

Chapter 36

A SWOT Analysis of Virtual Reality for Seniors

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ABSTRACT

The population of older people is increasing. In this book chapter, the author reviewed some of the applications of virtual reality (VR) for seniors in form of a strengths, weaknesses, opportunities, and threats (SWOT) analysis. This approach is commonly used to assess and guide internal and external parameters to accomplish a mission. Some of the challenges that the elderly are facing were reviewed and the way VR can help in overcoming those challenges were discussed. A comparison of VR technologies was also presented. The results show that VR's feasibility and concept are linked to existing technologies and the characteristics of each system control immersion, interaction, and stimulation. VR interventions might have the potential to be used as ecologically valid e-health screening systems. Systems should be specifically designed and adapted for seniors and usability issues should be addressed. Ideally, VR interventions work best in addition to traditional methods. Future studies should use more subjects to ensure the efficacy of such interventions for seniors.

INTRODUCTION

Human life expectancy and the population of elderly people over 60 years old are increasing. People might be less available to properly support older family members. Costs of hospitalization and nursery homes, as well as physical barriers, loneliness, and isolation, are among challenges that elderly are facing (Marcelino et al., 2018). Research has shown that regular physical activity (PA) is important for good health. It could also prevent various diseases and lower the risk of fall (Ofstedal, Zimmer, & Lin, 1999). Additionally, PA could improve memory and executive functions in the short and long term. However, aging is usually accompanied by deterioration of muscular strength, sensory sensitivity, and functional capacities (Park & Yim, 2016). These physiological changes affect the seniors' willingness to participate in regular PA (Lin et al., 2018). The physical decline also affects the elderly's quality

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of life, falls, admission to the healthcare centers, and mortality. Cognitive impairments also affect the elderly's functional autonomy and result in a decline in physical performance and unsafe decisions and behaviors (Dommès et al., 2015).

By means of computers interfaces, virtual reality (VR) allows users to enter a virtual world. It uses various audiovisual technologies to provide high interaction leading to a feeling of immersion (Lin, Jeng, and Yeh, 2018). VR simulates environments and activities by using real-time stimulation of one or more sensory channels. Its feasibility and concept have been linked to the existing technologies for simulation and interaction. VR settings provide immediate feedback that could be necessary for all forms of learning (Manera et al., 2016). They also offer personalized environments according to the needs of the different participants.

Although seniors shape a considerable portion of our population, they are often overlooked when it comes to newly introduced technologies. They may not always be willing to accept new technologies, in fear of not being able to use them (Lin et al., 2018). Despite the functional loss, seniors still have the abilities to acquire and re-learn performance skills (Skjæret et al., 2016). Technology might be used to promote better performance for them. Jeng, Pai, and Yeh (2017) suggested that to encourage the elderly to use technology, psychological barriers should be broken. Teaching and providing hands-on experience and assistance, increase their willingness to experience new things. VR may have the advantage to control the type and amount of experience each patient receives and may boost learning transfer to the identified targets (Maillot et al., 2017). VR also has the ability to change the existing scenarios by modifying physics and other aspects of reality. Virtual tasks might be designed according to the elderly's needs for acquiring and practicing new skills repeatedly. The immersive nature of these interventions may also offer implicit learning processes without the patient's awareness (Rand et al., 2017).

Telerehabilitation uses information and communication technology and offers accessible and affordable services to people in their homes (Kizony et al., 2017). The use of VR and serious games for older adults are generally categorized in improving upper and lower limbs movements, balance, mobility training, daily living, neglect, and cognition (cf. Deutsch and Westcott, 2017). The challenge is to provide enough amount and intensity and therefore, various technological approaches have been proposed. VR could also be used as an add-on to robotic devices for execution of movement or to be used as standalone systems using visual stimulation and interaction (Hoermann et al., 2017; Cameirão, Bermudez, & Verschure, 2008).

Considering these issues, this book chapter will present a SWOT analysis of using VR for seniors. SWOT stands for strengths, weaknesses, opportunities, and threats, and is usually used in business to analyze the parameters that affect the company's competitive position in the market. A strength is a positive capacity that allows an entity reaching to its defined goals. A weakness is a limitation that slows the progress towards the defined goals. An opportunity is an internal or external force in favor of that entity. A threat is an unfavorable situation that could present a barrier or limitation in achieving goals. SWOT analysis is done to reveal the optimal match between strengths, weaknesses, opportunities, and threats that the company is facing. SWOT framework could also be applied outside of the business domain (Rizzo & Kim, 2005). Based on a SWOT analysis, strategies could take advantage of opportunities by using their strengths and by actively addressing threats by correcting the weaknesses.

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