Analysis of Graduate Education in Learning Experience Design Using Immersive Technologies Online

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Abstract. This Practitioner Stream oral presentation focuses on a case study analysis of user experience data generated during the implementation phase of an asynchronous, online immersive technology course designed to develop effective problem-solving skills in learning experience designers using human-centered design strategies and immersive technologies such as augmented reality. The presentation explores evidence for student learning developed from secondary data analysis that includes user experience narratives observed in online, video-based discussion forums. In industrial applications, immersive technologies such as augmented reality (AR), virtual reality (VR), and mixed reality (MR) already serve critical training needs in diverse fields such as commercial aviation, the military, and healthcare. While these industries are pushing the boundaries of what is possible in training and development, higher education could benefit from new or enhanced instructional approaches.

Keywords: Learning Experience Design, Augmented Reality, Virtual Reality, Immersive Technology, Learning Engineering.

1 Introduction

The theoretical basis for the redesigned course were first described by the author at iLRN 2023 [1], and the first run of the course has now been completed. This presentation proposal reviews the prior work and describes some of the analysis now underway. The course was taught 100% online over an eight-week period in fall semester 2023 with 8-students. The course relied on a situated, inquiry-based framework for student learning. An assistant professor with experience in online program conception and online teaching served as the chief designer of the course and worked with an external instructional designer employed by the university's online program management (OPM) company. As described by Cheslock [2], OPMs provide universities with numerous benefits, among which course development resources, technical support, marketing, and integration, in exchange for a percentage of tuition revenues. In the OPM model at this institution, the faculty served as the course designer and the course development was handled by the OPM. Over a period of nine months, the faculty member worked with the instructional designer to draw up design blueprints and develop the course. The development of the course was guided by the university's core values and its mission statement, which center on student agency and promote collaboration, diversity, inclusion, fairness, and freedom.

2 Principles of Learning Experience Design

All elements of the course were within the framework of higher education, though with a focus on the hands-on use of immersive technology tools as preparation for taking on the role as a designer of workplace training. For example, the course included several custom-created videos in which the chief executive officer of an immersive technology company discussed the applications of such technologies in various industries [3]. Recorded student

reflections posted to video-based discussion forums were encouraged to promote the students' understanding of immersive technologies [4, 5]. Preliminary qualitative analysis of the video-based discussion forums suggests a strong community of learners formed. The designer also applied the following principles to the design of student learning experiences developed for the course [6]:

1. Learning is promoted when learners are engaged in solving real-world problems.
2. Learning is promoted when existing knowledge is activated as a foundation for new knowledge.
3. Learning is promoted when new knowledge is demonstrated to the learner.
4. Learning is promoted when new knowledge is applied by the learner.
5. Learning is promoted when new knowledge is integrated into the learner's world.

As described by Garrison and Vaughan [7], high levels of social presence, teaching presence, and cognitive presence in hybrid learning environments are shown to improve learning outcomes. In view of this, efforts were made to enhance these elements.

3 Learning Technologies

One of the challenges for the course, worth two graduate credit hours, was to find the best way to implement hands-on technologies for students to use, through the creation of augmented, virtual, and immersive technologies. Students were given a choice of which immersive technologies they wanted to explore, and a list of widely available and free or inexpensive tools, for example Blippar and Google Cardboard.

While the course was 100% online, a large percentage of students at the university lived geographically close to the main campus; these students had access to two centers equipped with loaner immersive technologies, such as virtual headsets and 360 video cameras. In these environments, students were free to work on their own or collaborate with students in a Community of Inquiry [7].

To enhance online social presence, the design team included Voice Thread, an online video discussion platform, and these narratives are currently being transcribed and analyzed.

Student learning activities were inquiry-based and included, but were not limited to, online discussions, a design thinking workshop, a design challenge, and hands-on explorations of immersive technologies.

Video and film were used as teaching tools throughout the course to teach principles of instructional design [8] and design thinking [9] to develop prototypes.

In addition, an online design thinking model was created to teach students problems of practice [10] and to contextualize the use of the immersive technologies within a realistic higher education context.

The project was evaluated using a variety of data sources included a student survey of instruction, design and development notes, observations of student interactions and tool use on assignments, and user reports generated by the learning management system [11].

4 Conceptual Frameworks

Clark and Mayer's [12] textbook on e-Learning informed design decisions for each module of the 7.5-week course. The course designer sought to situate student learning as a cognitive process that must also be accompanied by social interaction, in which learners leverage a feedback loop to inform changes in their learning behaviors [13].

5 Commitment to Universal Design

As part of the Diversity and Inclusion Unit, students were also exposed to the concept of Universal Design [14].

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