# The Role of Using Virtual Reality in Learning in an Education Environment

Mohammad Faruk[1(✉)], I Made Sri Undy M[1], Imam Syafi'i[1], Mukhidin[1], Dadang Sukirman[2], Mohammad Ali[2], and Norlidah Alias[3]

[1] Sports Coaching Education Department, Universitas Negeri Surabaya, Surabaya, Indonesia
`mohammadfaruk@unesa.ac.id`
[2] Doctor of Curriculum Development, Universitas Pendidikan Indonesia, Bandung, Indonesia
[3] Universiti Malaya, Kuala Lumpur, Malaysia

**Abstract.** This study aims to examine the literature on the use of Virtual Reality (VR) in education. The author discusses articles published in the last 10 years that discuss the use of Virtual Reality as a learning medium at all levels of education. A total of 50 articles were analysed comprehensively. The results of the study show that virtual technology allows humans to access simulations of the reality of situations that may not be done directly so that the action taken is to simulate it through virtual technology so that it remains relevant to actual conditions [3]. This virtual reality is very suitable to support efforts to solve various problems faced by humans related to limited access to real world conditions which are actually due to certain things. Related parties can use this technology to achieve their goals so that from all the limitations of existing circumstances, humans can still maximize everything they want to achieve or everything they want to do.

**Keywords:** Virtual Reality · Learning · Educational Environment

## 1 Introduction

In accordance with today's developments, the development of digital technology is also equally felt by various levels of society [1]. Technology is very rapidly developing in every joint of life, including in the educational environment. The use of technology in educational protection increased significantly during the COVID-19 pandemic. The existence of various rules related to preventing the expansion of this pandemic, inevitably the learning process in schools must use online learning media in which both educators and students have to learn a lot in order to be able to adapt to these conditions.

Learning is basically more effective if it is done offline, but some conditions require education providers to carry out online learning as happened during the COVID-19 pandemic, although it will directly affect the courses or subjects being taught and of course directly affect towards educators and students [2].

Virtual technology allows humans to access simulations of the reality of situations that may not be done directly so that the action taken is to simulate it through virtual technology so that it remains relevant to actual conditions [3]. This virtual reality is very

suitable to support efforts to solve various problems faced by humans related to limited access to real world conditions which are actually due to certain things. Related parties can use this technology to achieve their goals so that from all the limitations of existing circumstances, humans can still maximize everything they want to achieve or everything they want to do.

In an effort to implement various disciplines of education and sports, the application of computer-based technology greatly encourages the achievement of its goals, especially during the very high restrictions on social activities where it is not possible to carry out its implementation directly, but through technological innovation and computerization, it can still be maximized in such a way.

Many things can be done through computerization or computer programming so that they are relevant in the process of implementing learning, for example by making a game based on certain scientific disciplines, for example in the field of education and sports where this certainly triggers the enthusiasm of students to learn through learning with the game media, especially games. Very close to the daily life of students.

## 1.1 Virtual Reality

Virtual Reality VR is an unreal reality, this software is presented to the user in such a way. The end goal is to create a virtual reality that looks very real. The simplest form of virtual reality is a three-dimensional (3D) digital image, the image can only be viewed via a computer. Mouse and keyboard keys can be used to change the user's point of view.

As this technology develops, demands for interaction also arise. Therefore, gadgets in the form of gloves were created. Through these gloves, your hand movements are read in virtual reality. You can also interact with whatever is there. Launching the Virtual Reality Society, this technology is often used for games. However, there are still many other places to use VR.

The use of computer technology to create a simulated environment that can be explored in 360 degrees. This use of computer modeling and simulation allows a person to visually interact three-dimensional (3D) artificial or other sensory environments [4] VR technology is like immersing the user in a computer-generated environment that simulates reality through the use of interactive devices. The device sends and receives information that is used, among others, such as glasses and earbuds (headset).

Virtual reality technology plays an important role in realizing telesensation. The virtual world is a deep illusion technique from the front or the side (stereoscopy), depending on the point of view of seeing from the front or the side. The ability to enter and walk through virtual worlds and handle objects using motion makes VR interactive, that's one of the most important features.

## 2 Method

This study used the descriptive qualitative method. The selection of this method is adjusted to the research objectives. The research locations are in vocational universities, vocational schools, and state and private industries under the auspices of the government and the private sector in the province of East Java. The research stages are shown in Fig. 1.
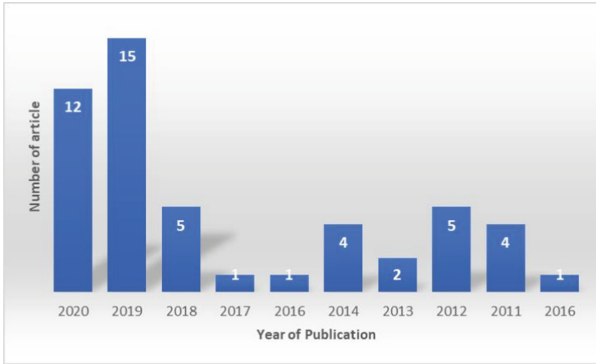
**Fig. 1.** Chart of published articles by year of publication

The stages carried out by the researcher include: 1) problem mapping, 2) litera-ture study, 3) research instrument development, 4) research instrument distribution, 5) research instrument data analysis. The instrument was used in the form of a semi-open questionnaire and documentation. Data analysis used descriptive qualitative to describe the data collected through questionnaires. The document study is intended to confirm the data from the questionnaire.



