuka Terai & Keiji Hirata, Future University Hakodate, Japan

An Examination of out-of-School Programming Experiences of Elementary School Children and their Parents’ and Parental Support .................................................................................................................. 651
YuKiko Maruyama, Tokai University, Japan

Learning by Ear: Cases of Informal Adult Learning with Podcasting ........................................... 657
Christopher Shamburg, New Jersey City University Educational Technology Department, Ed.D. in Ed Tech Leadership, United States; Veronica O’Neill, Remberto Jimenez, Juan Rodriguez & Kristina Harb, New Jersey City University, United States

Learning Taboo Topics Online: Witchcraft on YouTube ................................................................. 662
Christopher Shamburg, New Jersey City University, United States

The Art of 'Landguaging' in the City: Teacher Reflection for Inclusive Linguistic Futures ........................................................................................................................................................................... 671
Rhonda Chung & Walcir Cardoso, Concordia University, Canada

Gather STEAM- fostering environmental awareness using participatory media and arts .................................................................................................................................................................................. 677
Lisa Gjedde, Aalborg University, Dept for Culture and Learning, Denmark

“Hey Professor, A Little Help Here!”: Leveraging Technology-Mediated Communication to Improve Student Help Seeking Beyond the Pandemic ............................................................................................................. 682
Derek Schwartz, Augsburg University, United States; Kris Isaacson, University of Wisconsin-Stout, United States
Guest Speakers in Asynchronous Online Courses: Using a Video Discussion Board to Build Connections ................................................................. 688
Carla Vecchiola, University of Michigan-Dearborn, United States

Design, development and evaluation of an intervention in terms of teaching/learning practices of Curricular Units of Differential and Integral Calculus in engineering degrees ................................................................. 691
Emília Bigotte, Coimbra Engineering Institute /Coimbra Polytechnic Institute, Portugal; Araceli Queiruga-Dios & María José Cáceres, University of Salamanca, Salamanca, Spain

Investigation and perspectives about the promoting creativity to children with ASD in a Multisensory environment Magic Room. Generative game “Explora!”................................. 696
Sofya Komarova, I. Politecnico di Milano, Italy; Mattia Gianotti, Alessandro Atanassov, Guido Bordonaro, Clément Rousseau, Martin Goldschmidt, Giacomo Castini & Franca Garzotto, Politecnico di Milano, Italy

Can Children Achieve Literacy Gains During the Summer? .............................................. 711
Haya Shamir, Carolyn Ortiz-Wood, David Pocklington & Erik Yoder, Waterford Institute, United States

Replicating a Mixed methods examination of behavior change from learning supports based on a model of helping in equity focused simulation based teacher education ................................................................................................. 719
G.R. Marvez, Christopher Buttimer, Joshua Littenberg-Tobias, Garron Hillaire & Justin Reich, Massachusetts Institute of Technology, United States

Using Reflection and Feedback in a Simulated Teaching Environment to Improve Instruction for Differentiated Learners ................................................................. 726
Rhonda Christensen & Gerald Knezek, University of North Texas, United States; Jenna Kelley, Institute for the Integration of Technology into Teaching and Learning, United States

Changes in Knowledge Structures Among Middle School Students Participating in Technology Infused Space Science Engagement Activities .............................................. 731
Anila Das, University of North Texas, United States; Ottavia Trevisan, University of Padova, Italy; Gerald Knezek & Rhonda Christensen, University of North Texas, United States

Integration of Interactive Applets into Teaching Radian Concept .............................................. 737
Mustafa Demir, University of Detroit Mercy, United States

Virtual Reality, 3D and 2D Learning: A Study in Visual, Interactive Technology in Medicine. ....................................................................................................................... 743
Paul Dye, University of Nebraska Medical Center, United States; Martonia Gaskill, University of Nebraska Kearney, United States
Use of Game Design Principles in the Development of a Competitive Role-Play Simulation Game ............................................................... 748
Karla Hamlen, Xiongyi Liu, Ye Zhu & Haodong Wang, Cleveland State University, United States

