



# Metaverse: A Digital Dimension in the Educational Sector

**Priyanka Ganguly**

Assistant Professor, Madhyamgram B.Ed. College, Kolkata

DOI: <https://doi.org/10.70798/IJOMR/020040020>

Email: [pgangopadhyay17@gmail.com](mailto:pgangopadhyay17@gmail.com)

<p><b>Received</b> 09/06/2025</p> <p><b>Accepted</b> 12/06/2025</p> <p><b>Published</b> 09/07/2025</p>	<p><b>Abstract</b></p> <p><i>In the era of technological advancements, different areas of our modern life have been greatly influenced by the technology. In the field of education also, the influence of the digital culture is seen. "Digitization in education refers to the integration of digital technologies into everyday learning, such as online courses, virtual classrooms, and digital textbooks" (Roberts, 2023). In relation to this digitization in education, the technology of metaverse plays an important role. It creates a digital dimension in the teaching-learning environment. According to Sparks (2021), metaverse can be defined as "a shared online space that incorporates three-dimensional graphics, either on a screen or in virtual reality" (Buhalis et al., 2023). The objectives of the current study are to discuss about the Concept of metaverse, to understand the merits and challenges of using metaverse in the educational sector and to discuss about the possible ways for addressing the challenges of using metaverse. The study has been done by reviewing the secondary data from various sources like research journals, articles and online websites.</i></p> <p><b>Keywords:</b> Digitization, Digital Dimension, Educational Sector, Metaverse, Technology</p>
--	---

## Introduction

In the era of technological advancements, different areas of our modern life have been greatly influenced by the technology. In the field of education also, the influence of the digital culture is seen. "Digitization in education refers to the integration of digital technologies into everyday learning, such as online courses, virtual classrooms, and digital textbooks" (Roberts, 2023). In relation to this digitization in education, the technology of metaverse plays an important role. It creates a digital dimension in the teaching-learning environment. The term 'Metaverse' has come from two words. They are "Meta" which means 'beyond' and "Verse" which means 'Universe'. So, metaverse can be referred to as the "virtual universe that people can enter and experience as if it were real" (Vivian, 2023). According to Sparks (2021), metaverse can be defined

as “a shared online space that incorporates three-dimensional graphics, either on a screen or in virtual reality” (Buhalis et al., 2023). In this virtual world of teaching-learning process, educational sector has been revolutionized by the metaverse technology, which creates an “engaging learning experiences” that transcends the feasible aspects of the traditional classroom environment (Locurcio, 2022 as cited by Pradana & Elisa, 2023). In the current paper, concept of metaverse, merits and challenges of using metaverse in the educational sector, and the ways for addressing those challenges are discussed.

### **Review of Literature**

The concept of metaverse technology has gained an increased attention in the recent years. Several studies have been done on this metaverse technology. In a study by Pradana & Elisa (2023) a systematic literature review has been done on the metaverse technology in relation to education. Another qualitative study by Onu et al. (2023) has focused on examining the influence of metaverse on the teaching-learning process in relation to its advantages and challenges. A study by Kaddoura & Husseiny (2023) has focused on the “rising trends of metaverse in education” in relation to its key merits, demerits and ethical considerations. One study by Zamfir et al. (2023) has discussed about the ethical concerns and ethical principles of using metaverse and highlighted the possible solutions to address the ethical concerns. Some studies (e.g., Velve et al., 2023; Lin et al., 2022) aimed to focus on the fundamental concepts of metaverse, its merits and demerits in relation to education. A study by Huang et al. (2022) has focused on analyzing the construction of the metaverse from various aspects and analyzing the future prospects of metaverse technology.

### **Objectives of the Study**

1. To discuss about the Concept of metaverse.
2. To understand the Merits of using metaverse in the educational sector.
3. To understand the Challenges of using metaverse in the educational sector.
4. To discuss about the ways for addressing the challenges of using metaverse.

