‘Co-Creating’ Experiential Learning in the Metaverse- Extending the Kolb’s Learning Cycle and Identifying Potential Challenges

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Abstract

The metaverse has the potential to expand our understanding of the physical world by enabling seamless avatar-based interaction between users in both real and virtual contexts. Based on current insights, it is likely that learning and development methods for the management education in the metaverse will be transformed due to the blurring of lines between the virtual and real worlds. This study, based on systematic literature review, aims to present a framework to contextualize experiential learning in the metaverse for management education by highlighting the facilitators and potential challenges. The study also identifies ‘*co-creation*’ as a distinct dimension of the experiential learning cycle, which extends the existing Kolb's learning cycle to highlight the significance of interaction in the metaverse. The implications of this study are significant for both academics and practitioners, as the metaverse is still in its early stages, and discussions on management education via co-creation provide a rational perspective to consider for the future developmental needs.

Keywords- Metaverse, Experiential Learning, Management education, Framework, Co-creation, Augmented reality, Virtual reality, COVID 19, Learning and development

Introduction

We are living in a volatile, uncertain, complex, and ambiguous (VUCA) world. The pace of changing events as well as development in technology is shaping the way individuals and institutions learn and develop (Ratten, 2023; Sinha & Bagarukayo, 2019). Especially after COVID- 19 pandemic, organizations now realize the power of digital tools to free them from the spatial, temporal and traditional barriers in imparting management education. Several crisis situations like the pandemic and global conflicts have forced organizations to adapt to technologies (Pfaltzgraf & Insch, 2021) which are crucial in supporting communication, development and remote learning to foster management education. Educators switched to digital platforms like *Zoom* and *Microsoft Teams* to impart synchronous learning (instructors and participants gathering at the same time and place either virtually or physically and interacting in ‘real-time’) to the participants. Also, asynchronous methods like *Moodle* and *Blackboard* (participants access materials at their own pace and interact with each other over longer periods) are used for education purposes. While these tools have revolutionized the process of learning

and development (Kabudi et. al., 2021); such flat, static and 2-Dimensional (2D) methods have failed to transmit cognitive and emotional experience arising by body language, gestures, co-presence, and social interaction in the face-to-face learning environment. Considering human capital as a valuable and desirable good, which, when applied properly can significantly contribute to personal and professional growth (Somogyi, 2020); management educators are exploring the new upcoming technologies.

Use of the Metaverse (a 3-Dimensional platform) can uplift the experiences of online learning by not only facilitating virtual environments that can replicate the physical world but also diluting the geographic and temporal boundaries to facilitate real-time experiential learning among the participants. According to Daft & Lengel (1986), metaverse like environment are very "rich" (providing more cues than 2D environment); thus, allowing learners to share multidimensional visuals and sometimes even haptic sensations for greater learning experience (Wedel et al 2020). Hence, this study aims to understand the role of metaverse characteristics in facilitating the learning process in the era of technology.

Research Objective 1: To understand the role of metaverse (an immersive environment) in facilitating the learning process as compared to the existing 2D technologies (non-immersive environment) and potential challenges.

Further, according to Kolb's experiential learning theory (1984), participants first 'detect, depict, or grasp knowledge, and then a phase of construction should take place to complete the learning process' (Abdulwahed and Nagy, 2009). This process allows transformation of the grasped knowledge into a mental model through experimentation. Experiential learning is a process involving four main phases: concrete experience (A new experience or situation is encountered), reflective observation (highlights the gap between experience and understanding), abstract conceptualization (gives rise to a new idea or modifies the existing concept), and active experimentation (applying learnings to the real-world setting/situation) (Sinha and D'Souza, 2022). Past studies suggest, to optimise learning, a participant must adequately balance all the four stages (Sinha and D'Souza, 2022). However, one significant gap here is that, this model emphasizes on individual processes of learning (e.g., Healey & Jenkins 2000), and ignores the value of social interactions. Studies have indicated that social interactions are valuable for higher-order cognitive development (applying, analyzing, evaluating, and creating) (e.g., Garrison et al. 2000) that is an essential part of management education. While 2D platforms offer interactive tools to the participants but they provide limited experience as multimodal and multisensory real-time social interactions are not possible on such platforms. Thus, leading to phenomenon like zoom fatigue and stress (Sinha & laghate 2023). Studies suggest that the Metaverse can help overcome such significant limitation of the 2D learning by allowing participants to interact, immerse and co-create experience via social interactions (Dwivedi et al. 2022). Specifically, studies have indicated that value in a virtual world can be realised with the help of co-creation via interactions (e.g., Kohler et al. 2011)

to enhance the learning experience. The continuity of experiential learning depends on uninterrupted social interactions and feedback loops; hence, indicating towards the importance of co-creation. However, understanding of the same in the context of the Metaverse is diffused and limited. Thus, second research objective of this study is as follows:

Research objective 2: To understand the role of co-creation in the context of experiential learning in the metaverse by extending the Kolb's learning cycle

Thus, the aim of this article is multifold. First, this article examines the current state of digital learning experience. Second, it discusses the Metaverse and its implications in the context of experiential learning and development. Third, the article presents a framework of experiential learning in the metaverse by comprehending the extent of changes in the approach. Lastly, this study extends the Kolb's learning cycle by adding one dimension of 'co-creation' to contextualize the experiential learning in the metaverse and highlights significant challenges.

Background

The COVID-19 pandemic has an impact on a variety of areas, including the health industry, the economy, the labour market, management education, training and development and how people perceive new technologies. It turns out that modern technology is essential in the effort to tackle the problems, since it allows for unprecedented levels of communication, remote work, and online learning by breaking down barriers to knowledge and information sharing (Zelenkov & Lashkevich, 2022). Research showed that the pandemic has in some way compelled the management education to heavily rely on the video format as the best available substitute for in-person interactions (e.g., Mikołajczyk, 2021). For professionals in many areas, learning through videoconferences and webinars are common practices. Despite the abundance of digital tools available for online learning, technologies at present have not been able to replicate the face-to-face learning opportunities and still rely on textbook and conventional computer graphics on a 2D monitor. The issue of developing the appropriate virtual learning schemes to fulfil the demands of the courses, achieve the learning goals, and maintain the individuals' high learning experience still has to be resolved (Pappas & Giannakos, 2021). In their research conducted in 2021, Rauer et al. introduced a project named global virtual teams (GVTs) that aimed to provide university students with an opportunity to gain international experience by collaborating in virtual teams. The study involved 150 students from 26 countries who worked together in a simulated business environment to solve problems. They later presented their findings to a professor who was located remotely. The outcomes of the study indicated that the participants encountered challenges while working in teams that were geographically dispersed and consisted of individuals from different countries. Thus, training in the 2-D screen-based learning has some limitations. First, screen-based training is available to participants only when the instructor opens the video conferencing platform. Second, participants on any 2D platform (participants, peers and instructors) can interact with

