


A Visualisation Analysis Using the VOSviewer of Literature on Virtual Reality Technology Application in Healthcare

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EXECUTIVE SUMMARY

Current virtual reality technology applications in healthcare perform potential abilities in clinical and nursing practices. This review aims to analyse the use and the development direction of virtual reality technology in the whole healthcare field. Researchers searched (n = 5,209) English-language literature related to the application of virtual reality in healthcare on the basis of the Web of Science online database and used VOSviewer 1.6.17 to visualise and analyse the time trend co-authorship, co-occurrence keywords, and country distribution of the literature. Furthermore, they found that the application of virtual reality technology in healthcare shows an overall fragmentation and a relatively concentrated trend, focusing on medical education, rehabilitation therapy, and psychological interventions. Augmented reality and COVID-19 are present research hotspots.

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INTRODUCTION

With the current burst of 5G communication technology, artificial intelligence and the Internet of Things a simple keyboard–mouse type of human–machine interaction technology can no longer meet the requirement of technological innovation (Krupitzer et al., 2020). Virtual reality (VR), which provides a sense of immersion, could be the high-tech technology that changes the way humans live (Zhan, Yin, Xiong, He, & Wu, 2020). Virtual reality technology is a fusion innovation of multiple technologies (Chen, Zou, & Wang, 2021). Moreover, it integrates computer technology, human–computer interaction technology and graphics technology to create a virtual and realistic three-dimensional visualisation environment using graphics technology, network technology and interpersonal sensing technology (Shao et al., 2020).

Virtual reality technology has the following features: 3-dimension visualisation, immersion, simulation, interactivity and presence (Servotte et al., 2020). It is increasingly employed in the military, education, industry, entertainment and health-care fields (Javaid & Haleem, 2020). In addition, virtual reality technology has been applied earlier to aviation and military training, which can simulate the operation and training of new weapons or aircraft. It has also replaced dangerous actual operations and has allowed large-scale military exercises in a simulated environment (Ahir, Govani, Gajera, & Shah, 2020). Loucks et al. (2019) affirmed the usefulness of virtual reality exposure therapy for the treatment of military traumatic stress disorder. VR application on military is considered as early research on virtual reality technology application in health care. Since then, it has been attracting considerable attention (Rizzo & Koenig, 2017). Given the clinical costs or risk aversions of treatment option factors, advances in virtual reality technology mean more efficient treatment options for doctors and better patient experiences (Aziz, 2018).

Many reviews on virtual reality technology applications in health care have performed potential abilities on clinical education, physical therapy, anxiety management, acute and chronic pain management and nursing (Rousseaux et al., 2020). Nonetheless, visualisation studies on the correlation or similarity of related literature across the whole health-care field have been neglected. Due to the wide virtual reality technology applications and highly comprehensive value, this may induce a lack of research, broadness and rigour. Compared with other similar reviews, the current study purposefully identified the relationships between the literature pieces examining healthcare-related fields. Virtual reality technology is still evolving, and there is still much room for the exploration and development of its application in the health-care field. Systematically combining the published academic literature pieces in a visualisation way can help us find the research trend and understand the research hotspots. Therefore, analysing the literature on the application of virtual

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