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Pedagogical Approaches to Graduate Education in Learning Experience Design Using Immersive Technologies Online

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Abstract. This Practitioner Stream oral presentation chronicles the effort to develop a 100% online immersive technology course within a college of education at a Carnegie R1 Doctoral University in the Mid-Atlantic region of the United States. Immersive technologies hold great promise as technological tools to improve teaching and learning in higher education. 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, many well-financed, are pushing the boundaries of what is possible in training and development, the teaching and learning space could benefit from new or enhanced instructional approaches and opportunities in the field of higher education, which was significantly disrupted by the COVID-19 pandemic.

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

1 Introduction

The design of the course evolved from an existing face-to-face, two-credit hour elective format to a 100% online course with no prerequisites. 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 [1], 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 designers while their development was assigned to the OPM. Over a period of six months, faculty members 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 are within the framework of higher education, though with a focus on the hands-on use of immersive technology tools as a preparation for workplace learning, which is typically outside the education space. For example, the course includes several custom-created videos in which the chief executive officer of an immersive technology company discusses the applications of such technologies in various industries. These videos include embedded, interactive questions that students can answer during sessions designed to engage participants online; research supports the use of embedded video quiz features to promote student learning [2]. Similarly, recorded student reflections posted to video-based discussion forums are encouraged to promote the students' understanding of immersive technologies [3],[4]. The designer also applied these principles to the student learning experiences developed for the course [5]:

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.

Anecdotal student feedback in online instructional design graduate courses indicated that the asynchronous learning environment presented challenges for students, highlighting the need to support more robust social interactions to improve social presence. As described by Garrison and Vaughan [6], 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 majoring in a variety of disciplines from across the university, supported by a staff education technology specialist in a Community of Inquiry [6].

To enhance online social presence, the design team included Voice Thread, an online discussion platform with engaging multimedia tools. Use of the Kaltura video collaboration software was also planned to support immersive technology presentations.

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 [7] and design thinking [8] as human-centered approaches to innovation used by students to develop prototypes that attempt to solve instructional problems.

In addition, an online design thinking model was created to teach students problems of practice [9] and to contextualize the use of the immersive technologies within a realistic higher education context.

Evaluation is a student survey of instruction [10].

4 Conceptual Frameworks

Clark and Mayer's [11] textbook on e-Learning informed design decisions for each module of the 7.5-week course. The designer sought to define 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 [12].

5 Commitment to Universal Design

As part of the Diversity and Inclusion Unit, students were also exposed to the concept of Universal Design [13]. Universal design is a paradigm focused on the creation of learning environments that support and/or address the needs of all learners from the ground up. This includes accessibility.

References

1. Cheslock, J.J., Kinser, K., Zipf, S.T., and Ra, E. (2021). Examining the OPM: Form, function, and policy Implications, 10.35542/osf.io/py3sz, last accessed 2022/04/24.

2. Ogan, A., Aleven, V., and Jones, C. (2009). Advancing development of intercultural competence through supporting predictions in narrative video. *International Journal of Artificial Intelligence in Education, 19*(3), 267- 268
3. Chi, M.T., Bassok, M., Lewis, M.W., Reimann, P. and Glaser, R. (1989). Self-explanations: How students study and use examples in learning to solve problems. *Cognitive Science, 13*(2), 145-182.
4. Lang, J.M. (2016). *Small teaching: Everyday lessons from the science of learning*. San Francisco: Jossey-Bass
5. Richey, R.C., Klein, J.D., and Tracey, M.W. (2010). The instructional design knowledge base: Theory, research, and practice. New York: Routledge.
6. Garrison, D.R., and Vaughan, N.D. (2007). Blended learning in higher education: Framework, principles and guidelines.
7. Wilson, D., A. Raish, V. and Carr-Chellman, A.A. (2017). Film use to promote understanding in change and diffusion of innovation. Systems Practice and Action Research. Springer, vol. 30(3), 277-293.
8. Brown, T. (2008). Design thinking. Harvard business review, 86(6), 84.
9. Mintrop, R. (2016). *Design-based school improvement: A practical guide for education leaders.* Cambridge: Harvard Education Press.
10. Kirkpatrick Partners Homepage, https://www.kirkpatrickpartners.com/the-kirkpatrick-model/, last accessed 2022/04/24
11. Clark, R.C., and Mayer, R.E. (2011). e-*Learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning*. San Francisco: Pfeiffer.
12. Brown, J.S., Collins, A., and Duguid, P. (1989). *Situated cognition and the culture of learning. Educational researcher, 18*(1), 32-42.
13. CAST Homepage, https://www.cast.org/impact/universal-design-for-learning-udl, last accessed 2022/04/24.