Scholarly Article Review

The Potential of Using Virtual Reality Technology in Physical Activity Settings

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The article I reviewed was called, “The Potential of Using Virtual Reality Technology in Physical Activity Settings.” This article review examines current research on the role of virtual reality in a physical activity setting. The article also discusses potential application of using virtual reality technology to enhance learning in Physical Education. I will be reviewing some of the features involved with virtual reality technology in Physical Education, reviews and critiques of studies on virtual reality technology, and strategies that could enhance a Physical Education classroom in the future.

According to Sherman and Craig (2003), Virtual Reality is defined 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)”. Virtual reality is an artificial physical environment created through the use of technology. Things are incorporated in a VR environment through visual, audial, and other perceptual stimuli to manipulate events where a person is expected to react. There are two types of virtual reality environments. The first is a simple VR environment. That consists of a two-dimensional viewing environment. The second is a complex virtual environment, which can include three-dimensional (3D) digital objects and human avatars in real-time.

One virtual reality system that was discussed in the articles was the Cave Automatic Virtual Environment (CAVE). According to Pasco (2013), a CAVE system, when programmed well, can closely represent an environment by highly resembling the real world in full-scale. One advantage of using a CAVE system is it allows the user to move naturally in the space surrounding by digitally created environmental cues.
Another feature of a VR environment is they can interact in real time with objects. Some devices exist that capture one’s body in motion. The device records human movement in the human VR environment interaction. A body motion capture device consists of a set of internal sensors attached to the body by a Lycra suit that detects, follows, and records movements of the person and conveys body movements to a recognition server to activate an avatar. This type of VR environment also exists with the making of video games these days. Companies will have athletes use this type of suit to record real-life movements. The video game makers will use this as they develop and enhance the overall features of the video game.

One example of a VR environment provided in the article deals with a MASCARET virtual reality platform to help soccer players learn and practice tactical decisions during game like situations. Avatars were designed to mimic the process of how elite players make decisions and perform in real contexts. The avatars in the VR can be used to train novice soccer players to make tactical decisions by presenting tactical problems during interaction. One of the limitations discussed using this type of system is that it only requires the player to mimic an action rather than carry-out a soccer movement and/or skill. The effect of training on tactical decision making and carrying-out a tactical movement remains unknown after the study.

Research evidence of using VR technology in physical activity settings suggests a VR environment can be used to provide a realistic and safe environment for learners to perform specific tasks. Pasco (2013), stated, “Using VR technology in physical activity settings is new and is considered having great potential. One advantage of using VR is to eliminate the risk of injuries in physical training. Another advantage is to provide learners with the information that is not readily visible or available when learning in the real world but that can play an important role in learning.” If VR technology can improve, it could be a major tool to create conditions to enhance learning experiences.

One study focused on the effects of two variations of real-time VR feedback on motor learning in dance. There were three experimental conditions: full feedback, reduced feedback,
and no feedback. Results revealed that learners in both full and reduced-feedback conditions learned better than those in the control condition. Those in the reduced-feedback condition, however, demonstrated better performances than those in the full-feedback condition.

Another study used VR technology to address the “outfielder problem,” which refers to the ability of a baseball outfielder to decide where to run to catch a fly ball. This study had experienced college baseball and softball players that were asked to catch fly balls under two conditions: forward direction and backwards direction. Results revealed that one half of the balls were recorded as successful catches. Results concluded that although VR can be a useful tool for the study of perception-action relationship, it may have very limited influence on real action. Also noted was the key issue of transferring decisions and open skills learned in a VR environment to real playing fields remains unaddressed.

Virtual Reality technology has been viewed as an opportunity to study and improve physiological responses to exercise in a safe, controlled, and motivational environment. A study examined the influence on physiological responses of the cardiovascular and ventilatory systems during incremental exercise testing. Exercise was performed on a friction-braked cycle ergometer with VR technology (virtual screen that included two bicycle riders: one represented the subject and the other an accompanying rider) and without VR technology (no screen). Results revealed the VR and non-VR systems did not produce different outcomes on submaximal and peak exercise responses and the VR system significantly increased cycling time, distance, and caloric expenditure. Also noted, was that studies of VR impact on physiological responses are scarce, so the findings cannot be taken as conclusive.

The future direction of VR technology in educational settings to improve students’ cognitive, affective and motor learning are the main focus of what’s to come. Promoting change through instruction can be difficult. As students engage in physical activity task, it is difficult for students to know their energy level in real time. Physical educators should try to identify the initial conceptualization in the students, so that their initial naive conceptual mental models
might be targets for specific pedagogical strategies that facilitate the process of conceptual change. Future opportunities will teach key concepts in physical education and increase students' physical activity. One example given was learners can use VP technology to learn motor skills in a new way where they can mimic the movement of an expert avatar. This system can receive learning cues that are developed simultaneously by a real-time Intelligent Tutoring System based on real-time analysis of learners’ prior knowledge, current responses to the environment, their movement solutions in a large array of VR conditions, and application decisions made in the VR environment. These opportunities could lead towards new designs of learning experiences in PE for the 21st century. Pasco (2013) claimed, “effectively using VR technology to promote physical activity is till more of an assumption than a reality”.

Virtual reality can be an effective learning tool in a physical activity setting. More technologies are being created each year to push a VR environment in a physical setting. I have seen a few things recently with fitness bikes that you can do a classes with virtual instructors from the confines of your own home. Technology and physical activity is only going to increases of the next decade. This is a fad that many people are going to get hooked on and I feel it is going to be a group part of society.
References: