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Perspective Chapter: The Metaverse for Education

Nehme Azoury and Cynthia Hajj

Abstract

Due to ever-evolving teaching methods and technologies, the education sector has undergone and still undergoes several advances. The issue of knowledge creation and application through tutoring has evolved into the primary source of competitive advantage among colleges and a crucial element for success. In a turbulent world full of competitiveness, educational institutions and establishments strive to continuously provide excellence through top-notch education, international partnerships, collaborations, acknowledgments, and accreditations as well as updated technological tools such as e-learning platforms and online labs/workshops, constant investment in each person's human capital. It is hoped that this would improve people's knowledge, abilities, experiences, and cultural capital. Our digital lives have advanced quickly over the past two years to the point where living online and offline are now equally important. The purpose of this chapter is to discuss the significance of sustaining education while taking into consideration the undeniable technological advances. This chapter adopts a descriptive/narrative methodology approach. As a result, it can be concluded that, if implemented properly, virtual collaboration and success will become essential skills that professionals across almost all sectors would master. Hence, upcoming research could include the role of the metaverse in education on another aspect of the SGDs like "no poverty."

Keywords: higher education, metaverse, human capital, extended reality, knowledge creation

1. Introduction

Since the COVID-19 epidemic was announced in 2020, people have been compelled to live apart from one another [1]. Several real-world activities are moving to the virtual world. Online meetings, distant schooling, telecommuting, and shopping have all become commonplace in modern society. As a result, the need for more sophisticated virtual worlds has increased as humankind's desire to push the limits of the real world has increased [2]. The metaverse, a 3D digital realm where the line between virtual and reality has broken down, is drawing increasing amounts of attention because of advancements in virtual reality (VR), augmented reality (AR), artificial intelligence (AI), and blockchain. The internet is expected to

significantly alter how we connect with the world and has been dubbed the “Next Generation Internet” [3].

Metaverse has been evolving since the early 2000s but, until 2019, the progress has been moving slowly. In the last quarter of 2019, a global pandemic erupted, resulting in a complete lockdown worldwide. The announcement of the COVID-19 as a global pandemic and emergency had lots of effects on the students and the future of their education. Humanity was forced to rethink its teaching and learning methods, eyeing the metaverse as a possible and urgent solution to be implemented.

The strict measures taken to avoid the spread of the virus restricted physical interactions and transformed into virtual communication on platforms such as microsoft teams, zoom, and many more. As a result, many countries saw an opportunity to enhance online learning and look for much more advanced technology, which triggered VR, AR, and AI. Metaverse erupted into a 3D digital space that reflects the real world through digital agents and allows for interactions among people.

2. A new way to teach and learn

2.1 Sustainable development goals: Toward a new sustainability paradigm

The 2000 millennium conference celebrations unveiled the millennium declaration and eight millennium improvement goals namely “ending extreme poverty and hunger, achieving the highest levels of education, promoting gender equality and women’s empowerment, reducing child mortality, improving maternal health, combating HIV/AIDS, fighting malaria and other diseases, securing the environment, and increasing sustainability and building global environmental partnerships for development.”

Although the targets have drawn criticism for not rigorously upholding “human rights norms and values” [4], they could still be pertinent and particularly helpful for poor countries [5].

Another criticism of the MDGs is that in some regions, such as Africa, the strong personalities and arrangements of the MDGs have had a negative impact, making their achievements seem to be a failure [6]. Nonetheless, this agreement was a significant step forward since it wrote down a shared will on the part of nations to implement several sustainability-related measures and collaborate to find effective solutions. Many “generalists” and inconsistent compliance have been mentioned as negatives, along with the difficulties of quantifying their aims.

The goals have been set up to be achieved by 2015; while not all goals have been completed, certain advancements have been made. Another criticism of the MDGs is that they have had a negative impact in some regions, such as Africa, making the advancements appear to be failures [6]. However, this agreement marked a crucial turning point since it proved a universal willingness to undertake several sustainability-related initiatives and work together to discover practical answers. Too many “generalists,” uneven compliance, and trouble determining their aims have all been cited as issues. Although not all the goals have been reached, certain gains have been made since the goals were expected to be finished by 2015.

The MDGs and SDGs are highly regarded due to the attention and dedication of many nations throughout the world in the sustainable boom. The MDGs target impoverished nations, but the SDGs concentrate on all countries, regardless of their level of development, and have a different point of emphasis indicated design

(e.g., the SDGs consist of new SDG11 for societies). In this scope, attaining sustainability may be difficult and calls for the involvement of all social stakeholders [7].