Trainee Attitude Towards Virtual Reality Simulation (VRS) to Acquire Microsurgical Skills in Ophthalmology ............................................................... 753
Cal Gin, Jorge Reyna & Santosh Khanal, The Australian and New Zealand College of Ophthalmologist (RANZCO), Australia; Rahul Chakrabarti, The University of Melbourne, Australia

Constructing Virtual Reality Simulations and Visualizations for Teaching .................. 759
Gerd Kortemeyer, ETH Zurich and Michigan State University, Switzerland

Literature Review – XR in Medical and Healthcare Education ........................................... 764
Nan Li & Tuulikki Keskitalo, Lapland University of Applied Sciences, Finland

Changing from blended learning to fully online learning: Does the change influence the learners’ experiences and perception of a 360 lecture? .................................................. 773
Gergely Rakoczi, TU Wien, Austria

Supporting Cultural Understanding of Indonesia Through Virtual Reality and Immersive Media .......................................................... 779
Paul Wallace, Appalachian State University, United States

Navigating a Seismic Shift in Expectations: Building Online Teaching Strategies from Educators’ Lived Experiences During COVID-19 ...................................................... 784
Ashley Babcock, Maggie Broderick & Amy Lyn, Northcentral University, United States

Barriers of Math Teachers Related to Online Teaching and Learning in the COVID Era ............................................................... 790
Amy Crawford & Erik Kormos, Ashland University, United States

Unconventional and Collaborative ways to use Google Slides as an Instructional Tool in your Class that aligns with new computer science and digital fluency standards .................................................. 796
Maria Esposito, Molloy College, United States

An Examination of Teachers’ Digital Practices during School Lockdowns ............... 813
Matthew Kearney, University of Technology Sydney (UTS), Australia; Kevin Burden, University of Hull, UK, United Kingdom; Paul Burke, University of Technology Sydney (UTS), Australia.
Implementation of a One to One Laptop Computing Initiative in Response to COVID 19: Implications for Historically Black Colleges and Universities (HBCUs) ........................................ 819
Terry Kidd, St. Augustine’s University, United States

E-learning during COVID-19: Social Sciences MA Programs vs Mathematics MS Program ........................................................................................................................................................................ 826
Kuiyuan Li, Erin Stone & Samantha Seals, University of West Florida, United States

Photo Finish: Concrete Visual Representations Increase Student Motivation ........................................................................................................................... 836
Catherine Lussier, Annie Ditta & Annika Speer, University of California, Riverside, United States

Implementing Existing Technologies to Teach Phonics in Japan during the COVID-19 Pandemic ............................................................................................................................ 843
Eri Ono, Hitoshi Susono, Maki Hagino & Kazuyoshi Enomoto, Mie University, Japan

Training Mental Health Peer Support Specialists to Provide Telehealth During and Beyond the COVID-19 Pandemic ............................................................. 847
Karen Richards, Rita Cronise, Athena Anderson & Amy Spagnolo, Rutgers, the State University of New Jersey, United States

Zoom Behaviors and Expectations: The Non-Obvious ............................................................................................................. 853
Judith Slapak-Barski, Halmos College of Arts & Sciences, Nova Southeastern University, Ft. Lauderdale, Florida, United States

Insight of supporting the learning of a challenging content for special education preservice teachers with learning analytics ............................................................................................................................ 861
Erkko Sointu, Laura Hirsto & Sannsa Väisänen, University of Eastern Finland, Finland; Christine Cutucache, University of Nebraska at Omaha, United States; Teemu Valtonen, University of Eastern Finland, United States

Putting your educational institution in the best possible position for the future .................................................................................................................................. 870
John Sumpter, Jisc, United Kingdom

Towards a new normalcy: Faculty responses to distance education in Italy and the USA ..................................................................................................................................... 872
Ottavia Trevisan & Marina De Rossi, University of Padova, Italy; Rhonda Christensen & Gerald Knezek, University of North Texas, United States

