Chapter 2
Virtual Reality Considerations for Curriculum Development and Online Instruction

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ABSTRACT

For virtual reality (VR), augmented reality (AR), and mixed reality (MR) to become effective learning modalities, they must be considered in the context of experiential or constructivist learning which could disrupt traditional instructional and educational practices given their interactive quality. How might educators assess these applications and their implementation to determine their learning potential for online instruction? By applying the studio thinking framework (STF) and the presence pedagogy (P2) model, unique insights may be gained in terms of virtual reality's value to the learning process. Current research shows many similarities between the skills taught in studio art classes and opportunities to learn the same skills in virtual educational applications, while the P2 model has demonstrated its effectiveness in applying pedagogical strategies to collaborative VR environments. Tactics to prepare, apply, assess, and evaluate (PAAE) this technology in educational programs for teachers and school leaders provide a guide for implementation.

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INTRODUCTION

Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR) bring unique values to the educational experience. Furthermore, little information exists about the online potential for VR/AR/MR in the educational context (Philippe, et al., 2020). In this chapter, the researchers will include information defining and placing the new technological possibilities in the context of experiential or constructivist learning, and its related online potential. While VR educational applications could disrupt traditional instructional and curricular practices and transform teaching and learning, we know little about the pedagogies of VR educational applications. The research question posited by the researchers is: How might educators assess VR/AR/MR applications and their implementation in an educational environment to determine their learning potential for online instruction? Insights into how to understand and assess the learning value of VR/AR/MR applications will draw on the Studio Thinking Framework (STF), a model of visual learning that includes the hidden second curriculum in studio art classrooms as identified by Hetland et al., (2019) and Winner et al., (2013a) and the concept of Presence Pedagogy (Bronack, et al., 2008; Juma et al., 2017).

In the STF, the critique of studio artwork by students follows an established pattern involving visual elements such as observation, envisioning, and identifying improvements to non-working elements in their work (Winner et al., 2013b). Other components include ways to explore alternatives and reflect and assess the process employed by the students as well as the product of their work. Applying the STF during an analysis aided in developing insights into potential educational benefits from immersion in VR that might not display in a formal syllabus because VR applications are primarily visual and interactive. Recognition of the virtual environment potential will lead to an informed understanding of VR/AR/MR for teachers. Presence Pedagogy refers to providing a community of practice that relies on presence and social learning. VR applications offer a new visual context for learning. In the late 20th century, decentralized online education powered by technology was a disruptive innovation (Bergeron & Fornero, 2018; Psotka, 2013). The new decentralized learning opportunities remained primarily text based because computers were much less powerful. During the 21st century and beyond, technology does not restrict learning to text but could include a plethora of visual and sensory options available at decentralized locations (Romli et al., 2020; Thomas and Brown, 2011). VR as technology replaces the user's view by immersing the user in a simulated environment and stimulates the user's senses, such as vision, hearing, touch, and even smell (Farshid et al., 2018; Jackson, 2015). Hence, the user is immersed in the experience. Using a computer and the proper platform gives the user access to this type of reality, thereby allowing the user to gain a new digital and interactive experience. Understanding the various forms of VR technology to deliver educational content is critical to integrate and align the technology to learning practices. Before attempting to implement VR technology into the curriculum, educators and researchers should gain a high-level understanding of the technology on the market today including Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR).

This chapter will provide ways for educators to assess VR/AR/MR applications and their implementation in an educational environment to determine their learning potential for online instruction. With regards to curriculum development, the researchers have provided strategies to prepare, apply, assess, and evaluate this technology for educational programs, which may be of value to teachers, curricular administrators, and other school leaders. The following topics are addressed in support of the notion that Virtual Reality for education demands a consideration of pedagogy: Background; Applying Virtual Reality to Online Learning, The Studio Thinking Framework (STF), Integrating VR into the Curricula,