Chapter 15
VR Headset Selection via CODAS Based on Pythagorean Fuzzy Set

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ABSTRACT

Thanks to the developing technology, innovative activities emerge in the education sector, as in every sector. Contrary to traditional teaching and learning methods, novel models have started to be used in the education sector with the opportunities offered by virtual reality (VR), augmented reality (AR) or mixed reality (MR) technologies used in many different sectors. In this study, a model developed for use in the education sector in Turkey, which is named MEB-VR, has been introduced and the solution of a problem encountered in this model has been discussed. MEB-VR has been developed especially for applied and laboratory courses. The problem of determining the best headsets to be used in the model, in which the VR-based education approach is adopted, has been tried to be solved in this study. For this purpose, the most suitable VR headset was determined using the combinative distance based assessment (CODAS) method based on circular pythagorean fuzzy sets (C-PFS).

1. INTRODUCTION

Education is an important issue that shapes the lives of people and societies in a positive way and directs their futures. Though the pace of the technological development in education is slow, different innovative technologies are applied to this sector (Allcoat et al., 2021). For this reason, all necessary investments should be

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made in the field of education, and it should be ensured that all individuals receive equal and quality education. To achieve this quality and equality, it has become inevitable to take advantage of the opportunities offered by technology (Thangeda et al., 2016; OECD, 2012). All necessary technological developments should be used to amplify the teaching process in education. Mostly, traditional teaching methods such as auditory or visual, are widely used. Multisensory teaching methods can be used for more permanent and effective learning. The use of Virtual Reality technology in education is a tool that supports multisensory teaching methods (Horváth, 2021; Chen et al., 2014).

Virtual Reality (VR) is an advanced technology that excites individuals, supports, and encourages their learning processes. Thanks to this technology, the user feels as a part of the environment s/he is in, that is, s/he learns by living in that environment (Pantelidis, 2021). VR has been used in many different fields such as education, healthcare, manufacturing, entertainment, design, construction, and military fields (Albahbah et al., 2021). Lege and Bonner stated that VR experience is actively used and experienced especially in the entertainment industry. Although students have had this experience, it is still an effective and attractive learning tool for the education sector (Lege & Bonner, 2021). There have been discussions about the necessity of VR technology in the education sector for years. In the beginning, it was clear that institutions would not be able to afford such a large investment. However, with the advancements in VR technology over time, the costs have also decreased (Hussein & Nätterdal, 2015).

Different studies were found when it has been researched on the concepts of education and VR in the literature. VR is applied in different education fields such as science, engineering and even language learning (Frazier et al., 2021). Tang emphasized the importance of VR technology, which is a new teaching media, college physical education. In the study, it was investigated how VR technology is beneficial in increasing the quality of physical education. At the end of the research, it was concluded that this technology contributed a lot in increasing the quality of physical education (Tang, 2021). Ling and Rui applied VR glasses and Leap Motion to situational and practical courses and made some suggestions. They suggested that with this innovative educational environment in the History lesson, the students can feel themselves in that period, in the costumes and events of that period. With this feeling, a more permanent and effective learning environment can be provided for the students. Likewise, with an application made in the chemistry laboratory, a more effective learning environment can be provided by reducing the dangers and risks of the experiments, as well as the costs. It can be used in many different areas and for many different purposes, and the miracle results are provided (Ling & Rui, 2016).

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