the future of metaverse in educational organizations (definition, roles, and potential research issues of metaverse)

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Abstract

Introduction: The metaverse, often described as a convergence of physical and digital realms, is transforming industries worldwide. In education, this technology promises to redefine traditional methods of teaching and learning by introducing immersive, interactive, and globally connected experiences.In this article, we aim to provide a clear definition of the metaverse in educational organizations, as well as a model and strategy for its implementation and deployment in these organizations.

research methodology: Employing a phenomenological approach, the study analyzes insights from faculty members across Tehran to identify strategic opportunities and challenges.

Findings: Key findings emphasize the metaverse's ability to revolutionize teaching, learning, and organizational training. This research also proposes a roadmap for metaverse adoption, highlighting technological, ethical, and regulatory considerations. The study aims to guide future research and encourage strategic implementation of the metaverse in educational contexts. The metaverse is recognized as one of the technologies with the greatest potential today. Many educational organizations, such as universities, may be unaware of the characteristics of the metaverse, apart from the potential applications of this emerging technology. Despite the great excitement about the possibilities of the metaverse, in order to activate its full potential for interaction, community building, self-expression and commerce, key areas need to be further developed. We see these as new opportunities for teams, projects, businesses, technology providers and educational organizations to collaborate across vibrant ecosystems: Technology - Business infrastructure - Future workforce - Privacy and identity - Regulation, taxation, accounting and social infrastructure are the tools needed. In the Metaverse, some of the existing services and business models that we are familiar with will continue to exist, but the Metaverse will open up a new realm of ways for teachers and learners to interact, which we expect will lead to unique services and models. Not everything in the Metaverse will be relevant to every business. However, there is little harm in taking the opportunity to explore.

Conclusion: Finally, it is expected that through this paper, researchers in the fields of educational organizations and related technologies will have a clear picture of what the Metaverse is and how it can be used in educational organizations. Most importantly, it is expected that more studies on

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metaverse-centric educational organizations in educational organizations will be reported in the near future.

Key Words: metaverse, educational organizations, roles, potential research.

Introduction

The metaverse, often described as a convergence of physical and digital realms, is transforming industries worldwide. In education, this technology promises to redefine traditional methods of teaching and learning by introducing immersive, interactive, and globally connected experiences. However, while the excitement around the metaverse is palpable, its practical integration into educational organizations remains underexplored. Current literature focuses largely on isolated applications, such as virtual reality (VR) and augmented reality (AR), without addressing the broader systemic changes needed for effective metaverse adoption. This study fills this gap by examining the roles, applications, and challenges of the metaverse in educational organizations. It also offers a strategic framework for its implementation, considering the unique needs of educators, administrators, and students.

The metaverse is a seamless convergence of our physical and digital lives that creates a unified virtual community where we can work, play, relax, transact and socialize. A key point is that there is no such thing as a virtual world, but many worlds are emerging to enable people to deepen and expand social interactions digitally. This is done by adding an immersive, 3D layer to the web, creating more realistic and natural experiences. The metaverse even promises to facilitate access from home, breaking down borders and democratizing access to key goods, services and experiences.

Metaverse is known as the next generation of social communication. It refers to a world where people can “live” under the rules defined by the Creator (Farjami et al., 2021; Kay et al., 2021). A metaverse can be fully or partially virtual. For example, it can be a fully virtual world such as a virtual reality (VR) system or a semi-virtual world such as the use of augmented reality (AR) in real-world contexts (Avila, 2017). In addition, there can be many different types of activities or events in metaversion, just like in the real world, such as economic activities, political events, and natural disasters (Diaz et al., 2020).

Some people might think of Metaverse as just a new term for VR or AR. However, it is much more than AR or VR (Park and Kim, 2022). There are three characteristics of the metaverse that make it completely different from virtual reality or conventional virtual reality: "shared", "persistent" and "decentralized". Additionally, artificial intelligence (AI) is a technology required to make the metaverse work according to the rules defined by the creator. From this framework, it can be seen that an AR or VR system can be part of the metaverse to provide virtual content. On the other hand, Metaverse can contain AR or VR elements along with other required elements.

In the Metaverse, some of the existing services and business models we are familiar with will continue to exist, but the Metaverse will open up a new realm of ways of interaction that we expect will lead to unique services and business models in Educational organizations.

Research question

What are the the future of metaverse in educational organizations?

Methodology

The methodology for this research on "The Future of the Metaverse in Educational Organizations" is designed to provide a comprehensive

understanding of the metaverse's definition, roles, and potential research issues within the context of educational institutions. The study employs a qualitative and phenomenological approach, allowing for an in-depth exploration of participants' experiences and perceptions regarding the metaverse.

