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Examination of Teachers' Views on Metaverse-Based Education

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ABSTRACT

The aim of this study is to determine teachers' views on metaverse-based education. The research is qualitative and was conducted with a phenomenological design. The maximum diversity sampling technique, one of the purposeful sampling methods of the study group, was used. In this direction, data were collected from as many different teachers as possible, including their age, field of study, school type, and gender. The research was carried out with 32 teachers. The data were collected through face-to-face interviews using a semistructured interview consisting of four questions about personal information and 11 questions about the metaverse. The data were analyzed by a descriptive analysis method using MAXQDA software. Teachers stated that the integration of metaverse technology into education and training processes will increase the quality, efficiency and permanence of this process.

Keywords: Metaverse, Metaverse-Based Education, Technology, Virtual Universe

INTRODUCTION

Humanity has been in continuous development and has changed since its existence. This change and development have accelerated so much today that we encounter new technology almost daily. Technological movements, which bring about change and development in numerous fields such as education, entertainment, trade, social life, cultural interaction, and communication, are occurring more quickly than they were in the past. This rapid impact on our lives is due to the internet and computers. Especially with the internet, many innovations are offered that help individuals reach their goals and make their lives easier (Haleem et al., 2022; Hamutoğlu et al., 2017). Technological developments have occupied much space in people's lives, and the internet and technology field has expanded and diversified. Technology and its accompanying applications have inevitably affected education, as they affect every aspect of human life. In addition to technology, the recent COVID-19 pandemic has shown the importance of distance learning and online teaching (Azhari & Fajri, 2022). To prevent the spread of the disease during the pandemic, education was carried out remotely in a non-face-to-face and noncontact way with the "social distancing" policy (Chen, 2022; Mishra et al., 2020). One of the technologies supporting distance education is the recently emerging metaverse technology. Kim (2021) mentions that one of the most popular technological words today is "metaverse," which refers to a three-dimensional virtual environment through people's avatars. This word was first mentioned in Neal Stephenson's 1992 science fiction novel Snow Crash. This expression, which appeared to be a dream in those years, has become a reality with today's technology (Ko et al., 2021; Seok, 2021). Lee et al. (2021) stated that the metaverse is influenced by emerging technologies such as augmented reality, 5G and AI and that although it may seem futuristic, the digital big bang of the cyber universe is not far away. Although the Metaverse has great potential for development, it is still in its infancy (Duan et al., 2021). Metaverse technology allows individuals to transfer the real world to a digital platform, synchronously interact with images created in the virtual environment and manipulate virtual environment objects. This technology involves digital creations that mimic the physical and social structures of the real world in a virtual reality environment (Anderson & Rainie, 2022). In general, metaverse technology is effective at increasing academic achievement, retention, desire, interest, and motivation in education; facilitating learning; improving the quality of learning environments; and allowing us to experience dangerous experiences in the real world in a virtual environment (Liu & You, 2022). In addition, metaverse technology saves time by creating learning environments independent of space and time, improving students' social, psychomotor, and communication skills, and increasing skills such as creativity and problem solving (Tokgöz & Karabatak, 2022). It is necessary to discuss how metaverse and related technologies, which are predicted to change the

communication and social structures of individuals, will affect the field of education and how they can be used.

According to Garcia (2011), rapid developments in the field of technology affect education and training processes and cause change. Since the beginning of the 21st century, many new studies have been carried out to actively develop distance learning methods with 'e-learning'. One of these developments is metaverse technology. In today's age, teachers and students need to adapt quickly to technological developments and changes by continuing these technological developments. It is inevitable that education and training processes will change and develop with developing technology. Metaverse technology is one of the newest technologies of our age. Since the adaptation of metaverse technology to educational processes will lead to the start of a new educational process, it is important to manage this process correctly and efficiently. One of the most important elements of the technology adapted to education in this process is teachers. The implementation and diffusion of innovations in the field of education depend on the individual meanings that teachers give to these innovations (Fullan, 1991; Van Den Berg et al., 1999). In this respect, it is necessary to examine the effects of metaverse, a new technology, on education from the perspective of teachers. It is necessary to understand this technology correctly by explaining the role of the metaverse in education and training from the teachers' perspective.

LITERATURE REVIEW

Defining the Metaverse

The term metaverse is derived from the words universe and meta (data). It is seen as a three-dimensional virtual space where social and economic activities, as in the real world, are widely used (Seok, 2021). It is also a platform where individuals can communicate with each other online in a three-dimensional virtual world with their peers, earn and spend money, play games, and work (Lee, 2021). In short, the metaverse is a new generation of internet technology that covers not only entertainment and commerce but also a three-dimensional virtual environment that allows the creation of communities living in the virtual world where users can interact through their avatars.