each other through audio, video and lectures only which is fairly static in nature and limits spontaneous and unplanned interactions with other Participants (Ratten, 2023). Third, such platforms don't allow easy immersive collaboration among the participants mainly because it aims to develop lower-order cognition (e.g., remembering, understanding, and memorizing). Fourth, training on 2D platforms is focused on learning outcomes rather than continuous growth/improvement of the participants through summative data. Fifth, innovation in 2D platforms such as Zoom, is limited to only audio-video and lecturing content that hinders the non-verbal communication (an important part of overall communication mechanisms) and leads to fatigue; thus, viewing people in a virtual format result in loss of communication to co-create innovative learning space (Ratten, 2023; Zhang et al. 2022). These limitations can be overcome with the help of the metaverse. Learning in the metaverse is immersive and gives participants the flexibility to seamlessly switch between the real and virtual world.

Further, experiential learning cycle by Kolb is a popular framework to understand the process of experiential learning (Kolb, 1984). However, it has a prominent drawback that it only emphasizes on individual processes of learning (e.g., Healey & Jenkins 2000); thus, ignoring the role of social interaction in the learning process. According to the community of inquiry theory (CoI) (Garrison et al. 2000), while cognitive presence (knowledge construction and critical thinking of an individual) and teaching presence (focuses on instructional design and facilitation) is important for learning process; social presence (interaction and coloration among learners) is very significant in creating a meaningful learning experience. In a management education setting, social interaction helps create a supportive and collaborative learning community. Learners can share their experiences, perspectives, and insights, fostering a sense of belonging and motivation to actively participate in the learning process. When learners engage in experiential learning, their interactions with others can be seen as instances of social presence within a community of inquiry. As learners share their experiences, discuss their reflections, and collaborate on projects, cognitive presence is enhanced, leading to deeper understanding and knowledge construction (Garrison et al. 2000). Unlike 2D based learning platforms, in the metaverse such interactions and collaborations are seamless due to its rich esthetics and technologies involved (Ratten 2023). Additionally, social interaction in the Metaverse transcends geographical barriers, enabling learners from different cultural backgrounds and regions to connect and collaborate seamlessly (Dwivedi et al 2022). This aspect of inclusivity aligns with the globalized nature of contemporary organizations and promotes cross-cultural understanding, essential for effective management practices in an increasingly interconnected world.

Thus, this study through systematic literature review aims to presents a framework for experiential learning in the context of the Metaverse.

Methodology

A systematic review of recent literature was carried out to understand the concept of the Metaverse and its significance in the area of learning and development. Systematic Literature reviews (SLR) are essential for: "(a) identifying what has been written on a subject or topic; (b) determining the extent to which a specific research area reveals any interpretable trends or patterns; (c) aggregating empirical findings related to a narrow research question to support evidence-based practice; (d) generating new frameworks and theories; and (e) identifying topics or questions requiring more investigation" (Paré and Kitsiou, 2017 p. 157).

Besides providing researchers with the necessary 'background' and theoretical foundation for their proposed study (Levy and Ellis, 2006), SLR also creates a solid starting point for all members of the community interested in a particular area or topic (Russo et al 2023). According to Siddaway et al (2019), "systematic reviews offer the most robust means of clarifying the extent, nature, and quality of the evidence on a particular topic. They can therefore contribute to the issue of replicability in important ways, potentially fostering scientific rigor and maintaining a robust reputation for psychological science" (p. 753). This article aims to systematically review the recent literature on the topic under consideration and reveal the strengths and challenges to present a framework for experiential learning in the Metaverse. Keeping the objectives in mind, literature search was conducted using keywords ('metaverse', 'metaverse and experiential learning', 'virtual reality and experiential learning', and 'Management education and virtual world') in reputed databases (Emerald, Google Scholar, SCOPUS and Web of Science) to identify seminal work. The initial readings helped in making decisions about the suitability of material to be considered in the review (Cooper, 1988). The literature review was based on the steps proposed by Tranfield et al. (2003), which included: (1) distinguishing proof of research, (2) choice of studies, (3) evaluation of the nature of the papers, (4) information extraction, and (5) synthesis of information.

The inclusion criteria for the literature were based on the following:

*Relevance to the Metaverse***:** Studies should be directly related to the Metaverse or virtual worlds ensuring that the articles selected explicitly discuss the use, impact, or application of the Metaverse in the context of learning and development.

*Publication Type***:** Studies should be from peer-reviewed journal, conference papers, dissertations, and reputable reports ensuring rigorous research and analysis for this study.

Language: Studies should be in English language to be considered for inclusion in this study to ensure effective analysis.

Focus on Learning and Development: All the studies which focused on learning and development in the metaverse were included. These articles included empirical studies, experimental research, case

studies, qualitative interviews, and surveys that investigate the Metaverse's role in learning and development.

Further, studies that were found to be not directly related to the Metaverse or studies that focus on other applications of the Metaverse unrelated to learning and development were excluded. Also, studies that were not published in peer reviewed journals listed in ABDC, ABS and SCOPUS were excluded. Studies in non-English language were also excluded from this review.

The above inclusion and exclusion criteria ensured the systematic review's integrity to avoid bias in the selection process. It helped to identify relevant studies that contribute meaningfully to the above stated research objectives and ensured that the SLR is comprehensive and reliable.

We retrieved a total of 67 articles on the Metaverse/virtual world between 2000 to 2022 after searching the relevant databases. Out of which 39 had to be rejected either because as we went through the full text it was found that while they talked about the Metaverse, they did not explicitly relate to learning and development and five were not in English. At the end, a total of 28 articles were taken into consideration for the final examination (Figure 1). These articles were published in reputed journals, for example: The International Journal of Management Education, Journal of Management Information System, International Journal of Information Management System, International Journal of Human Computer Studies and The International Journal of Management Education.

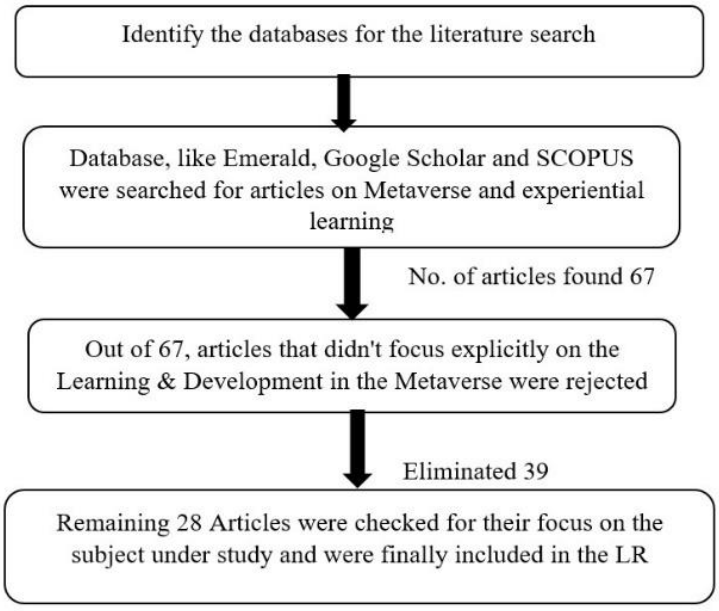

Figure 1: The Process of Sample Article Selection for the Systematic Literature Review

It was found that literature was diffused and comprehensive framework on experiential training in the Metaverse received very little attention. Thus, this study aims to bring consistency in the use of the Metaverse for experiential learning and development by identifying related pros and cons of using the

Metaverse for developmental needs. The list of seminal studies in this area is presented in Table 1 below.

Table 1: Seminal Studies on Education and Learning in the Metaverse and Virtual World

Study	Methodology	Interface	Key Findings
Ratten (2023)	SLR	VR and Metaverse	The use of metaverse and VR after COVID 19 pandemic is useful in producing effective and innovative educational results.
Dwivedi et al. (2022)	Expert Viewpoints	Metaverse	In the realm of education, the utilization of the metaverse has the potential to enhance user-environment interaction, replicate emotional and cognitive experiences, and better emulate the overall in-person classroom setting, surpassing previous technologies.
Dincelli & Yayla (2022)	SLR	VR and Metaverse	Education and teaching in interactive VR/Metaverse environments provide either on par or better learning effectiveness compared to traditional teaching.
Bourhim and Cherkaoui (2020)	Experiment	VR and Real world	The ability to move oneself freely through a virtual environment (i.e., navigability affordance) increases the sense of being and acting in it. Users' reactions to learning module in VR match the real-world behavior.
Chávez et al. (2020)	Case study	VR	The gamified VR educational tool improved students' learning performance the most. All versions of the educational tool (2D, 3D, and VR) are perceived as equally useful and usable.
Brusamento et al. (2019)	Meta-analysis	VR and Real world	The focus is comparison of education technologies in improving health professionals' learning skills. Digital education technologies include high-fidelity mannequins, computer-based education, mLearning, and VR
Nolin et al. (2016)	Experiment	VR	The neuropsychological assessment conducted in VR is more effective than traditional methods in assessing cognitive problems
Stull et al. (2015)	Experiment	VR	The focus is a comparison of virtual and physical models for learning. The accuracy of the participants was the same in both models and participants spent less time completing the tasks using virtual models
Choi & Baek (2011)	Survey	VR	VR characteristics like 'interactivity', 'representational fidelity', 'immediacy of communication', 'consistency', and 'persistence' influences the flow of learning
Rönkkö et al. (2006)	Survey	VR	VR can be an effective tool for astronaut assembly training in zero gravity

Sutcliffe et al. (2005)	Case Study	VR	Development of human-centred design is possible via usability assessment of VR
Stone (2001)	Conceptual	VR	Review of applications of VR. Understanding the needs and characteristics of the users via interactions and measuring their performance is critical for the development.

The next section describes the Metaverse and its potential for experiential learning based on the SLR.

Literature Analysis

Experiential Learning

Kolb's Learning Cycle is a theoretical framework that describes the process of experiential learning. It was proposed by David Kolb (1984), an American educational theorist. The cycle consists of four stages that learners typically go through when engaging in a learning experience. These stages are:

1. *Concrete Experience*: This stage involves the actual hands-on experience or encounter with something in the real world. It can be a direct interaction with a situation, an event, a task, or an activity. Concrete experiences provide the foundation for learning as they allow individuals to observe, participate, and have direct personal encounters that form the basis of subsequent learning.

2. *Reflective Observation*: After the concrete experience, learners engage in reflective observation, where they reflect on and analyze their experiences. This stage involves stepping back and reviewing what happened, examining the events and their own reactions, and considering the implications and consequences of their actions. Reflective observation helps learners gain a deeper understanding of the experience, identify patterns or insights, and make connections to existing knowledge.

3. *Abstract Conceptualization*: In this stage, learners draw upon their reflections and observations to form abstract concepts, theories, or generalizations. They integrate their observations with existing knowledge and theories to develop new ideas and frameworks. Abstract conceptualization involves thinking critically, making connections, and organizing information into meaningful concepts or models.

4. *Active Experimentation*: The final stage of the cycle is active experimentation. Learners apply their abstract concepts and theories to real-world situations to test their validity and usefulness. This stage involves taking risks, trying out new approaches, and engaging in problem-solving. Active experimentation allows learners to gain practical experience, receive feedback, and refine their understanding and skills.

What sets Kolb's Learning Cycle apart is its emphasis on the iterative nature of the learning process. The cycle suggests that learning is an ongoing process of experiencing, reflecting, conceptualizing, and experimenting. Learners can enter the cycle at any stage and move through it in a continuous manner, building upon their previous experiences and expanding their knowledge and skills.

However, this framework is individual oriented (Sinha & D'Souza 2022). It suggests that all the experiences and learnings individuals gain are based on their learning styles and, cognitive conditions such as attention and memory alone (Healey & Jenkins 2000). However, theory of community of inquiry suggests that learning is a social process and people learn via interacting and observing each other (Garrison et al. 2000). Such interactions can lead to value co-creation that can enhance the experience of the learners.

In the next section, the paper describes the Metaverse and how it can be a useful platform to enhance the process of experiential learning via interactions.

What is Metaverse?

