Chapter 7
Creating a Virtual Reality Lab:
Using a Student-Centered Approach

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ABSTRACT

Use of virtual reality (VR) has increased in higher education in recent years and is projected to continue to increase. At the same time, there is a growing emphasis for institutions of higher education to re-envision learning spaces and teaching strategies that are student-centered rather than faculty centered. Use of VR, by faculty, requires a new pedagogy of teaching as well as a willingness to explore the use of an unknown technology in delivering curriculum. Having access to a technology lab that uses VR can be a welcomed support for faculty. VR can be expensive and creating a VR lab may not seem doable in settings other than large, well-funded universities. This chapter describes a technology lab that was established at a small Midwest liberal arts university, funded by a student technology fee and created by a student-led technology committee.

INTRODUCTION

Nineteen years ago, Prensky (2001) posited that learners are 'digital natives' who have grown accustomed to the integration of technology in all aspects of life: for entertainment, communication, consumerism, and education. This observation also applies to students entering higher education today. As one of the latest technologies to be integrated into the higher education teaching-learning process, virtual reality (VR) offers the capacity to enhance instructional processes and impact student learning.

The definition of VR has evolved over time in response to the rapid growth in the depth and breadth of its development. As early as 2005, Dickey stated that three-dimensional immersive virtual worlds are one of the most exciting emerging technologies being successfully implemented to promote learning in higher education. Yet, there often are too few opportunities for students to initiate use of VR to

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explore their field of study. More often than not, when VR is used, it is faculty led. Teaching pedagogy is slowly shifting from a faculty-centered teaching-learning process to one that is more student-centered. "Teaching practices in higher education are evolving, as student-centered approaches to instruction play a growing role in course design" (Alexander et al., 2019, p. 19). As teaching practices are evolving, VR hardware and software are concurrently evolving; staying current with VR technology is a challenge which requires on-going faculty development opportunities and joint ventures between faculty and students. Institutional support and commitment are crucial to sustainability of staying current with technology in higher education. Providing a state-of-the-art learning experience for students will not only benefit the colleges and universities in their competitive environment, but also aid in preparing students for their entry into the workforce (Miller, 2014).

The goals of this chapter are to provide: 1) background information related to VR and applications in higher education; 2) a discussion of a student-centered approach to teaching in higher education, and 3) a detailed description of a Technology Exploration Lab (hereafter, referred to as The Lab) created at a small, private, liberal arts institution and 4) implications for future practice.

BACKGROUND

"There is no reason why the objects displayed by a computer have to follow the ordinary rules of physical reality with which we are familiar" (Sutherland, 1965, para. 13). And so it began. Some fifty-five years later we find technology integrated into our personal, professional, and social lives in ways that were unimaginable in 1965. The advent of VR has certainly ushered in a new technology medium. While Helig (1962), a cinematographer, has been identified as the "father of virtual reality," VR did not become known as a research field until the late 1980's. Sherman and Craig (2003) defined VR as "a medium composed of interactive computer simulation that senses the participant's position and actions and replaces or augments the feedback to one or more senses, giving the feeling of being mentally immersed or present in the simulation (a virtual world)" (p. 13). Kapp and O'Driscoll (2010) defined a virtual world as an "immersed 3D virtual environment in which a learner acts through an avatar to engage with the other avatars for the explicit purpose of learning" (p. 55). LaValle (2019, p. 2) defined VR as "Inducing targeted behavior in an organism by using artificial sensory stimulation, while the organism has little or no awareness of the interference."

The environment created through VR is referred to as a virtual world (VW) or virtual world environment (VWE). Simply, a VWE is an artificial physical environment created using digital technology viewed two-dimensionally (2D); a complex three-dimensional (3D) environment contains digital objects and human avatars in real-time. Virtual world learning environments (VWLE's) can accommodate a wider range of learning styles and goals, encourage collaborative and resource-based learning and allow greater sharing and re-use of resources (Britain, 1999). These VR environments are used to support multiple learning styles and encourage collaborative exchange, social learning, which evolved when innovators of VR noticed that users were responsive to the collaborative community.

As creators of the VR experience focus on the VWLE and collaborative experiences, users are focused on the type of VR experience provided; having guidelines for user experience becomes a topic of discussion. For example, according to Babich (2019), VR apps should have the following properties: