Chapter 1
Exploring the Ethical Issues of Educational Metaverse: Insights from Experts

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Abstract Many educational institutes adopt immersive learning environments (ILEs) for their positive contribution to learning outcomes. However, challenges reflecting a wide range of serious ethical issues and concerns also evoke a degree of apprehension in its integration by educators and researchers. This study identifies the ethical issues and risks associated with integrating Metaverse technologies into educational settings. It also focuses on the voices of Metaverse experts with the idea of a safe and educationally immersive environment. A qualitative approach was used in

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M. Jemni et al. (eds.), *Digital Transformation and Human-Machine Collaboration in Education*, Lecture Notes in Educational Technology,
https://doi.org/10.1007/978-981-96-7587-6_1

which in-depth interviews of the experts on ethical issues were conducted. According to the experts' perspectives, key ethical issues and risks are highlighted, such as data privacy, security, policies, hyperreality, loss of social skills, and negligence of physical health. The findings also emphasize the importance of the Metaverse-related considerations, including design, policies, universities' roles, and safety concerns for equality, diversity, and inclusion (EDI). Based on the findings, we recommend enhancing the Metaverse design environments by integrating ethical frameworks and policies to ensure safe and inclusive environments for teachers and students.

Keywords Educational Metaverse · Immersive learning · Ethical issues · Design · Safety · Privacy · EDI

1.1 Introduction

Immersive Learning Environments (ILEs) are learning spaces that employ cutting-edge technologies, including virtual reality (VR), augmented reality (AR), and simulations for interactive learning. This is evident in the case of Metaverse, a complicated digital dimension beyond the conventional platforms and environments, wherein lies the integration of AR and VR technologies and the vast digital space [1]. It is an endless space where users can have complete immersions, moving between the physical and digital worlds with a seamless transition, performing seamless activities and networking, and finding ways with avatars and digital personas [2].

The integration of AR and VR characterizes Metaverse. AR provides a real environment with additional digital aids for students to enhance their learning experience [3]. This feature is particularly useful in classrooms because students can interact with educational content rooted in real-world scenarios, thereby fostering a dynamic and interactive learning pathway. On the other hand, VR introduces students to a new digital environment, situating them within a richly rendered fantasy environment [4]. Such immersion in the Metaverse heightens the human experience, wherein students can now rise beyond the constraining physical world [5].

Metaverse technology helps educators create an environment relevant to the subjects being taught in classrooms by selecting the most appropriate educational settings from the available models [6]. This also supports real-time interactions that can simulate a classroom setting much more naturally, hence making learning objects even more engaging and interactive [7].

In enhancing student engagement, Metaverse technology increases motivation, presenting in-school events and activities in an appealing manner that will increase the usability of digital learning objects [8]. This is certainly true with integrated artificial intelligence (AI) and immersive technologies in presenting complex topics using high-quality visuals such as drawings, images, and videos. Intrigued by the current use of technology, students exhibit a desire towards the lesson content, thus aiding the creation of an active learning environment [9].

However, despite the positive effects of adopting Metaverse technologies in education, there are still apprehensions and challenges related to how these can be perfectively carried out in practice [10]. This transition, for example, may be affected by a range of serious ethical issues that educators and researchers face [11]. This study aims to identify experts' perceptions and opinions on the ethical problems and risks of using Metaverse technologies in education and highlight their recommendations to ensure a safe immersive environment. Therefore, this study seeks to answer the following questions:

(1) What ethical concerns and considerations do the experts identify regarding the educational Metaverse?
(2) How to ensure safe and inclusive integration of Metaverse technologies into educational environments?

1.2 Literature Review

The literature has signaled some obstacles to the best utilization of Metaverse. The first of these obstacles is that insufficient knowledge exists about this technology, or it is not available in an educational environment [12], leading to negative attitudes about this technology or resistance to implementation in the learning context. In the study conducted by Tlili et al. [13], content and bibliometric analysis were applied to reveal the research trends, focus, and limitations of the Metaverse in education. The results indicated a large gap in integrating Metaverse's real-life tools and applications in classroom settings. The results also showed that the design of the Metaverse for education has changed across generations, in particular, Generation Z, which uses AI technologies more than Generations X and Y. As noted by Sinlapaninman et al. [14], Metaverse educational design is far associated with mobile learning, and therefore learning scenarios have been rarely focused on mobile learning, blended learning, and partial learning.

Zhang et al. [5] demonstrated that strong technologies like edge and cloud computing will enhance data processing and resource management for Metaverse applications. Moreover, analytical methods, including AI and big data analytics, will offer personalization of the learning experiences through the indices of the virtual world. Additionally, modeling and rendering technologies, such as immersive design spaces, will visualize complex ideas in richer environments. Interaction technologies, including VR and AR, make full physical and social interaction among learners possible, as shown in Fig. 1.1.