In the Metaverse Paris Summit 2022 Preparatory Report (2022), the original vision and definition of the metaverse is expressed as a point in time where the distinction between the physical and digital world is blurred through a user interface consisting of both hardware and software. Kye et al. (2021) noted that the metaverse extends the reality of daily activities and economic life. Chen (2022) stated that “the metaverse offers a reflection of the blockchain-based real world based on augmented reality and virtual reality, actively connecting the physical and virtual worlds through experience” (p.3). Virtual reality enables interaction with events and objects that do not exist in reality and are impossible to reach with

the possibilities of visualization, the feeling of being away and interaction with the virtual environment (Freina & Ott, 2015). With the metaverse, the real world merges with the virtual environment, and reality expands into the virtual environment. The transfer of reality to the virtual environment occurs through avatars and constitutes the person's real self in the metaverse. When all these definitions are examined, the metaverse can be expressed as a virtual and digital environment where individuals interact digitally and physically through their own created avatars or digital holograms (digital identities). It is predicted that the use of metaverse technology in the field of education will provide many benefits. It is expected to make education and training more efficient, with immersive scenarios expected to be created in the learning and teaching process (Chen, 2022).

Metaverse and Education

In the education and training process, technological resources are used to provide learning experience in the classroom (Timotheou et al., 2022). The metaverse, one of the resources that has attracted attention in recent years, is expected to provide uninterrupted education for anyone with sufficient technology worldwide (Göçen, 2022). Jovanovic & Milosavlievic (2022) stated that using virtual worlds for the teaching and learning process of the metaverse can potentially increase discovery, social interaction, student motivation, collaboration, and creativity by addressing different learning strategies. According to Gandasegui (2013), the metaverse is a tool for enhancing learning. It is a technology that enables individuals to learn in a communication and information society where individuals collaborate in different ways in virtual worlds. Suh and Ahn (2022) stated that the metaverse could be the focal point of innovative education, where different behavioral activities such as learning by playing games, attending lectures, and having fun can be fully developed. In addition, metaverse education can be customized according to the individual, education will not be limited to schools, and access to rich resources will be provided (Wu & Gao, 2022). Due to its simultaneous feedback, the metaverse enables students to perform experiments in a real way, provide rich resources and media, create a community with social interaction, develop creativity, support cooperation, and increase their interest and participation in the course. Therefore, it offers an environment that supports educational activities (Lopez et al., 2023). These environments improve learners' problem-solving and critical thinking skills, promote collaborative learning and communication, facilitate the tracking and evaluation of academic performance and provide easy access to interactive learning resources and material (Pan et al., 2006).

Metaverse technology has disadvantages as well as advantages. In this regard, Mystakidis (2022) stated that violent representations or applications in virtual reality environments might trigger traumatic experiences in individuals. In addition, fake avatars may emerge, and artificial intelligence (AI) algorithms may

be created and used for identity theft, thus raising concerns about issues such as security and data ethics. Barry et al. (2015) drew attention to another issue by stating that the lack of facial expressions in the metaverse environment is an obstacle to virtual learning in the education and training process. Diaz et al. (2020) stated that for virtual reality not to slow down or interrupt connections, both the internet and the equipment used should have good hardware, such as processing capacity and graphics cards; otherwise, problems will occur. Therefore, if not every user can access it under the same conditions, it may cause inequality of opportunity in education. When metaverse studies are examined, it is generally stated that the most significant disadvantages of metaverse technology are that researchers may encounter situations that are not in accordance with morality and ethics, individuals may become antisocial, and psychological and physical health problems may occur.

According to the literature on the adaptation of metaverse technology to education, the positive aspects of this technology include providing experience-based education, rich and efficient learning, interactive learning opportunities, and time, space, and budget advantages (Damar, 2021). The integration of metaverse technology into the education and training process has many advantages and disadvantages. In particular, the social media addiction of the younger generation is increasing daily (Çelik, 2017). It is quite likely that metaverse technology will be added to this addiction. Although it is estimated that the metaverse environment will become very close to the real world, education is thought to be incomplete in an environment where human emotions are absent and sincerity empathy is lacking (Altunal, 2022).

Therefore, technology is rapidly developing and changing daily. This change and development forces education to change as it changes many areas of society, such as industry, science, health, and trade. Consequently, expectations about today's education and training process are also changing. Educational reforms worldwide are based on integrating technology into education (Tosuntaş & Çubukçu, 2019). In this direction, the functions of educational institutions and the content and functioning of educational programs should also change. Teachers and administrators, who are the implementers of education programs, should adopt the changes and innovations brought about by the technology age they are in. The adaptation and integration of metaverse technology into the education and training process has many benefits as well as disadvantages. Teachers are responsible for reflecting changes in the education and training process and integrating and adopting technology into education. Therefore, teachers need to develop the right attitude and have sufficient knowledge, skills, and techniques. They should be able to learn the use of high-tech equipment and Web 2.0 educational tools and have basic text-based coding knowledge and digital literacy skills (Almarzouqi et al., 2022).

