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Metaverse As a Learning Tool: Sample Applications

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Abstract

New emerging technologies also affect education. In this context, the recently emerging metaverse technologies also find a place in education-related research. Metaverse offers high immersion, virtual reality experience and a new social space, allowing users to have brand new experiences on the internet. For this reason, it is possible for students to benefit from new educational opportunities by using these tools. In addition, some restrictions that arise with two-dimensional distance education technologies, which are frequently used during the pandemic period, can be overcome with the metaverse.

For these reasons, studies on the metaverse have been encountered in the field of education recently. The subject of this study is which studies are carried out in education about metaverse, which environments are preferred, and which sample applications about the use of metaverse in education. With this study, which metaverse examples are included in education and how metaverse tools are used in education are examined.

Keywords: Education, Applications, Metaverse.

Introduction

There are many studies on education and technology in the literature. Each new technology will be used in education is important. One of the most important technologies of recent times is metaverse technologies. In this sense, with this study, it is aimed to give an idea about how to use metaverse applications and metaverse environments in education.

Metaverse is a super-reality universe where physical reality is combined with digital virtuality, allowing multiple users. In addition to virtual environments such as Metaverse, technologies such as augmented reality and virtual reality are based on the convergence of sensory

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interaction. Metaverse is also known as a multi-user social network. Dynamic interactions are possible in the digital world with Metaverse (Azar, Barretta and Mystakidis, 2022).

Although the term metaverse has gained popularity recently, it is a long-standing concept in the literature. The term metaverse first appeared in the book Snow Crash. In this book written by the American author Neil Stephenson, the metaverse is depicted as a virtual environment parallel to the real world. (Stephenson, 2003).

In order to fully understand the metaverse technologies, some of their properties should be known. A metaverse environment has a number of features. The first of these features is interaction. Interaction means users interact with each other and with the metaverse environment. With interaction, a social network can be created in the virtual environment. Another feature of Metaverse is institutionalism. Institutionalism is possible with the use of avatars in the metaverse environment. Another feature of the metaverse is persistence. The metaverse environment preserves its properties even if users are not included in the metaverse environment. (Díaz, 2020).

Other authors have described the properties of the metaverse differently. For example, Dionysio et al. (2013) listed the qualities that the metaverse should have as follows::

Realism: Realism, which is expressed as the real-like experiences of the users in the metaverse environment, also means that the users experience a sense of social presence.

Ubiquity: ubiquity means users can access the media from different devices, as well as be included in different metaverse environments with the avatars and identities created by the users.

Interoperability: Interoperability refers to the exchange of information and data between different metaverse environments.

Scalability: scalability means meeting hardware and software requirements to support multiple users and media components at the same time.

There are studies in the education about the metaverse, the basic features of which are listed in this way. Within the scope of this study, studies and sample applications related to the use of metaverse in education are included.

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Metaverse Applications in Education

There are some studies with metaverse in the field of education. Some universities have prepared a number of studies for students to study in the metaverse environment. Stanford University brought 263 students together in a metaverse environment in a study conducted in 2021. These students, who have their own augmented reality glasses, trained in the metaverse environment for a total of 20 weeks during the two courses. This metaverse environment with topics such as health, climate change or sports education allows students to be involved with their avatars (Stanford, 2022).

The use of metaverse in health education is gaining importance day by day. Therefore, there is research in this area. In a study on dentistry, the metaverse mentions the advantages of students' learning by using haptic devices. Locurcio (2022) drew attention to the importance of the metaverse for dentistry in his study. Since dentistry is a sensitive field, students' gaining technique in this field and feeling virtual objects reveal the importance of the metaverse in dentistry.

In one of the studies on metaverse and education, avatar-based participatory learning is supported. In this study, which was carried out using the game-based learning model, the students learned the language with the metaverse by learning the words. In this study, which consists of different categories, students receive beginner, intermediate and advanced education (Yoo, Chun, & Author, 2021).

