



The impact of multiuser virtual environments on student engagement



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ABSTRACT

The purpose of this pilot study was to test the hypothesis that web-based synchronous instruction utilizing Multi-user Virtual World Environments (MUVes) increases student engagement compared to traditional asynchronous learning methods. In a quasi-experimental two group posttest only study, a sample of Family Nurse Practitioner students ($n = 21$) received instruction using either a synchronous ($n = 10$) or asynchronous ($n = 11$) learning method. Engagement was measured using the Community of Inquiry survey. Results indicated that engagement scores were significantly higher for the synchronous learning platform (mean = 3.61, SD = 1.13) compared to the asynchronous learning platform (mean = 3.49, SD = 1.08, $t(1766) = -2.21$, $p < 0.05$). Increased student engagement with synchronous MUVE platforms have the potential to improve learning outcomes and offer nursing students a multitude of educational opportunities to practice new skills and behaviors in real life scenarios, all within the safety of a controlled environment.

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Background and review of literature

It has been more than a decade since the United States' National League for Nursing prioritized nursing education reform by encouraging the development and use of innovative teaching methods (National League for Nursing, 2003). One innovation increasingly utilized is online, internet-based education. The development of internet-based education platforms is providing more higher education opportunities for local, national and international learning communities over long distances. Development of the internet has facilitated globalization of distance education. The International Council for Open and Distance Education's strategic objectives for 2013–2016 includes supporting the development of new methodologies and technologies (International Council for Open and Distance Education, n.d.). Elfrink and Harding (2008) suggested that online global education has the potential to provide nurse educators with the ability to instruct diverse student cohorts who might learn from international content experts. Internet-based education has the potential to increase access to the training of future health care professionals in remote locations and reduce associated costs by greatly reducing or even

eliminating travel expenses. Massive Open Online Courses, also known as MOOCs, offer educational courses free of charge.

Internet-based distance learning can use asynchronous or synchronous methods. Asynchronous methods offer the learner static instructional content and provide tools for critical thinking by giving students the opportunity for reflective inquiry through posts and blogs to the instructor and classmates. With internet-based platforms such as Blackboard® (www.blackboard.com), students generally work at their own pace and convenience, and collaborate through group pages and Wiki's. Synchronous methods provide instructional content in real time. With platforms such as Elluminate® (www.illuminate.com) or Adobe Connect® (www.adobe.com), students can interact with the instructor and classmates and obtain immediate feedback, clarification, and remediation.

Using synchronous platforms has been demonstrated to increase student satisfaction and improve communication (Boubannais, 2010; Little et al., 2006). Using a qualitative design, Australian research Michael (2012) reported that both teachers and students expressed increased flexibility and reduced costs with the online experience. Although small in magnitude, Carini et al. (2006) found that synchronous learning platforms are advantageous for internet-based distance learning because higher levels of engagement are associated with better learning outcomes.

A new generation of synchronous internet-based learning technology is evolving that delivers virtual real-time instructional

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content in three dimensions. These platforms, called Multi-user Virtual World Environments (MUVES), adapted the technology of interactive recreational online virtual worlds such as Second Life[®] (www.secondlife.com) and The Neighborhood[™] (www.pearsonneighborhood.com) to provide a virtual environment where students and instructors can create avatars and interact synchronously in virtual classrooms in real time from any location with a computer and internet connection. The technology allows multimedia lectures, discussions, chat rooms, and voice contact during and outside of class time. Students can “leave” the classroom to collaborate and plan future presentations and projects in “breakout sessions,” and conduct peer mediated study sessions or hold office hours with faculty.

The lack of human interaction may be an obstacle to online learning. The perception of “presence” has been shown to be lower for students using a primarily asynchronous internet-based learning platform compared to live classroom instruction, thereby reducing student engagement (Sit et al., 2005). MUVES have the potential to increase student engagement by providing dynamic, interactional, and engaging student-centric learning environments that are conducive to constructivist learning, socialization, exploration, discovery, and creativity (Johnston et al., 2009). One study in Taiwan showed that MUVES enhance communication behaviors (Tang et al., 2012), and a study of nursing students suggested that, students perceived the virtual experience as a helpful activity (Schmidt and Stewart, 2010). MUVES could potentially complement existing experiential modalities and social learning systems and allow students to practice newly acquired skills and behaviors in real life scenarios within the physical safety of a virtual environment (Schmidt and Stewart, 2010). However, little is known about the extent to which MUVES can increase student engagement with internet-based learning.