With the primary objective of fostering peace and prosperity, the United Nations (UN) and its member States unveiled the 2030 agenda for sustainable development in 2015. This agenda ensures that economic progress is being made in all countries. These are all summarized in the 17 sustainable development goals known as the SDGs. The goals are based on contemporary human development concepts that emphasize health and education and are based on continued economic growth that guarantees a permanent surplus of all kinds of commodities that can be used to “satisfy” development. The world is overcoming the old notion of “process” to satisfy human needs and increase well-being (**Table 1**). When understood in this way, human development aims at human well-being and quality of life.

2.2 Institutions of higher education and sustainability

Universities play a significant role in the formation of future leaders who will support the UN’s sustainable development goals (SDGs) in their effective implementation. Even though the SDGs are being implemented in a range of various locations, higher education institutions play a significant role in cultivating a mentality that makes the SDGs’ guiding principles more well-known. Building sustainability is fueled by education, one of the most important communication instruments and the cornerstone of the “sustainable attitude.” “A systemic approach to knowing, one which goes beyond technical knowledge and even understands the principles of a healthy environment and a functional society,” is included in this idea.

One of the abilities required to understand the concept of sustainability, for instance, is system thinking. This is so because sustainability balances the three elements of the environment, society, and economy. The economies that sustain people’s livelihoods and improve their overall quality of life, according to ESCAP [8], change

MGDs	SDGs		
End poverty and hunger	No poverty	Industry, innovation, and infrastructure	Partnerships to achieve the goal
Achieve universal Primary education	Zero hunger	Reduced inequality	
Promote gender equality and empower women	Good health and well-being	Sustainable cities and communities	
Reduce child mortality	Quality education	Responsible consumption and production	
Improve maternal health	Gender equality	Climate action	
Combat HIV/AIDS, malaria, and other diseases	Clean water and sanitation	Life below water	
Ensure environmental sustainability	Affordable and clean energy	Life on land	
Develop a global partnership for the development	Decent work and economic growth	Peace and justice strong institutions	

Table 1.
Difference between MGDs and SDGs.

people and the character of the society in which they live and, in turn, influence people and society. For economies and people, environments supply services that are both life-giving and economically significant. In this instance, systems thinking is essential for fostering a comprehensive method of issue analysis [8].

Several significant pieces of work have recently assessed how higher education affects sustainability [9]. A sustainability-based education influences educational material, as well as the related procedures and results [10]. According to Fien [11], human structures and institutions should be used to implement higher education strategies to promote sustainability. According to [12] found the greatest hurdle of SD in universities and the lack of concern for sustainability in the areas of management and control.

According to some authors (for example, see [13]), the SDGs can be used in research to solve social problems, and sustainability technologies must support the transition to sustainability. According to Filho et al. [12], a few specific “elements” of sustainability research dealing with the implementation of the SDGs, particularly interdisciplinary and interdisciplinary sustainability research, the development of research at an intimate level, and the social dissemination of scientific grabs the attention of stakeholders toward social communication, and linkages of science and politics. To fulfill its mission, universities must play a key role in responding to the adoption of SD.

Over the decades, the field of education has undergone experienced several improvements and changes due to ever-evolving technology and educational tools. The topic of producing knowledge and implementing experience through tutoring is a core competitive advantage of the university and a key factor in its success. This subject is influenced by psychological and social dimensions and depends on the idiosyncrasies of the environment in which this research topic is addressed. Moreover, in a competitive and turbulent world, educational institutions and facilities are continuously improving through quality teaching, international partnerships and collaborations, accreditation and accreditation, and modern technological tools, such as e-learning platforms and online labs, strives to achieve excellence in workshops and constant investment in individual human capital. The expected result is that individuals will improve their knowledge, skills, experience, and cultural capital.

Most empirical studies consider all these components to increase the relevance and quality of the materials taught and uncover new needs and services each year to attract learners. Nevertheless, we are unaware of the fact that all these properties are of significant importance and have contributed in many ways to the development of knowledge acquisition. Diversification in educational methods is neglected. In the middle east, there is little interest in researching pedagogy and its impact on knowledge production, human capital, and economic life. To the best of our knowledge, we analyze the key factors that educators can incorporate into their tutoring and/or transform teaching methods that can support and inspire students through diverse learning styles. Few, if any, studies have considered this.

