Chapter 4
Virtual Reality in Medical Education

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ABSTRACT

The aim of this research is to examine student acceptance and use of virtual reality technologies in medical education. Within the scope of the research, a questionnaire consisting of 4 sub-dimensions and 21 items was developed by the researchers. This questionnaire consists of sub-dimensions of performance expectancy, effort expectancy, facilitating conditions, and social influence. The study was conducted on 421 university students who participated in courses and activities related to the use of virtual reality applications in medical education. The findings of the research demonstrated that the students' acceptance and use of virtual reality applications were high in medical education. Various suggestions were made for researchers and educators in accordance with the findings.

INTRODUCTION

Although Virtual Reality (VR) has been used in a few fields such as some sectors in the military since the 1970s, technological advances have recently made the accessibility of VR affordable and the use of it prevalent now (Beheiry et al., 2019). While the affordability of it has increased its usage among prospective customers, it has evolved to become a sophisticated technology that immerses a user in a virtual environment that is getting similar to reality, which even draws non-consumer attention towards

this technology. It can be seen as a technological revolution that leads to the triumph of 3-D environments. Therefore, it is widely used in fields such as healthcare, military and education.

The popularity of VR increases in the realm of medicine. Many researchers emphasize the use of VR in healthcare as a potentially effective tool that provides innovative techniques for clinical practice settings. Morel, Bideau, Lardy, and Kulpa (2015) state that standardization, reproducibility and stimuli control are the benefits of the VR system in clinical assessment and rehabilitation. The use of VR technology offers a standardized virtual environment in which stimuli can be controlled to accurately evaluate the balance recovery of patients and their progression, and this standardized environment can be reproducible to make comparisons among patients in the same condition or between the trials of patients (Morel et al., 2015). Also, the accessibility and affordability of VR technologies are easier with the commencing mass production of low-cost devices so rehabilitation can be continued anywhere, anytime in motivating and entertaining virtual environments (Morel et al., 2015; Riener, & Harders, 2012).

Rose, Nam and Chen (2018) indicate that VR technologies have been employed in treatments of physical impairments as an emerging rehabilitation technology for those who suffer from "stroke (Jack et al., 2001), cerebral palsy (Reid, 2002), severe burns (Haik et al., 2006), Parkinson's disease (Mirelman et al., 2010), Guillain-Barré syndrome (Albiol-Pérez et al., 2015), and multiple sclerosis (Fulk, 2005) among others" (p. 153). This aligns with the comprehensive systematic review study conducted by Ravi, Kumar and Singhi (2017) who state that the utilization of VR technologies in therapeutic interventions for children and adolescents suffering from cerebral palsy is a promising intervention in order to make improvement in balance and overall motor capabilities. VR technology can also be used in psychotherapy. The use of VR applications has been proved as an effective treatment for phobias through the processes of habituation and extinction (Riva, 2005). In the VR treatment of phobias, patients are exposed to controlled, fear-provoking stimuli to gradually alleviate the anxiety in the realistic environment.

While VR has been gained popularity in the use of interventions for balance assessment, rehabilitation and psychotherapy in the medical field, De Luca et al. (2019) point out that it is commonly cited as a valuable educational tool used in many fields of study such as medical and dental sciences. When VR is employed in medical education, it offers a safe environment where students gain fun, engaging, interactive and cost-effective experiences by eliminating the risk factors (de Ribaupierre et al., 2014). These situation-based experiences including specifically surgical experiences generated by VR technologies represented to students enable them to practice how to perform surgery for knowledge and skill acquisition without suffering possibly life-changing consequences. When the promise and potential of VR are considered in medical education, it can be seen that there are few numbers of research. It is important to increase current knowledge and diversity of research on this subject. Therefore, the aim of the study is to investigate the students' acceptance and use of VR technologies in healthcare education.

BACKGROUND

Brief History of VR

Although VR can be seen as a new phenomenon because of recent technological advancements that support the development of today's VR systems, the early roots for VR emerged in the 1920s. In 1920, Edwin Albert Link began working on a flight simulator for flight training and the first flight simulator was presented in 1929. Link later launched a company that produced flight simulators for flight train-

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