Hipkin Journal of Educational Research | e-ISSN 1234-5678 & p-ISSN 1234-5678
Volume 1 No 3 (2024) 287-298

Hipkin Journal of Educational Research
http://ejournal-hipkin.or.id/index.php/hipkin-jer/

Exploring the potential of Metaverse: The transformation of social interaction in distance learning

Lisna Dwi Astuti[1], Salma Ambar Sunni Syahbana[2] , Muhammad Nazuar[3]
[1,2,3] Universitas Pendidikan Indonesia, Bandung, Indonesia
lisnadwiastuti@upi.edu[1] , salma.ambar@upi.edu[2] , mnazuar@upi.edu[3]

ABSTRACT

Distance learning has become a new educational paradigm, especially with the ever-evolving technology. One of them is the metaverse, a virtual world that allows users to interact with virtual environments and objects and other users. This study aims to determine the use of metaverse for social interaction during distance learning (online) through a literature review. The method used in this research is a literature study. The existence of Metaverse in education is both an opportunity and a challenge. Learning using Metaverse can provide new experiences for students and is not limited by space and time. Metaverse can be used in distance learning to improve social interaction between students and teachers, as well as between students with each other. It is hoped that this article can provide insight into the potential of Metaverse in transforming social interaction in distance learning.

ARTICLE INFO

Article History:
Received: 29 Aug 2024
Revised: 12 Nov 2024
Accepted: 21 Nov 2024
Available online: 8 Dec 2024
Publish: 30 Dec 2024

Keyword:
distance learning; Metaverse; social interaction

Open access
Hipkin Journal of Educational Research is a peer-reviewed open-access journal.

ABSTRAK

Pembelajaran jarak jauh telah menjadi suatu paradigma baru dalam dunia pendidikan, terutama dengan teknologi yang terus berkembang. Salah satunya Metaverse yang merupakan dunia virtual sehingga memungkinkan pengguna untuk berinteraksi dengan lingkungan dan objek virtual serta dengan pengguna lainnya. Penelitian ini bertujuan untuk mengetahui penggunaan Metaverse terhadap interaksi sosial saat pembelajaran jarak jauh (online) melalui tinjauan literatur. Metode yang digunakan pada penelitian ini yaitu studi literatur. Keberadaan Metaverse dalam dunia pendidikan menjadi peluang sekaligus tantangan. Pembelajaran menggunakan Metaverse dapat memberikan pengalaman baru untuk peserta didik dan tidak terbatas oleh ruang serta waktu. Metaverse dapat digunakan dalam pembelajaran jarak jauh untuk meningkatkan interaksi sosial antara peserta didik dan guru, serta antara peserta didik satu sama lain. Diharapkan artikel ini dapat memberikan wawasan tentang potensi Metaverse dalam transformasi interaksi sosial dalam pembelajaran jarak jauh.

Kata Kunci: *interaksi sosial; Metaverse; pembelajaran jarak jauh*

How to cite (APA 7)
Astuti, L. D., Syahbana, S. A. S., & Nazuar, M. (2024). Exploring the potential of Metaverse: The transformation of social interaction in distance learning. *Hipkin Journal of Educational Research, 1*(3), 287-298.

Peer review
This article has been peer-reviewed through the journal's standard double-blind peer review, where both the reviewers and authors are anonymised during review.

INTRODUCTION

Distance learning has become a new paradigm in education, especially with the continuous development of technology. With the emergence of online platforms and technological tools, students and teachers can connect without having to be in the same physical location. However, despite providing easy access, this approach to learning often poses challenges related to the lack of in-depth social interaction between students and teachers. The application of one-way teaching methods has a negative impact on students due to their lack of motivation to learn. In the context of distance learning, social interaction is considered a crucial element that supports an effective educational process. Social interaction enables the exchange of ideas, in-depth discussions, and collaboration between students and teachers.

Currently, technology continues to evolve to meet the needs of distance learning. One of them is the Metaverse, an innovative concept that offers great potential in the context of distance learning. In the rapid development of the digital world, the idea of the Metaverse has emerged as the basis for the development of cutting-edge technology-based learning approaches (Cahyani *et al.,* 2024). With increasingly advanced virtual technology integration, the Metaverse enables more interactive and in-depth learning in a digital environment. Metaverse platforms facilitate closer social interaction with users, allowing students and teachers to engage in collaborative activities, discussions, and project-based learning without being constrained by geographical limitations.

