In-World Behaviors and Learning in a Virtual World

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ABSTRACT

Educational virtual worlds can give students opportunities that would not otherwise be possible in face-to-face settings. The SciEthics Interactive simulations allow learners to conduct scientific research and practice ethical decision-making within a virtual world. This study examined the in-world behaviors that identify students who perceive learning in virtual worlds as effective. Participants include 53 students in higher education coursework. This study indicated that there is a positive relationship between learning and a feeling of presence, specifically with avatar identification. Movement in-world that is explorative and open is also correlated to presence. These findings indicate if learning in virtual worlds is to be perceived as a worthwhile activity by students, then learners require support to develop identification with their avatar and to build a sense of immersion within the virtual world.

INTRODUCTION

Three-dimensional, virtual worlds can provide students with opportunities for exploration and learning that would not otherwise be possible in traditional classroom settings. They are computer-generated environments in which participants adopt an avatar, i.e. “a graphical representation of a user within the environment which is under his or her direct control” (Allbeck & Badler, 2002, p. 313) and employ this avatar as a point of reference by moving through a three-dimensional, navigable and persistent space (Bell, 2008).

Virtual worlds made their mark in the public realm, as indicated by their location on Gartner’s Hype Cycle for Emerging Technologies (2007). Gartner routinely evaluates technologies from an IT research perspective and virtual worlds were at the peak of the chart in 2007. At this time in the popular virtual world Second Life, students were able to experience a tsunami (National Oceanic and Atmospheric Organization, 2009), train as a paramedic (Conradi et al., 2009), learn how to stay healthy (Boulos, Hetherington, & Wheeler, 2007), and reenact characters within an ancient civilization (Bogdanovych, Rodriguez-Aguilar, Simoff, & Cohen, 2010).

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Subsequent reviews of research in the educational use of virtual environments indicated positive outcomes for student motivation, learning, and social behaviors (Hew & Cheung, 2010; Mikropoulos & Natsis, 2011). Studies in K-12 and higher education demonstrated significant learning gains for students participating in virtual activities (Sourin, Sourina, & Prasolova-Förlund, 2006; Tüzün, Yılmaz-Soylu, Karakuş, İnal, & Kızılkaş, 2009). Learners also valued the experience as an effective way to engage with content in educational contexts (Jarmon, Traphagan, Mayrath, & Trivedi, 2009; Wiecha, Heyden, Sternthal, & Merialdi, 2010). Innovative educators were designing and developing within immersive environments and finding success.

The 2012 Hype Cycle showed a different picture of virtual worlds with a move to the “trough of disillusionment” (Gartner, 2012; Wired, 2012). Second life was no longer a hub of educational activities, and users were dispersed to smaller and more local servers. Ten years after the development of Second Life, the education community moved away from the hype and towards specific uses and benefits (Yoon & George, 2013). Unfortunately, there is still little guidance on what defines an effective learning environment in virtual worlds, and which students benefit the most from these virtual worlds (Inman, Hartman, & Wright, 2010; Warburton, 2009). This study contributes to research literature through the identification of factors associated with student learning and presence in a virtual space, and by offering guidance to educators and developers in virtual environments.

**Presence and Learning**

One key element of a virtual world brings to the experience of learning online is the sense of presence within the virtual space. Presence is usually loosely and variously defined, and conflated with concepts such as immersion, social richness, and embodiment (Schuemie et al., 2001). Although there are several categories within the concept of presence, it is generally a sense of “being there” within a virtual world (Zahorik & Jenison, 1998). Presence is related to higher levels of performance, particularly cognitive performance (Biocca, 1999) as indicated by studies linking students’ perception of presence with the effectiveness of the learning experience and achievement measures (Childs and Kuksa, 2009; Picciano, 2002; Ragan, Sowndrarajan, Kopper, & Bowman, 2010).

A sense of identification with the avatar is an important factor in developing presence, since avatars also “provide access points in the creation of identity and social life. The bodies people use in these spaces provide a means to live digitally – to fully inhabit the world” (Taylor, 2002, p. 40). This affinity with an avatar develops through a series of stages identified by Warburton (2007). Each stage of development adds to greater degrees of immersion within the virtual world; passing from one stage to the next requiring either the acquisition of a particular skill set, or redefining one’s relationship with the virtual world. By comparing the degrees of presence students report while in a virtual world for a short period of time, as compared with those who have spent a longer period within the environment, it also appears that students experience a greater degree of presence with increased time spent (Childs, 2011). Thus, the longer the time spent in-world corresponds to a greater affinity with one’s avatar, and, hence, a greater experience of presence.

Further, allowing participants to customize their avatars also has a demonstrable effect on their sense of presence (Bailey, Wise and Bolis, 2007). Gonzalez, Younger and Lindgren (2011) found in their virtual world learning activities that students who were allowed to use the avatar they had customized themselves were more involved with the activities and had better recall than those who were assigned one of the default ones. Psychology research in the past 20 years provides clues to the development of presence in virtual environments. Studies determined six personality variables associated with presence, including empathy, imagination, immersive tendencies, dissociation tendencies, locus of control, and cognitive style (Wallach,
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