The word 'Metaverse' consists of two components: Meta (Greek prefix meaning post, after or beyond) and Verse (universe). In other words, "the Metaverse is a post-reality universe, a perpetual and persistent multiuser environment merging physical reality with digital virtuality" (Mystakidis, 2022). The definition of the metaverse varies based on purpose and viewpoint (Table 2). However, one can understand the metaverse as a virtual world that mimics the real world by utilising virtual reality (VR) headsets, augmented reality (AR), avatars (alter ego), 3-Dimensioanl (3D) and blockchain technology (The Verge, 2021). Also, cryptocurrencies and non-fungible tokens (NFTs) are the key building blocks of the metaverse; using these, avatars can buy assets like real estate, shoes and clothes etc. in the metaverse. The metaverse was first surfaced in Neil Stevenson's science fiction novel *Snow Crash* in 1992 and described a world where virtual and reality interact and "create value through various social activities" (Park and Kim, 2022). The metaverse offers an immersive and collaborative environment due to the technologies involved where users' avatars can share and co-create experiences (Dwivedi et. al., 2022). In the extended digital life of the metaverse, friends and colleagues can meet, interact, socialize and live life similar to their physical spaces. The two main technologies for combining reality and virtuality have been identified as AR and VR (Xi et.al., 2022) in the Metaverse. The understanding of AR & VR has deepened with the development of multimodal and sensory technologies. There lies a consensus that any sensory experience can be augmented digitally (Harley et al., 2018) and also be virtualized (Boyd & Koles, 2019). While AR by augmenting content helps to build user interactivity, novelty and vividness (McLean & Wilson, 2019); VR creates an immersive experience (Suh & Prophet, 2018), by establishing a sense of "being there" (Xi et. al., 2022). This way, the metaverse allows users to build financial wealth, create new things, and provide them with an opportunity to showcase a different side of themselves (Dwivedi, et. al., 2022) in a three-dimensional platform. Metaverse

facilitates exchange of vivid experiences and new knowledge creation among users. There are platforms like Decentraland and Spatial that aim to provide metaverse experience to the users where users are also creators. To access these platforms, one only need to have a stable internet connection and a computer. However, to fully experience the Metaverse one would need some other devices like, head mounted devices (HMDs), wired gloves, 3D mouse and motion controller (Coursera 2023).

Table 2: Seminal definitions of the metaverse

Author	Definition
Dionisio et. al., (2013)	Integrated network of 3D virtual worlds that constitutes a compelling alternative realm for human sociocultural interaction.
Yoon et. al. (2015)	An immersive world of information where anything one can imagine today is connected to the internet and intensely stimulates the senses.
Barry et. al., (2015)	A virtual 3D world where the avatar does everything for you.
Chen (2016)	Immersive environments that reflect the real world and are co-created by residents using the imaginations.
Choi and Kim (2017)	Metaverse connects reality to a virtual world to enable two-way interaction between the two spaces by stimulating all five senses in a three-dimensional space to give a sense of reality.
Flavián et. al. (2019)	Metaverse is a technology-mediated realities where physical and virtual worlds are integrated at different levels. Users can Prada interact with both digital and real contents, and these elements can also interact.
Park and Kim (2021)	Metaverse refers to a three-dimensional virtual world where avatars engage in political, economic, social, and cultural activities. It is widely used in the sense of a virtual world based on daily life where both the real and the unreal coexist
Dwivedi et. al. (2022)	Metaverse describes an integrated immersive ecosystem where the barriers between the virtual and real worlds are seamless to users, allowing the use of avatars and holograms to work, interact and socialise via simulated shared experience
Mystakidis, (2022)	the Metaverse is a post-reality universe, a perpetual and persistent multiuser environment merging physical reality with digital virtuality
Xi et. al., (2022)	Metaverse is an extended reality: XR that enables novel forms of engrossing telepresence, but it also may make mundane tasks more effortless.

Realizing the potential of metaverse, organizations have experimented with VR and AR in various combinations for imparting management education and offer customizable and motivating learning experiences. The metaverse gives business schools the opportunity to create an online experience which connects and unite students, offering them an immersive campus experience at home. Chloe (2023) in her article pointed out that several universities and business schools are already branching out into metaverse technology. The University of California, San Diego (UCSD) in the US, Tecnológico de Monterrey in Mexico and Northwest University in China have each opened their own virtual campuses with great success. In 2020, France's NEOMA Business School opened its award-winning digital campus in partnership with Laval Virtual. This 15,000m² online space is Europe's first fully-virtual campus.

However, the use of the Metaverse for management education is still very limited and in-depth understanding is warranted. Educators do use digital tools and platforms but in a 2-D screen-based mode that fails to evoke engagement among learners and lead to fatigue. Some of the potential benefits of conducting management education and learning in the Metaverse are discussed in the section below.

Contextualizing Experiential Learning Capabilities in the Metaverse

Sinha and D'Souza (2022), suggested experiential learning as a "process where solutions to the problems are approached by reflecting on the situations created through a performance by professionals and participants themselves". In this view, metaverse can provide a space for effective visualization, co-creation and storytelling to enhance the learning experience in management education. Individuals can move around, walk places, see things, do things and also co-create things with others in the Metaverse making it a very powerful platform in terms of helping people learn things with greater involvement (Ward & Alaghband, 2022).

Purpose of management education is to motivate individuals to grow by igniting the need of development. Such developmental needs are promoted by the management educators by setting "requirements, expectations, enforcing behavioural changes and acquisition of new skills and knowledge" (Mikołajczyk, 2021). Therefore, one of the objectives of an effective management education should be to balance and support the development of the participants' capabilities and competences. Competence here can be understood as, "knowledge, skills, attitudes, abilities, styles of action, personality, principles, interests and other characteristics which, when used and developed can lead to results that are in line with the strategic goals" (Mikołajczyk, 2021; Mourão and Fernandes, 2020). Such competence is required to deal with any unforeseen external stimuli too and produce desired results (Sinha, 2021). With the COVID-19 pandemic a range of activities in the physical world including management education has transited into the digital platforms resulting into the need for a more advanced platform to develop learners' competence. The answer came in the form of the Metaverse which incorporates items mapped or augmented from the real world and the creations produced in the virtual world (Zhang et. al., 2022) to reduce or perhaps eliminate the boundary between the virtual and physical world. Scholars (e.g., Dwivedi et. al., 2022) have identified training and education as one of the most prominent uses of the Metaverse, where users' digital *avatars* can interact with each other in real time in a 3-D virtual space irrespective of their spatial and temporal boundaries.