Previous research indicates that the public remains largely uninformed about the Metaverse (Hapidz *et al*., 2022). There are still pros and cons regarding the use of the Metaverse in education. This is due to several factors, including the limited availability of technology in certain areas, which results in a lack of knowledge about the Metaverse, both in terms of its form and its applications. Meanwhile, in major cities, some people are already quite familiar with the Metaverse, as many companies in these areas are beginning to utilize it. Metaverse technology is widely used to enhance accessibility to places, learning resources, or experiences that can help maximize learning by presenting them as closely as possible to the real thing (Cecere *et al.,* 2024; H. K. Lee *et al.,* 2022). The difference between this study and previous studies is that this study focuses on one learning model, namely Distance Learning (DL). This was chosen because Distance Learning (DL) has become one of the learning alternatives that is often used in schools and is referred to as the education model of the future.

This study aims to investigate the use of the Metaverse in social interaction during distance learning (online) through a literature review. This study was conducted by reviewing previous studies to examine how interactions occur in Distance Learning (DL) and whether they can fulfill the interactions that typically occur in face-to-face learning. Through further research and exploration, the researcher will explore how the effective use of the Metaverse can improve the quality of social interaction and learning experiences in the context of distance education. When a literature review thoroughly explains the benefits of the Metaverse and the learning that occurs within it, it can open up opportunities for more widespread adoption of the Metaverse. As a result, the use of the Metaverse in distance learning represents a significant step in understanding the extent to which this technology can transform the way we learn and interact in a virtual educational environment. This research is expected to provide a comprehensive understanding of the impact of the Metaverse on distance learning. This research is important because it can provide valuable insights for educational institutions when considering the implementation of distance learning.

LITERATURE REVIEW

Metaverse

The metaverse is a technological innovation that is widely used in the current era. The Metaverse is a virtual world developed by Mark Zuckerberg, CEO of Facebook, now known as Meta Platform Inc. or Meta. The Metaverse project was developed because Mark Zuckerberg conceived a new idea about the future direction of the internet, envisioning a world where the virtual and the real merge, combining reality and virtuality. It was this idea that ultimately led to the creation of the Metaverse as a bridge that would eliminate the limitations of the real world. The word “Meta” is a compound word meaning transcendence and virtuality, and “verse” means world and universe (Kurdi, 2021). Following the emergence of the Metaverse concept, research was conducted to bring the Metaverse into reality. The Metaverse is understood as a layer between users and reality.

The metaverse is a virtual world with various features accessible through computers, smart devices, augmented reality, and virtual reality headsets, which facilitate users' exploration of the digital world and interaction with other users, as principles of the metaverse (Nugraha & Purwati, 2023). The metaverse enables users to experience an online environment that resembles the real world. The metaverse exists as an augmentation of the real world, a three-dimensional environment that allows individuals to interact with and engage in it (Fauzian, 2022). The metaverse focuses on virtual reality that exists outside of reality. The metaverse encompasses various aspects of life, including social, economic, and cultural. In the metaverse, people can interact with each other, evolve together, and collaborate on projects. The metaverse is based on Virtual Reality and Augmented Reality technology.

Virtual Reality (VR) is a technology that can display a virtual world that appears to be real. This allows VR users to be immersed in the environment they see, making them feel as if they are experiencing it in real life. This technology can be used to interact with computer-generated 3-dimensional objects, such as 360-degree videos that display detailed angles (Siahaya, 2024). In the field of education, VR can serve as a learning medium that offers diverse experiences to students, thereby creating interactive and practical classes and facilitating easier understanding of the learning material.

Next, Augmented Reality (AR) refers to technology that combines the real world and the virtual world in real-time. The use of AR still requires an effort to combine the real world and the virtual world created on a computer, so there is still a thin line between the two. AR can be used directly through 3D and assisted by a smartphone camera (Yusup *et al*., 2023). The primary difference between VR and AR is that VR technology creates a fully immersive virtual environment, effectively disconnecting users from the real world. Meanwhile, AR technology combines the real world and the virtual world, allowing users to remain in their real environment.

