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Editorial: Virtual learning environments in educational institutions

Tien-Chi Huang[1]*, Maria Limniou[2] and Wen-Chi Vivian Wu[3]

[1]National Taichung University of Science and Technology, Taichung, Taiwan, [2]Department of Psychology, Faculty of Health and Life Sciences (HLS), University of Liverpool, Liverpool, North West England, United Kingdom, [3]Department of Foreign Languages and Literature, Asia University, Taichung, Taiwan

Editorial on the Research Topic
Virtual learning environments in educational institutions

Introduction

In recent years, the popularization of virtual reality (VR) technology has made VR increasingly influential within various teaching and research settings. On one hand, the visual and audio effects of virtual reality can help create an immersive and imaginative learning environment, sharpening the learner's attention and improving their affective and cognitive learning. Moreover, the tactile simulation and perceptual feedback systems in virtual reality make it possible for users to interact with virtual objects and actively participate in the learning process. This technology is especially beneficial for the practice of dangerous or urgent skill training that is not possible to perform in the real world. In addition, virtual reality can also provide effective learning when physical contact is not appropriate, as is the case during the current COVID-19 pandemic. Therefore, the application of virtual reality in education is indeed a good solution for technical curriculum design. This research topic welcomes researchers in various fields to share their research on virtual reality technology education models, virtual reality technology textbook construction, and the effects and outcomes of virtual reality technology education.

Innovative virtual learning environments in Educational Institutions

The five papers chosen for this research topic provide a range of perspectives and approaches, each suggesting potential implications for skill and motivation development, learning outcomes, and innovative technologies applicable in educational virtual environments. The main point of the first article by McMahan et al. is that using machine learning predictors such as average response time and dwell time from a Virtual Classroom Stroop Task makes it possible to create an adaptive virtual school environment that dynamically adjusts its difficulty level (e.g., level and number of distractors) to match the user's performance. The study found that the Support Vector Machines (SVM) classifier (86.7%) was the most robust classifier for identifying cognitive performance, followed by Naïve Bayes (81.7%) and

KNN (76.7%). The results from the classifiers suggest that average response time and dwell time can be used as predictors for adapting to social cues and distractors in the environment to construct the appropriate difficulty level for the user. Using virtual reality technology, modern education has been given the opportunity to experience a new medium which has allowed for a change in pedagogical practices, presenting further opportunities for experiential learning. This technology is particularly useful for practical courses such as Creative Design, which appeals to students due to its practical elements and helps students develop creative and cognitive abilities. Niu et al. introduced a teaching framework that combines classroom learning with VR technology and is based on Bloom's Taxonomy. This course was implemented in a local school, with questionnaires and interviews being used to collect feedback from the participants. The results showed that the interactive experience of VR better matched the students' perception of 3D conceptual design, and the teaching methods were well-received. It is suggested that immersive VR technology is a promising tool for developing practical courses such as product design and development. The research conducted by Suárez et al. aimed to compare the effectiveness of virtual human role-players as a leadership training tool within two computer-generated environments (VR and MR) to that of real human role-players in a real-world environment for the practice of leadership skills. The results of the study indicated that, while all three conditions showed an increase in performance from pre-to post-sessions, the VH-MR condition had the most significant influence on performance and task engagement. As such, the study concluded that VH role-players can be as effective as RH role-players for the practice of leadership skills, with VH-MR potentially being the most effective method. The research by Tunur et al. aimed to explore the potential of using Extended Reality-immersive lab activities in a kinesiology course to enhance students' motivation to learn. Through this study, they hope to provide more insights on the efficacy of immersive learning and determine the effectiveness of extended reality immersion. The research used an instrumental case study method to combine established physical motor control and biomechanical data collection techniques with virtual reality technology for the lab experience. Ultimately, this research seeks to contribute to the growing body of knowledge on the subject. Dobrowolski et al. conducted a study to assess the effectiveness of training a complex skill within an immersive virtual environment. They created a sensorimotor workstation task and trained participants to operate it with either a non-interactive (text/video) method or with a virtual equivalent of the workstation. The results revealed that virtual-reality trained participants achieved higher accuracy and fewer timeouts in the workstation task compared to those trained with non-interactive methods. Furthermore, both younger and older adults were able to benefit equally from virtual reality training, regardless of their cognitive deficits. The findings suggest that virtual reality technologies could have a wide range of practical applications in skill training.

Author contributions

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Conflict of interest

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