Purpose

This pilot study tested the hypothesis that a synchronous internet-based learning platform utilizing a MUVE result in greater student engagement compared to a standard asynchronous internet-based learning platform, primarily through an increase in social presence.

Theoretical framework

This study was guided by the Community of Inquiry (CoI) theoretical framework. Although iterations of the conceptual elements of the CoI have evolved, the seminal CoI framework represents the process of creating a deep and meaningful learning experience through the development of the three interdependent elements of social, cognitive and teaching presence (Garrison et al., 2001). The framework outlines the dynamics of an online educational experience by defining, describing and measuring the elements that contribute to a collaborative and worthwhile educational experience (Shea et al., 2010). Social presence is the extent to which the individual perceives a trustworthy environment that allows for the development of creating community, inter-personal relationships, and the ability to express their individuality (Swan and Ice, 2010). Cognitive presence is the degree to which the learner is able to build and validate meaning by way of contemplation and communication (Garrison et al., 2001). The presence of teaching is the participant's perception of the instructor's contributions in the development, guidance and facilitation of cognitive and social processes that support valuable and meaningful learning outcomes (Swan et al., 2009).

Methods

Sample

This pilot study utilized a quasi-experimental two group post-test only design to examine the effectiveness of a MUVE internet-based learning platform on perceived student engagement compared to a familiar asynchronous platform. The study subjects were a convenience sample of Family Nurse Practitioner students ($n = 21$) at a small university near Washington DC. Participation was voluntary, and students were provided assurance that a decision not to participate in the study or leave the study at any time would not influence their classroom status or grade in the course. Written consent was obtained from participants, and the study received approval from the Institutional Review Board. Surveys were stored in a locked file cabinet accessible only to the researcher and stored for a minimum of three years.

Design

Commercially available internet-based platforms were used to provide the synchronous and asynchronous learning environments. The synchronous MUVE platform was Venuegen (www.venuegen.com) and the asynchronous learning platform was the learning management system Blackboard[®] (Blackboard, Inc., Washington, DC). Venuegen is a MUVE similar to Second Life[®] and The Neighborhood[™]. Participants create avatars and interact synchronously in different environments. Content can be uploaded and edited online to further support learning.

The study was performed during 3 different semester-long courses. For each 15 week course, one lesson was designated for the study. Students used their own computers although campus desktop computers were available. Internet access was provided on campus if students were not able to connect remotely. Subjects were randomly assigned to either the synchronous (Venuegen) ($n = 10$) or asynchronous (Blackboard) ($n = 11$) group. After both groups completed their lesson, each study subject anonymously completed a survey designed to measure perceived engagement. The same experimental paradigm (including random assignment to either the synchronous or asynchronous group) was repeated for the 2 subsequent semester-long courses.

Subjects had previous experience using the control platform. Few subjects initially had previous experience using the MUVE. All subjects received an orientation to the MUVE platform prior to the study and each time the intervention was implemented; subjects who participated in the study more than once (in different semester-long courses) had previous experience with the MUVE by virtue of their previous participation.

Instrumentation and analysis

Perceived presence was evaluated in both the synchronous and asynchronous groups after the classes were completed using the CoI survey (<http://communitiesofinquiry.com/methodology>). This self-report survey, composed of 34 questions answered on a Likert scale, measures engagement in teaching presence, social presence, and cognitive presence (Cronbach's $\alpha = 0.94, 0.91, 0.95$ respectively). The instrument has been demonstrated to be a valid, reliable, and efficient measure of the dimensions of teaching, social, and cognitive presence, thereby providing additional support for the validity of the CoI as a framework for constructing effective online learning environments. Further information on this instrument can be found on the CoI website www.communitiesofinquiry.com.

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