Social Interaction

Social interaction is one of the learning models based on theory, namely Gestalt learning theory (field theory). This model focuses on harmonious relationships between individuals (learning to live together). Social interaction itself comes from the words *Con* or *Cum*, which means together, and *tango*, which means to touch, literally meaning to touch together. Social interaction is generally defined as the relationship between individuals, between individuals and groups, and between groups, which influence one another (Setyaningsih, 2020). Social interaction is a form of action involving two or more objects that affect each other. Two-way effects are important in interactions where both individuals initiate interactions and those who receive them (Fahri & Qusyairi, 2019). Interaction occurs when both parties share a

common orientation. Simply paying attention to someone is not a form of interaction, because the person being observed may not be aware of it and may not respond accordingly.

Social interaction is the essence of humanity as social beings. Social interaction is a necessity for everyone. Without social interaction, there would be no communal life. Similarly, society is a network of relationships that involve both giving and taking. One speaks, another listens; one asks, another answers; one gives orders, another obeys; all influence each other and must therefore support one another. The main condition for social interaction to occur is the existence of social activities. Social interaction occurs when the behavior of one individual can influence, change, or improve the behavior of another individual, and vice versa. Soekanto, in his book "*Sosiologi Suatu Pengantar*," states that there are various forms of interaction, such as social interaction that brings people closer together or unites them, which is called associative, and social interaction that distances or divides people, which is called dissociative. Social interaction is categorized into the following forms: a) Cooperation; b) Competition, namely accommodation and conflict.

Distance Learning

Learning is a process of interaction between students, teachers, and learning resources in a learning environment (Muis, 2021). In learning activities, teachers act as facilitators who must be able to condition the learning environment so that changes in student behavior occur in the form of knowledge, skills, attitudes, and other positive values. In addition, through the learning process, students can collaborate to discuss, work together, and create innovations, so that the knowledge gained is not limited to the classroom. Knowledge can be obtained from various sources, supported by rapidly developing information technology (Santoso, 2023). This will make it easier for people to obtain and disseminate information. The learning process occurs throughout a person's life and can take place anywhere and at any time.

Distance learning is a learning process that utilizes certain media to facilitate interaction between teachers and students. Distance learning is a form of learning that utilizes specific media to facilitate interaction between teachers and students, eliminating the need for physical presence (Prawiyogi *et al*., 2020). This means that through distance learning, teachers and students can be in different locations, even separated by great distances, facilitating the learning process. Distance learning, also known as e-learning, is a new learning method that utilizes information and communication technology as its primary tool for delivering learning materials and strategies (Atikah *et al*., 2021). Therefore, Distance Learning (DL) is a teaching and learning process that occurs without physical presence and is supported by current technology as a learning medium, such as Zoom, Learning Management Systems (LMS), Google Meet, and other media.

METHODS

The method used in this study is the literature study method. According to Zed in the book "*Metode Penelitian Kepustakaan*," a literature study is defined as a series of activities related to the collection, reading, and recording of library data, which are then processed as research material. This study focuses on identifying the potential of the Metaverse as a transformation of social interaction in distance learning. In this case, the researcher aims to identify the common thread of experts' thoughts on how Metaverse technology can facilitate social interaction during distance learning (online). The researcher collected information from various sources, including books, journals, and other literature discussing the Metaverse. Next, the researcher will conduct a descriptive analysis of the information obtained and link it together to create coherent information that is easy for readers to understand.

RESULTS AND DISCUSSION

The results of research on the Metaverse, as described in various published studies, are summarized by researchers in Table 1 below.