Additionally, most educational institutions typically employ a lecture-based approach. This also refers to teacher-centered education. This is the most common method most learners are familiar with. Over the years, the same teaching style has continued, but students are expected not to talk to each other, and the teacher, the source of knowledge, informs students and teaches them how to remember. Put students back on a test designed to measure how much content they remember, not how much they actually remember and fully understand. Plutarch (AD 46–120) said, “The mind is not a vessel to be filled, but wood to be burned.” After years of

repeating the same teaching pattern, students became demotivated and less inspired by knowledge. Given the existence of such advanced technology, most students tend to use abbreviations to obtain information and answers to their questions, regardless of accuracy or reliability.

They are content with what they have and no longer have the will to criticize themselves or challenge themselves for additional information. Eventually, the same students may become teachers and contribute to knowledge distortions. Following what Albert Einstein (1879–1955) once said: *“Education is not to learn facts, but to train the thinking mind.”* It has been proven. Today, these universities are interested in obtaining internationally recognized accreditations that take knowledge production to new levels while setting innovative, updated, and improved standards. Therefore, in the quest for continuous development, their role shifts from providing knowledge, to creating value, to producing it. The quality of an individual’s knowledge and educational background defines who they are and empowers an organization when harnessed and shared.

2.3 Education meets the metaverse

The concept of the metaverse is not exactly new. It has already appeared in his science fiction works, such as Snow Crash [14], but it only gained some notoriety following the publication of the movie Ready Player One [15], which adapted the concept. The phrase “metaverse” is derived from the prefix “meta,” which means transcendence, and the word “universe,” which refers to a network of parallel or virtual universes. Neil Stevenson used the phrase “metaverse” in his science fiction book Snow Crash (1992). The book’s main character adopts a variety of digital personas as an escape from grief in the real world [14].

Since then, virtual collective spaces, international replication, embodied web/spatial internet, diverse innovative technologies, a class of internet software and social forms have integrated post-reality universes, persistent and chronic multi-users. The metaverse described by Cross and his colleagues in [1] is his 3D virtual environment, where individuals perform their daily tasks and manage their financial affairs through avatars that accurately represent themselves. According to [16], “A metaverse approach to a world where digital and fact meet and co-evolve, where social, financial and cultural sports end and cost.”

These definitions show that instead of the real world following the virtual world, as the metaverse argues, the real world follows them, creating an ecosystem that connects the two (physical and virtual). Knox [17] states that the metaverse is “not just a platform to be further developed by corporations, implying the usual limitations of monopolies, but instead a whole new life that is not only now beyond corporate operations. It is flat,” he emphasized. As proof of the idea that the metaverse is an ecosystem and underscores its scale as a single company, but free from interference by national entities or governments.” In addition to time and implementation experience, Hwang et al. [3] proposed three features: “shared,” “continuous,” and “distributed” to highlight the potential applications of AR and VR in the metaverse. As a result, the metaverse offers opportunities for immersive experiences, partnerships, and interactions that foster the development of societies by enabling the emergence of “parallel internationals.”

A digital twin that enables the creation of virtual representations and styles of the real world. The terms “digital twin,” “human with a plethora of virtual abilities,” and “physical-digital symbiosis” all refer to the fusion and connection of physical

and digital environments and are used to describe the digital replication of reality increase. An environment that is used synchronously. In addition, Davis et al. [18] developed his five-component metaverse research paradigm as follows: (1) the metaverse itself, (2) people/avatars, (3) technical capabilities of the metaverse, (4) behavior, and (5) results.

The e-learning industry has evolved significantly since the computer internet boom of the late 1990s. Industry observers now argue that the third generation of computers is among us, as the second wave of mobile computing and social media introduced microlearning through short video-based learning calls. The metaverse, a virtual three-dimensional environment that is “always on” and allows social interaction with friends, replaces the static, flat pages, and contacts on your computer. This change has important implications for learning to build features.

The idea of the metaverse in education is likewise no longer original because it has been hotly contested by academics and educators. As an illustration, research by Kemp and Livingstone [19] detailed how to integrate metaverse with a virtual environment termed “second existence” by using control mechanisms to improve the learning process. When focusing on virtuality measurements, the metaverse may be the upcoming location for social interaction and meetings, and he called for proactive education to make use of it for teaching and getting-to-know-you purposes. Avatars that evoke a sense of presence are believed to enable interaction and communication in the three-dimensional virtual environment [20]. A summit to develop a roadmap for the metaverse generation’s future also took place in 2006 at the Stanford Research Institute. Researchers from many areas, generation architects, businesspeople, and futurists worked together to assess and estimate an approximate ten-year plan for the future of the internet.