Further, according to revised Bloom's taxonomy of learning, objectives include six categories from low to high: remembering, understanding, applying, analyzing, evaluating, and creating (Bloom et. al., 1956; Anderson et al., 2001, Zhang et. al., 2022). Screen-based remote learning primarily focuses on lower-order cognitive development (i.e., remembering, understanding, and memorizing) of learners due to limited resources like time and space (Arievitch, 2020). Due to its characteristics of immersion, multi-sensory experiences and enhanced digital presence, metaverse enables learners to engage in various

types of learning activities (e.g., creative learning or inquiry-based learning) regardless of their spatial and temporal boundaries, which can help learners to "apply, analyze, evaluate or create knowledge more easily throughout the learning process" (Zhang et. al., 2022 p.10); thus, facilitating higher-order cognitive development. According to Bednar & Welch (2020), learning in the metaverse can increase working efficiency of individuals by providing real-time information.

Based on the discussion above, this study contextualizes experiential learning in the metaverse (Figure 2) and discusses some highlights of the same as below:

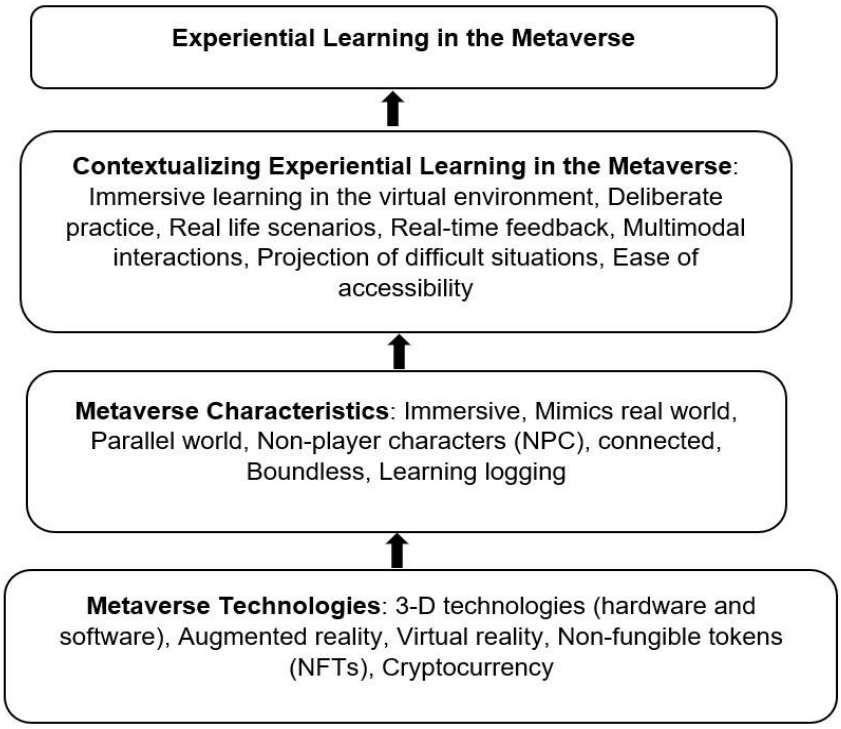

Figure 2: Contextualizing Experiential Learning in the Metaverse

Learning in an immersive virtual space

"Immersion is an antecedent of presence, and is dependent on the technology's capabilities" (Flavián et. al. 2019). In the metaverse it is possible to have multimodal and embodied interactions unlike the conventional Internet. With the help of various technologies like VR, 3D, sensors, real-time tracking, IoT (internet of things), smart wearable devices (e.g., head-mounted display) and BCI (brain-computer interface) learners can experience high level of navigations, collaborations, and sensory feedback (e.g., vision, audition, and kinaesthesia) (e.g., Prieto et al., 2022). Learners can organize their bodies to explore various learning activities, collaboration, and socialization; thus, stimulate different sensory organs and get real-time feedback without worrying about the temporal and spatial boundaries.

Digital representation as 'Avatar'

In the metaverse the '*avatar*' is the digital representation of the actors (e.g., facilitator and learner) which can be customized. With the help of technologies, these avatars can resemble to the participants or at the same time can be customised to be different. Thus, avatars can help learners to express themselves in a fresh joyful, and completely immersive way, as well as provide them with a sense of being when they experience the metaverse. Avatars allow learners to overcome their real-world challenges (e.g., gravity and impairments), representing the users to showcase their full potential without having any fear of being judged (Jagannathan 2022). Avatars enable learners to engage in realistic simulations, collaborative activities, and role-playing exercises, creating an immersive and interactive learning experience. According to Zhao et. al. (2022), facial expressions and gestures of the avatars can be captured and shared in real-time in the metaverse to make the experience more immersive that can allow them to co-create experiences.

Presence of Non-player characters (NPCs)

Metaverse also provides an opportunity to interact with non-player characters (NPCs) that have a personality, hobby, values etc. Users can interact with these artificial intelligence (AI)-driven NPCs for emotional stability and heightened immersive experience in the metaverse (Hwang and Chien, 2022). Such intelligent agents can facilitate simulation, co-creation and decision-making for learning purposes by engaging the participants in a more challenging task and meeting their personalized needs. It implies that within the metaverse, learners have the opportunity to receive tutoring, seek assistance, engage in discussions, or practice various skills with NPCs (Zhang et al 2022). In this sense, the provision of those intelligent agents can greatly meet personalized needs and enhance interaction for learners.

Opportunities to individuals with impairments

The Metaverse has the potential to increase disabled people's access to learning and development opportunities. An immersive environment gives young adults with special needs, autism, and social interaction challenges, the chance to develop their interpersonal and employment skills (Zhang et. al., 2022). Through VR such individuals may communicate with others and practise skills in a secure setting without worrying or feeling overwhelmed. Additionally, VR can enhance the quality of learning for people who struggle with mobility or anxiety.

Build human capabilities in interpersonal or difficult situations

Developing competence, such as leadership, communication, listening, and empathy is hard to achieve and measure for organizations. However, by immersing learners in real-world conflicts, metaverse makes it possible for participants to practice their skills in a safe environment by developing their higher-order cognitive skills (Shin, 2022). Scenarios relating to handle difficult or sensitive conversations with co-learners can be easily crated in the metaverse for learning and development purposes. For example, for Verizon staff, safety training scenarios concerning robberies can be dangerous and overwhelming. However, by using VR, Verizon trained over 22,000 associates across

1,600 stores for this complex scenario; the company reported that 97 percent of those trained said they felt prepared when put in such dangerous situations (Jagannathan, 2022). Building immersive scenarios virtually with various permutation and combination costs less as compared to the real physical setup.