Table 1 Research Results on the Metaverse

No	Author	Discussion
1.	Zonaphan *et al.* (2022)	Active learning using the Metaverse will provide a new experience for students. The Metaverse enables students to interact within a virtual world through a learning system that is more interactive, accessible, and engaging, thereby supporting teachers in the learning process.
2.	Cai *et al*. (2022)	The use of the Metaverse in education has great potential. However, some challenges must be overcome in order to utilize the Metaverse, namely accessibility to supporting devices, the readiness of teachers and students to use the Metaverse, and ethical issues.
3.	Herlambang & Abidin (2023)	The metaverse is an innovation in the world of the internet that can change social interaction patterns through the use of more advanced technology. The emergence of technology in the metaverse warrants critical attention, as the metaverse's presence can be both an opportunity and a challenge for society. Therefore, preventive measures are needed to face the future.
4.	Lee & Hwang (2023)	The rapid advancement of technology today requires teachers to adapt by enhancing their competencies, particularly in utilizing the Metaverse. Teachers need to master the 4Cs: critical thinking, creativity, collaboration, and communication in this digital age and experience its pedagogical benefits.
5.	Hambali *et al*. (2023)	The existence of the Metaverse has given people the freedom and flexibility to interact, such as chatting and sharing experiences, without having to leave their homes. This can increase creativity, supported by the Gather Town platform, which combines video calls with 2D maps, making it easy for users to interact and communicate while exploring the virtual environment. Gather Town can be used for free with a maximum capacity of 10 people. With the limitations of online classes and long distances, Gather Town can be a solution for distance learning by providing a new experience and immersion for students.
6.	Hussain (2023)	In this study, the author takes the perspective that the Metaverse can change the education system that has been established for centuries. The Metaverse will present a challenge in the world of education, while also offering an exciting opportunity to enter the virtual world and overcome distance, thereby promoting equality, diversity, and inclusion in the academic world.
7.	Prakash *et al*. (2023)	The Metaverse refers to a virtual world created by the convergence of the physical and digital worlds, enabling immersive and interactive experiences. In the world of education, the Metaverse has enormous potential to revolutionize the way students learn and interact with information. However, there are still challenges associated with the use of the Metaverse in education, including issues related to accessibility, data privacy, and technological infrastructure requirements.
8.	Alderbashi (2023)	This study examines the utilization of the Metaverse in private schools in the UAE. The results show that 88.37% of respondents support the use of the Metaverse. In this case, the use of Metaverse can develop students' observation skills, teamwork, analytical thinking, and problem-solving skills. The use of the Metaverse can also improve students' academic achievement and information retention levels.
9.	Guillén-Yparrea & Ramírez-Montoya (2023)	The Metaverse can be used to foster intercultural competence and bring together students from diverse cultural backgrounds through a virtual environment. Activities within the Metaverse will also reflect the real world, enabling deeper interactions between students.

No	Author	Discussion
10.	Salloum *et al.* (2023)	This study demonstrates that an innovative academic environment can have a positive impact on teachers' and students' attitudes toward new technologies. Additionally, this study demonstrates that innovation is crucial for the effective utilization of the Metaverse system. Socialization of the Metaverse system in the educational environment can be achieved by holding seminars and workshops, offering incentives for teachers to utilize it, and allowing experts to assist teachers in maximizing the system's benefits.

Source: 2024 Research

Discussion

Learning Transformation in the Metaverse

The 4.0 industrial revolution requires us to be able to use digital tools and utilize the internet in various types of daily activities. Not only that, but big data is also being developed to generate new knowledge, further enhanced with cloud computing and autonomy, providing a glimpse of future technology. This is followed by the Internet of Things (IoT) and data management, ultimately leading to the emergence of the Metaverse, the next major technology. The Metaverse is a technological innovation in the form of a 3D digital world that combines AR and VR technologies (Zonaphan *et al.*, 2022).

On the cloud computing page, Waranggani wrote that in Indonesia itself, the development of the Metaverse is being built in stages (see: https://www.cloudcomputing.id/berita/wirgroup-rancang-Metaverse-indonesia). The potential for implementing the Metaverse in education is evident in the use of AR and VR as learning media. ICE Institute is an online course platform that supports the development of AR and VR technology, particularly in the educational sector. ICE Institute is collaborating with the Indonesia University of Education as a first step in developing the Metaverse in education. This ecosystem is being built to improve Indonesia's human resources through quality education. The Metaverse presents a virtual world that enables interaction through innovative and engaging learning experiences.

The transformation of learning in the Metaverse occurs when certain aspects are fulfilled, including: 1) interactive capabilities, which refer to the way individuals behave socially so that they can interact with others. Social interaction must be possible for every individual or group; 2) virtual collaboration, a communication method that utilizes technology for activities such as generating ideas, critiquing, and problem solving; 3) the use of AR and VR technology, an experience that combines the virtual and 3D worlds; 4) resource efficiency; and 5) facilities and infrastructure.