Besides, blockchain technology allows for the integrity of data and the privacy of students by taking a decentralized approach to security regarding student personal information [15]. Smart wearables, headsets, and smart glasses bridge the physical and digital worlds for enhanced immersion. Avatars and intelligent Non-Player Characters (NPCs) represent self-expression and personalized support in education. Such technologies allow the Metaverse to display learning resources dynamically and capture learner data for analysis and personalized instruction [16].

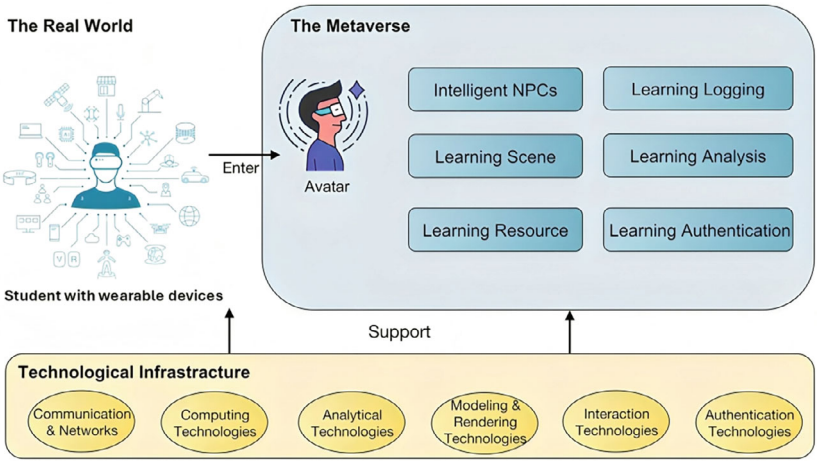

Fig. 1.1 Power Metaverse components for educational settings, adapted from [5]

Recent research endeavors have emphasized the change-bringing benefits of immersive virtual environments [17, 18], although concerns related to it are still relevant. Several issues have been raised, including data privacy and security, emotional manipulation, social isolation, equitable access, and authenticity and accountability [19]. In addition, the rapid growth of the internet has led to calls for more robust regulatory frameworks to protect some of the more at-risk groups of students in cyberspace [13]. Scholars have thus put significant efforts into collaborative designing that involves both educators and students, with an emphasis on ethical standards. This oeuvre involves the promise of continued dialogue among stakeholders to sort out the sophistications relating to Metaverse integration within learning.

1.3 Method

1.3.1 Participants and Data Collection

Five highly qualified experts, from Spain, Greece, and the United States, participated in this qualitative study on the Metaverse, and the curricula of the respondents are filled with considerable academic and professional backgrounds. The experts provided their views on the ethical issues related to the Metaverse in education. All participants have PhDs and have between 10 and 36 years of experience as professors, researchers, or consultants. They have extensive experience with different Metaverse applications and devices, such as Oculus Metaquest glasses, Social VR, WebXR, and MUVEs. In this respect, participants described their expertise in the Metaverse as an average of 3.8 out of 5. Data were collected using in-depth interviewing [20] via

email in 2023, at any time convenient for the respondents to reply. We ascertained their anonymity, with the confidentiality of their information both during and after the data collection.

1.3.2 Instrument

The interview questions were prepared based on reviewing the existing literature. The instrument was revised to validate its accuracy and validity by researchers in educational technology. The final version of the instrument consisted of two sections. The first section is to collect the participants' demographic information (gender, country, educational level, occupation, years of working experience, Metaverse familiarity in years, Metaverse application type, and Metaverse expertise). The second section comprises seven open-ended questions derived from the study's objectives. These questions include: What are the key ethical issues that arise in the context of educational Metaverse? What are some potential ethical risks associated with the use of Metaverse in education? What ethical considerations should be considered when designing Metaverse worlds in education?

1.3.3 Data Analysis

An author of this study transcribed the interview responses in a Microsoft Word file. Data screening was conducted through a comprehensive analysis of the transcribed texts provided by participants. Each participant was given pseudonyms using the acronym P (P1 refers to participant 1) to maintain confidentiality. Using deductive reasoning, thematic analysis was used to analyze the data [21]. The data were organized into themes and sub-themes derived from an extensive analysis of the transcribed texts.

1.4 Results

The analysis of the interview data has led to seven main themes namely, ethics questions in the educational Metaverse, ethical risks of Metaverse in education, ethics in designing Metaverse-based education, regulations and policies for Metaverse education, university's role in ethical standards for Metaverse education, Metaverse safety concerns for equality, diversity, and inclusion (EDI), and balancing ethics and personalized immersive experience in Metaverse education, as presented in Table 1.1.