Deep analysis through learning logging

In the Metaverse, technologies like AI play an important role in providing and analyzing huge amounts of data (Yang et al., 2022). The analysis provides insights to learners' learning performances and achievements. To capture, store, and distribute daily experiences and information of objects and people *lifelogging*- an essential scenario- is used in Metaverse. With the help of lifelogging, learners' real-time status information can be presented and shared, meanwhile, learners' historical information (e.g., footprints, data, assignments, and virtual works) can be recorded and stored in the metaverse (Zhang et. al., 2022). Such logging helps participants to review and keep track of their progress and also conduct some meaningful events (e.g., analyzing behavior or interactive patterns) based on personal experiences (Prieto et al., 2022).

The above stated factors posit the Metaverse as an effective platform for learning and development needs. Also, literature above highlights the aspect of co-creation in the Metaverse. The Metaverse is a rapidly evolving space where virtual and physical reality converge, offering an immersive and interactive learning environment that provides new opportunities for experiential learning. In this environment, co-creation enables learners to actively participate in the learning process, share ideas, and work together to achieve common goals seamlessly. The next section discusses the importance of co-creation in the experiential learning cycle in the Metaverse.

Discussion: 'Co-Creating' Experiential Training in The Metaverse

With the above discussion it is clear that the Metaverse is likely to transform the way participants interact and learn. It provides an involving and immersive experience, potentially creating new social interaction and content which is not possible within existing 2-D technologies and current spatial and temporal boundaries (Fernandez & Hui, 2022). Such interactions promote learning, which is an integral aspect of co-creation, as this approach utilizes the diverse identities and concepts associated with each participant to create value. The various types of motivation and personalities exhibited by each participant determine value through interactional co-creation, which is challenging to control and parameterize, given that it generates new knowledge and ideas that go beyond the individual members' existing knowledge and understanding (Miguel et al., 2023).

In the metaverse, various learning scenes can be reconstructed virtually based on the real learning environment or simulated in a fully virtual way (Prieto et al., 2022). it enables learners to experience the learning process in visualized and immersive scenarios as if they are right there in the real world. Scholars have indicated that when participants learn in a simulated way, their sense of presence and immersion can be enhanced significantly (e.g., Sinha and D'Souza, 2022). Individuals while being at

their home can indulge into highly engaging interactions through the Metaverse with the help of real-time management scenarios in the virtual world. The Metaverse also provides intense practice and feedback loops, where learners can practice many variations of a concept to hone skills and co-create cases and scenarios. For example, Walmart's Spark City game is different every time the game is played. If customers appear within 10 feet, players have to ask if they can help, but not before they've addressed spills and other safety hazards (Jagannathan, 2022). In another example, Grundfos- the world's largest pump manufacturer- saved an estimated $15K in time-related costs as well as an estimated $10K on travel-related costs by training 19,000 employees worldwide to understand better how the pumps work thorough VR (SynergyXR, n.d.). Another use case involves Clostra's DeepMeet training solution for defence, using the Metaverse. The senior leadership of the US Air Force can remotely attend a command room or training facility using DeepMeet. With the help of artificial intelligence (AI), DeepMeet turns participants into 3D avatars that virtually replicate real-world movements and interactions. In order to produce 3D models of actual places and things, the software renders the space. By simulating them in DeepMeet, it gives distant participants the same controls and capabilities as their in-person counterparts (Wiggers, 2022), thus, minimizing the risk associated. Hence, it can be deduced that while the metaverse reflects all the four phases of Kolb's experiential learning cycle, it also brings people together in a virtual world to interact with each other in an immersive environment to allow co-creation of scenes and improvise scenarios that reflect real-world issues (e.g., Chen, 2016; Dionisio et. al., 2013) which is the core of management education. Participants gain concrete experience through immersive environment and based on multimodal processes can feel the situation in the real time to reflect on the same. Such involved reflective observation helps to overcome the anxiety, fear and doubts, thus allowing participants to understand their own as well as others' emotions to develop logic and plans-abstract conceptualization- to solve any problem. Then they apply the learnings in the real time situations through active experimentation to improve outcomes via rich interactions. Thus, this study proposes an additional dimension to Kolb's learning cycle: co-creation (Figure 3).

Co-Creation as Part of the Experiential Learning Cycle

Prahalad and Ramaswamy (2004), suggested that co-creation is a process of creating value for "a specific person, at a specific point in time, in a specific location, in the context of a specific event" while interacting with the network (pg. 10). With traditional method of learning slowly fading out, today learners have greater choices and opportunities to learn from multiple channels. Technology today is revolutionizing channel structures to shape the learning processes both in physical and virtual world. While learning in physical environment offers a direct sense of presence, it also has spatial and temporal boundaries that is likely to hinder the process of experiential learning.

The metaverse with its rich technology and design can offer simulated experiential learning experience to individuals that can enhance their productivity as it emphasizes on subjective experiences, cognition,

emotions and co-creation (Dwivedi et al. 2022). The intense metaverse technologies (Figure 2) and dynamic interactions in the metaverse allow participants to co-create impactful content and experiences for effective learning without any spatial and temporal barriers. According to the theory of Community of Inquiry (Garrison et al. 2000), social interactions provide necessary support for individuals' cognitive presence, indirectly facilitating the process of critical thinking carried on by the community of learners. Also, such interactions allow learners to meet affective goals of the educational process, where they find the interaction in the group enjoyable and personally fulfilling so that they remain in the cohort of learners. Thus, co-creation can be seen as a natural extension of the reflective observation stage in the Kolb's learning cycle (Figure 3) because it allows learners to build upon their insights and ideas by collaborating with others to design and test solutions to real-world problems. During the reflective observation stage, learners reflect on their experiences, identify patterns and insights, and develop new perspectives. However, this stage is often an individual process, and learners may struggle to apply their insights to practical challenges of the real world. Co-creation provides learners with an opportunity to work with others to apply their insights and diverse perspectives to real-world challenges, which can help to deepen their understanding and improve their problem-solving skills. Co-creation in the Metaverse allows learners to establish effective dialogue with transparency in a supportive, risk-free and collaborative environment that eliminates spatial and temporal boundaries. It is easy to provide tools and resources to learners in the virtual world without worrying about their geographic location and time-zone. Technologies like NFTs and cryptocurrencies allow for authenticity (Mystakidis 2022) and minimizes the risk of loss and intellectual duplication; thus, helping to create a transparent environment for discussion and collaboration to co-create value. Usually, during the reflective observation stage, learners may develop hypotheses or solutions based on their insights and may struggle to test these ideas on their own. However, in the Metaverse their avatars can collaborate with others without worrying about the temporal and spatial boundaries in an immersive environment to improve the quality of their solutions and enhance their learning experience.