The implementation of the Metaverse in education requires much preparation. In addition to the aspects previously discussed, security is a requirement that must be met, and there needs to be a legal basis for cyber and data. Additionally, users and the community must make an effort to develop digital literacy skills in order to welcome the Metaverse era (Cai *et al.*, 2022). This digital literacy skill must be supported by every community so that the use of the Metaverse can be maximized, and they will not be left behind in the times.

Utilization of Metaverse in Distance Learning

As time progresses, learning styles and models must also evolve in line with developments. The changing times encourage people to carry out activities effectively and efficiently, allowing them to be completed easily without restrictions on space and time, which provides a more engaging experience (Hambali *et al.*, 2023). In the presence of the Metaverse, humans can create a new world through the same building blocks as in the real world, without involving or destroying what already exists in the real world.

In the Metaverse itself, there are several other worlds present, one of which is caused by Mirror World (Iswanto *et al*., 2022). Through the Mirror World, there is a simulation of life outside the world where the conditions and environment are a reflection of the real world in a better version. The system used by Mirror World involves transferring aspects similar to the real world to Mirror World under more comfortable and efficient conditions. Through Mirror World, some representatives can be utilized in the educational world, such as digital classrooms, digital laboratories, and others.

Through the Metaverse Mirror World, learning in the educational world has great potential to provide a learning environment that is as realistic as possible, with a broader scope of information and functions than the real world, without altering the meaning contained in the reflection of the real world. In addition to Mirror World, there is another type of Metaverse, namely VR, which relies on simulations of the inner world through reality technology that is designed differently from the real world. In a narrow sense, all activities, including movements, activities, and aspects of life such as economic activities, are carried out through virtual living spaces (Iswanto *et al*., 2022).

With the advent of VR, it has become one of the most diverse types of Metaverse in terms of usage and is considered the most active in education. The use of Virtual Reality provides easy access, regardless of time and place, thereby achieving the expected efficiency and effectiveness in educational activities in this era of development. The presence of the Metaverse is not merely a necessity of the times to develop without any real essence. However, with the presence of the Metaverse in the realm of education, students can critically and creatively capture and explore information, processing the information obtained from the breadth of available resources, including digital literacy and extended reality frameworks (Chang *et al.,* 2023). In addition, the contribution of the Metaverse to the world of education provides a deeper understanding than learning through text, as the presence of the Metaverse enables students to develop their knowledge management skills through hands-on experience.

The experience provided by Metaverse is interactive, allowing participating students to feel more present than they would during traditional learning activities (Hariyono, 2023). The limitations of space and time, which were previously the main factors contributing to ineffective learning, can now be overcome by incorporating Metaverse technology, where learning activities will continue to take place in real-time through technologies that collaborate with the Metaverse. As the Metaverse relies on 3D virtual technology that does not alter the characteristics and features of the real world, it enables experiences that cannot be had in the real world due to limitations of space and time. The in-depth experience gained by each participating student enhances their ability and skills in comprehensive thinking, which also involves their problem-solving abilities, skills that are certainly needed in the real world (Guillén-Yparrea & Ramírez-Montoya, 2023).

In the use of the Metaverse, training in learning activities is carried out through exercises that utilize simulations of real-world environments likely to be experienced by young students, and can be implemented with minimal costs and risks. Therefore, learning through the Metaverse is said to offer students a more effective learning experience.

Social Interaction in Distance Learning Using the Metaverse

In Metaverse learning, the emphasis is on social interaction, which forms a strong foundation for a deep learning experience. Metaverse learning is a learning approach that utilizes Metaverse technology, which promises improvements in the learning process (Humaira *et al*., 2024). The metaverse is based on technology that enables interaction with various senses using virtual environments, digital objects, and humans. Wibowo, in his book "*Literasi Digital*," mentions that the accuracy of the XR system display is made possible by stereoscopic displays that can provide depth perception.

Interactions occur in accordance with the three fundamental characteristics of the Metaverse: interactivity, physicality, and permanence. This also applies to current technological developments, as explained based on research experience. Interactivity means that users can communicate with others through the Metaverse. Users can develop broader communication with their peers through various platforms, hold discussions, and exchange ideas in a virtual environment that offers freedom of expression without geographical boundaries (Hussain, 2023). For example, students can join virtual classrooms to listen to and interact with teachers and fellow students from anywhere in the world. In addition, collaboration on group projects is easier in the Metaverse, where team members can design, create, or complete tasks together directly in the digital space that has been created. The Metaverse can facilitate collaboration and social interaction in the learning process (Hennig-Thurau *et al.,* 2023).