The ability for students to pay attention to their instructions and give elements that would be an issue in a regular classroom are two advantages of the metaverse. Classmates in the metaverse can interact with their instructors and fellow students by using their avatars. This might result in an immersive learning experience that boosts the student’s desire to learn. For instance, the use of mixed facts in maintenance presents an interesting overview of aircraft renovation [21]. Academic digital environment programs based on OpenSim and knowledge exchange in the metaverse were studied by González Crespo et al. [22] as free resources.

2.4 The metaverse for education: Building a meaningful learning experience

Technology like XR, when properly built, can enhance studying efficiency, which is difficult to do in any other situation. A few XR properties that can be particularly significant when used in educational environments are as follows:

Immersion: it can give the impression of depth and space; XR gear can make use of stereographic imagery and spatial audio. Customers can view 3D content (such as objects) in their environment from a first-person perspective, giving them the impression that they are in the same space as the content.

Interactivity: XR enables responses to user movements and activities, allowing users to actively interact with virtual surroundings. As such, it is an interactive medium that may activate users’ complete bodies and foster creativity and expression.

Invisibility: XR can visualize phenomena like alternate through the years or minute particles that are invisible to the human eye because it employs realistic 3D imaging and combines the digital with the physical.

Together, those traits can support a strong sense of presence, or the sensation of “being there,” at a location relevant to your physical location, as well as a strong sense of commercial enterprise, all of which can help enable learning. Additionally, technology can provide a sense of being present in an extraordinary frame, known as digital frame possession, and a sense of being present with other people, known as co-presence. Due to these traits, XR is particularly suitable for constructive getting-to-know aims and techniques, while being less effective for others.

3. Conclusion

To assist the ambitious SDGs objectives implementation and develop future sustainability leaders, higher education institutions have a major duty. The reputation and prestige of a university internationally also heavily depend on sustainability. Higher education shapes adult thinking and is seen as a “changing agent” for sustainable development. Institutions of higher learning must spearhead change and create courses based on sustainable principles.

Growth in computers, artificial intelligence, high-speed communications, and virtualization technologies make the metaverse promising [23, 24]. According to Gartner [25], by 2027, 30% of people will spend two hours of their day working, playing, learning, and socializing in the metaverse. Compared to current educational technology, the existence of the metaverse is a completely new idea in the context of education. As mentioned earlier, the metaverse offers many opportunities and advancements in education. The reality of the existing schooling metaverse can help to some extent in overcoming some barriers and limitations. More importantly, continued interest in the metaverse points to future shaping trends and directions [26]. Therefore, soon, it can be predicted that academics involved in education will actively engage in research on the learning metaverse.

An additional point to be made is that incorporating the metaverse into schooling may bring up several contentious issues (such as addiction, ethics, or security) that require more debate; otherwise, the “metaverse” will be a “*metaworse*.” To maximize the benefits of the metaverse’s influence on future education, educational scholars should focus more on how to use it to get beyond existing education’s drawbacks. As a result, the introduction of the metaverse in education is intriguing and widely predicted.

We expect the number of articles on this topic to grow significantly over the next few years. To expand future research, various potential research subjects of the metaverse in education will be covered as follows:

1. Developing a model or framework for the metaverse for educational purposes. Education is based on the metaverse design and framework, which includes both hardware and software.
2. Applying the laws and morals of the metaverse to schooling. Therefore, it should be urgently necessary to develop and apply tight standards in metaverse-based educational environments.
3. Implementing the metaverse would present teachers and school administrators with both wonderful possibilities and difficult obstacles.

4. Advancing the careers of teachers, as a result, topics such as teacher preparation and professional growth may be significant subjects in metaverse-related educational research.
5. Evaluating the efficiency of instruction and learning across multiple metaverse platforms, other learning settings, and the metaverse. Will students do better in the metaverse than they would in a conventional classroom or via distant learning via screens, for example?

In the last quarter of 2019, a global pandemic erupted and resulted in a complete lockdown all around the world. Humanity was forced to rethink its teaching and learning methods, eyeing the metaverse as a possible and urgent solution to be implemented. As a result, many countries saw an opportunity to enhance online learning and look for much more advanced technology, which triggered VR, AR, and AI. Metaverse erupted into a 3D digital space that reflects the real world through digital agents and allows for interactions among people.

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Conflict of interest


The others declare no conflict of interest.

Author details

Nehme Azoury* and Cynthia Hajj
Holy Spirit University of Kaslik (USEK), Kaslik, Lebanon

*Address all correspondence to: nehmeazoury@usek.edu.lb

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