Hence, the study posits that learning and development in the Metaverse imbibes all the five dimensions of experiential learning to impart an effective learning experience in diverse fields through a collaborative approach.

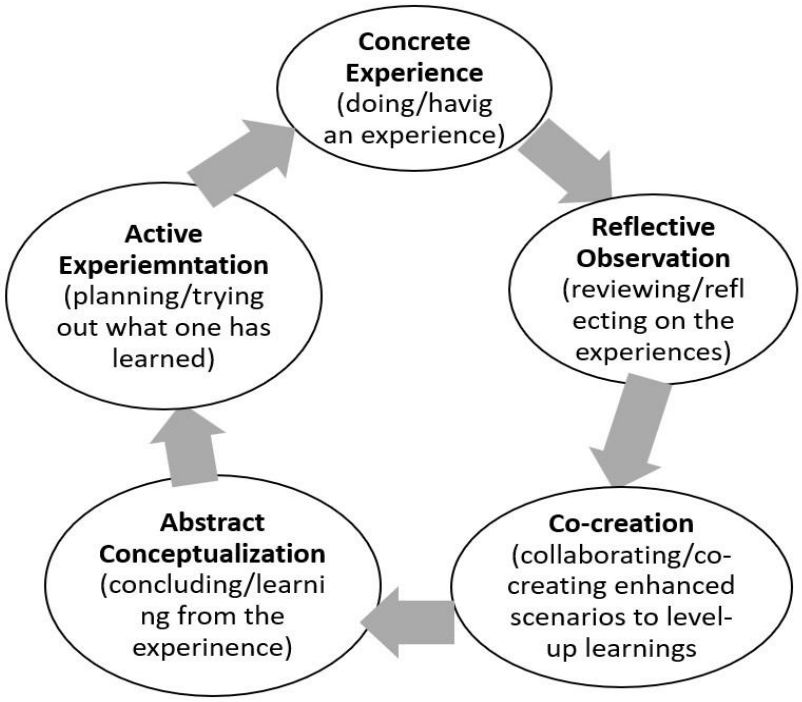

Figure 3: 'Co-creation' as Part of Experiential Training/Learning in Metaverse
Source: Adapted from Sinha and D'Souza (2022)

The metaverse fuels a variety of technological advancements that enable users to transition from the real world to virtual world and vice versa (Buhalis et. al., 2022). Metaverse takes advantage of technologies to create a bridge to facilitate the integration of real and virtual world and to allow participants to effectively blend existence and experiences of both the worlds. By blending the virtual and physical worlds, Metaverse allows participants to interact with different co-learners in real-time by supporting seamless transfer of participants between the virtual and real-world environments (Dwivedi et. al., 2022). Given such experiences, the metaverse can offer participants with better value with active participation and co-creation can therefore be elevated to new dimensions. Having complete control over the virtual environment encourages the formation of flexible, individualised, and context-sensitive settings that may be utilised to co-create experiences that correspond to user requirements, needs, and preferences. The co-creation in the metaverse can enhance the participants satisfaction due to the high degree of experience customisation, cost-effective and simpler access to their individualised, appealing, immersive virtual surroundings. It also possible to record insightful interactions between the participants at any time or place, thus, advancing personalisation and contextualization of training programs.

Thus, it can be deduced that the learning experience in the metaverse certainly allows individuals to immerse in the process for better experience; hence, outcomes. The before, during and after phases of the learning session in the metaverse allows users to undergo the high-quality immersive realism in the virtual world with immense possibilities of collaboration through co-creation (Table 3).

Table 3: Experiential Learning in the metaverse - before, during and after session

Before the Learning session	• Possible to experience the virtual scene without being physically present • Possible to discuss and meet with fellow participants through avatar • Possible to feel the real ambiance and context of the training in virtual world
During the Learning session	• Learning through multi-modal model • Co-create scenarios/modules in a virtual world • Experience and resolve the real time challenges in a safer environment • Additional sources (e.g., AR and AI) can be used to analyze and evaluate personal progress
After the Learning session	• Possible to re-experience the scene whenever required to recharge memories • Possible to re-engage with people for cognitive support and discussion • Possible to share learnings with others in virtual world. • Possible to co-create/Plan a new related/enhanced simulation

However, there are some challenges and risks too relating to the management education in the metaverse. They are discussed in the section below.

Challenges of the Metaverse in experiential Learning

The Metaverse promises to offer cognitive and perceptual advantages such as supporting cognitive processing, enhancing mental immersion through imagery, stimulating scenarios and visual cues that are missing from the physical environment (e.g., Yoon et. al., 2015; Park & Yoo, 2020; Xi et. al., 2022), or are difficult to create in the real world (e.g., Cliford et al., 2018). However, it appears that these gains often come at the cost of additional efforts to maintain a delicate balance between economic, cognitive, physical and ethical feasibility. Some of the challenges are discusses as below:

Cost of Technology

A well-designed and affordable smart wearable device (e.g., head-mounted display- HMD) is essential for both learners and trainers to teleport to the metaverse world (Choi and Kim, 2017; Parmaxi, 2020) and to have multisensory experience. But price is an important factor of hardware and the current cost of equipment is still too high for most people (Taylor and Soneji, 2022). Also, to be noted that for a period of time some users could experience cybersickness, blurred vision, or dizziness or even fall after putting on the wearable devices which may bring about a potential security risk in practice and also increase the cost of training.

Identity as avatar

In the metaverse, avatars personify individuals. Usually, these avatars correspond to the real people in appearance, behavior, feelings, and desires. Hence, it may be necessary to decide the extent to which an avatar is exposed to or withdrawn from access and the possibility of manipulation by the operators in the metaverse (Dwivedi et. al., 2022). On the other hand, avatars may not necessarily represent the individual in the real world, thus behaving otherwise to their habits in real-world social interactions.