The metaverse also provides opportunities to deepen learning experiences through realistic simulations (Guillén-Yparrea & Ramírez-Montoya, 2023). Users can engage in situations that mimic the real world, allowing them to hone their skills, test strategies, and explore scenarios that may be difficult to do in the real world. In the Metaverse environment, simulations like this can provide valuable practical experience for learners, allowing them to learn more engagingly and responsively to their surroundings. This means that the interactions that occur will not be significantly different from those in face-to-face learning.

Challenges and Advantages of the Metaverse

The metaverse has the potential to transform the way education is delivered fundamentally. In this case, schools, classrooms, and the learning process could exist entirely in the virtual realm. Everything, from school design to administrative management, could be done digitally without physical presence (Salloum *et al*., 2023). This has the potential to shake up the current concept of education drastically. Although it is an attractive prospect, it also raises serious concerns regarding its implications and impacts, which cannot be predicted with certainty (Herlambang & Abidin, 2023).

In the era of Revolution 4.0, the work of a teacher has become more complex. There are four steps necessary for a teacher to be ready to face this era (Suryati *et al*., 2022). First, teachers must have a deep understanding of their field and be aware of developments in related science and technology. Second, the ability to work professionally with excellence and high quality is key. Third, teachers need to be able to produce work that demonstrates their expertise and professionalism. Finally, teachers need to possess a character that aligns with the society in which they are using technology. Society as a whole plays a role in the direction, goals, and vision of education. However, the weakness of the Metaverse in the context of education lies in the lack of close social interaction between users.

The limitations of the Metaverse in the context of education lie in the dynamics of social relationships between users. In this virtual space, users can become very expressive and are encouraged to present the version of themselves that they want to show, which is often different from their actual self-concept. Privacy is also an issue that needs to be considered when using the Metaverse (Rewara *et al*., 2024). The use of the Metaverse often makes people feel free, which can create the impression that their actions have no consequences, as in the real world. This can lead to problems in social interactions, where the boundaries between the virtual and real worlds become blurred for users.

In the workplace, the shift towards more common online meetings, expected to reach around 75% by 2024, indicates a significant change (H. Lee *et al*., 2022). The metaverse promises enhanced interaction compared to what is currently possible. Efficiency in cost expenditure, time flexibility, and greater freedom characterize the working environment in the metaverse, making it more effective. However, these changes require the world of education to prepare graduates not only in terms of technical skills to work in a virtual environment, but also to understand the potential ethical issues that may arise in the future. The greatest

challenge for education is not only equipping the next generation with skills relevant to the times, but also preserving morality and values that remain relevant amid changing times.

The metaverse presents exciting prospects for the world of education, offering the potential to transform learning by enabling global access, fostering more interactive learning experiences, and driving innovation in teaching methods. However, significant challenges arise alongside its benefits. One of these is a paradigm shift in social relationships and self-concept, which can affect how students interact and feel about the virtual learning environment. Privacy challenges are also a focus, as recordings of every activity have the potential to threaten individual data security (Alderbashi, 2023; Prakash *et al*., 2023). Education must be prepared to face this evolution by preparing teachers and students to adapt to virtual environments, understand the ethics of technology use, and build awareness of its impact. Integrating technology with effective teaching methods and maintaining a balance between physical and virtual interactions is key to addressing these challenges. It is important for education to not only keep pace with technological developments but also uphold moral values, fairness, and responsibility in educating children in this increasingly digitally connected era.

CONCLUSION

The Metaverse has great potential to change the paradigm of education. The interactive capabilities, virtual collaboration, and use of AR & VR technology in the Metaverse offer a more immersive and interactive learning experience. The Metaverse also transforms learning by enabling realistic simulations and practical experiences for students, preparing them to think comprehensively and improve their problem-solving skills. However, significant challenges arise alongside the advantages of the Metaverse. The lack of close social interaction, privacy issues, and the use of the Metaverse, which sometimes blurs the line between the virtual and real worlds, raise concerns about its impact, especially on students' social relationships and self-concept. Paradigm shifts in social interaction and self-concept, as well as privacy challenges, are some of the issues that must be addressed in the use of the Metaverse in education.

