

# Chapter 8.12

## 3-D Virtual Worlds in Education: Applications, Benefits, Issues, and Opportunities

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### **ABSTRACT**

*Three-dimensional virtual world environments are providing new opportunities to develop engaging, interactive experiences in education. These virtual worlds are unique in that they allow individuals to interact with others through their avatars and with objects in the environment, and can create experiences that are not necessarily possible in the real world. To assess the impact that these virtual worlds are currently having on education, a literature review is conducted to identify current applications, benefits being realized, as well as issues faced. Based on this review, virtual world*

*capabilities, experiences, and factors associated with educational opportunities are presented as well as gaps in meeting pedagogical objectives. Practical and research implications are then addressed. Virtual worlds are proving to provide unique educational experiences, with its potential only at the cusp of being explored.*

### **INTRODUCTION**

Engagement, interactivity, collaboration, experimentation, and idea generation – Achieving these common objectives has been an on-going

challenge for many in the field of education, and has become more complicated and challenging as courses move to on-line formats. In trying to achieve enhancements in these different aspects, many instructors have looked to technologies such as wikis and blogs (Guru and Siau, 2008) to discussion forums on Blackboard as a means to achieve these objectives. However, there are limitations with these technologies.

One particular technology that presents new opportunities to achieving these objectives is three-dimensional (3-D) virtual world technology which provides a common space for individuals to interact and create an environment that suits their needs. One may establish replications of reality in this virtual space for individuals to explore or interact with. Alternatively, entirely new spaces can be created and individuals allowed to generate ideas and experiment with them. Whatever the purpose, the nature of the virtual reality is such that students have the potential to become engaged in a simulated activity and collaborate in a dispersed setting that more closely replicates the advantages of being face-to-face.

In addition, changes in educational paradigms are creating a need for new technologies to support new learning environments. Dickey (2005a) cites that creating *interactive* learning environments is a current trend being supported by the increasing shift towards constructivism. The paradigm advocates that knowledge is *constructed* and learners need to be more engaged in the learning process. Therefore, environments that are conducive to learners being able to manipulate and explore are more conducive to constructivist activities and learning. Also, Barab et al. (2000) cite that many learning environments are becoming more collaborative in nature. Therefore, technology incorporated into a curriculum should engage students in the learning process, allow students to experiment and explore so as to construct their own knowledge base, and provide an adequate platform for rich communication and cooperation to take place.

3-D virtual world environments may prove to enhance existing technologies' capabilities to better achieve these goals. The environments offer abilities to communicate and collaborate with others in a shared virtual space that is created by the users and foster potential for many educational and cooperative activities. Typically, the virtual environments are created by the users. These capabilities afford new opportunities for creativity to abound and for idea generation and experimentation to flourish.

Accounts of educational applications of virtual worlds provide insights into various opportunities that exist and are being realized, along with issues that have been encountered. This article addresses these applications and opportunities by focusing on 3-D virtual world environments in educational contexts. Specifically, this article reviews the literature that addresses current applications, benefits, and issues of virtual worlds in education, then summarizes opportunities and gaps of these virtual worlds for consideration in education, and highlights implications for both practice and research.

### 3-D VIRTUAL WORLDS IN EDUCATION

Educational institutions continually explore new opportunities to bring the classroom online as technology continues to grow in sophistication and capabilities (Erickson and Siau, 2003). Some pursue this endeavor to create greater opportunities to reach students through distance education programs. However, some have extended this concept of using Internet-based technologies to teach by creating more sophisticated virtual realities or virtual worlds to expand on the interaction that takes place among students as well as with their instructors. Bryson (1996) has defined virtual reality as "the use of computers and human-computer interfaces to create the effect of a three-dimensional world containing interactive

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