Chapter 2
Virtual and Augmented Reality: Exploring the Potential for Instructional Application

Liston William Bailey
University of Phoenix, USA

ABSTRACT

This chapter focuses on virtual reality (VR) and augmented reality (AR) as tools for teaching and learning. Attainment of skills and knowledge can be supported through the use of VR/AR applications that are being developed both in the commercial sector and at various research institutions. An overview of what differentiates VR and AR is provided to the reader along with considerations of how such applications might be used to support learning environments in the future. If instructional designers and programmers can synchronize their efforts it may be possible to make VA/AR a common feature across learning environments nationally. Common elements of a VR/AR system are discussed here as well as the need to incorporate instructional design practices into the design of learning applications that use VR/AR.

INTRODUCTION

Up to this point, organizations held fast to the idea that to develop people and their competencies, we need to build big infrastructure representing huge outlays of dollars, thus bringing training accessibility to the masses. Think about the potential of organizations to leverage innovative programs and systems associated with augmented reality (AR) and virtual reality (VR) to educate, train, and empower adults to learn wherever and whenever they choose. Obviously, in the past decade and since the year

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2000, new social media platforms using smart computing applications have been developed. These platforms advance the possibility of using VR/AR as immersive technologies for teaching. However, there remain purists in the field of education who still need to be convinced that immersive learning technologies have a place in the halls of academia. Who can blame them? Back in 2003, gaming futurists predicted that VR software applications created for Second Life would give us an avatar world where we could roam and play to our hearts content. It was a heady atmosphere of anticipation for creative computing possibilities. However, at that time the computing technology was not sufficiently mature to attract the masses. Today, though, industry estimates predict that VR/AR will be a $150 billion industry by 2020.

As a cautionary note, let me say here that I do not make the argument that immersive technologies such as VR/AR on their own can supplant or replace the need for well-designed instruction. A well-designed cognitive learning framework still requires essential elements related to attention, activation, elaboration, recall, encoding and retrieval. Learning experiences associated with VR/AR still need to produce useful knowledge. Development of educational objectives, well-sequenced curriculum and the use of generative learning strategies all have an important place in teaching and learning praxis. Immersive technologies, however, promise the potentiality to transform the learning environment from a static brick and mortar one to one with a dynamic and vibrant backdrop. Innovative uses of VR and AR will also free learners from traditional restrictions on when and where learning has to occur.

The Future Is Now

Within an educational setting, the ability to create learning environments that spark interest and promote critical thinking and problem solving can be attained using immersive VR or AR. In a few short years, the digital programs and tools that are now at a relatively new stage of development (VR, AR, and artificial intelligence [AI] and 3D printing) will make the learning environment virtually unlimited. The ability to work with an intelligent tutor, converse with other learners, create new products or transcend boundaries of time and space will become more accessible. Increasingly powerful computer chip technology advancements building upon Gordon Moore's 1965 Law related to computer technology advancement will bring VR/AR to the masses in a few short years.

As VR and immersive technologies mature, and as the work being done within AI continues to evolve at the current pace, we can propose possible future changes for the way teaching and learning unfolds. The expansion of this new technological frontier does not pose a threat to the idea of a what universities and learning institutions do right now. That is to say that universities and training institutes will still have an important place in our society as citadels of learning where creative ideas are