As a recommendation, the education sector needs to prepare teachers and students to navigate the virtual environment, foster awareness of the ethics of technology use, and maintain a balance between physical and virtual interactions. Integrating technology with effective teaching methods and upholding moral values are key to addressing challenges and maximizing the potential of the Metaverse in distance learning.

AUTHOR'S NOTE

The author declares that there are no conflicts of interest related to the publication of this article. The author confirms that the data and content of the article are free from plagiarism.

REFERENCES

Alderbashi, K. (2023). The use of metaverse for delivering school education in the future in UAE: Advantages and challenges. *Journal of Curriculum and Teaching*, *12*(6), 265-282.

Atikah, R., Prihatin, R. T., Hernayanti, H., & Misbah, J. (2021). Pemanfaatan Google Classroom sebagai media pembelajaran di masa pandemi COVID-19. *Petik: Jurnal Pendidikan Teknologi Informasi dan Komunikasi*, *7*(1), 7-18.

Cahyani, D. A., Sari, D. M., & Rahma, D. F. (2024). Literature review study: Effectiveness of using GoMeta for Metaverse learning media. *Hipkin Journal of Educational Research, 1*(2), 127-138.

Cai, S., Jiao, X., & Song, B. (2022). Open another door to education—applications, challenges and perspectives of the educational Metaverse. *Metaverse, 3*(1), 1-12.

Cecere, L., Colace, F., Gupta, B. B., Lorusso, A., Messina, B., & Valentino, C. (2024). Metaverse and museum: A case study*. Procedia Structural Integrity, 64*(1), 2189-2196.

Chang, C. Y., Kuo, H. C., & Du, Z. (2023). The role of digital literacy in augmented, virtual, and mixed reality in popular science education: A review study and an educational framework development. *Virtual Reality, 27*(3), 2461-2479.

Fahri, L. M., & Qusyairi, L. A. H. (2019). Interaksi sosial dalam proses pembelajaran. *Palapa*, *7*(1), 149-166.

Fauzian, R. (2022). Metaverse dan pembelajaran sejarah kebudayaan Islam di madrasah: Tantangan dan peluang. *Madaris: Jurnal Guru Inovatif*, *2*(1), 27-37.

Guillén-Yparrea, N., & Ramírez-Montoya, M. S. (2023). The use of Metaverse for intercultural collaboration in higher education. *Proceedings of the 22nd International Conference on Mobile and Ubiquitous Multimedia, 1*(1), 580-582.

Hambali, Y. A., Putra, R. R. J., & Wahyudin, W. (2023). Implementasi Metaverse menggunakan aplikasi Gather Town untuk Pendidikan jarak jauh dengan pendekatan virtual learning environment. *Information System for Educators and Professionals: Journal of Information System*, *7*(2), 163-172.

Hapidz, F., Akbar, F. M., Maulidi, W. K., Siburian, R. M., & Puspitasari, H. (2022). Pemberdayaan teknologi Metaverse bagi kelangsungan dunia pendidikan. *Jurnal Kewarganegaraan*, *6*(1), 1738-1747.

Hariyono, H. (2023). Penggunaan teknologi augmented reality dalam pembelajaran ekonomi: Inovasi untuk meningkatkan keterlibatan dan pemahaman siswa. *JIIP-Jurnal Ilmiah Ilmu Pendidikan*, *6*(11), 9040-9050.

Hennig-Thurau, T., Aliman, D. N., Herting, A. M., Cziehso, G. P., Linder, M., & Kübler, R. V. (2023). Social interactions in the metaverse: Framework, initial evidence, and research roadmap. *Journal of the Academy of Marketing Science, 51*(4), 889-913.

Herlambang, Y. T., & Abidin, Y. (2023). Pendidikan Indonesia dalam menyongsong dunia Metaverse: Telaah filosofis semesta digital dalam perspektif pedagogik futuristik. *Naturalistic: Jurnal Kajian dan Penelitian Pendidikan dan Pembelajaran*, *7*(2), 1630-1640.

Humaira, A., Haq, M. J., & Fitri, T. N. (2024). Metaverse in higher education. *Hipkin Journal of Educational Research, 1*(1), 87-100.

Hussain, S. (2023). Metaverse for education-Virtual or real?. *Frontiers in Education, 8*(1), 1-4.

