

DESIGN INTERVENTIONS THROUGH IMMERSIVE VIRTUAL ENVIRONMENTS

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The use of Virtual Reality (VR) technology in Design and Design education is not new. Since its inception in the 60's, VR has been employed by designers for communicating their design ideas. VR can be defined from a technology standpoint (associated hardware) as well as from an experiential standpoint (focusing on experiences such as immersion and presence). On a broader scale, VR is defined as "an alternate world filled with computer generated images that respond to human movements" (Greenbaum, 1992, p. 58). With the advancement of technology, cost effective Virtual Reality has become more available to designers and educators.

With these new types of VR Head Mounted Display (HMD) systems as well as with improved tracking systems, a new paradigm in VR termed "Room Scale Virtual Reality" has immersed. Room Scale VR provides new opportunities for designers through more immersive VR environments. Immersion and Presence are two main topics that have been discussed with regard to how people are affected by virtual environments. While immersion is identified as a quality of the technology used (Sanchez-Vives and Slater, 2005), presence is defined through a human perception perspective (Slater, Usoh and Steed, 1994). Both of these concepts are used to define and measure the feeling of 'being there' in a mediated environment. The concepts of presence and immersion are important in order to understand the experience of the atmosphere in a designed space. When considering interior spaces, atmosphere refers to the sensorial qualities of that space, which might be effected through materiality, lighting condition and



acoustics. Virtual spatial experiences allow a designer to make interventions to the factors that affect the spatial quality or the atmosphere of that space before they are actually built.

The Mixed Reality Lab at Oklahoma State University provides the students in the Interior Design program the opportunity of using cutting edge VR tools. Students in an early design studio were provided with a simple design problem of designing a dorm room for two college students. The students worked in 6 groups, and drew inspiration through a Native American art exhibition they visited. The students were instructed on using SketchUp and Unity 3D (a gaming engine) to develop an immersive virtual environment. Using SketchUp, the students developed the 3D model, then using Unity 3D they added lights and materials. 3 groups developed immersive virtual environments for the Oculus Rift DK2 HMD, 2 groups developed immersive virtual environments for the Oculus

Rift CV1 HMD, and 1 group developed an immersive virtual environment for the HTC Vive HMD.

The students used VR as a mechanism to evaluate their designs. They made changes to the materials or lights and then checked if the atmosphere of the space that they designed adhered to their initial concept. The design outcomes were then reviewed through the virtual environments that the students developed. In a posttest survey students expressed that they found that the technology to be useful in their design work and that there was a high probability they would use it in their future careers.

References

- Greenbaum, P. (1992). The lawnmower man. Film and video, 9(3), 58-62.
- Sanchez-Vives, M. V., & Slater, M. (2005). From presence to consciousness through virtual reality. *Nature Reviews Neuroscience*, 6(4), 332-339.
- Slater, M., Usoh, M., & Steed, A. (1994). Depth of presence in virtual environments. *Presence: Teleoperators & Virtual Environments*, 3(2), 130-144.is assignment