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Editorial

Virtual reality and competency-based health professional education

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INTRODUCTION

Health professional education (HPE) adopted various digital technologies in the past decade. Virtual and augmented reality (VR and AR) are a recent addition to the list. Due to the ease of availability, many of the institutes in the developing countries are adopting VR and AR techniques. VR is defined as "a computer-generated simulation of a 3-D environment that users can interact with in a seemingly real or physical way using special electronic equipment, such as a helmet with a screen inside or gloves fitted with sensors."[1] VR creates real-life simulated environment to provide an immersive learning experience. Users can manipulate the virtual objects using haptic devices. Since VR requires the use of various senses from the learners, learning is facilitated by increasing learner's concentrations.

LEARNING THEORIES AND VR

Transformative learning theory postulated by Mezirow explains that individual's critical reflections and discussions of assumptions based on their experience alter their perception. In-depth learning may be facilitated by improved perception.[2] VR may allow learners to reflect on the immersive real-time experience.

Motivation is one of the most important elements of adult learning. Students with intrinsic motivation will engage actively in the learning process; they may not require external stimulus. Learners with low motivation can be facilitated by external stimulus in the form of rewards. In the earlier stage, motivation can be cultivated by external factors; when deeper learning occurs that it can be transformed into intrinsic motivation.[3] The realization of three basic psychological needs "autonomy, competence, and relatedness" is considered as core concepts of self-determination theory.[4] If motivation is the driving force for learning, individual differences will affect engagement and learning outcome achievements. The attention, relevance, confidence, and satisfaction model stresses the importance of motivating learners through engaging contents and learning activities to facilitate concentration. Learner's curiosity needs to be roused and sustained to achieve desired satisfaction level.[5] Using VR technologies learners, motivation level may be aroused. Providing relevant learning experience using VR might improve learner's confidence and satisfaction.

VR AND HPE

The primary objective of VR is to create opportunities for learners for real-time learning experience.

The advantages of VR in HPE documented literatures can be summarized as:

Delivery of learning

VR may provide easy and improved access to real-time learning resources. Continuous and flexible access to learning is important as adult learning is sometimes an unplanned activity. Students can access the VR resource at their convenient time and it also allows the repeated practice. As the learning process can be designed by individual student as per their convenience, it provides greater autonomy in learning.[6]

Content standardization and real-life experience

Learning materials are standardized and delivered as per predetermined sequence and criteria. Learners can interact with learning materials through touch, visual, and auditory feedback. Through multisensory system involvement and improved perceptions, learners might have an immersive experience. Immediate feedback received may allow learners to reflect. Learning outcomes achieved can be tracked and documented.

Enhanced learning experience

The principles of adult learning are applied in VR to enhance the learning experience. In VR, learners are facilitated to understand their pre-existing knowledge and identify gaps

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through well-designed activities. Participants are allowed to set their learning goals and draw learning plans, which provides more flexibility. VR allows learners to control their learning. VR provides an opportunity for HPE learners to practice the skills multiple times. Repeated practice may improve the confidence level of the learners before their real-life encounters in the clinical settings.[7]

Facilitation of interaction through the digital tools makes learning more active and becomes learner-centric. Immediate feedback on learning provides the necessary motivation to learn further. Attainment of learning outcomes in a specified time motivates and facilitates faster learning.

Administrative advantages

Since the learning materials are available through digital platform, it can be scalable and a maximum number of learners can have an immersive experience. Once created, course materials require only regular updates. The entire process of learning can be monitored and required interventions be implemented.

VR LEARNING AND COMPETENCY-BASED HPE

The ultimate goal of competency-based medical education is to create health-care professionals, who are competent to deliver the health care needs. VR tools create opportunities to practice in the real-life situations through a simulated environment. The students of entry-level graduate programs can practice procedures through VR repeatedly to acquire the predetermined levels of competency. VR technology is used to create realistic anatomical structures in three-dimensional, which may allow the learner to understand the anatomy in depth. Advanced surgical skills can be acquired through VR before the real-life experience. Learners can develop their skills in a controlled simulated environment. The confidence level of learners can be built through VR, which will improve their performance.[6,7]

VR provides flexibility in learning and facilitates self-directed learning, which is important in acquiring competencies. Due to its immersive experience, it might reduce the boredom and engage learners.

OPPORTUNITIES

With the aim of creating adequate numbers of competent health professionals, adopting tools such as VR may be useful. Creating the VR environment for the desired competencies for Indian health professional students in collaboration with technological institutes might be an opportunity. Validating the VR tools well-designed research in the Indian scenario will be of interest. Considering the characteristics of the current generations of learners, adopting tools such as VR may be a good opportunity in imparting competency-based education.

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