Iswanto, N. I. P., Widhiantoro, D., Munawar, Z., & Komalasari, R. (2022). Pemanfaatan Metaverse di bidang pendidikan utilization of metaverse in education. *Jurnal Teknologi Informasi Komunikasi*, *9*(1), 44-52.

Kurdi, M. S. (2021). Realitas virtual dan penelitian pendidikan dasar: Tren saat ini dan arah masa depan. *Cendekia: Jurnal Ilmu Sosial, Bahasa dan Pendidikan*, *1*(4), 60-85.

Lee, H., & Hwang, Y. (2022). Technology-enhanced education through VR-making and metaverse-linking to foster teacher readiness and sustainable learning. *Sustainability, 14*(8), 1-21.

Lee, H., Woo, D., & Yu, S. (2022). Virtual reality metaverse system supplementing remote education methods: Based on aircraft maintenance simulation. *Applied Sciences*, *12*(5), 1-15.

Lee, H. K., Park, S., & Lee, Y. (2022). A proposal of virtual museum metaverse content for the MZ generation. *Digital Creativity, 33*(2), 79-95.

Muis, A. A. (2021). Peranan internet sebagai sumber belajar dalam meningkatkan minat belajar Pendidikan Agama Islam peserta didik kelas XI di SMA Muhammadiyah Parepare. *Jurnal Al-Ibrah*, *10*(1), 189-222.

Nugraha, R., & Purwati, A. (2023). Peluang pasar Metaverse tourism pada objek wisata museum di Jakarta. *Jurnal Ilmiah Wahana Pendidikan*, *9*(11), 486-503.

Prakash, A., Haque, A., Islam, F., & Sonal, D. (2023). Exploring the potential of Metaverse for higher education: Opportunities, challenges, and implications. *Metaverse Basic and Applied Research*, *2*(1), 1-11.

Prawiyogi, A. G., Purwanugraha, A., Fakhry, G., & Firmansyah, M. (2020). Efektivitas pembelajaran jarak jauh terhadap pembelajaran siswa di SDIT Cendekia Purwakarta. *Jurnal Pendidikan Dasar*, *11*(1), 94-101.

Rewara, N., Faridah, N. A., & Wijay, T. T. (2024). Inhibiting factors of metaverse adoption in Indonesian education: A literature review. *Hipkin Journal of Educational Research, 1*(1), 75-86.

Salloum, S., Al Marzouqi, A., Alderbashi, K. Y., Shwedeh, F., Aburayya, A., Al Saidat, M. R., & Al-Maroof, R. S. (2023). Sustainability model for the continuous intention to use metaverse technology in higher education: A case study from Oman. *Sustainability*, *15*(6), 1-19.

Santoso, A. B. (2023). Peran teknologi informasi terhadap peningkatan pengetahuan perempuan: Studi Kasus mahasiswa IAIN Manado. *Spectrum: Journal of Gender and Children Studies*, *3*(1), 1-16.

Setyaningsih, K. D. (2020). Analisis pelaksanaan pembelajaran jarak jauh di SD Negeri Karangrena 03. *Jurnal Riset Pendidikan Dasar (JRPD)*, *1*(2), 19-27.

Siahaya, S. R. (2024). Literatur review: Penerapan virtual reality sebagai media pembelajaran interaktif. *Buletin Ilmiah Ilmu Komputer dan Multimedia (BIIKMA)*, *2*(2), 313-319.

Suryati, L., Maksum, H., & Rahmadhani, S. (2022). Manajemen kepemimpinan kepala sekolah dalam upaya meningkatkan kompetensi guru menghadapi era revolusi 4.0. *Jurnal Ilmiah Pendidikan dan Pembelajaran*, *6*(3), 632-642.

Yusup, A. H., Azizah, A., Rejeki, E. S., Silviani, M., Mujahidin, E., & Hartono, R. (2023). Literature Review: Peran media pembelajaran berbasis augmented reality dalam media sosial. *Jurnal Pendidikan Indonesia: Teori, Penelitian, dan Inovasi*, *3*(5), 1-9.

Zonaphan, L., Northus, K., Wijaya, J., Achmad, S., & Sutoyo, R. (2022). Metaverse as a future of education: A systematic review. *International HCI and UX Conference in Indonesia (CHIuXiD), 1*(1), 77-81.