

Chapter 20

Effects of Assistive Technologies Combined with Desktop Virtual Reality in Instructional Procedures (1)

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ABSTRACT

Based on research, desktop virtual reality (DVR) has been shown to have learning benefits over traditional methods of instruction. However, implementing assistive technology (ATs) in DVR would seem to enhance the learning process. This study aimed to examine effects of web-based DVR on learning performances. The literature reviewed for this particular study ultimately shows DVR to be beneficial in training in many fields found in the workforce. The overall advantages utilizing advanced technology in the form of DVR and ATs allow safe and controlled training environments, realistic simulations, and the ability to reconstruct learner processes and interactions.

INTRODUCTION

Desktop virtual reality has been proven as a viable means of training in many industries, businesses, and professional environments. Because DVR is new in training and teaching, the addition of ATs further introduce more possibilities for those training individuals for the workforce. Because many individuals employed in business, industry, and specialized fields have some type of impairment, whether it is considered a minor impairment or severe, technology has provided the necessary tools

for those individuals to perform in the workforce. The contribution to new knowledge in training that utilizes DVR combined with AT (DVR/ATs) is the ability to immerse individuals in a safe environment while training for more dangerous or hazardous work areas. Individuals can take virtual tours, visit far away countries, and even explore new frontiers from the safety of their own desktop. These new advanced and innovative technologies combined together are so new that the potential for this type of training tool has yet to be determined.

Providing learning opportunities for employees with disabilities have been limited in regards to technology and the type of procedures that could be

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constructed. Advancements and new technology can create environments conducive to assisting the disabled with training and developments of skill knowledge. It is important that employers consider this technology due to the lack of constraints in space and through properly constructed and developed instructional procedures desktop computers can affordably provide many training options for these individuals. Those who are not whole should be given every opportunity that others have to become fully humanized by the liberation of DVR through AT devices. Section 508 requires that governmental offices provide all employees equal access to electronic documentation. Desktop virtual reality/ATs provide alternative solutions that can be more beneficial if properly initiated. The strong learning potential of DVR has been shown through many training procedures and many people assume this technology cannot work for people with disabilities. However, this is not true, given new ATs that can make DVR possible for everyone.

RESEARCH PROBLEM

In 1998, Congress passed an amendment to the Rehabilitation Act known as Section 508 requiring federal and state agencies, including educational institutions and specialized fields, to make their electronic and information technology accessible to people with disabilities. "Inaccessible technology interferes with an individual's ability to obtain and use information quickly and easily" (IT Accessibility & Workforce Division, 2006, p.1).

These federal, state, educational agencies are required to offer individuals with impairments hardware and software technologies that give equal access to Internet and Intranet websites, interactive forms, videos, audio files, digital documents, and other web-based tools. Much of this content depends on the user and their ability to see, hear, or navigate using AT input and output devices such as a screen reader, trackball,

Braille board, and voice-recognition software as an alternative method to access online content. This non-compliance opens the door for litigation and learners who rely on AT devices are faced yet with another road block, although DVR/ATs may show to have advantages in training.

RESEARCH PURPOSE

Learners with impairment use ATs to access online learning content through input devices and software. According to Netherton and Deal (2006) ATs can be defined as, "...any piece of equipment or device that may be used by a person with a disability to perform specific tasks, improve functional capabilities, and become more independent. It can help...people with a wide range of cognitive, physical, or sensory disabilities" (p.11). Although these devices are used primarily for accessing electronic documents, bridging connectivity with desktop publishing software, and browsing Internet content, the literature shows that ATs are compatible with most digital online content, however, what has not been researched is the comparison of learning outcomes among instructional procedures: text-only, image-only, DVR/ATs, and hands-on instructional treatments. The purpose of this study was to determine, through dependent evidence or consequences that are observable, using a mixed method research design, the effects of four treatments on learner performance outcomes.

Hypothesis and Conceptual Research Framework

The hypothesis and conceptual framework proposed in this study were formulated based on the previous research conducted by Ausburn and Ausburn (2004). The following hypothesis was derived:

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