### **Methodology of the Study**

The study has been done based on the secondary data which includes several research journals, articles, online websites etc. This is a qualitative study done by the review method.

### **Results & Discussion**

#### **Concept of Metaverse**

The term ‘metaverse’ is coined by Neal Stephenson in his fiction ‘snow crash’ in 1992 (Buhalis et al., 2023). Metaverse, according to Damar (2021), can be considered as a “3D virtual shared world where all activities can be carried out with the help of augmented and virtual reality services” (Buhalis et al., 2023). Metaverse plays an important role in the educational sector. It creates an engaging virtual learning environment for the students. “It alludes to a digital environment where users may engage with virtual things and communicate with one another in a fully immersive setting which is reachable over the internet” (Durak & Cankaya, 2022 as cited in Pradana & Elisa, 2023, p. 2).

***Some important features of metaverse can be described as follows***

- Creation of the “digital avatars” for expressing one’s feelings and emotions is an important feature of metaverse technology (Mallick, 2022).
- Another important feature of the metaverse technology is block chain based operations. The users of metaverse are allowed to safeguard their “virtual assets” and are provided with the “digital proof of ownership”, by the block chain based operations (Mallick, 2022).
- In the metaverse technology, the concept of decentralization has been given much importance. It means “Metaverse is no longer created by a specific group of people but by all users’ participation and equal co-creation” (Lin et al., 2022).
- Virtual land space is an important element of the metaverse technology. These lands can be purchased by the users by using the cryptocurrencies. These virtual lands are the “non-fungible token” and cannot be exchanged for other things. These lands are used for several purposes like for displaying the virtual assets, for social interaction, for recreational purposes etc. (Mallick, 2022).
- Virtual reality and augmented reality are two basic components of the metaverse technology (Mallick, 2022), in which the virtual reality helps the users to immerse themselves into a totally new virtual world and the augmented reality helps the users to create a “digital overlay” to the existing physical environment, instead of creating a totally new virtual world (Dickman, 2023).
- Metaverse relies upon the “Human-Computer Interface” to exchange the information between a human and a computer for integrating the activities of the users to the virtual world (Mallick, 2022).

So, metaverse can be considered as the “collection of digital worlds created using different technologies such as Virtual Reality (VR), Augmented Reality (AR), Cryptocurrency, and Internet to play, work and socialize” (Sivan, 2022).

***Merits of Using Metaverse in the Educational Sector***

Metaverse technology has brought several positive changes in the education sector. Some key merits of using metaverse in the educational sector are:

- In the virtual world of metaverse, “learners can delve into captivating virtual environments and actively engage with the subject matter, fostering deeper understanding and knowledge retention” (George Reyes, 2020; Hanid et al., 2020 as cited in Onu et al., 2023, p. 8909).
- Metaverse technology offers tailored learning contents and experiences according to the needs and interest areas of the learners. It makes the personalized and effective learning experiences (Frost et al., 2020; Kounlaxay & Kim, 2020 as cited in Onu et al., 2023, p. 8909).
- In metaverse technology, everything happens with synchrony without any delay. So it makes the experiences of the learners perfect (Huang et al., 2022).
- Metaverse education system encourages collaborative learning environment. “Collaborative learning helps students to work together in virtual teams to complete assignments and projects, and they can learn from each other in a shared digital space” (Williams, 2022 as cited in Velev et al., 2023, p. 48).
- Metaverse technology encourages to make learning experiences more accessible to different learners irrespective of their physical location or abilities (Velev, 2023).

