

Editorial Board Members

Joaquim Filipe 

Polytechnic Institute of Setúbal, Setúbal, Portugal

Ashish Ghosh

Indian Statistical Institute, Kolkata, India

Raquel Oliveira Prates 

Federal University of Minas Gerais (UFMG), Belo Horizonte, Brazil

Lizhu Zhou

Tsinghua University, Beijing, China

More information about this series at <https://link.springer.com/bookseries/7899>

Lorna Uden · Dario Liberona (Eds.)

Learning Technology for Education Challenges

10th International Workshop, LTEC 2022
Hagen, Germany, July 11–14, 2022
Proceedings

Editors

Lorna Uden
Staffordshire University
Stoke-on-Trent, UK

Dario Liberona 
Seinäjoki University of Applied Science
Providencia, RM - Santiago, Chile

ISSN 1865-0929

ISSN 1865-0937 (electronic)

Communications in Computer and Information Science

ISBN 978-3-031-08889-6

ISBN 978-3-031-08890-2 (eBook)

<https://doi.org/10.1007/978-3-031-08890-2>

© The Editor(s) (if applicable) and The Author(s), under exclusive license
to Springer Nature Switzerland AG 2022

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors, and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

Welcome to the proceedings of the 10th International Workshop on Learning Technology for Education Challenges (LTEC 2022) held at the FernUniversität in Hagen, Germany, during July 11–14, 2022. The conference was preceded by a day of free tutorials for participants who wished to learn the state of the art of research relating to the topics of LTEC. Tutorials were held on July 11, with the conference itself commencing on July 12, 2022.

Today the education sector is going through an unprecedented period of change with the sudden shift away from the classroom in many parts of the world because of the COVID-19 pandemic. Due to this change, there has been a distinct rise in online learning. The effect of the pandemic on our teaching and research is far from uniform or wholly negative. No doubt there will be many new insights gained from the use of online learning, although the fundamentals regarding the use of technology for learning remain. The question is, how can we use technologies that push the boundaries of the learning experience, engage students more deeply, and produce learning outcomes that live up to the high expectations of society? In this conference, we wanted to focus not just on the impact of COVID-19 on education but on the pedagogical innovations that help us to advance education research. Such innovations include playful learning, learning through wonder, action learning, making thinking visible, and virtual studios, amongst others.

LTEC 2022 sought to examine how technologies and pedagogical advances can be used to change the way teachers teach and students learn while giving special emphasis to the pedagogically effective ways we can harness these new technologies in education. The aim was to provide a platform for research in the very broad area of educational technology that bridges theory, research, practice, and policy.

The proceedings consist of 20 papers covering various aspects of technologies for learning including:

- Serious games and virtual learning environments
- Learning practices and methodologies
- Learning technologies
- Learning technologies performance

The papers were selected following a X-blind review process, with a minimum of X reviews per paper. The authors of the accepted papers come from many different countries including Austria, China, Colombia, France, Germany, Greece, Indonesia, Italy, Malaysia, Mexico, Slovenia, Spain, Russia, and Taiwan.

We would like to thank our authors, reviewers, and Program Committee for their contributions and the FernUniversität in Hagen, Germany, for hosting the conference. Special thanks to the speakers and participants at the conference. Without their efforts,

there would be no conference or proceedings. Special thanks also to Birgit Feldmann for local support and coordination.

