

Transformative Impact of Metaverse on Education

Yirui Liu *

China Pharmaceutical University

* Corresponding Author Email: 1731236177@qq.com

Abstract. The metaverse has emerged as a revolutionary force, significantly reshaping various sectors, with education being one of the most profoundly influenced domains. As a virtual, interconnected digital space that transcends traditional physical boundaries, the metaverse presents unprecedented opportunities for enhancing educational experiences and fostering innovative learning methodologies. This essay delves into three pivotal aspects of the metaverse's transformative impact on education: immersive learning experiences, personalized learning and global collaboration, and preparation for the future workforce, which can reshape the way students learn and educators teach. The metaverse has emerged as a game-changing force in education.

Keywords: Metacosmos, education, change.

1. Immersive Learning Experiences

Traditionally, education often found itself in a rut where students merely followed teachers' instructions without questioning the 'why' behind their actions. Some scholars call it 'Duck-filling education' (a term coined by Soviet educator I. Ann Kerov)[1]. It refers to the rapid weight gain of ducks during a specific stage of their growth is achieved by a unique feeding method, which involves timely filling the ducks' beaks with feed that has been formed into long strips. By doing so, it minimizes the amount of movement the ducks need to make in order to consume their food, thereby facilitating their rapid growth and weight gain. Duck-filling education, as the name suggests, is to instill knowledge into the students in one go, and the process often consist of mechanical memorization exercises, with no regard to whether the students can understand the meaning. This mechanical repetition often hindered the true absorption of knowledge and skills. William Ralph Inge, a distinguished professor at Cambridge University and Dean of St Paul's Cathedral in London, famously articulated in his 1917 essay titled 'The Training of the Reason' within the 'Cambridge Essays on Education' collection that "The aim of education is the knowledge, not of facts, but of values".

The metaverse addresses this issue properly by offering immersive learning experiences through virtual reality (VR), augmented reality (AR) and extended reality (XR) technologies. For example, in November 2021, the Seoul Metropolitan Government released the "Metaverse Seoul Five-Year Plan," which aimed to build a metaverse administrative service ecosystem in three phases starting from which began in 2022 in all business areas of the city government, including economy, culture, tourism, education, and petition. Among them, the practice of "Metaverse+Education" has already been implemented in various schools in Korea. The platform is able to set up teaching scenes according to students' needs and provide various virtual teaching scenes such as classroom space, project space, free space, attendance space and other modules. Teachers can introduce and explain topics related to traditional Korean culture in the textbook through the screen-sharing function, while students can further deepen their understanding through audio and video resources. This teaching method is no longer limited to one-way indoctrination – instruction by the teacher, but encourages students to explore and learn on their own initiative.

The COVID-19 pandemic also underscored the paramount importance of digital technologies in sustaining educational continuity. The prevalent use of video conferencing solutions during this period significantly contributed to the uninterrupted delivery of educational services, though the unavailability of conventional face-to-face instruction. This occurrence showcased the capability of digital platforms to bolster education not only during crises but also in the post-pandemic era. By

immersing students in virtual simulations and experiments, the metaverse enables them to engage in activities that would otherwise be impossible or costly in the physical world. For example, students can explore historical events, conduct scientific experiments, or practice surgical procedures in safe and secure virtual environments. This approach not only enhances students' engagement and comprehension but also improves knowledge retention, making learning more interactive and memorable.

2. A New Era of Personalized Learning and Global Collaboration

The metaverse is leading in a new era of personalized learning and global collaboration. With the aid of artificial intelligence and big data analytics, the metaverse can deeply analyze students' learning behaviors, preferences, and progress. This information is then used to customize educational content and learning paths, ensuring that each student receives instruction tailored to their unique abilities and interests. As Jeremy Luisier, a Senior Technical Trainer at Unity, a platform for creating and operating interactive real-time 3D content, highlights the acceleration brought about by AI in students' ability to create distinctive applications. He remarks, with the utilization of AI tools, students actively seek guidance and step-by-step instructions for exploring new endeavors, often receiving high-quality code samples. This facilitates simultaneous progress for all students in the classroom, eliminating the need for individualized instruction from a trainer. The transformation from traditional lecture-based methods is profound. [2]

Furthermore, the metaverse's virtual classroom is highly adaptable, allowing educators to adjust to different learning styles and create a dynamic and responsive learning environment. Beyond personalization, the metaverse also breaks down geographical barriers, facilitating seamless collaboration and communication among students from diverse backgrounds. This global collaboration not only promotes cultural exchange and understanding but also significantly enhances students' communication skills and teamwork abilities.