Learning about Vaccines in Middle School Using Socioscientific Problem Based Learning Modules ............................................................................................................. 879
Debra Tyrrell & Manetta Calinger, Wheeling University, United States
Let No Crisis Go to Waste: Preparing Faculty for the Future ........................................ 890
Meg Van Baalen-Wood, Oksana Wasilik & Christine Boggs, University of Wyoming, United States

Designing a Virtual High School Mathematics Tutoring Program for Students with Learning Disabilities ................................................................. 897
Janet Zydney & Casey Hord, University of Cincinnati, United States

Building Your Own Online Faculty Dossier for Annual Reviews and Tenure & Promotion with The Use of a New Online CV Folder System ........................................ 901
Zafer Unal, University of South Florida, United States

Mining Formulaic Sequences from a Spoken Japanese Based on Consolidated Contextualized N-gram Analyses and Its Verification with Key Phrases in Japanese Language Textbooks ............................................................... 909
Hajime Mochizuki & Kohji Shibano, Tokyo University of Foreign Studies, Japan

Relationship Between Learning Time in an Online Course and Learning Behavior and Outcomes ........................................................................................................... 917
Yoshiko Goda, Kumamoto University, Japan, University of Michigan,, United States; Caitlin Hayward, University of Michigan, United States

Using Open Educational Resources ........................................................................ 926
Eunice Luyegu, Nova Southeastern University, United States

Increasing Motivation for Learning through Non-disposable Assignment: A Student Perspective ........................................................................................................... 929
Feng-Ru Sheu, Kent State University, United States; Judy Grissett, Georgia Southwestern State University, United States

ARC: An Educational Project on Automated Reasoning in the Class ......................... 934
Isabela Dramnesc, West University of Timisoara, Romania; Tudor Jebelean, Johannes Kepler University, Austria; Erika Abraham, RWTH Aachen University, Germany; Gabor Kusper, Eszterhazy Catholic University of Eger, Hungary; Sorin Stratulat, University of Lorraine, France

Open Educational eXtended Reality: Why Now? ....................................................... 944
James Frazee, Maureen Guarcello & Sean Hauze, San Diego State University, United States; David Woodbury, North Carolina State University, United States

The Digital Divide: Identifying and Reducing the Gap ............................................. 954
Brittany Rivera, University of North Texas, Department of Learning Technologies, United States

Edutrekkning: Globalizing Eco-Travel Through Volunteer Humanitarian Projects ......................................................................................................................... 960
David L. Brooks, Rainbow Travel Network, Inc., United States
Using Social Design Notebook with Digital Platform in a Museum Setting
Mizuho Iinuma, Tokyo University of Technology, Japan

Indigenous Knowledge (IK) and Technological Pedagogical Content Knowledge (TPACK): Starting a Conversation
Cathy Adams, Sean Groten, Patricia Steinhauer & Michael Carbonaro, University of Alberta, Canada

Beyond Digital Citizenship…Let’s Teach our Students to be Digital Leaders
Kristi Hall, University of Cincinnati, Clermont College, United States

Social Media as a Digital Tool Changing the Game Plan of Women Entrepreneurs - Case on the usage of Facebook in the Beauty Salon Sector of Sri Lanka
Thilini De Silva, NSBM Green University, Sri Lanka, Stockholm University, Sweden, Sri Lanka; Henrik Hansson, Department of Computer and Systems Sciences, Stockholm University, Sweden, Sweden

Virtual Reality Headsets: Potential Side Effects & Risks to Persons with Cognitive Disabilities
Taliah Ales, University of North Texas, United States

Supporting Independent Navigation Of Disabled Students In University Campus Using Beacons And Ontology Map.
Dariusz Mikulowski, Artur Niewiadomski, Andrzej Salamonczyk, Marek Pilski, Piotr Switalski & Grzegorz Terlikowski, Siedlce University of Natural Sciences and Humanities, Faculty of Exact and Natural Sciences, Poland

Culturally-Relevant Computer Science: Teachers’ Perspectives and Practices
Daniel Hoffman & Peter Leong, University of Hawai‘i at M?noa, United States; Rochelle Pi’ilani Ka‘aaloa, University of Hawai‘i at M?noa, United States; Seungoh Paek, University of Hawai‘i at M?noa, United States

