Impacts of Sensory and Cognitive Reality on Enjoyment, Usefulness, and Satisfaction in Virtual Reality Sports

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The development of virtual reality (VR) technology offers opportunities for a widespread consumption of VR sports experience. The VR, an immersive and interactive three-dimensional 3D computer experience occurring in real time, has been described as having the potential to be a powerful tool for sport companies to provide sport experiences. In the VR, ‘reality’ is a key variable that can explain a user’s experiences that is different from the real world. It is argued, therefore, one of the key determinants of VR is the authenticity, which refers to the extent to which the virtual environment can resemble the real environment.

The purpose of this study was to investigate the effect of reality on user’s experience performance (i.e., enjoyment, usefulness, satisfaction) in VR sports. In this study, the ‘reality’ of VR sports is composed of ‘sensory reality’ (Steuer, 1995) and ‘cognitive reality’ (Lombard & Ditton, 1997) based on previous studies related to presence and reality. It reflects the technical factors that can materialize reality and the content factors that enable the interpretation of reality, based on the media characteristics of VR sports. ‘Sensory reality’ means that user’s evaluation of how vividly the VR sports are created (or reproduced), including the visual display (image quality, image size, viewing distance, color, etc.), aural presentation (volume, quality and required sound), tactile stimuli, and so on. ‘Cognitive reality’ means that the user’s evaluation of whether the contents (objects, environment, and nature of task or activity, etc.) of VR sports created by VR technology accurately describe actual sports situations.

A total of 238 users from 8 virtual golf centers in Korea participated in this study. Pre-existing measures of the core concepts were identified where possible and adapted on the basis of the nature of the phenomena understudy. Participants responded to Nam, Yu, & Shin’s (2017) sensory reality scale (4 items), and Hwang and Park’s (2011) cognitive reality scale (4 items). Users’ experience performance (i.e., enjoyment, usefulness, satisfaction) was measured using 9 items developed by Franke & Schreier (2010) and Crespo, Bosque, & Sanchez (2009). Results using structural equation modeling showed that sensory reality and cognitive reality had positive impacts on enjoyment and usefulness. In terms of influence, sensory reality had more influence on enjoyment than cognitive reality. On the other hand, cognitive reality had more influence on usefulness than sensory reality. In addition, enjoyment and usefulness had positive impacts on satisfaction.

This study suggests that reality has to be managed in order to improve user experience performance in VR sports. As found in this study, the dimension of reality has a relatively different effect on enjoyment and usefulness. Although sensory reality and cognitive reality are considered as determinants and measurement factors in virtual reality, it is necessary to develop multidimensional and detailed reality concept that can analyze VR sport more concretely.