The following part presents the findings based on the main themes, followed by quotes from the experts.

Table 1.1 Themes and sub-themes of the Metaverse ethical issues

Themes	Sub-themes	Description
1. Ethics questions in the educational Metaverse	Teacher role User experience Data privacy Harvesting of emotions Hyperreality, Addiction, Doxing	The use of the Metaverse in educational questions raises several questions that need to be addressed
2. Ethical risks of Metaverse in education	Loss of social skills Learner safety Harmful experiences Identity theft and deep fakes Neglect of physical health	The potential ethical challenges and concerns that arise from the use of Metaverse in educational settings
3. Ethics in designing Metaverse-based education	Learning content Suitability of environment Equality and equitable participation Visual Health Co-designing Test experience for user groups	The design-thinking approach to developing and using the Metaverse in educational settings
4. Regulations and policies for Metaverse education	Age usage Coherent use of the Metaverse Standards on misuse Integrating social multiuser VR environments in formal and informal education	The rules and guidelines that govern the use of the Metaverse in education
5. University's role in ethical standards for Metaverse education	Creating a safe and optimal digital environment Partnership for teacher professional development Student orientation	The responsibility of universities to promote and uphold ethical standards for the use of the Metaverse
6. Metaverse safety concerns for EDI	Principles of equality and respect Governance of the Metaverse	Addressing potential risks and issues in the Metaverse regarding EDI
7. Balancing ethics and personalized immersive experience in Metaverse education	Adopting experiential learning Co-designing with students Anonymity concerns Using non-gendered avatars Ensuring security	Reconciling ethical issues and the challenge of maintaining quality Metaverse- education

First Theme: Ethics Questions in the Educational Metaverse The experts enumerated several dilemmas or topics of discussion regarding Metaverse used in the educational context. Some focused on thematic areas such as the teacher's role in the digital environment, safeguarding user privacy, issues of addiction, and so forth.

> Some of the ethical dilemmas that arise when discussing the application of Metaverse in educational institutions include biometric data privacy, harvesting of emotions, hyperreality, addiction, doxing [P2, Researcher, Greece].

> In this aspect, the teacher's fundamental role to preserve the ethical conditions of the generated formative environment, where respect in the interactions generated must be the basis of any instructional process is an ethical dilemma [P1, Professor, Spain].

Second Theme: Ethical Risks of Metaverse in Education All the experts agreed that using the Metaverse in educational settings comes with potential risks and challenges such as exposure to harmful experiences, loss of social skills, identity theft, and the tendency to neglect physical appearance or health safety. These are pertinent issues the experts considered as educators should address for effective and quality Metaverse-based education.

> It is true that skills related to social skills on a physical level can be affected when carrying out an interactive process in digital environments. This is an ethical concern in using the Metaverse for educational purposes [P1, Professor, Spain].
>
> For some users such as children, virtual experiences may become encoded as real experiences for them, creating false or harmful memories. Experiences can exacerbate stereotypes. The experiences can be haunting or too graphic for some viewers [P4, Consultant, USA].

Third Theme: Ethics in Designing Metaverse-based Education Almost all the experts agreed that without a careful design, the utilization of Metaverse applications for instructional purposes will not achieve its goal. They recommended that instructional technologists, developers, and educators map out design solutions that will enhance learning in the Metaverse such as involving students and faculty in designing Metaverse platforms and ensuring safe use in the virtual world.

> It is crucial to partner with children in the co-design of such sophisticated technologies. Their voice should be centered on its design and development, especially regarding how the data is collected and how it would be used in their best interest. At the same time, there are always some tradeoffs at the boundary of practice and research, and it is key to cross those barriers and develop more context-dependent solutions [P3, Researcher, USA].
>
> Since the use of the Metaverse relies heavily on the eyesight, design solutions to create an environment that environments whose design allows proper visual health are very integral [P1, Professor, Spain].

Fourth Theme: Regulations and Policies for Metaverse Education The participant emphasized the importance of establishing regulations and standards, especially for school education, which could provide a safe immersive environment.

> It is important to have standards to protect very young children and minority populations from misuse or abuse of their personal stories [P4, Consultant, USA].
>
> Regulations should be in place to ensure a safe and effective approach to implementing Metaverse-based education. One approach can be to define a coherent use of such Metaverse tools to have a more equal impact across classrooms and schools [P3, Researcher, USA].

Fifth Theme: University's Role in Ethical Standards for Metaverse Education In consensus, the experts agreed that higher education institutions should set up rules and guidelines to promote a responsible use of Metaverse platforms for educational purposes. They called for a coalition between universities to organize

professional development programs for teachers. Also, orientation for students was considered integral in equipping them with the requisite knowledge and skills to navigate the Metaverse environment.

