

# Contents

## Virtual Worlds and Virtual Reality

Towards Online Immersive Collaborative Innovation Spaces . . . . .	3
<i>Oluwatimilehin Salako, Michael Gardner, and Vic Callaghan</i>	
Extended Field Trials of a Mixed-Reality Teaching Environment: Practical Issues Beyond the Technology. . . . .	14
<i>Warren Sheaffer and Michael Gardner</i>	
Impact of Non-verbal Communication on Collaboration in 3D Virtual Worlds: Case Study Research in Learning of Aircraft Maintenance Practices . . . . .	25
<i>Gustavo Silva, Leonel Morgado, and Armando Cruz</i>	
The Development of Transactive Memory Systems in Collaborative Educational Virtual Worlds . . . . .	35
<i>Louis Nisiotis, Styliani Kleanthous Loizou, Martin Beer, and Elizabeth Uruchurtu</i>	
Towards Observing and Assessing Collaborative Learning Activities in Immersive Environments . . . . .	47
<i>Samah Felemban, Michael Gardner, Victor Callaghan, and Anasol Pena-Rios</i>	
Development of Cross-Curricular Key Skills Using a 3D Immersive Learning Environment in Schools . . . . .	60
<i>Daisy Abbott, Stuart Jeffrey, Anastasia Gouseti, Kevin Burden, and Mhairi Maxwell</i>	
Investigating Social Presence and Communication with Embodied Avatars in Room-Scale Virtual Reality. . . . .	75
<i>Scott W. Greenwald, Zhangyuan Wang, Markus Funk, and Pattie Maes</i>	

## Augmented Reality, Wearable Technologies

Do You Know What Your Nonverbal Behavior Communicates? – Studying a Self-reflection Module for the Presentation Trainer . . . . .	93
<i>Jan Schneider, Dirk Börner, Peter van Rosmalen, and Marcus Specht</i>	
The Integration of Augmented Reality and the Concept of Sticker Album Collection for Informal Learning in Museums . . . . .	107
<i>António Coelho and Luís Miguel Costa</i>	

Immersive Indiana: Constructing an Augmented Reality in Columbus . . . . . 116  
*Kristin Barry and Carol Street*

Technology Acceptance of Augmented Reality and Wearable Technologies . . . 129  
*Fridolin Wild, Roland Klemke, Paul Lefrere, Mikhail Fominykh,  
and Timo Kuula*

Community Learning Analytics with Industry 4.0 and Wearable  
Sensor Data . . . . . 142  
*István Koren and Ralf Klamma*

**Customized Games, Off the Shelf Modifications**

MythHunter: Gamification in an Educational Location-Based  
Scavenger Hunt . . . . . 155  
*Armin Hutzler, Rudolf Wagner, Johanna Pirker, and Christian Gütl*

Efficient Software Assets for Fostering Learning in Applied Games . . . . . 170  
*Matthias Maurer, Alexander Nussbaumer, Christina Steiner,  
Wim van der Vegt, Rob Nadolski, Enkhbold Nyamsuren,  
and Dietrich Albert*

**Immersive Experiences for Children with Special Needs and Older Adults**

A Prototype Immersive, Multi-user 3D Virtual Learning Environment  
for Individuals with Autism to Learn Social and Life Skills:  
A Virtuoso DBR Update . . . . . 185  
*Matthew Schmidt, Dennis Beck, Noah Glaser, and Carla Schmidt*

DISCOVER-ing Beyond OpenSim; Immersive Learning for Carers  
of the Elderly in the VR/AR era. . . . . 189  
*Panagiotis E. Antoniou, Efstathios A. Sidiropoulos,  
and Panagiotis D. Bamidis*

Demystifying Ageing Bias Through Learning: Co-designing  
an Online Course About ‘Ageing Well’ . . . . . 201  
*Liliana Vale Costa and Ana Isabel Veloso*

**Immersive Education to Teach Specific Academic Content**

Learning Languages and Complex Subjects with Memory Palaces. . . . . 217  
*Aaron Ralby, Markos Mentzelopoulos, and Harriet Cook*

Learning Principles of Electricity Through Experiencing in Virtual Worlds. . . 229  
*Fabrcio Herpich, Tito Armando Rossi Filho, Leandro Rosniak Tibola,  
Valter Antonio Ferreira, and Liane Margarida Rockenbach Tarouco*

Immersive Learning as an Opportunity to Upgrade Learning Outcomes  
and Improving Skills in Political and Social Sciences . . . . . 243  
*João Carlos Relvão Caetano and Marc Jacquinet*

A Virtual Museum Installation for Time Travel. . . . . 255  
*Adeola Fabola, Sarah Kennedy, Alan Miller, Iain Oliver,  
John McCaffery, Catherine Cassidy, Jo Clemens, and Anna Vermehren*

**Author Index** . . . . . 271



<http://www.springer.com/978-3-319-60632-3>

Immersive Learning Research Network  
Third International Conference, iLRN 2017, Coimbra,  
Portugal, June 26–29, 2017. Proceedings  
Beck, D.; Allison, C.; Morgado, L.C.; Pirker, J.; Khosmood,  
F.; Richter, J.; Guetl, C. (Eds.)  
2017, XXV, 272 p. 95 illus., 86 illus. in color., Softcover  
ISBN: 978-3-319-60632-3