Moreover, avatars can be possibly replaced and altered at will so affecting transparency of social behaviour during the training process.

Security and Privacy

Despite the considerable research relating to the metaverse technologies, little attention has focused on security and privacy in the metaverse. Like other social media platforms, security and privacy are crucial concerns in the metaverse too. Evil users can monitor and collect data relating to metaverse users' social behaviour and interactions and biometrics (e.g., facial expressions, vocal inflections) in real-time, which could be used to recognize the user (Dwivedi et. al., 2022). Thus, violating the participants' security and privacy. Protecting individual's vulnerabilities from diverse threat will be an important issue in metaverse (Zhang et al., 2022).

Morality and ethics

Studies have identified significant areas of concern relating to ethics as well as the morality in the metaverse. It has been observed that there has been some detrimental psychological impact for vulnerable members of society (Zhang et. al., 2022) while in virtual world. Within existing areas of the metaverse, users are reporting increasing levels of undesirable behaviours including: bullying of users, sexualisation of avatar interactions, data stealing and un-regulated gambling (Dwivedi et. al., 2022). This calls for a well-organized and well-regularized metaverse with healthy and sustainable ecosystem,

Addiction

The high immersion and presence close to the reality created by the sensor and virtual technologies, and plenty of scenarios and items that exist in the metaverse but miss in the real world, make learners more easily indulge in such a virtual world (Prieto et al., 2022). Those participants who lack self-discipline and self-control, may fall into a state of addiction, which can lead to likely damage to their physical and psychological health (Xi et al., 2022).

The study highlights the aspects of the metaverse based experiential learning and has attempted to conceptualise how organizations can utilise available technologies and transaction mechanisms to develop a training framework to transform current practices.

Implication

Theoretical Implications

This work has some significant theoretical implications. First, this study though SLR brings forth the importance of emerging technology-Metaverse- in the learning and development process for effective management education. The comparison between existing 2-D based learning and learning in the metaverse helps to develop an in depth understanding of the utilitarian value of the platform to engage learners. Second, the study also contextualizes experiential learning in the Metaverse to highlight the factors that facilitate the learning and development process for an enriching experience. By adding the

distinct dimension of 'co-creation' in the Kolb's learning cycle, the work extends the model to explain the experiential learning in the Metaverse for management education purposes. Third, this study found that co-creating content, scenarios and situations are possible in the Metaverse with the help of various technologies used (Prieto et al., 2022). This aspect of experiential learning is likely to improve the participants' engagement and understanding of various management concepts and possibilities through active interactions and involvement. Fourth, this paper also throws light on some significant challenges of the Metaverse that can act as potential hindrances in the management education. The framework presented in this study, provides a solid ground to researchers to develop and design learning modules in the Metaverse to provide a more immersive environment for learning via user-content and interpersonal interactions.

Practical Implications

First, the study suggests that metaverse can impact cognitive (e.g., attention and thinking) as well as non-cognitive (e.g., attitude and perseverance) aspects of learning, which can be a significant insight for the educators to work on a focused strategy for various training contexts. Second, the study also highlights the potential of the metaverse to improve access to several learning programs for individuals with impairment to offer deeper levels of social interaction and inclusivity which is not possible in physical world. Third, based on the earlier studies (e.g., Lee & Hwang, 2022) that have indicated that the metaverse will facilitate participants to design new enhanced learning environments in 3-D virtual space to offer an exciting and inclusive immersive approach, one of the major implications of this work can be viewed in the extended Kolb's learning cycle. By highlighting the importance of co-creation, this work provides educators and practitioners with a more comprehensive and effective model for experiential learning that can help them prepare learners for success in the modern world. Fourth, the study highlighted some possible challenges associated with the experiential learning in the metaverse in the context of management education. Organizations can do the feasibility analysis to ensure necessary support and ethical compliances. The challenges highlighted in the study (e.g., cost, bullying, ethics etc.) can be the start point for the organizations to mitigate the underlying risk for vulnerable participants, avoid addiction and anxiety.

Limitation And Future Research Direction

The study has highlighted both significance and challenges of conducting the experiential learning in the field of management education in the metaverse. The work also extends the experiential learning cycle by Kolb's to find a better fit of the model in the context of the metaverse. With limited focused work on learning and development in the metaverse, the potential for future work is huge. First, future work can design the metaverse models/framework for learning purposes and assess their impact given the challenges associated with various learners. Second, future work can also look into the learners' attitude towards training in the metaverse through the lens of technology acceptance model (TAM).

Third, studies can be undertaken to compare participants' performances in the metaverse after learning sessions in the metaverse and through conventional technology. Fourth, with metaverse offering high immersion and freedom to co-create, it will also be worthwhile to investigate the effect on participants' both cognitive (such as memory, problem-solving skills and attention) and non-cognitive (such as motivation, mindset and self-efficacy) factors. Fifth, future studies can also look into the effect of learning and development in the metaverse on other individual dimensions such as personality, subjective well-being, technology readiness and productivity. Also, researchers can empirically validate the proposed experiential learning model in the context of the Metaverse.

Conclusion

According to a report from Technavio (2020), the market of 3-D space is expected to grow at a compound annual growth rate of over 35% through 2020-2024. However, a significant number of organizations still do not have proper understanding of its usability and interactions at various levels. This study develops an understanding of the metaverse in management education space and also addresses the user challenge. In the metaverse, it's ok to make mistakes, in fact, they're encouraged! Because that's how we learn. The use of metaverse extends the number of learning opportunities as it enables educators to provide participants with hands-on guidance using various scenarios that are not available in the physical world. For example, Microsoft Mesh (Microsoft, 2022), which provides the opportunity of training together in a virtual world. The participants can mimic in-person learning without the need for travel resulting in saving in time and cost with the help of hologram sharing and visualization. Even the experts can share their views in a virtual environment with real-time presence. This study by including co-creation as a separate stage in Kolb's Learning Cycle, helps educators to provide learners with a more comprehensive and effective model for experiential learning that prepares them for success in the modern world. The study emphasises that co-creation in the Metaverse as part of the experiential learning cycle fosters a sense of community and social learning, which can enhance the management education experience and prepare learners for success in a wide range of contexts and can help to foster a sense of community and social learning. Although the rise of the metaverse promises stimulating interaction in the virtual world, generating new opportunities, extensive adoption poses many challenges too as highlighted in this study. To utilize this technology optimally we need to well-organize and well-regulate the platform.

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