Participatory Learning: Educators Designing Media to Expand Global Perspectives
Veronica Oguilve, Wen Wen, Jill Castek & Christopher Sanderson, University of Arizona, United States; Zueyzan Pineda, Clawson Elementary, Douglas Unified School District, Arizona, US, United States

Game-based Virtual Learning Environments: Does Gender matter?
Ahmed Yousof, East Stroudsburg university, United States; Nahla Abousamra, Indiana University of Pennsylvania, United States

Learner Engagement Through Culturally Responsive Teaching in a Blended Delivery Format
William Dunn, Mike Carbonaro & Denyse Hayward, University of Alberta, Canada; Amin Mousavi, University of Saskatchewan, Canada
Impact of Lexia® PowerUp Literacy® Program on Sixth Grade Student Reading Achievement .................................................................................................................... 1043
Jenny Liu, Lexia Learning, United States; Paul Macaruso, Community College of Rhode Island, United States; Rajendra Chattergoon, Lexia Learning, United States

The ReDesign Canvas as a tool for the didactic-methodological redesign of courses and a case study ............................................................................................................. 1048
Sandra Schön, Clarissa Braun, Katharina Hohla, Annette Mütze & Martin Ebner, Graz University of Technology, Austria

Student Voices about Distance Education during the Pandemic ................................. 1056
Patricia Fidalgo, Emirates College for Advanced Education, United Arab Emirates; Joan Thormann, Lesley University, United States; Oleksandr Kulyk, Oles Honchar Dnipro National University, Ukraine; José Lencastre, University of Minho, Portugal; Maria Joao Figueiras, Zayed University, United Arab Emirates

A decade of first-semester students surveys concerning IT equipment and communication applications and effect of Covid-19 related experiences for first-year students in 2021. ............................................................................................................. 1060
Walther Nagler, Sandra Schön, Bettina Mair, Martin Ebner & Sarah Edelsbrunner, Graz University of Technology, Austria

A Practical Guide to Learning Design in Higher Education Disciplines ...................... 1068
Jorge Reyna, The Australian and New Zealand College of Ophthalmologist (RANZCO), Australia

Using personal storytelling to understand online learning contexts .......................... 1078
José Luis Rodríguez-Illera & Cristina Galván Fernández, Universitat de Barcelona, Spain

Improving Video-Based Learning Experiences and Retention Through Authentic Conversations: A Pilot Study with Interesting Results .................................................. 1082
Feng-Ru Sheu, Kent State University, United States

EvoliSync: An Educational Video-Annotation System for The Live Class ................. 1088
Giacomo Cassano & Nicoletta Di Blas, Dept. of Electronics, Information and Bioengineering, Politecnico di Milano, Italy

LEAP forward for success: An online bachelor’s degree tailored for adult learners ........................................................................................................................... 1096
Elizabeth Crawford & David Rausch, University of Tennessee at Chattanooga, United States

Project Management That Makes the Difference: Applying Agile to Online Learning ........................................................................................................................... 1102
Gene Deese, The University of North Carolina at Pembroke, United States; Terry Locklear, University of North Carolina at Pembroke, United States
Thrown Into the Fire: Using UTAUT and Dewey’s Theory of Experience to Interpret Corrections Education Faculty Involvement in Online Teaching during the Age of the COVID-19 Pandemic ................................................................. 1106
Terry Kidd, St. Augustine’s University, United States

Individual Learner Traits as Predictive Markers of Performance in a STEM-Based Interactive Multimedia Learning Environment .................................................... 1113
Amanda MacCormac, Rob Monahan & John Nietfeld, North Carolina State University, United States

Implementation of UX Design to Enhance Spontaneous and Continuous Study of a Mobile Application for Foreign Language Learning ........................................... 1119
Ryo Nakagawa, Yuichi Ohkawa & Xiumin Zhao, Tohoku University, Japan; Akiko Takahashi, National Institute of Technology, Sendai College, Japan; Tomoya Ohyama, Takashi Mitsuishi & Yoshinori Hayakawa, Tohoku University, Japan

