Learner Characteristics and Performance in a First-Person Online Desktop Virtual Environment

Lynna J. Ausburn, Oklahoma State University, USA

ABSTRACT

This study used a trait/treatment conceptual model with a single-treatment design to examine effects of gender, computer gaming experience, age, and visual skill on learners’ performance and perceptions in an online desktop virtual environment (DVE). Participants were 55 adult students in a sub-baccalaureate surgical technology program. The DVE presented two operating rooms (ORs) and their contents. The DVE was a “first-person” environment in which learners controlled their exploration and navigation and viewed the ORs from their own perspective as if seeing them in the physical world. Results indicated that gender, gaming experience, and age affected the learners’ spatial orientation, perceived confidence, and perceived task difficulty in the DVE, but visual skill did not. Correlations were also found among several of the learner variables. Recommendations are made for both practice and further research.

Keywords: Computer Gaming, Gender, Spatial Orientation, Trait/Treatment Interactions, Virtual Environments, Virtual Reality, Visual/Haptic Perceptual Styles

INTRODUCTION AND BACKGROUND

Virtual environments on personal computers are an important emerging technology for online learning. These desktop virtual environments presented on the Internet can take advantage of the advanced multimedia capabilities of the Web 2.0 to provide realistic replication and functional depiction of real-world spaces and objects. This fidelity characteristic is resulting in rapidly increasing use in a wide variety of industries for both product development and personnel training (Ausburn & Ausburn, 2008b; Ausburn, Ausburn, Cooper, Kroutter, & Sammons, 2007; Ausburn, Martens, Dotterer, & Calhoun, 2009). Given the characteristics of desktop virtual environments, it can be argued that they should be added to Tomei’s (2011) recent discussion of “technogogy” (i.e., teaching with technology) and list of top technologies for online instruction. Online desktop virtual environments appear to meet Tomei’s criteria that instruction should use technologies that students will actually be encountering and

DOI: 10.4018/ijopcd.2012040102
that technology integration often stems from replicating real-world situations. Internet-based virtual reality also appears to fit the category of technology-rich environments advocated by Gabriel, Wiebe, and MacDonald (2009) as meeting the learning needs of students who have grown up with technology and are fascinated by its many possibilities. In a time when students envision 21st-century learning that is socially-based, digitally-rich, and uncoupled from traditional classrooms and school structures, teachers need to discover technologies that go beyond presenting online courses through word processing and multimedia presentations (Project Tomorrow, 2010). Desktop virtual environments offer one way to make this leap.

Desktop virtual environments (DVEs) are complex high-fidelity graphical simulations of 3D spaces that users interact with and control in real time through a mouse and an on-screen interface (Ausburn & Ausburn, 2010; Ausburn, Martens, Dotterer, & Calhoun, 2009; MosHELL & Hughes, 2002). One way to present DVEs is as on-screen movies that users can “enter,” walk-through, and explore interactively. As they navigate the environment, users make personal choices about how and where to move and explore the imagery as if actually moving within a place in the physical world (Ausburn & Ausburn, 2008b; Ausburn, Ausburn, & Kroutter, 2010; Ausburn et al., 2009). They can also click on “hot spots” to jump to new locations or to access embedded text, video clips, and even other Internet links. These desktop virtual reality (DVR) movies are “first-person” environments that users view and experience through their own eyes and personal observer point of view as if exploring a space in the physical world. This is different from the “second person” viewpoint experienced through on-screen avatars that is typical of screen-based environments such as Second Life (Ausburn et al., 2009; Schroeder, 1997).

The defining attributes of all forms of virtual reality (VR) are learner control of the environment, real-time interactivity, and immersion. These core characteristics of VR separate it from other media and technology-based learning environments (Ausburn & Ausburn, 2008b; Inoue, 2007; Pan, Cheok, Yang, Zhu, & Shi, 2006). When virtual environments (VEs) are effectively designed and presented, the sense of immersion and engagement for learners can be quite powerful. Learners can feel they are actually in the middle of an environment that closely resembles reality and that what they are doing is actually real (Chen, Toh, & Wan, 2004; Inoue, 2007). The technical name for the sense learners have that they have actually been someplace after experiencing a VE, rather than just seeing it, is presence. When presence is achieved in a VE, there is an illusion for the learner of non-mediation, or a removal of the sense of a technology standing between user and experience (Ausburn & Ausburn, 2010; Di Blas & Poggi, 2007; Lombard & Ditton, 1997; Mikropoulos, 2006). Ausburn and Ausburn (2010) asserted that presence is, in essence, the “reality” in virtual reality.

Because they create high levels of learner immersion, engagement, and interaction through a graphical on-screen computer interface, desktop VEs are close media kin to computer gaming and its motivational properties (Badigue, Cavazza, Klinker, Mair, Sweeney, Thalmann, & Thalmann, 2002; Calvert, 2002; Isdale, Fencott, Heim, & Daly, 2002; Schroeder, 1996, 1997). Desktop virtual environments offer new potentials for online learning, collaboration, and knowledge sharing (Holton & Baldwin, 2003) and for successful transfer of training to the real world (Bollman & Friedrich, n. d.). Silva, Cardoso, Mendes, Takahashi, and Martins (2006) differentiated between offline and online VR and cautioned that online VEs are often less complex because of more limitations imposed on their multimedia aspects due to concern for the file sizes to be transmitted via the Internet. However, new bandwidth-efficient file formats such as Flash® make it possible for online VEs to preserve a level of learner immersion and presence that Edmonds (2007) asserted can “… take the Internet to the next level…..” (p. 1) and dramatically enhance the learning potential of screen-based VEs.

Copyright © 2012, IGI Global. Copying or distributing in print or electronic forms without written permission of IGI Global is prohibited.
Cases on Higher Education Spaces: Innovation, Collaboration, and Technology
www.igi-global.com/article/cases-higher-education-spaces/77902?camid=4v1a

Global Kitchen Project: Promoting Healthy Eating Habits and Developing 21st Century Skills among Children through a Flipped Classroom Model
Melda N. Yildiz, Altagracia Petela and Brianne Mahoney (2014). *Promoting Active Learning through the Flipped Classroom Model* (pp. 226-244).
www.igi-global.com/chapter/global-kitchen-project/94416?camid=4v1a