Using Mixed Reality in Online Learning Environments

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ABSTRACT

Among the technological advancements of Industry 4.0, virtual reality (VR), augmented reality (AR), and mixed reality (MR) have been used in many industries to visualize and interact with digital twins in real-time. These technologies have also been used with building information modeling (BIM) and geographic information systems (GIS) throughout the lifecycle of construction projects. Moreover, the integration of BIM and GIS has been proven to improve collaboration among stakeholders by allowing them to visualize information seamlessly between buildings and their surroundings. Following the COVID-19 pandemic, many undergraduate and graduate courses were moved online which posed many challenges on instructors to deliver lectures in accessible and informative ways. Furthermore, many courses and curricula have been originally online and have not yet benefited from the full potential of MR in virtual classrooms. Therefore, the aim of this research is to evaluate how MR applications of integrated BIM-GIS can improve the online learning experience of construction management students. An experimental study was conducted with students to evaluate the effect of using AR on handheld devices and MR on head-mounted devices on their spatio-temporal reasoning and understanding skills.