VR in Medical Education

Virtual reality (VR) technology mostly features eye-catching visuals, interactivity and immersion, making it an effective tool in learning new skills or enhancing one's abilities in doing job-related tasks.

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Three different VR technologies have been found to be commonly used in healthcare education and practice. These technologies offer immersive virtual environments that provide a favourable learning experience for both medical practitioners and students.

Three Leading Healthcare VR Technologies

An integrative review, carried out by researchers from Finland (Mäkinen et al. 2020), has identified these three VR technologies generally used as learning tools in healthcare.

Haptic device simulators. These devices are the most widely used in training as they offer more immersive learning experiences and improved realism. Haptics enable the user to feel a natural or synthetic mechanical environment by touch; this is achieved by applying forces, vibrations, or motions to the user. Through such simulations, the user is able to develop fine motor skills that are important in performing surgical procedures, for example.

Computer-based simulations. This kind of technology is effective especially in nursing education, as it provides real-time visualisation and enables the user to interact with the virtual environment, then receiving computer-generated feedback for their actions. Using these kind of simulations helps the learner combine theoretical knowledge with practice.

Head-mounted displays (HMDs). These systems offer the most immersive learning experience, engaging the learner in a 3D world using a head-mounted display. Total immersion is made possible through the use of haptic, auditory and other non-visual technologies. Of the three healthcare VR technologies, HMD is the least used possibly because this kind of technology is relatively new in the field of healthcare.

Importance of UX When Using VR Tools

In the context of highly immersive, real-world like environments, user experiences (UXs) include all the 10 components described in the UX model introduced by Tcha-Tokey et al. (2018). The quality of user experience has been correlated with the learner's motivation and engagement.

Based on their integrative review, the Finnish researchers note that usability and technology adoption were the most observed UX components in every VR technology used in healthcare training and education. In fact, usability issues and technical problems could cause frustration among VR users, according to the researchers, citing one study included in this integrative review.

In addition, this review reveals that: 1) Most of the UX components were highlighted when using haptic simulations and HMD devices; and 2) All 10 components were observed with HMD systems.

The research team concludes that better UXs can lead to better learning which, in turn, could lead to improved care and positive patient outcomes. Insights from this research can also help future studies to examine more deeply the concept of UX in the context of immersive virtual

environments, with the aim of strengthening the user's motivation towards learning.

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