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Muhammad Ikhsanuddin, Kholil, Muhtar Hidayat, Rizka Setiawan & Slamet Budiyo

Institut Islam Mamba' ul 'Ulum Surakarta

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Analysis of The Potential of The Metaverse in The Education Sector in Indonesia

Muhammad Ikhsanuddin^{1*}, Kholil², Muhtar Hidayat³, Rizka Setiawan⁴, Slamet Budiyo⁵
Institut Islam Mamba'ul 'Ulum Surakarta^{1,2,3,4,5}

Corresponding author's email: abuarfanjr@gmail.com

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ABSTRACT

The Metaverse is an innovation in 3D virtual space technology, and its rapid development and implementation have sparked curiosity among many people and have been widely used in various fields. This research study explains the challenges and opportunities of the Metaverse in the field of education and its application in the educational world. The research method used is a literature survey by collecting data from various sources in academic journals relevant to the discussed topic. A narrative review will be used as the research design. Data collection is summarized from articles in international journals, accredited national journals, and proceedings, from the years 2017 to 2022. The research results show that the popularity of the Metaverse has peaked in recent months, and the acceleration of Metaverse technology in the education sector can be observed through the implementation of digital learning media based on augmented reality and virtual reality. The Metaverse is believed to overcome existing limitations in the educational world, such as classroom capacity restrictions due to the pandemic, and limitations of distance and time in attending classes, among others. The concept of a virtual world makes online learning more interactive without sacrificing the learning experience of students. Learning anytime, anywhere is an appealing concept embraced by many Gen Z individuals today. The Metaverse is expected to enter many areas of human life in the next 10-15 years.

Keyword: Analysis Potential, Metaverse, Education in Indonesia

INTRODUCTION

On October 29, 2021, Mark Zuckerberg announced that Facebook would change its name to Meta and make significant investments in the development of Metaverse technology (Muhammet Damar, 2021). Many see the Metaverse as a new buzzword. However, the concept of the Metaverse is not new. The term "Metaverse" first appeared in Neal Stephenson's 1992 speculative novel "Snow Crash" (Li & Xiong, 2022). In this novel, Stephenson defines the Metaverse as a large-scale virtual environment. The Metaverse world was also introduced in the novel and film "Ready Player One." Naya, V.B., Lopez, R.M., and Hernández, I.L. (2012) define the Metaverse as a virtual environment, also known as MUVE (Multi-User Virtual Environments), which is derived from MMORPG (Massive Multi-player Online Role-Playing Games), resulting from the combination of virtual reality Augmented reality (AR), virtual reality (VR), and the Internet allow anyone to meet avatars in a 3D virtual video game.

In this way, the Metaverse and its supporting technologies enable users to feel as if they are in a highly realistic virtual environment (Díaz et al., 2020). It is not limited to video games and other recreational activities (Lee, 2021). Metaverse technology can be applied in many aspects of life. One of the main areas discussed in this article is the field of education. The development of the Metaverse also addresses the shortcomings of current virtual dimension technology, which is still limited to senses and experiences. The low self-awareness created by 2D virtual technology results in a suboptimal user experience when exploring virtual spaces (Dunn, T.J.; Kennedy, 2019). While 2D virtual technology has been replaced by 3D technology, the models presented by 3D technology provide users with a more realistic visual sensation. This Metaverse technology is fundamentally different from AR and VR. Taman, M., and Kim, Y.G. (2022) state that there are three key differences between the Metaverse and AR and VR, two technologies that preceded the Metaverse. First, while VR-related research focuses on physical approaches and rendering, the Metaverse has a stronger aspect as a service with more sustainable content and social relevance. Second, the Metaverse does not necessarily require the use of AR and VR technologies. A platform can be a Metaverse application even if it does not support VR and AR. Lastly, the Metaverse has a scalable environment that can accommodate many people, which is crucial for enhancing the social significance emphasized by this technology (Xi et al., 2022). When talking about VR, people usually refer to futuristic sci-fi imagery and sophisticated hardware. However, it is important to realize that VR involves processes in the human brain that do not require devices. Humans can experience alternative realities through imagination, such as thoughts, fantasies, or daydreams (Hemmati, 2022; Park & Kim, 2022).

In fact, the construction of virtual worlds has been an essential part of the human experience since the early days of primitive humans, playing a crucial role in articulating creative visions of the future and innovative solutions to technological problems. This knowledge is vital for future Metaverse applications (Blascovich, J & Bailenson, J, 2011). Figure 1. Concept of the Metaverse (Source: Mystakidis, S. (2022). Metaverse. 486–497) The main dimensions are shown in Figure 1. However, in the context of reality In the context of mixed reality (MR), social media connectivity can be combined with the unique immersive capabilities of VR and AR technology. When interactions among these technologies are creatively unleashed, they promise to transform many areas of life, including education. New formal and informal learning experiences are made possible using the concept of virtual online campuses (Kye et al., 2021).