Managing Stress in Online Dissertation Students: Faculty Perceptions of Lowering Students’ Affective Filter ................................................................. 1124
Ashley Babcock & Laurie Bedford, Northcentral University, United States

How Instructivist versus Constructivist Pedagogical Perspectives of Code Teachers Affect Visual Programming Artifacts of Students? .............................................. 1131
Ina Blau, Tamar Shamir-Inbal & Avital Kesler, The Open University of Israel, Israel

Teaching and Learning Online in Higher Education during COVID: Who did We Leave Out and Can We Do Better by Drawing on the Online Learning Literature? ................................................................. 1137
Eva Mary Bures, Bishop’s University, Canada

Leading by Design: A Practical Framework for Rigorous, Motivating Online Instruction ........................................................................................................ 1141
Audrey Heron, Angelo State University, United States

Eye-tracking Analysis of Visual Attention Allocation, Learning Comprehension, and Cognitive Control in Instructional Videos .................................................. 1149
Jisu Jang, Suhkyung Shin & Jisu Song, Department of Learning Science, College of Education, Hanyang University, Korea (South)

Designing Inclusive Online Learning Environments Through the Lenses of Feminist Technoscience and Postphenomenology: An Educational Design Research Approach .................................................................................. 1155
Jolie Kennedy, University of Minnesota, United States
Three Dons for Learning Experience Design: Perspectives from Ihde, Schon, and Norman .......................................................................................................................................................................................... 1159
Jolie Kennedy, University of Minnesota, United States

Inside Their Minds: Student Reactions to a Game-Based Learning Environment .................................................................................................................................................................. 1163
Amanda MacCormac, Robert Monahan & John Nietfeld, North Carolina State University, United States

Patterns of quiz attempts in a MOOC. The full-points-pattern and other patterns on the way to a successful MOOC in a lecture setting .......................................................................................................................... 1169
Bettina Mair, Sandra Schöen, Martin Ebner, Sarah Edelsbrunner & Philipp Leitner, Graz University of Technology, Austria; Angela Schlager, Private Pädagogische Hochschule Augustinum, Austria; Martin Teufel, Pädagogische Hochschule Steiermark, Austria; Stefan Thurner, Graz University of Technology, Austria

A Mixed-Method Study Examining Course Design and Quality of Instruction, Feedback, and Overall Student Satisfaction of Online Learning during COVID-19 ..................... 1180
Anne Mutiga & Hayaa Alhazani, University of Nevada-Reno, United States

Designing effective virtual learning environment for Adult Learners .................. 1189
Huey Zher Ng, INCEIF University, Malaysia

Online Course Re-Design that Enhanced Course Completion .......................... 1198
Susan Oaks, SUNY Empire State College, United States

Successes and Challenges of Students in Online/Virtual Learning Classes .......................................................................................................................................................................................... 1203
Betsy Orr, University of Arkansas, United States

Taking the Studio Online: Designing a Studio-Based Instructional Design Course ........................................................................................................................................................................... 1209
Seungoh Paek & Patrick Agullana, University of Hawai‘i at M?noa, United States; Daniel Hoffman, University of Hawai‘i at M?noa, United States

Scripting Argumentative Text Analysis and Response Generation in ScALE .......................................................................................................................................................................................... 1213
Tsering Wangyal & Seng Chee Tan, National Institute of Education, Singapore, Singapore

Dynamics of visual attention during online lectures - evidence from webcam eye tracking ........................................................................................................................................................................... 1220
Katarzyna Wisiecka, SWPS University of Social Science and Humanities, Poland; Krzysztof Krejtz & Izabela Krejtz, SWPS University of Social Sciences and Humanities, Poland; Andrew Duchowski, Clemson University, United States
Is There a Dearth of Advanced and Innovative Technologies in the Teaching of Social Determinants of Health to Medical School Students?  

Keith Stringer, University of Cincinnati and Cincinnati Children's Hospital Medical Center, United States