Metaverse in Education: Beyond the Realm of Games and Entertainment

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KEYWORD	ABSTRACT

Metaverse, Education, Innovation, [VR] Virtual Reality, [AR] Augmented Reality

To explain the application and challenges along with opportunities in metaverse here, we study different methods like mirror world, VR, lifelogging and AR. It creates a space for new education that provides the space to share innovative ideas for Gen Z. Possibility of impingement and weak social connection may be the limitation of metaverse. Beyond the world of games and entertainment metaverse play a vital role in education and improve the economy. While adopting metaverse for education we should keep in mind the privacy of data while developing projects and setting standard for class where augmented reality works effectively and collaboratively.

1. Introduction

The concept of metaverse came into existence from one of science fiction novel written by Neal Stephenson in 1992 "Snow Crash". It refers to the virtual shared space developed by integrating the physical reality along with virtual reality. It originally creates a space where the user can interact with one another by using real-time digital environment. In this digital era, it provides a revolutionary change in education world. Here, the virtual world interacts with the physical world enabling never before seen levels of interaction and exploration. It surpasses the boundaries of traditional theme of education and muddled up the fine line of physical and digital education. In the virtual world of metaverse, users can trade, educate, participate and can engage in multiple activities that only constraint by imagination. We all spend a good chunk of time on the internet every day. We are browsing social media or watching videos on YouTube. As of 2024, 5.35 billion people around the world that is equivalent to 66.2% of the world's population uses the internet.

So now imagine while watching the picture of one of your friends on Instagram you can interact with them on real time. There is where metaverse come from. As per Neal Stephenson Metaverse is a world that exists with physical world. The metaverse is a virtual reality in which we can communicate with the help of computer-generated environment along with the 3D version of internet. CEO of Meta Mark Zuckerberg announces that Metaverse will take five to ten years to become mainstream. The Metaverse is rapidly increasing, if you currently own any cryptocurrency virtual hardware or NFT, you are already a part of metaverse.

2. Related Work

Metaverse technology introduced on October, 21[1]. Although other sub parts are like Augmented reality, Virtual reality and mixed reality are already been used in education sector. On the basis of some papers here I am summarizing my literature review. So now imagine while watching the picture of one of your friends on Instagram you can interact with them on real time. There is where metaverse come from. As per Neal Stephenson Metaverse

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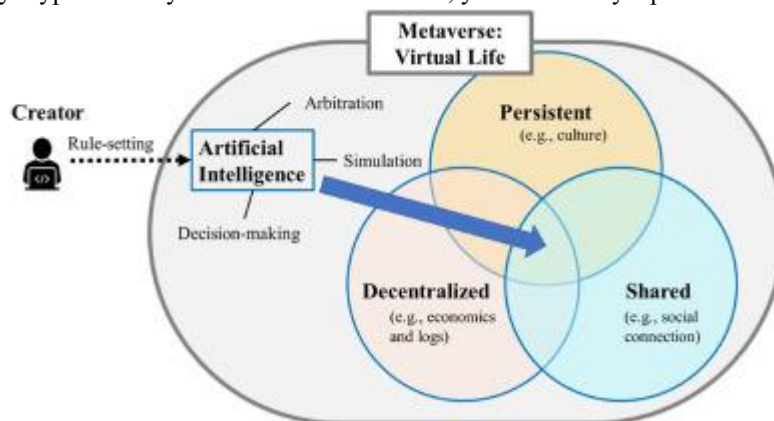

Figure1: Metaverse

One new term "Third Space" is introduced as Metaverse [2], Where we created an environment which create a new space for learner with the combination of digital and physical world. This technology combines other technology like AR, VR and MR in such a way that it concatenates multiple senses all together which makes us feel like reality [1][2][3]. The combination enables new education opportunities for learning and provides a better connection between educator and learner. Educational metaverse describes qualitative and quantitative data on the basis of survey where quantitative data shows more interest of learner towards this technology but result was not satisfactory [4]. Where as in quantitative data exposes some technical challenges while learning and grasping [5]. In video-based learning, Specially in Medical and aero-engineering the virtual projection helps a lot in deep learning of related topic. By using Avatars social presence makes thing easy. Students focuses on learning only in place of wasting time in other terms like physical appearance, show offs and clothing etc.

Unification and Complication of Metaverse: Unification is simply the idea of seamless virtual world that provides platform to the individuals for creating and reshaping their thoughts. Presently, the metaverse is divided into multiple world that existed on separate platforms and have their own ecosystem. However, the idea of unification is to unite all different ecosystem on a single platform to enable the interoperability, communication and collaboration in different virtual spaces.

3. Challenges

Ensuring countless interaction across the different virtual platforms is the main challenge while dealing with metaverse. Protecting and preventing the user data from cyberattacks and security breaches within the virtual space is also challenging. Dealing with issues like harassment, hate speech and handling inappropriate content even in decentralized environment needs to be moderate. Digital identity needs to be maintained in the metaverse along with data privacy. Accessibility should be very strong and should focuses on ensuring the connectivity in diverse background as well. Overcoming from moral conundrums and maintain the fine line that blurring the reality and fantasy.

Resulting these challenges require association among policymakers, society and technology companies at large.

Requiring multidisciplinary approaches in the field of infrastructure, scalability, economy, cultural integration, training and impact on environment is also countable. The necessary technical and infra-support to support that vast metaverse includes bandwidth, computational power, server, system and tech-support. For developing such huge kind of infra and sustainable environment includes issues like digital assets and digital currency. Legal and regulatory framework will govern activities involved in metaverse including taxation, jurisdiction and IPR (intellectual property rights).

Conclusion: Metaverse represent a virtual universe where anyone can get interaction exploration and creation opportunity in digital environment. Day by day technology is changing rapidly, the fine line between virtual and

physical world is disappearing and building a novel path for new opportunities and creating challenges as well. The metaverse contains tremendous potential for diverse area like education, entertainment, science, commerce and interaction with others like social networking. However, as we explore more deeply into the virtual world of metaverse. It is hard to reflect and implication to certify secure privacy for all the members of Digi-world. Ultimately, the metaverse represents a metamorphic frontier where inventiveness and creativity of human can reshape the way we work, live and connect in Digi-world.

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