> A partnership between universities to encourage professional development opportunities for educators in all levels of education is necessary [P2, Researcher, Greece].
>
> Universities and companies can consult based on already known workable policies to protect the vulnerable elsewhere. Additionally, universities can run workshops on ethics to introduce all stakeholders to the problems that are possible. In this way, universities can "see around corners" for companies and governments when setting up standards [P4, Consultant, USA].

Sixth Theme: Metaverse Safety Concerns for EDI As communicated in the United Nations Sustainable Development Goal Four (SDG4), equity, diversity, and inclusion were key issues that experts raised during the interviews. According to them, to ensure a safe use of the Metaverse, there have to be foundational virtues, values, and standards that all users must adhere to and educators need to implement. For example, a pilot project on using the Metaverse could be conducted to know what works well for different age groups and learners. To them, the principles of equality and respect should underpin all operations in the virtual world.

> First, existing standards can be the design foundation– based on the idea that the Metaverse is a copy of reality for the users. What is already known to work and support EDI (equity, diversity, and inclusion) should be where designs begin. Test user groups should be used and be reflective of the proposed actual user group. Experiences can be built for specific educational applications and then within the experience, the expected EDI issues can be addressed [P4, Consultant, USA].
>
> As I have commented previously, it must start from the principles of equality and respect [P1, Professor, Spain].

Seventh Theme: Balancing Ethics and Personalized Immersive Experience in Metaverse Education Since sometimes implementing regulations to the main ethical standard comes at the cost of positive learning experiences, experts were asked to provide their views on finding a balance between ethics and customized real-world experience in the Metaverse. Using non-gendered avatars, ensuring security, and adopting a co-design and experiential learning approach were hailed as means of finding the balance between ethics and a personalized immersive learning experience.

> For security, we do not share our personal information, click on links from outsiders, or auto load media and audio from external websites without first confirming their source and approval. Several privacy measures exist to protect users [P5, Professor, USA].
>
> I believe rather than going from a researcher's point of view, we have to build partnerships with the students to co-design and develop such technologies that foster their interests and identities in these technologies [P3, Researcher, USA].

1.5 Discussion

Interviews with qualified experts have underlined a multi-dimensional ethical landscape that pertains to the use of the Metaverse in educational contexts. Such concerns as privacy of biometric data, emotional manipulation, and addiction raise several ethical questions. This result also came from [22], who clustered the main issues in the following pairs: privacy & freedom, duplicate & false identities, abuse & manipulation, trade & ownership, censorship & surveillance, democracy & participation, and regulation & control. The experts also pointed out such risks as exposure to harmful content, identity theft, and the atrophy of social skills. With these environments, there is a risk of creating false memories or reinforcing stereotypes, and the content presented within these environments should be critically examined. There are similarities between attitudes expressed by experts in this study and those described by [23]; they highlighted the ethical and legal challenges, e.g., daily life activities and the psychological impact of virtual interactions on learners. The other key problem is that there have yet to be any predetermined rules concerning using Metaverse for educational purposes. Clear policies ensure a safe and non-discriminatory virtual environment. The call for standards to protect vulnerable groups, such as people with disabilities, young children and minorities, reflects an urgent need for regularizations that allow all people equal opportunities with resources in the Metaverse while avoiding risks [24, 25]. Piecing them together, the findings substantiate the necessity of a solid structure to guide ethical interaction, as emphasized by the experts. Such a structure needs to ensure, above all, protection for students against any form of technological abuse for the safety of the learning environment. The experts discussed EDI in framing the code of ethics in the Metaverse. Interactions in these spaces should be informed by foundational values that allow experiences to be inclusive and representative of various user groups. In developing a set of design principles inclusive of existing standards on EDI, educators will build an arena that celebrates diversity while mitigating potential biases.

1.6 Conclusion

Excerpts of these interviews reveal the complexity of ethical considerations in the educational Metaverse. As educators and technologists build out this emerging landscape, ethical frameworks, safety regulations, and inclusive design principles will have to be their guiding North Star. Experts say there is an extremely thorny ethical landscape regarding the application of Metaverse for education, identified with issues like the privacy of biometric data, emotional manipulation, and addiction. Other identified risks include exposure to harmful content, identity theft, diminished social skills, and the creation of false memories and reinforced stereotypes. The lack of clear rules on using the Metaverse in education brings to the fore the need for standards of protection, particularly concerning vulnerable populations such as children

and minorities. The findings stress that there needs to be a solid, unshakeable ethical framework that protects student safety as paramount while advancing EDI in virtual interactions. This will help ensure that educational experiences are representative and inclusive for various user groups.

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