To capture diverse perspectives, this study employs a phenomenological approach with purposive and snowball sampling methods. Participants, consisting of 15 faculty members in Tehran, were chosen for their expertise in educational sciences. While this geographic focus provides rich localized insights, future studies should expand to include international participants to ensure global applicability.

This research follows a phenomenological design, which focuses on describing the lived experiences of individuals as they relate to the phenomenon being studied. According to Streubert and Carpenter (2003), phenomenology aims to capture the essence of experiences by exploring how individuals perceive and make sense of their realities. This approach is particularly suitable for understanding the complex and evolving nature of the metaverse in educational contexts.

Sample Selection

The sample for this study consists of 15 faculty members from various universities in Tehran, specifically those teaching in the field of educational sciences. Participants were selected using purposive sampling, which involves choosing individuals who possess specific characteristics relevant to the research topic. Additionally, a snowball sampling technique was employed, where initial participants referred other qualified individuals to participate in the study. This method ensured a diverse range of perspectives from educators who are actively engaged in higher education.

Data Collection

Data were collected through semi-structured interviews, allowing for flexibility in exploring participants' thoughts and experiences related to the metaverse. The interview questions were designed to elicit insights into several key areas:

1. Understanding of the metaverse and its implications for education.
2. Perceived benefits and challenges of integrating the metaverse into educational organizations.
3. Potential applications of the metaverse in enhancing teaching and learning processes.
4. Suggestions for future research directions regarding the metaverse in education.
5. Each interview lasted approximately 45-60 minutes and was conducted in a comfortable setting to encourage open dialogue. Interviews were audio-recorded with participants' consent and subsequently transcribed for analysis.

Data Analysis

Thematic analysis was employed to analyze the interview transcripts. This process involved several steps:

Familiarization: Reading through transcripts multiple times to gain a comprehensive understanding of the data.

Coding: Identifying significant statements and coding them into categories based on emerging themes.

Theme Development: Grouping codes into broader themes that reflect participants' collective insights about the metaverse's role in education.

Validation: Engaging with participants to validate findings and ensure that their perspectives were accurately represented.

Research Findings

1. Applications of the Metaverse:

Immersive Learning: Simulations for medical and engineering education allow learners to practice skills in risk-free environments.
Collaborative Classrooms: Global connectivity enables real-time interactions among students and teachers from different regions.
Operational Training: Staff training in complex scenarios, such as crisis management or high-stakes decision-making, can be replicated virtually.

2. Opportunities for Educational Organizations:

Student Engagement: Engaging younger, tech-savvy learners through gamified experiences.
Global Collaboration: Building partnerships and shared virtual campuses with other institutions worldwide.
Cost Savings: Virtual labs and campuses reduce infrastructure costs while maintaining high-quality education.

3. Challenges:

- Technological Readiness: Many organizations lack the infrastructure for metaverse integration.
- Privacy and Security: Safeguarding user data in decentralized systems requires robust frameworks.
- Regulatory Uncertainty: The absence of clear policies around metaverse use in education poses compliance risks.

Applications of the metaverse

In recent years, many applications related to the metaverse have been reported worldwide, especially by computer game companies and social networks (e.g., Facebook) (Egliston & Carter, 2021; Jeong et al., 2022; Kye et al. al., 2021; Wiederhold, 2022). In addition, several emerging technologies such as wearable devices can also be used in the metaverse (Cipresso et al., 2018). For example, CEO Mark Zuckerberg of the meta-platform, head-mounted display (HMD), called Oculus a social computing platform (Egliston & Carter, 2021). Additionally, researchers have shown that in addition to VR and AR, the advancement of brain computer interfaces (BCI) will further facilitate the adoption of the metaverse (Mystakidis, 2022). In recent years, the issues and applications of metaverse have been widely discussed. Several institutions or articles have claimed that there are multiple applications of the metaverse. The most mentioned application is digital games (Park and Kim,

2022). Another well-known healthcare application is, for example, the use of AR or VR to engage students in teaching medical or nursing skills (Huang et al., 2021; Huang et al., 2022; Zhang et al., 2021). AR or VR has also been used to display some new products or provide virtual experiences. In addition, the use of AR or VR for military training is another example often mentioned in previous metaverse articles (Díaz et al., 2020). From the perspective of a strict definition of the metaverse, most existing applications are actually AR or VR rather than metaverse. On the other hand, the effectiveness and success of these applications determine the potential of Metaverse. Of course, to implement ideal metaverse applications, properties (eg, "shared", "persistent", and "decentralized") must be considered. For example, a metaverse game environment must allow multiple players to participate in the game in order to implement the "share" feature. In addition, individual players can continuously play the game to comply with the "continuous" feature. More importantly, the game environment must ensure that players can work for and own their assets or treasures, and their logs must be kept securely using some secure technology, such as blockchain, to fulfill the "decentralized" feature (Vergne , 2021).

