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ABSTRACT
This paper describes an implementation process of Second Life (SL) virtual reality as a pedagogical tool in an interior design foundations course. SL was found to advance learning, collaboration, engagement, and critical thinking among students who brought disparate levels of preparation. The case study presented represents a process evaluation approach, documenting and analyzing the development and implementation of the curriculum within an environment that was new to most stakeholders. Output measures reported include student evaluations of the course, peer evaluations of student products, and final grades. Important to successful incorporation of SL in interior design instruction is ensuring that the training students receive in SL align with the assignments they are expected to complete. Also important is the ongoing, cooperative support of university technical staff in providing the needed training and developing the virtual environment. Effective, informative hard-copy and on-line visual aids for students unfamiliar with SL or other virtual reality applications are also necessary. Alignment of SL activities and the course curriculum into a workable sequence was achieved by trial and error during two years of development. Since incorporating SL, the researchers have found that virtual reality enhances student engagement and outcomes.

Keywords: Interior Design, Pedagogy, Process Evaluation, Second Life, Technology, Virtual Reality

INTRODUCTION
This paper describes the application of virtual reality (VR) through Second Life (SL) as it was used for a freshman foundations course in interior design, one of the first core courses in the program. Process evaluation was used to determine outputs and impacts of SL as an educational environment, learning strategy, and means of formative and summative learning. A qualitative, multi-method approach was adopted using constructivist theory as a guiding framework. The specific aim of the research was to evaluate the process of creating a hybrid course in interior design, using both SL and traditional teaching strategies, to instruct
135 students over a period of three years (five semesters). Incorporating a virtual learning environment into an existing, traditional (bricks and mortar) classroom experience allowed for interactive evaluation and thus development of critical thinking and marketing skills. It was hypothesized that applications in SL advance student learning; that interior design skill sets are clearly demonstrated through use of the virtual environment; and that SL virtual reality is an effective adjunct in preparing students for the profession of interior design.

The foundations course described focuses on the elements and principles of design concepts required to develop environmentally safe and aesthetically pleasing interior spaces, and is the first in an eight-semester developmental sequence of required courses leading to a bachelor’s degree in interior design. The program in interior design is fully accredited by the Council for Interior Design Accreditation (CIDA), the National Kitchen and Bath Association (NKBA), and the National Association of Schools of Art and Design (NASAD).

In this course, students must demonstrate: 1) skills in rendering basic draft plans in multiple dimensions, 2) mastery in the interrelationships between form and function, and 3) precision in model building. These goals are fundamental to all beginning interior design courses. What sets this course apart is not content but the virtual environment in which the products (drawings, models, and peer-review) are developed and presented. SL distinctly empowers students to engage in ongoing, formative evaluation, freeing them of time/space constraints associated with traditional classroom attendance. Findings indicate that student attainment of course goals and objectives is strengthened by the use of SL, as a form of VR. Learning through use of VR is validated in the literature as following the tenets of constructivist theory.

Constructivist Theory and Learning in Virtual Reality

Constructivist theory supports the concept of active experiential learning, allowing the learner to connect existing knowledge to create new knowledge, and has outcomes to improve reasoning and problem solving (Huang, Rauch, & Liaw, 2010). VR offers features that enhance immersion, interaction, and imagination which “scaffold” learning in a constructivist framework. In addition, VR enhances social constructivism, increasing independence but also interaction among learners, and in this case study, supporting collaborative learning through the peer-review process (Huang, Rauch, & Liaw, 2010). Neely, Bowers, and Ragas (2009) found that instructors surveyed (in 15 nations) realized the “constructivist potential” for active learning through use of SL as an educational environment (p. 117). The use of VR helps to generate a learner-centered environment where the student has freedom of choice and creativity in design while also assuming greater responsibility in the learning interaction or co-construction of knowledge. Brill and Park (2008) suggest that thinking and behavioral patterns of college-age students are altered by digital technologies so that visual images are read in “parallel and linear means” just as books might have been read in prior generations (p. 71). This type of learning is consistent with the use of VR as a learning environment, where visualization is important to construction of new knowledge, and is an essential skill for the interior designer.

Methodology: Case Study Process Evaluation Analysis

The methodology used for this research was a case-study process analysis. Qualitative content analysis of peer-review statements and summative score calculation in a mixed-method tradition provided insights to the outcomes of integration of SL as a teaching and learning strategy. As it is important to provide an analytical review to curricular changes over time, process evaluation is an exploratory methodology of determining the consistency between the formal learning environment and the experiences of students achieving the desired outcomes (Heywood, 2006). This study applied that process to a single case where SL
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