

# **2017 9th International Conference on Virtual Worlds and Games for Serious Applications (VS-Games 2017)**

**Athens, Greece  
6-8 September 2017**



**IEEE Catalog Number: CFP1738G-POD  
ISBN: 978-1-5386-1203-3**

**Copyright © 2017 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP1738G-POD
ISBN (Print-On-Demand):	978-1-5386-1203-3
ISBN (Online):	978-1-5090-5812-9
ISSN:	2474-0470

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: (845) 758-0400  
Fax: (845) 758-2633  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

## Table of Contents

<b>A Serious Game for Understanding Ancient Seafaring in the Mediterranean Sea .....</b>	<b>1</b>
<i>Oliver Philbin-Briscoe, Bart Simon, Sudhir Mudur, Charalambos Poullis, Selma Rizvic, Dusanka Boskovic, Fotis Liarokapis, Irene Katsouri, Stella Demesticha, and Dimitrios Skarlatos</i>	
<b>DRUMM: Dynamic Viewing of Large-scale 3D City Models on the Web.....</b>	<b>8</b>
<i>Timo Koskela, Matti Pouke, Arto Heikkinen, Toni Alatalo, Paula Alavesa, and Timo Ojala</i>	
<b>Developing Games for Non-Leisure Contexts Identification of Challenges and Research Gaps .....</b>	<b>15</b>
<i>Per Backlund, Henrik Engstrom, Bjorn Berg Marklund, and Marcus Toftedahl</i>	
<b>VRanimate - Non-Verbal Guidance and Learning in Virtual Reality .....</b>	<b>23</b>
<i>Tim Blome, Alexander Diefenbach, Stefan Rudolph, Kristina Bucher, and Sebastian von Mammen</i>	
<b>Telemetry-based Optimisation for User Training in Racing Simulators.....</b>	<b>31</b>
<i>Keith Bugeja, Sandro Spinay, and Francois Buhagiar</i>	
<b>Swarm Intelligence for Autonomous Cooperative Agents in Battles for Real-Time Strategy Games .....</b>	<b>39</b>
<i>Damon Daylamani-Zad, Letitia B. Graham, and Ioannis Th. Paraskevopoulos</i>	
<b>Learning the Cell Cycle with a Game: Virtual Experiments in Cell Biology .....</b>	<b>47</b>
<i>David Panzoli, Sylvain Cussat-Blanc, Jonathan Pascalie, Jean Disset, Marvyn O'Rourke, Laetitia Brichese, Valerie Lobjois, Elsa Bonnafe, Florence Geret, Catherine Pons Lelardeux, Bernard Ducommun, and Yves Duthen</i>	
<b>Learning Mechanical Engineering in a Virtual Workshop: A Preliminary Study on Utilisability, Utility and Acceptability .....</b>	<b>55</b>
<i>Nicolas Muller, David Panzoli, Michel Galaup, Pierre Lagarrigue, and Jean-Pierre Jessel</i>	
<b>Designing Educational Games: Key Elements and Methodological Approach.....</b>	<b>63</b>
<i>Rafael P. De Lope, Nuria Medina-Medina, Rosana Montes Soldado, Antonio Mora Garcia, and Francisco Luis Gutiérrez-Vela</i>	
<b>City Knights: Spatial Realism and Memorability of Virtual Game Scenes in Pervasive Gameplay.....</b>	<b>71</b>
<i>Paula Alavesa, Minna Pakanen, Alexander Voroshilov, Hannu Kukka, Alexander Samodelkin, Timo Ojala, and Matti Pouke</i>	
<b>Geogames in Education for Sustainable Development: Transferring a Simulation Game in Outdoor Settings.....</b>	<b>79</b>
<i>Joachim Schneider, Steffen Schaal, and Christoph Schlieder</i>	
<b>An Interactive E-book with an Educational Game for Children with Developmental Disorders: A Pilot User Study .....</b>	<b>87</b>
<i>Nirvana Pistoljevic and Vedad Hulusic</i>	
<b>Extraction of Key Postures from 3D Human Motion Data for Choreography Summarization.....</b>	<b>94</b>
<i>Ioannis Rallis, Ioannis Georgoulas, Nikolaos Doulamis, Athanasios Voulodimos, and Panagiotis Terzopoulos</i>	
<b>Design, Development, and Usability Evaluation of a System for Adding and Editing Social Media Banners in the Immersive Street-level 3D Virtual City.....</b>	<b>102</b>
<i>Mahmoud Badri, Minna Pakanen, Paula Alavesa, Hannu Kukka, and Timo Ojala</i>	
<b>Single Image Reconstruction of Human Faces Using Database of Depth Images.....</b>	<b>109</b>
<i>Zuzana Ferkova, Marek Zuzi, Petra Urbanova, and Petr Matula</i>	

