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

Abstract

Virtual Reality (VR) has become an increasingly effective and powerful medium for learning, especially when applied to subjects that involve acquiring situational awareness/navigation. Research has shown an encouraging array of positive learning outcomes in applying VR technology to support and improve learning. Findings include observing positive effects on learning of spatial awareness acquisition and navigation. Apart from these observations, research has demonstrated that learners enjoy their VR educational experience.

VR continues to be applied as an excellent educational tool because it offers opportunities for students to visualize, explore and interact with objects within a computer-generated environment. This immersive environment encourages and enhances self-paced learning and also permits a more student-centered approach of instruction. Nevertheless, VR is an educational tool which can be used to support certain types of learning and the medium may not work for all kinds of learning. So, despite many encouraging findings of VR research, it is premature to apply broad recommendations regarding the use of VR as curriculum enhancement. Furthermore, there have been few studies comparing the effectiveness of VR against non-VR teaching practices to support the use of VR in learning. Thus, the primary objective of this study was to compare the learning effectiveness of a VR-based learning environment with a conventional classroom learning practice for the purposes of teaching students how to navigate the International Space Station (ISS) as part of an undergraduate course in Spaceflight Operations.

This study utilized a VR software program (Oculus Rift ISS), as the VR learning material. 2 groups of students were instructed on navigating through the interior and around the exterior of the ISS via different means; one group (Group 1) received conventional instruction and one group (Group 2) received VR instruction. Following instruction, half of Group 1 participants were assessed by conventional means and the other half were assessed in the VR-rendered environment. Following VR instruction, half of Group 2 participants were 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. 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.