The metaverse environment can be used in areas that are difficult to experience. In a study, radioactivity, nuclear safety education and STEM education were presented in the metaverse environment. As a result of this study, the importance of providing trainings such as nuclear safety education and STEM education at an early stage has emerged (Kanematsu et al., 2014).

Metaverse can be used in different fields as educational opportunities. In a study about metaverse and education, metaverse environment is preferred for architectural education. Within the scope of the study, the metaverse was used in the education about the history of architecture. In the application part of the study, a virtual copy of a pharaoh's tomb was presented to the students in the metaverse environment. The use of architectural models for architectural education in students' metaverse environment constitutes the theme of this study (Gaafar, 2021).

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It is pointed out that educational effects cannot be achieved sufficiently with e-learning. It is important for various higher education institutions to increase the attendance rate for distance education. In a study where virtual learning environments were designed for engineering students, they designed problem-based activities in engineering education (Kanematsu et al., 2009).

Metaverse can also increase the possibilities of mental learners. In a study, the metaverse environment was used to gain the necessary skills for mentally disabled individuals to continue their lives. As a result of the study, it was revealed that the metaverse is effective in the learning of life skills of individuals (Cheung et al., 2022).

Second life, which is one of the environments that comes to mind when Metaverse is mentioned, also contains many educational environments. For example, Museum of Computing History is an example for those who want to learn about computer history in the metaverse environment. The College of Medicine at the University of South Florida provides the opportunity for students to receive education in the fields of Nursing, public health and continuing education in a second life environment. The University of Western Australia is located in a second life environment. The Autistic Resource Center is an educational organization created to talk about the lived experiences of individuals with autism. As you can see, there are many different educational environments in the second life (“Second life”, 2022).

Minecraft, another medium that comes to mind when Metaverse is mentioned, offers educational opportunities through education.minecraft. Under the Minecraft education title, there are options such as coding, e-sports, virtual teacher academy and education opportunities in the metaverse environment (“Minecraft Education”, 2022).

spatial.io, a website used as the metaverse universe, offers a variety of educational opportunities. Andrew Wright, who has designed a number of learning environments with the “The iTeacher” metaverse project in this metaverse environment, offers environments with different themes. The "Britain at War" metaverse universe contains objects describing Britain's war years. The “Fossil Museum” is a metaverse environment where visitors can examine three-dimensional fossils and also learn about fossils. “Da Vinci Force Gallery” is a metaverse environment that provides information about Da Vinci and showcases the devices designed by Da Vinci. Users can see examples of machines designed by Da Vinci. Spatial.io offers this and many similar learning environments (Spatial.io, 2022).

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The Opensim platform, which allows institutions and individuals to create their own metaverse environments, is used by various organizations. For example, Stanford University offers metaverse possibilities in healthcare using the Opensim platform. This environment, which includes various models and simulations, is used for the metaverse ("Open Sim StanFord", 2022).

Conclusion

Within the scope of this research, studies on metaverse and education were examined. In addition, the websites and applications used to create a metaverse environment are also mentioned. By looking at the studies on the metaverse in education and the applications used, the use of the metaverse in education can be viewed with a general perspective.

When we look at the studies on the use of metaverse in education, it is seen that the metaverse is used for education in a wide variety of fields. Health, climate change, sports education, dentistry, foreign language learning, nuclear safety education, STEM, architecture, engineering, education of the mentally handicapped are among the examples that come to mind when education is mentioned in the metaverse.

Metaverse environments were also examined within the scope of this study. The environments to be used for the Metaverse are varied. Major metaverse environments include Second Life, spatial.io, Minecraft, Opensim. Within the scope of this research, sample metaverse studies in these environments are also mentioned. The metaverse possibilities of each environment are different. Minecraft offers a version of minecraft education for education, while openssim allows independent users to design their own educational environments.

As a result, metaverse examples in education were discussed with this research. Thus, it is aimed for researchers to reach information about the use of metaverse in education. With this study, researchers who want to do educational studies with the metaverse can have an idea about sample applications and environments. At the same time, studies on the metaverse have been put forward in which areas and a guiding study has been tried to be put forward in the future metaverse studies.

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