<b>Investigating the Effect of User Profile during Training for BCI-based Games.....</b>	<b>117</b>
<i>Athanasios Vourvopoulos, Evangelos Niforatos, Michal Hlinka, Filip Skola, and Fotis Liarokapis</i>	
<b>Information Recall in a Mobile VR Disability Simulation .....</b>	<b>125</b>
<i>Tanvir Irfan Chowdhury, Raphael Costa, and John Quarles</i>	
<b>Effects of Multiple Displays on Video Game Difficulty .....</b>	<b>N/A</b>
<i>Zahen Malla Osman</i>	
<b>A Virtual Reality Simulation for Children: Build and Create from the Perspective of a Toy Figure .....</b>	<b>133</b>
<i>Juliane Axt, Mareike Schmiedecke, Kristina Bucher, Andreas Knotz, and Sebastian von Mammen</i>	
<b>A Model of Heritage Content in Serious and Commercial Games.....</b>	<b>137</b>
<i>Laurence Hanes and Robert Stone</i>	
<b>Gamifying Software Development Scrum Projects .....</b>	<b>141</b>
<i>Rita Marques, Goncalo Costa, Miguel Mira da Silva, and Pedro Goncalves</i>	
<b>Evaluation of a Virtual Gaming Environment Designed to Access Emotional Reactions while Playing .....</b>	<b>145</b>
<i>Sarah-Christin Freytag and Carolin Wienrich</i>	
<b>A Curriculum for Developing Serious Games for Children with Autism: A Success Story .....</b>	<b>149</b>
<i>Vedad Hulusic and Nirvana Pistoljevic</i>	
<b>The Effect of Cognitive Load on Physiological Arousal in a Decision-Making Serious Game .....</b>	<b>153</b>
<i>Petar Jercic, Charlotte Sennersten, and Craig Lindley</i>	
<b>When Facial Expressions Dominate Emotion Perception in Groups of Virtual Characters .....</b>	<b>157</b>
<i>Robin Palmberg, Christopher Peters, and Adam Qureshi</i>	
<b>Improving the Visualisation of 3D Textured Models via Shadow Detection and Removal .....</b>	<b>161</b>
<i>Evangelos Maltezos, Anastasios Doulamis, and Charalabos Ioannidis</i>	
<b>Gamified 3D Orthopaedic Rehabilitation using Low Cost and Portable Inertial Sensors.....</b>	<b>165</b>
<i>Gregory Kontadakis, Dimitrios Chasiouras, Despoina Proimaki, and Katerina Mania</i>	
<b>Variance-based Shape Descriptors for Determining the Level of Expertise of Tennis Players.....</b>	<b>169</b>
<i>Georgios Tsatiris, Kostas Karpouzis, and Stefanos Kollias</i>	
<b>Adaptivity and Safety in Location-Based Games .....</b>	<b>173</b>
<i>Joao Jacob, Rui Nobrega, Antonio Coelho, and Rui Rodrigues</i>	
<b>Novel 3D Games for People With and Without Hearing Loss.....</b>	<b>175</b>
<i>Mirabelle D’Cruz, Harshada Patel, Madeline Hallewell, Davide Salanitri, Jeena Velzen, and Lorenzo Picinali</i>	
<b>Research on Method of Game Interaction Mode Conversion Based on Development Framework of Somatosensory Action Mapping.....</b>	<b>N/A</b>
<i>Yihang Zhang, Xinrong Cheng, Hong Chen, Qing Wang, and Qikai Gao</i>	
<b>Janitor Run: Studying the Effects of Realistic Mirror World like Game Scenes on Game Experience.....</b>	<b>179</b>
<i>Paula Alavesa, Olli Korhonen, Jussi Sepponen, Mikael Martinviita, Mohammed Abdrado, Minna Pakanen, Timo Koskela, and Matti Pouke</i>	
<b>Bug Bang: An Educational Game Based on Eye Movement Interaction.....</b>	<b>N/A</b>
<i>Shu Wang, Qing Wang, and Hong Chen</i>	