July 2022

Lorna Uden
Dario Liberona

Organization

General Conference Chair

Lorna Uden

Staffordshire University, UK

Program Chair

Dario Liberona

Seinajoki University of Applied Sciences, Finland

Local Program Chair

Birgit Feldmann

FernUniversität in Hagen, Germany

Program Committee

Angel Alberto Magrenan

Universidad de La Rioja, Spain

António Moreira

University of Aveiro, Portugal

Birgit Feldmann

FernUniversität in Hagen, Germany

D'Arcy Becker

University of Wisconsin, USA

Dario Liberona

Seinajoki University of Applied Sciences, Finland

Débora Barbosa

Feevale University, Brazil

Erick Kin Wai Lau

Hong Kong Metropolitan University, Hong Kong

Fernando Moreira

Universidade Portucalense, Portugal

Fotini Paraskeva

University of Piraeus, Greece

Gregory Ching

Fu Jen Catholic University, Taiwan

Hui Min Lai

National Taichung University of Science and
Technology, Taiwan

I. Hsien

National University of Kaohsiung, Taiwan

Jane Sinclair

University of Warwick, UK

Jeremiah Sullins

Harding University, USA

Lorna Uden

Staffordshire University, UK

Michael Vallance

Future University Hakodate, Japan

Viktorija Florjančič

University of Primorska, Koper, Slovenia

Contents

Serious Games and Virtual Learning Environments

Gamified Learning in Online Teaching Through Platforms: The Use of Quizizz	3
<i>Jesús I. Rivas-García and Marta Magadán-Díaz</i>	
Digital Workbook in Virtual Learning Environment	21
<i>Mertika, Dina Anika Marhayani, Dewi Mariana, Rini Setyowati, Emi Sulistri, and Andi Mursidi</i>	
The Assessment Pattern Catalog for a Distant Education: The Study of the Classroom Applicability	30
<i>Marjan Heričko, Tina Beranič, and Luka Pavlič</i>	

Learning Practices and Methologies

Testing the Instructional Design for Knowledge Nuggets Implementation	45
<i>Christian Ploder, Laura Gamper, Lisa Ehrhardt, and Christoph Hazy</i>	
Empowering E-course Effectiveness and Student's Motivation Through Inquiry Based Learning Aligned to ARCS Motivation Model in Moodle Workplace	55
<i>Styliani-Nikoleta Alikari, Foteini Paraskeva, and Hara Bouta</i>	
Assessing the Performance of Open Contracting in Colombia Through Data Mining	68
<i>Katherine Andrea Cuartas Castro, I-hsien Ting, and Giovanny Tarazona Bermúdez</i>	
Engineering for Sustainable Development: A Smart Pedagogical Framework for Developing IoT Projects Applied to Climate Action – Practices and Challenges	81
<i>Vasiliki Karampa and Foteini Paraskeva</i>	
Knowledge Management Model in Telework	98
<i>Víctor Hugo Medina García, Jennifer Paola Ochoa Pachón, and Kelly Alexandra Ramírez Guzman</i>	

Learning Technologies

The Importance of Tasks and the Use of Digital Technologies Affordances
in Mathematical Problem-Solving Approaches 113
Manuel Santos-Trigo, Isaid Reyes-Martínez, and Adrián Gómez-Arciga

Assessing Teachers’ Use of English E-Textbooks over Time:
A Technology-Mediated Learning Perspective 125
Hui-Min Lai, Pi-Jung Hsieh, Ren-Cheng Zhang, and Yu-Chin Tseng

A Review on the Training Effects and Learners’ Perceptions Towards
Asynchronous Computer-Mediated Peer Feedback for L2 Writing Revision 139
Keng-Chih Hsu and Yun Wang

Compensatory Skill: The Dyslexia’s Key to Functionally Integrate
Strategies and Technologies 153
Michele Della Ventura

Learning Mehtodologies and Pandemic Impact

Online Learning in Higher Education Institution During COVID-19:
A Review and the Way Forward 167
Fauziah Sulaiman, Lorna Uden, and Elnetthra Folly Eldy

Delivering an Online Course on ‘COVID-19 Vaccination Campaign:
Administration in Safety of the Anti SARS-COV 2/COVID-19 VACCINE’
for Nursing Students at Italian Universities 185
*Giovanni Galeoto, Anna Berardi, Francescaroberta Panuccio,
Alessandro Delli Poggi, Marco Tofani, and Donatella Valente*

The Lockdown Impact on Students’ Successfulness 192
Viktorija Florjančič

Learning Technologies Performance

Test of Competencies (TECO) in the Bachelor’s Degree Course in Psycho
and Neurodevelopmental Therapy at the “Sapienza” University of Rome:
Cross Sectional Study Internal Consistency and Discriminant Validity 207
*Giovanni Galeoto, Anna Berardi, Francesca Alatri,
Maria Teresa Giannini, Marco Tofani, and Donatella Valente*

Means Ends Analysis Learning Model on Students’ Problem-Solving
Ability and Creative Thinking Ability 216
*P. Nindy Citioresmi, Nurul Husna, Citra Utami, Mariyam,
Rika Wahyuni, and Andi Mursidi*

Development and Validation of a Progress Test in Occupational Therapy Degree Courses: A Cross-Sectional Study	227
<i>Francesca Roberta Panuccio, Giovanni Galeoto, Marco Tofani, Maria Auxiliadora Marquez, Luca Celli, and Anna Berardi</i>	
Shaping Learning Within the Digital Transformation the Hagen Manifesto on #NewLearning	236
<i>Annabell Bils and Ada Pellert</i>	
Matching Efficiency of Admission Procedures in Online-Education	243
<i>Sandra Grässle, Moritz Mosenhauer, and Maria Pammer</i>	
Author Index	257