Article selection should have the following criteria:

a) Related articles provide for the use of VR technology in educational institutions, b) Articles must be published within the last 10 years. The results of the articles reviewed by year of publication are shown in Fig. 1.

## 2.1 Data Analysis

A total of 50 articles analyzed in this study have met the initial criteria that the influence of the role of virtual reality as a learning medium can significantly affect student interest, participation and motivation as well as learning outcomes, especially in the last 10 years.

## 2.2 Categories Virtual Reality

The main category chosen in this study is the use of Virtual Reality (VR) technology in an educational environment. Virtual Reality (VR) was developed for its use to act as a learning medium in the learning process in schools.

## 3   Result

### 3.1   General Findings

Based on 50 articles carefully studied in this study, the use of virtual reality in learning activities involving various methods, it was found that the development of learning media using virtual reality technology with different models was carried out in varying levels of education such as early childhood and elementary school, junior high school, secondary school, vocational schools, college environments, and virtual reality developments are also found in special settings such as children with special needs (disabilities). The results of the journal review can be seen in Fig. 2.

Student response to the use of VR technology in the learning process. The implementation of the development of Virtual reality technology caused a very positive response from students. The students were pleased and motivated by the use of VR technology in the field of education. In addition, educators (teachers and lecturers) have a positive impression in the use of VR technology in the educational environment [1, 5, 7], where users can increase freedom in learning.

### 3.2   The Impact of the Use of VR Technology

The findings show that the application of VR has several advantages in the learning process that show improvements not only in the cognitive skills of learners but also result in student motivation that affects their achievement in the learning process.

### 3.3   Development of VR in the Field of Disability

The results show that VR interventions are safe and feasible for children with a variety of disabilities and, in particular, for children with cerebral palsy (CP). They showed that VR has the potential to be a very attractive rehabilitation technique for children with disabilities because it involves them in games that motivate them to explore and practice the repetitive activities needed for skill acquisition. VR has a role to play in the
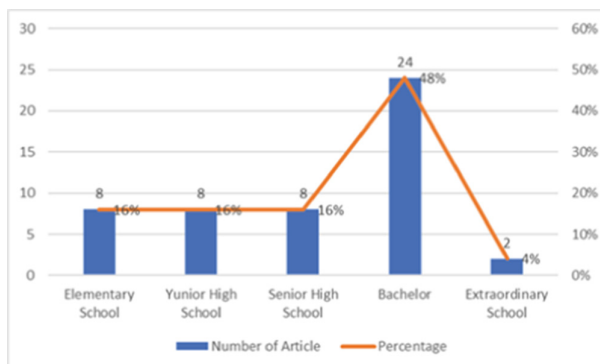


**Fig. 2.**   The use of virtual reality at various levels of education

cognitive rehabilitation of students with intellectual disabilities. The potential to develop a system that simultaneously assesses and addresses the educational, rehabilitative and therapeutic needs of a group that can benefit with technological advances.

## 4 Conclusion

The results of the study show that virtual technology allows humans to access simulations of the reality of situations that may not be done directly so that the action taken is to simulate it through virtual technology so that it remains relevant to actual conditions. This virtual reality is very suitable to support efforts to solve various problems faced by humans related to limited access to real world conditions which are actually due to certain things. Related parties can use this technology to achieve their goals so that from all the limitations of existing circumstances, humans can still maximize everything they want to achieve or everything they want to do.

## References

1. McGovern, E., Moreira, G., & Luna-Nevarez, C. (2020a). An application of virtual reality in education: Can this technology enhance the quality of students' learning experience? Journal of Education for Business, 95(7), 490–496. https://doi.org/10.1080/08832323.2019.1703096
2. Mesra, Romi, Nonsi Mononege, and Yossi Christian Korah. 2022. "Efektifitas Pembelajaran Online Dan Offline ( Hybrid Learning ) Bagi Siswa Di Sma Negeri 1 Tondano." 8(3):2287–94. https://doi.org/10.36312/jime.v8i2.3710/http.
3. Elmqaddem, N. (2019a). Augmented Reality and Virtual Reality in education. Myth or reality? International Journal of Emerging Technologies in Learning,14(3), 234–242. https://doi.org/10.3991/ijet.v14i03.9289
4. Finkenberg, Mel. E., & Mohnsen, B. (2003a). Virtual Reality Applications in Physical Education. Journal of Physical Education, Recreation & Dance,74(9), 13–15. https://doi.org/10.1080/07303084.2003.10608513
5. with education. Journal of Physics: Conference Series, 1456(1). https://doi.org/10.1088/1742