Online learning in the Metaverse can push the boundaries of social connection and informal learning. Physical presence in the classroom is no longer a privileged educational experience. Telepresence,

avatar body language, and facial expressions make virtual meetings as effective as face-to-face meetings. Additionally, social MR in the Metaverse allows for blended and active teaching methods to foster deeper and more enduring knowledge (Mystakidis, S., 2021). More importantly, it will become a democratizing factor in education, enabling equal participation worldwide, no longer constrained by geographical boundaries (Girvan, 2018).

METHODS OF RESEARCH

This type of research is a literature study. Literature research method involves a series of activities related to how library data is collected, how to read and take notes, and how research materials are managed (Bermejo & Hui, 2021; Muhammet Damar, 2021). Literature research is conducted by every researcher with the main goal of extracting and building theoretical foundations, frameworks, and finding the basis for making initial speculations, also known as research hypotheses. It allows researchers to categorize, connect, organize, and utilize various libraries in their field. The survey population consists of individuals with connections in the fields of information technology and education. A narrative review is used as the research design for the literature survey. A narrative review is a type of research that summarizes theories, examines research, and reviews the methods used in existing research. This review gathers a collection of literature written on the subject and synthesizes it into a coherent interpretation that highlights the key issues, trends, complexities, and controversies at the heart of the debate. The article search procedure was conducted on Google Scholar, the Publish or Perish application, or Science Direct by entering the keywords Metaverse and Education. We searched for articles from international journals, accredited and non-accredited national journals, proceedings, papers, or articles from 2017 to 2022.

The validation and review process encompass several criteria, including open access journals (OJS), the methodological quality of articles, the quality of data presentation and discussion, the adequacy of data for analysis, recent references, and relevance. The results of the validation and review of scientific work are presented in the form of tables. Data analysis uses qualitative analysis following the Miles and Huberman model, which includes data reduction, data analysis, and drawing conclusions.

RESULT AND DISCUSSION

The literature review utilizes bibliometric approaches to identify trends and patterns in scholarly growth and analyze the novelty and prevalence of scholarly references. Our analysis indicates that educational metaverse has been actively debated by various researchers over the past two years. The scholarly articles obtained were extracted from a total of 25 scholarly articles from both domestic and international sources from the Google Scholar and Scopus databases using the keywords "metaverse" and "education" over the past five years, from 2017 to 2022. Then, from this dataset, the articles were analyzed using literature analysis methods. This is the method used to examine various academic data. From the visualization above, we can see that various discussions related to metaverse and education have been actively discussed by researchers over the past two years. Analysis of author keyword trends indicates that selected articles use 573 author keywords in at least three occurrences. As a result, authors use 48 keywords in their articles, which then decrease from 48 to 29 related keywords. As shown in Figure 1, this is closely

related to metaverses and formation. Figure 2. Keyword Density, Overlay, and Network Visualizations on Metaverse & Education. Some examples of journals analyzed are as follows: 1. A Metaverse: Taxonomy, Components, Applications, and Open Challenges (Park & Kim, 2022). 2. Educational Applications of Metaverse: Possibilities and Limitations (Kye et al., 2021). 3. The Metaverse Phenomenon in the Teaching of Digital Media Art Major (Li & Xiong, 2022). 4. Virtual World as a Resource for Hybrid Education (Díaz et al., 2020). 5. A whole new world: Education meets the Metaverse (Hirsh-Pasek et al., 2022).

Metaverse technology can be helpful. Considering its potential, education in the Meta-verse era will offer different experiences in the world of education. The presence of the Metaverse can optimize current educational technologies and media, making them more effective. The learning experiences gained by students with Metaverse technology are even more helpful in developing soft Skills and improved self-awareness are better enhanced, thanks to the simulations created. The Metaverse also serves as a solution for distance learning, but it is currently less effective due to the lack of interaction between students and teachers during the learning process. However, there are weaknesses and challenges in using the Metaverse. Providing unlimited or boundless space for the metaverse creates greater commitments that need to be met. In other words, once education enters the metaverse, it must be ready for broader international engagement. Another challenge is the socioeconomic status of communities that not everyone can access in the Metaverse era. However, in online lectures, some students complain about signal disruptions hindering the teaching and learning process. There are still many other challenges. Crimes in the digital world, data security and privacy, motion sickness, nausea, dizziness, and other physical conditions that affect Metaverse devices. However, by familiarizing oneself with this new technology, the application of this technology will be more flexible and will certainly help improve the quality and learning experience in the future.

CONCLUSION

Based on the literature research conducted on the Metaverse as well as its challenges and opportunities in the field of education, it can be concluded that the implementation of the Metaverse in education is highly feasible to support better educational implementation processes. Audiovisual education is currently the most popular application of the Metaverse, widely used in learning. For example, in experiential learning, it's not just about seeing but also about reading, feeling, thus having direct experiential learning processes or simulations enhance learning.

Discussion related to this research is still very limited and requires a lot of input. Suggestions for future researchers are to delve deeper and comprehensively into the Analysis of the Metaverse Potential in the Education World in Indonesia.

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