<b>Serious Games Adapted to Children with Profound Intellectual and Multiple Disabilities .....</b>	<b>183</b>
<i>Alexandre Abellard and Patrick Abellard</i>	
<b>Experimentation with the Human Body in Virtual Reality Space: Body, Bacteria, Life-cycle .....</b>	<b>185</b>
<i>Christina Oikonomou, Alain Lioret, Manthos Santorineos, and Stavroula Zoi</i>	
<b>Serious Games in Nursing Education: An Integrative Review .....</b>	<b>187</b>
<i>Apphia Jia Qi Tan, Cindy Ching Siang Lau, and Sok Ying Liaw</i>	
<b>The Value of Establishing a Community of Teachers for the Gamification of Prosocial Learning .....</b>	<b>189</b>
<i>Stefano Cobello, Elena Milli, Pilar Perez Berganza, and Nikos Zygouritsas</i>	
<b>Modelling Learning Experiences in Adaptive Multi-Agent Learning Environments .....</b>	<b>193</b>
<i>Dorothea Tsatsou, Nicholas Vretos, and Petros Daras</i>	
<b>Offline and Online Adaptation in Prosocial Games .....</b>	<b>201</b>
<i>Konstantinos C. Apostolakis, Kiriakos Stefanidis, Athanasios Psaltis, Kosmas Dimitropoulos, and Petros Daras</i>	
<b>An Adaptive Framework for the Creation of Body-Motion-Based Games .....</b>	<b>209</b>
<i>A. Grammatikopoulou, S. Laraba, O. Sahbenderoglu, K. Dimitropoulos, and N. Grammalidis</i>	
<b>Expressive Virtual Characters for Social Demonstration Games .....</b>	<b>217</b>
<i>Fangkai Yang, Chengjie Li, Robin Palmberg, Ewoud Van Der Heide, and Christopher Peters</i>	
<b>ProsocialLearn: A Digital Distribution Platform for Prosocial Games .....</b>	<b>N/A</b>
<i>Francesco D'Andria, Jose Miguel Garrido, Michael Boniface, Stefano Modafferi, Simon Crowle, Lee Middleton, Konstantinos C. Apostolakis, Kosmas Dimitropoulos, and Petros Daras</i>	
<b>The Gamification of Accessibility Design: A Proposed Framework .....</b>	<b>233</b>
<i>Fotios Spyridonis, Damon Daylamani-Zad, and Ioannis Th. Paraskevopoulos</i>	
<b>Serious Games as a means for Holistically Supporting Parkinson's Disease Patients: The i-PROGNOSIS Personalized Game Suite Framework.....</b>	<b>237</b>
<i>S. B. Dias, E. Konstantinidis, J. A. Diniz, P. Bamidis, V. Charisis, S. Hadjidimitriou, M. Stadtschnitzer, P. Fagerberg, I. Ioakeimidis, K. Dimitropoulos, N. Grammalidis, and L. J. Hadjileontiadis</i>	
<b>Integrating Fall-risk Assessments within a Simple Balance Exergame .....</b>	<b>245</b>
<i>T. J. Ellmers, W.R. Young, and I.T. Paraskevopoulos</i>	
<b>The Interplay between IoT and Serious Games towards Personalised Healthcare .....</b>	<b>249</b>
<i>E. I. Konstantinidis, A.S. Billis, I. Th. Paraskevopoulos, and P. D. Bamidis</i>	
<b>Guidelines for Interactive Digital Storytelling Presentations of Cultural Heritage .....</b>	<b>253</b>
<i>Selma Rizvic, Nermin Djapo, Fatmir Alispahic, Bojan Hadzihalilovic, Fahira Fejzic Cengic, Ahmed Imamovic, Vensada Okanovic, and Dusanka Boskovic</i>	
<b>Developing a Virtual Museum for the Stoa of Attalos.....</b>	<b>260</b>
<i>Margarita Skamantzari, Georgia Kontogianni, Andreas Georgopoulos, and Savvas Kazanis</i>	
<b>Storytelling Games with Art Collections: Generic Game-play Design and Preliminary Evaluation through Game Testing Sessions.....</b>	<b>264</b>
<i>Maria Vayanou and Yannis Ioannidis</i>	
<b>An Immersive Virtual Environment for Collaborative Geovisualization.....</b>	<b>272</b>
<i>Milan Dolezal, Jiri Chmelik, and Fotis Liarokapis</i>	
<b>Serious Gaze.....</b>	<b>276</b>
<i>Andrew T. Duchowski</i>	
<b>Towards Effective Serious Games.....</b>	<b>284</b>
<i>Olga De Troyer</i>	
<b>Author Index.....</b>	<b>291</b>