Interactive Learning Environments

Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/nile20

The disruptive power of virtual reality (VR) and serious games for education

Nian-Shing Chen a, Wu-Yuin Hwang b & Gwo-Dong Chen b

a National Sun Yat-sen University, Taiwan
b National Central University, Taiwan


To cite this article: Nian-Shing Chen, Wu-Yuin Hwang & Gwo-Dong Chen (2013): The disruptive power of virtual reality (VR) and serious games for education, Interactive Learning Environments, 21:2, 101-103

To link to this article: http://dx.doi.org/10.1080/10494820.2012.704249

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: http://www.tandfonline.com/page/terms-and-conditions

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae, and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand, or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.
EDITORIAL

The disruptive power of virtual reality (VR) and serious games for education

The recent advancement in augmented reality (AR), such as multi-touch technologies and wireless sensors gives a great potential for creating brand new interactive learning environments for learning. Augmented reality enhances learning and playfulness by employing sensors, computer graphics, and advanced interactive technologies, to create a joyful and meaningful AR environments. It offers learners flexible and tangible ways to interact with physical objects and manipulate computer artifacts just with fingers by using touch or autostereoscopic display systems. Therefore, AR can facilitate learners to solve problems by manipulating physical artifacts, interacting with peers, and exploring problems with useful information from the digital space. The availability of AR-based virtual environments is recognized as a key asset to investigate new interactive models of human-to-computer and human-to-human interactions for collaborative learning both in distance and in co-located environments. Therefore, AR has been recognized as a promising environment in work, learning, and entertainment. It will potentially integrate the physical world and the digital word into a joyful and highly interactive blended learning environment.

Serious games for education have become one of the major research topics in the field of technology-enhanced learning recently. Many researchers have been devoting their energies to study digital games with intelligent devices/toys to enhance learning from various aspects of pedagogical principles, learning activity designs and technological issues, etc. Technologically, digital games employ advanced computing, multimedia, and Internet technology, while intelligent devices utilize embedded chips and wireless sensors together with ubiquitous technologies. Pedagogically, the key point to make serious games for education successful is active participation and social interaction with other learners and sharing learning experiences together for facilitating peer learning. The big challenge they may begin to answer is how to sustain students’ motivation and how to engage students in educational games for effective learning outcomes. Therefore, intelligent devices/toys may offer a new angle for exploring all those design issues of educational games in education.

With new advancement in AR and educational game technology, its potential in education is just beginning to be explored. This special issue presents a range of studies to answer the challenges of using AR and serious games for education to enhance learning and playfulness.

This special issue comes after the successful organization of Edutainment 2011, the sixth International Conference on E-Learning and Games, which was held during 7–9 September 2011, Taipei, Taiwan. In this special issue, we have tried to include the best papers selected from Edutainment 2011 regarding educational serious games, robots, and AR/VR for education by taking into account the target audience of the journal, Interactive Learning Environments. There are nine papers to be published in this special issue and the summary of each paper is described as follows.
Educational games

Chung-Yuan Hsu and Chin-Chung Tsai found self-explanation in educational games led to improved performance in the paper “Examining the effects of combining self-explanation principles with an educational game on learning science concepts.”

In the paper “The importance and use of targeted content knowledge with scaffolding aid in educational simulation games,” written by Fu-Hsing Tsai, Charles Kinzer, Kuo-Hsun Hung, Cheng-Ling Alice Chen, and I-Ying Hsu, three types of scaffolding aids were provided to assist the acquisition of Targeted Content Knowledge in educational simulation games.

Multimedia factors in educational games are attractive and appealing to help language learning and how to use video games to facilitate foreign language learning with context support has become interesting. Hao-Jan Howard Chen and Ting-Yu Christine Yang proposed adventure video games in their paper “The impact of adventure video games on foreign language learning and the perceptions of learners,” to stimulate college freshman students’ motivation and interests to solve problems with English learning. Their findings were that participants perceived the adventure game helpful in improving their language skills and also enjoyed playing the game.

Robots, AR, and VR for education

Robots have potentials to help learning and teaching, particularly when students build or interact with robots with scenarios support in educational tasks. The paper “Framework for educational robotics: a multiphase approach to enhance user learning in a competitive arena,” written by Ngit Chan Lye, Kok Wai Wong, and Andrew Chiou, studied a multiphase framework to support a long-term Educational Robotics for students of different ages. The scenario for Educational Robotics is to have a contest in a competitive arena and enhance students learning.

I-Chun Hung, Kuo-Jen Chao, Ling Lee, and Nian-Shing Chen proposed one robot teaching assistant to enhance and sustain learning motivation and to help students’ English reading skills. They designed learning activities based on the motivation model, ARCS, and found that learners’ learning motivation, learning performance, and continuance intention were improved significantly.

The paper titled “Digital Learning Playground: supporting authentic learning experiences in the classroom,” written by Gwo-Dong Chen, Nurkhamid, Chin-Yeh Wang, Su-Hang Yang, Wei-Yuan Lu and Chih-Kai Chang, proposed one near-authentic context with robots as surrogates of students to accomplish real-life tasks for English learning. In their design, Kolb’s four-stage experiential learning cyclical model was adopted and the effect on teaching students English as a foreign language was also examined.

Shih-Ching Yeh, Wu-Yuin Hwang, Jin-Liang Wang, and Shi-Yi Zhan studied how to use haptic technology in VR to enhance collaboration with multiple representations in the paper “Study of co-located and distant collaboration with symbolic support via a haptics-enhanced virtual reality task.” It was found that multiple representations in haptics-enhanced VR systems had potentials to effectively help collaborative work with cohesive communication among team members.

In the paper “Walk-rally support system using two-dimensional codes and mobile phones,” by Tetsuya Miyagawa, Yoshio Yamagishi, and Shun Mizuno,
proposed one Walk-Rally system with mobile phones and two-dimensional code readers to support outdoor edutainment (education + entertainment).

For the paper “Designing the Internet of Things for learning environmentally responsible behavior,” the authors, Jun Hu, Bram van der Vlist, Gerrit Niezen, Willem Willemsen, Don Willems, and Loe Feijs, studied how to connect domestic objects in the physical world to the information world and coached the responsible behavior of students, or raised their awareness about environmental protection issues.

It is hoped that the publication of this special issue will stimulate more novel and imaginative research on applying VR, AR, and educational robots to developing serious educational games.

Acknowledgements
This study was supported by the National Science Council, Taiwan under contract numbers NSC 99-2511-S-110-004-MY3, NSC 101-2917-I-110-001, NSC 100-2511-S-110-001-MY3, NSC 100-2631-S-011-003.

Nian-Shing Chen
National Sun Yat-sen University, Taiwan
Email: nschen@mis.nsysu.edu.tw

Wu-Yuín Hwang and Gwo-Dong Chen
National Central University, Taiwan
Emails: wyhwang1206@gmail.com; gwodong@gmail.com