- Using metaverse has no restrictions with respect to space and time. For example, in the virtual world of Metaverse education, students can experience any events from history by recreating the event virtually. Also, the students from temperate regions can explore the tropical region environment (Lin et al., 2022).
- Academic misconducts can be tracked down with the help of the block chain technology of metaverse (Mohan, 2019 as cited in Lin et al., 2022). The protection of copyrights can also be done with the help of this function. It helps to trace and supervise easily the publication, distribution and dissemination of the academic work (Sharples & Domingue, 2016 as cited in Lin et al., 2022).
- Metaverse technology also helps in lowering the operational risks of the learners in the high risk experiments. For example, the subjects like Chemistry need to do some experiments with explosive and flammable chemical materials etc., which has high risk for the students. Metaverse helps in this context by simulating those experiments virtually (Lin et al., 2022).

### ***Challenges of Using Metaverse in the Educational Sector***

Several challenges are present in the use of metaverse, which hampers the widespread integration of teaching learning programs based on the metaverse technology. Some key challenges of using metaverse in the educational sector are:

- Creation of metaverse environments require expensive technological support, which is challenging for the adoption of metaverse based education system (Onu et al., 2023).
- Currently adequate educational materials are not available in the metaverse system. So here the educators face difficulty for finding and using the relevant content for the class (Onu et al., 2023).
- As the metaverse is relatively a new technology, so the platforms, tools and protocols, which are needed for creation and access to the virtual world, are not currently standardized. So it creates difficulty for the use of different environments of metaverse and for navigating it properly (Onu et al., 2023).
- No legislative restrictions are active in the technology of metaverse at the both national and international levels. As the metaverse is a “decentralized internet environment, its computer security appears lacking” (Discover Hub Pages, 2022; Baltas, 2022 as cited in Kaddoura & Husseiny, 2023, p. 16). The issues of privacy and security in the metaverse technology, makes the students and the teachers uncomfortable in personal information sharing in this virtual environment (Onu et al., 2023).
- It is difficult to monitor all activities of the students in the metaverse learning platform, because the students do not need to be in the same space in the real world (Jovanovic & Milosavljevic, 2022 as cited in Zonaphan et al., 2022).
- Using the metaverse technology, sometimes some students indulge themselves in harassing the other users in the virtual world. It can harm the victims physically and psychologically (Angeles, 2023).
- Another challenge of using metaverse is the addiction among the students towards the virtual reality applications (Angeles, 2023). “The higher the quality of immersive interaction, the easier it is for users to indulge in it, eventually leading to cyber-syndrome, which means that

the physical, social, and mental disorders that affect human beings due to excessive interaction with cyberspace” (Lin et al., 2022, p. 2864).

- The use of metaverse technology also affects the physical health of the users. It can cause “discomfort or nausea in users in as little as 10-15 minute, hence it is better to utilize them sparingly rather than as the primary educational modality for an entire course” (Kaddoura & Husseiny, 2023, p. 17).

### **Ways to Address the Challenges of Using Metaverse in the Educational Sector**

Some possible ways to address the challenges of using metaverse in the educational sector are:

- Transparency should be present in the metaverse platforms regarding the collected data from the users and their uses and storage in the metaverse systems. It helps in maintaining the security and privacy of data (Zamfir et al., 2023).
- To prevent the unauthorized use of the virtual assets of the students and the teachers, they should have clear digital ownership and the property rights (Zamfir et al., 2023).
- Necessary measures can be taken to prevent the harassment, abuse and harmful activities in the metaverse platforms (Zamfir et al., 2023). As the learners vary in their level of morality, so “promulgating and improving community standards of conduct to prevent moral problems (e.g., using slang, insulting, bullying and shaming each other) is necessary” (Inceoglu & Ciloglulil, 2022 as cited in Lin et al., 2022).
- Apart from the uses of the metaverse technology, the students should participate in the real world face to face interaction with the teachers to maintain the physical interaction and to develop social and emotional skills (Zamfir et al., 2023).
- A balance must be created between the physical experiences and the virtual experiences to address the problems like digital addiction (Zamfir et al., 2023).

### **Conclusion**

In the era of digital technology, metaverse plays an important role in the educational sector. It creates an interactive and collaborative virtual learning space. In metaverse platforms, students can enjoy the freedom of space and time without any restrictions during learning. However, using metaverse technology has some disadvantages also, which can be addressed by taking the necessary measures.