Opportunities for Educational organizations in Metaverse some of the key questions to consider before applying for Metaverse at Educational organizations are:

- If more time is spent interacting, interacting and socializing in the virtual world, how will the business model of your overall Educational organizations be affected? Will it have any effect at all?
- If the business and brand name of the Educational organizations were in the metaverse world, what value could you create for society? Are you a participant or an Educational service provider?
- What are the reliable experiences and services of the Educational organizations that make sense in a virtual ecosystem?
- Do you have an inner talent to help you navigate the metaverse?
- If you want to be in the metaverse or create an experience, do you have the internal skills to do it yourself?
- Business in the real world is still a priority. If your business is limited in terms of time and financial resources, what is the perceived value of being the first mover in an emerging sector?
- How important is targeting younger generation audiences and tech-forward sub-communities to your business?
- Are your competitors present in Metaverse?

We are not seeking in this article to suggest that the metaverse, as we know it today, will take over all human interactions in Educational organizations, but rather to explore the many exciting opportunities that exist for Educational organizations and There are their shareholders, we are. Because we believe the metaverse is likely to penetrate all sectors in the coming years in some way, including the Educational organizations, and its market opportunity is estimated at more than $1 trillion in annual revenue. Undoubtedly, it is not only the

Educational organizations that will benefit. Metaverse provides a huge business opportunity for Educational organizations.

Potential uses of metaverse in training operational staff of Educational organizations

staff of Educational organizations

There are potential applications of the metaverse in education in general, such as medical education, nursing and health care education, science education, military education and manufacturing education, as well as language learning. But in Educational organizations, Metaverse actually allows learners to have more opportunities to experience, explore, learn and train in the new world of as well as work and interact with customer service people. They can even learn or practice in situations that they cannot experience in the real world of the Educational organizations. For example, most of the operational staff of Educational organizations may not have the opportunity to serve at the management level or practice working in Educational organizationss. However, if the company wants to provide users with experience or learning opportunities, this can happen in the metaverse. Therefore, there are many potential applications of the metaverse in the training of operational staff. There are several reasons for training employees of Educational organizations in Metaverse, including:

(1) Continually placing employees in a cognitive or skill practice environment that could be hazardous or hazardous in the real world.

(2) permanent placement of employees in areas to experience and learn something that they generally do not have the opportunity to engage in the real world of Educational organizationss;

(3) Empowering employees to understand or learn something that requires long-term participation and practice in the Educational organizations.

(4) encourage employees to try to create or discover something that they are unable to do in the real world for practical reasons, such as cost or lack of real materials;

(5) Empowering employees to have alternative thoughts and efforts about their jobs.

(6) To enable employees to understand, experience or see things from different perspectives or roles.

(7) To enable employees to learn to interact and even collaborate with people they may not have the opportunity to work with in the real world.

(8) To discover the potential or higher order thinking of employees by engaging them in complex, varied and authentic tasks.

Based on this, it can be seen that Metaverse-based training is widely used in Educational organizations. If operational employees do not have the opportunity to experience or practice in the real world, learning objectives in the metaverse can be strongly related to the needs of employees in real work life.

five Key requirements for deploying Metaverse in Educational organizations

1. Technology
2. Commercial infrastructure
3. Workforce of the future
4. Privacy and identity
5. Regulation, tax, accounting and social infrastructure

What is "metaverse strategy" in Educational organizations?

Metaverse strategy in Educational organizations

The proposed strategy of using Metaverse in Educational organizations consists of 5 steps

1. Learning: Here, there are different interpretations of meta-facets and different angles beyond the content.
2. Evaluate: While Metaverse will scale across many parts of the Educational organizations, evaluate whether there are relevant business opportunities for Educational organizations.
3. Create: Gain experience through internal development. Take this opportunity to explore creative customer engagement through new channels, services, experiences, goods and digital assets. Start small and move fast. Test and learn.
4. Communication: Start building a network of stakeholders in the Metaverse ecosystem. The world is still small, so high-quality collaborations and partnerships are still available at a reasonable level of investment. Connect with the new generation and tap into alternative talent.
5. Establishment: Start your Educational organizations business there and position yourself to capture the hearts and minds of the leading tech sub-communities.

