EFFECTIVENESS OF VIRTUAL REALITY TO ENHANCE CLASSROOM INSTRUCTION FOR NAVIGATING THE INTERNATIONAL SPACE STATION.

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Abstract

Virtual Reality (VR) has become an increasingly effective and a powerful medium for learning, especially when applied to subjects that involve acquiring situational awareness and navigation (1). Research has shown, and continues to show, an encouraging array of positive learning outcomes in applying VR technology (Figure 1) to support and improve learning (2). Findings include observing positive effects on learning of spatial awareness acquisition, astronaut navigation, and engineering (3). Apart from these, research findings have demonstrated repeatedly that learners enjoy their VR educational experience and acknowledge the potential of VR in instruction.

Figure 1. Oculus Rift VR headset used in study

Methods

A VR software program, Oculus Rift International Space Station (ISS), was used as the VR learning material (Figures 2 and 3). Two groups of students received identical instruction on navigating through the outside the ISS but through different means. The following objectives guided the study.

1. To determine the effects of a desktop VR-based learning environment on students' academic performance.
2. To determine the effects of a desktop VR-based learning environment on students' perceived learning
3. To determine the effects of a desktop VR-based learning environment on students' perceived satisfaction.

Figure 2. Screenshot of Oculus Rift ISS Exterior

Figure 3. Screenshot of Oculus Rift ISS Interior

Protocol

One group (Group 1) received conventional instruction and one group (Group 2) received VR instruction. Following instruction, half of Group 1 was assessed by conventional means and the other half were assessed in the VR-rendered environment. Following VR instruction, half of Group 2 was assessed by conventional means and the other half were assessed in the VR-rendered environment. Assessment included questions on situational awareness, module identification and navigation completion times.

Results

Pearson correlation coefficient revealed a moderate degree of correlation (0.31) between the effect of VR instruction and assessment, demonstrating a positive effect of VR instruction. Pearson correlation coefficient revealed a low degree of correlation (0.18) between the effect of conventional instruction and assessment, demonstrating conventional instruction was less effective than VR instruction for this type of learning.

Discussion

A VR-based learning environment positively affects the cognitive and affective domains of learners. Being immersed in a VR environment helps students acquire situational and navigational awareness more easily.

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