### **References**

- Angeles, M. B. (2023). Main risks and benefits of Metaverse on mental health. *Telefonica*. <https://www.telefonica.com/en/communication-room/blog/main-risks-and-benefits-of-metaverse-on-mental-health/>
- Buhalis, D., Leung, D., & Lin, M. (2023). Metaverse as a disruptive technology revolutionizing tourism management and marketing. *Tourism Management*, 97(3),1-11. <https://doi.org/10.1016/j.tourman.2023.104724>
- Huang, J., Sun, P., & Zhang, W. (2022). Analysis of the Future Prospects for the Metaverse. *Advances in Economics, Business and Management Research*, 211, 1899-1904. <https://doi.org/10.2991/aebmr.k.220307.312>
- Kaddoura, S., & Husseiny, F. A. (2023). The Rising Trend of Metaverse in education: challenges,

- opportunities, and ethical considerations. *Peer J Computer Science*, 9, 1-33. <https://doi.org/10.7717/peerj-cs.1252>
- Lin, H., Wan, S., Gan, W., Chen, J., & Chao, H. C. (2022). Metaverse in Education: Vision, Opportunities, and Challenges. *IEEE International Conference on Big Data (Big Data)*, 2857-2866. <https://doi.org/10.1109/BigData55660.2022.10021004>
- Mallick, C. B. (2022, October 10). What is the Metaverse? Meaning, Features, and Importance. *Spiceworks*. <https://www.spiceworks.com/tech/artificial-intelligence/articles/what-is-metaverse/>
- Onu, P., Pradhan, A., & Mbohwa, C. (2023). Potential to use metaverse for future teaching and learning. *Education and Information Technologies*, 29, 8893-8924. <https://doi.org/10.1007/s10639-023-12167-9>
- Pradana, M., & Elisa, H. P. (2023). Metaverse in education: A Systematic Literature Review. *Cogent Social Sciences*, 9, 1-24. <https://doi.org/10.1080/23311886.2023.2252656>
- Roberts, S.C. (2023, May 19). What is Digitization in Education? *Medium*. <https://medium.com/@everlynsalt/what-is-digitization-in-education-6b697bcfb38b>
- Sivan, V. (2022). Introduction to Metaverse. *Medium*. <https://codemaker2016.medium.com/introduction-to-metaverse-e48a29fc906f>
- Velev, D., Dimitrov, D., & Zlateva, P. (2023). Challenges of Metaverse in Education Digitalization. *Digitalization and Management Innovation II*, 43-51. <https://doi.org/10.3233/FAIA230715>
- Vivian, M. (2023, July 13). Beyond Sci-Fi: A Brief History of the Term 'Metaverse'. *Vection Technologies*. <https://vection-technologies.com/blog/Beyond-Sci-Fi-A-Brief-History-of-the-Term-Metaverse/#:~:text=The%20Metaverse%3A%20Early%20Developments%20and%20Concepts&text=During%20the%20transition%20from%20the,quests%2C%20and%20explore%20various%20environments.>
- Williams, J. (2022, February 26). Education in the Metaverse. *Let's Go Learn*. <https://www.letsgolearn.com/math-curriculum/education-in-the-metaverse/>
- Zamfir, M., Marinescu, A., Iordache, D., Barbu, M., & Cirnu, C. E. (2023). Exploring ethical considerations in Metaverse from the education perspective. *Proceedings of the International Conference on Virtual Learning*, 91-100. <https://doi.org/10.58503/icvl-v18y202307>
- Zonaphan, L., Northus, K., Wijaya, J., Achmad, S., & Sutoyo, R. (2022). Metaverse as A Future of Education: A Systematic Review. *ResearchGate*. <https://doi.org/10.1109/CHIuXiD57244.2022.10009854>