Leticia Jauregui, the Global Head of Education Partnerships and Immersive Learning at Meta, advocates that VR has the potential to dismantle barriers, fostering greater equity and accessibility in education.[3] Leveraging AI advancements has the potential to transform stripped-down versions of XR experiences into engaging role-playing games accessible via platforms like WhatsApp. While this can offer increased accessibility to certain educational resources, it's important to critically evaluate the overall quality and impact of such experiences, as well as address potential barriers to ensure equitable access for students worldwide, regardless of their geographical location or socioeconomic background."

3. Future opportunities and risks

Education's ultimate goal is to equip students with the skills necessary for success in both professional and personal domains. The metaverse plays a pivotal role in preparing students for the future workforce by facilitating their socialization. In an interconnected world, the ability to collaborate, communicate, and build networks is crucial. The metaverse provides a unique platform where students from diverse backgrounds can engage in teamwork, developing interpersonal skills essential for professional success. As students embark on collaborative projects and undertake group activities within the metaverse, they learn to navigate conflicts, share ideas, and achieve common goals. This process of socialization is fundamental to their personal growth, enabling them to become effective team players and leaders. By blending skill development and socialization, the metaverse ushers in a new era of education that actively prepares students for the challenges and opportunities of the 21st-century workplace.

However, numerous challenges exist from a sociotechnical and governance perspective, as metaverse develop stronger capability for providing users virtual worlds. Studies have identified significant areas of concern relating to ethics, data security, regulation, safety as well as the potential

detrimental psychological impact for vulnerable members of society.[4] The Centre for Countering Digital Hate (CCDH) is a UK-based non-profit research organization dedicated to combating and exposing digital hate speech on the internet. The researchers from it recently posed as minors, spending hours on Oculus and VR Chat within Meta Platforms metaverse finding that users were: “exposed to abusive behaviour every seven minutes” [5]. This included instances of bullying, presentation of graphical sexual content, racism, threats of violence and grooming of minors.[6] Moreover, the ethical dilemmas surrounding the metaverse extend far beyond the instances of harassment and abusive content encountered by researchers at CCDH. One major concern is the potential for children’s addiction and excessive screen time, which can lead to social isolation, disrupted sleep patterns, and decreased physical activity among young users. The immersive nature of the metaverse, with its endless stream of virtual experiences and social interactions, may prove irresistible to children who are still learning to regulate their behavior and self-prioritization.

Another ethical issue revolves around the collection and use of personal data within the metaverse. As users navigate these virtual worlds, their every move, interaction, and preference are tracked and analyzed, creating a detailed digital profile. This data can be used for targeted advertising, behavioral manipulation, or even sold to third parties without the user’s full consent or understanding of the consequences. For children, who may not fully comprehend the implications of sharing their personal information, this can lead to a loss of privacy and potential exploitation.

4. Conclusion

In short, metaverse represents a transformative force in education, offering unprecedented opportunities for immersive learning experiences, personalized learning paths, global collaboration and interaction, access to rich educational resources, and preparation for the real world. It can go a long way in helping to fulfill the aim of education and promote the holistic development of students. As educators and policymakers continue to explore the potential of the meta-world, it is important to ensure that its development is consistent with ethical and societal values and that its benefits are equitably accessible to all students. Academics have a critical role to play in shaping the future of metadata-based education, driving innovation, and ensuring that technology serves the best interests of learners around the world. However, we must pay attention to the potential threats. In light of these ethical challenges, it is imperative that policymakers, tech companies, educators, and parents work together to establish guidelines and safeguards that protect children in the metaverse. This includes implementing stricter age verification measures, developing robust content moderation systems, providing comprehensive education on digital citizenship, and fostering an environment that prioritizes the safety, privacy, and well-being of all users, especially the most vulnerable ones. Only by addressing these ethical concerns proactively can we ensure that the metaverse evolves into a truly beneficial and inclusive digital space for all. Through collaborative efforts among policymakers, tech innovators, educators, and parents, we can navigate the ethical challenges that arise and ensure that the metaverse becomes a beacon of opportunity for all learners, fostering a future where education is not just accessible but also empowering, inclusive, and truly transformative.

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