Discussion and conclusion

The metaverse offers unparalleled opportunities for innovation in education, but its integration demands a thoughtful and strategic approach. This study identifies the transformative potential of the metaverse while highlighting the critical challenges that must be addressed. Educational organizations should adopt a phased strategy, starting with low-risk pilot projects to build confidence and capability. Future research should delve deeper into specific applications, such as AI-driven customization of learning experiences and the long-term effects of metaverse engagement on academic performance. By fostering collaboration among stakeholders, educational institutions can position themselves at the forefront of this digital revolution.

The insights gained from this research provide a foundation for future studies aimed at exploring specific applications of the metaverse in education. As more organizations begin to experiment with this technology, sharing best practices and lessons learned will be vital in shaping an effective strategy for implementation. Ultimately, embracing the metaverse could lead to a paradigm shift in education—one that not only enhances learning but also prepares students for a rapidly changing world. The time to explore these opportunities is now; by doing so, educational organizations

can position themselves at the forefront of innovation in teaching and learning.

The exploration of the metaverse in educational organizations presents a transformative opportunity to redefine how learning and engagement occur. As outlined in this article, the metaverse is not merely an extension of existing technologies like virtual reality (VR) or augmented reality (AR); it represents a new paradigm that can fundamentally alter interactions within educational settings. The potential for immersive learning experiences, collaborative environments, and innovative teaching methods positions the metaverse as a critical tool for modern education.

The findings suggest that educational organizations must approach the metaverse with a strategic mindset. Key questions highlighted in this research, such as the impact on business models, value creation, and the necessity for internal talent, underscore the complexity of integrating this technology into existing frameworks. It is evident that while the metaverse offers exciting possibilities, careful consideration must be given to how these opportunities align with organizational goals and the needs of learners.

Moreover, the potential applications of the metaverse extend beyond traditional classroom settings. For instance, virtual training environments can simulate real-world scenarios, enabling students and staff to practice skills in a safe and controlled space. This aspect is particularly valuable in fields such as healthcare and engineering, where hands-on experience is crucial. Additionally, the ability to connect with peers and mentors globally can enhance collaborative learning and foster a sense of community among learners.

However, challenges remain. The need for robust technological infrastructure, privacy considerations, and regulatory compliance are critical factors that educational organizations must address before fully embracing the metaverse. Furthermore, there is a need for ongoing research to explore the long-term implications of metaverse integration on learning outcomes and organizational effectiveness.

Conclusion

In conclusion, the future of the metaverse in educational organizations holds significant promise. By leveraging this emerging technology, educational institutions can create more engaging, interactive, and personalized learning experiences that cater to diverse student needs. As we move forward, it is essential for educators and administrators to remain proactive in their approach to integrating the metaverse into their practices.

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References

[1] Kye, B., Han, N., Kim, E., Park, Y., & Jo, S. (2021). Educational applications of metaverse: possibilities and limitations. Journal of Educational Evaluation for Health Professions.

[2] Avila, S. (2017). Implementing augmented reality in academic libraries. Public Services Quarterly, 13(3), 190-199.

[3] Díaz, J., Saldaña, C., & Avila, C. (2020). Virtual world as a resource for hybrid education. International Journal of Emerging Technologies in Learning (iJET), 15(15), 94-109.

[4] Park, S. M., & Kim, Y. G. (2022). A Metaverse: taxonomy, components, applications, and open challenges. IEEE Access. 10, 4209-4251.

[5] Wiederhold, B. K. (2022). Ready (or Not) Player One: Initial Musings on the Metaverse. Cyberpsychology,Behavior, and Social Networking, 25(1), 1-2.

[6] Cipresso, P., Giglioli, I. A. C., Raya, M. A., & Riva, G. (2018). The past, present, and future of virtual and augmented reality research: a network and cluster analysis of the literature. Frontiers in psychology,2086.

[7] Egliston, B., & Carter, M. (2021). Critical questions for Facebook's virtual reality: Data, power and the metaverse. Internet Policy Review, 10(4), 1-23.

[8] Hwang, G. J., Chang, C. C., & Chien, S. Y. (2022). A motivational model-based virtual reality approach to prompting learners' sense of presence, learning achievements, and higher-orderthinking in professional safety training. British Journal of Educational Technology.

[9] Vergne, J. P. (2021). The Future of Trust will be Dystopian or Decentralized: Escaping the Metaverse. Forthcoming in special issue of Revista de Occidente on The Future of Trust.