Purpose of the Study

Teachers are the most important aspects of education that effectively make a difference in students. Teachers' perceptions, attitudes, and experiences greatly impact the education and training process. The frequent use of new technology in education, such as the metaverse, does not seem far away. Therefore, it is important to determine the knowledge and attitudes of teachers. Therefore, this study's aim was to determine teachers' views on education as metaverse. In this direction, answers to the following questions were sought:

Q1: What are the teachers' views on metaverse and metaverse-related concepts?

Q2: What are teachers' views on the future and use of metaverse?

Q3: What are teachers' views on integrating metaverse applications into the education and training process?

RESEARCH METHOD

The qualitative research method is used in the study. Qualitative research is an individual-oriented approach that examines the experiences, perceptions, attitudes, behaviors, and beliefs of society and people in depth (Given, 2021). It also allows for comparing the process and dynamics underpinning a causal relationship in qualitative research and allows for the inclusion of differences in participants' understanding of their beliefs and values, as well as social, cultural and physical contextual factors that influence causal relationships (Mertens, 2019). The research was conducted with a phenomenological design, one of the qualitative research designs, which focuses on phenomena that individuals are aware of but do not have an in-depth and detailed understanding of (Yıldırım & Şimşek, 2021). Although metaverse technology is used in different fields, we do not have enough information in terms of its use in educational processes, so the research was conducted with a phenomenological design. Phenomenological research investigates an individual's perception and understanding of a phenomenon or experience, where the aim is to understand and explain the event or phenomenon from the participant's point of view, in short, to examine how the individual interprets the event or phenomenon around him (Mertens, 2019). In addition, instead of focusing only on what is unique to one person, researchers often look for similarities between people and write a content-rich report for readers after analyzing the research data (Sart, 2021).

Study Group

Different interpretations, expressions and answers were obtained from the teachers who participated in the research. It is desirable to conduct in-depth examinations by obtaining more data about the use of metaverse technology in

education. For this reason, teachers of different ages, branches, genders, working areas and schools were attempted. Maximum variation sampling also aims to reflect and identify central themes where diversity is largely wide-ranging so that the common patterns that emerge from much diversity capture the core experiences and shared dimensions at the center (Patton, 2018). To collect more in-depth data, the maximum diversity sampling technique, a purposeful sampling method, was used. Maximum diversity sampling involves predetermining different criteria for places or individuals and then selecting places or participants that differ considerably according to the criteria (Creswell, 2021). In this vein, we aimed to collect data from as many different teachers as possible, taking into account their age, field of study, school type, and gender. In the study, 57 teachers were reached, but 25 teachers were excluded because they did not have any information about metaverse. Thus, the study was conducted with 32 teachers. The 32 teachers included in the study knew about metaverse technology from news, movies, the internet, books, games or social media, but none of the participants had experienced this technology. Table 1 shows the characteristics of the participants.

Table 1

Characteristics of the study group

Participant	Demographic Information	Frequency	Percent
Gender	Woman	11	34
	Male	21	66
Field of Study	Primary Education (Classroom and Preschool Education)	11	34
	Numerical Lesson (Maths and Science Teacher)	12	38
	Verbal Lesson (Turkish, Social, Religion, and Foreign Language Teaching)	6	19
	Other (Physical Education, Music, Guidance, etc.)	3	9
	Middle School	14	49
Current School	Primary School	11	31
	High School	7	20
Age	20-29	6	13
	30-39	12	37
	40-49	10	31
	50+	4	13

Table 1 shows that 11 of the teachers included in the study were female, and 21 were male. When the distribution according to their field of study is analyzed, there are numerical (12), verbal (6), primary education (11), and other field (3) teachers. When the type of school is examined, there are teachers working in middle school (14), primary school (11) and high school (7). Considering the

ages of the teachers, their ages are grouped between 20-29 years (6), 30-39 years (12), 40-49 years (10) and over 50 years (4).

Collection and analysis of data

The data were collected with an interview form prepared by the researchers consisting of 4 questions about personal information and 11 questions about metaverse. Based on the literature and past research, 17 questions were created at the beginning of the study. These questions were prepared in a way that the participants could understand. In addition, the questions were organized and sorted in line with the themes. In addition, more open-ended questions were included, and directive questions were avoided. The interview questions were sent to a total of 12 experts, including six experts in the field of curriculum and instruction, four computer teachers, and two science teachers. Ten of the experts sent to formulate the research questions were academics working as professors, associate professors and research assistants at the university, and two of them were teachers with master's degrees. Six of these experts were experts in curriculum and instruction, four were experts in computer science, and two were experts in science and technology education. The Lawshe technique was applied to test the content validity. In the Lawshe technique, 12 experts were deemed sufficient since a minimum of 5 and a maximum of 40 experts (Lawshe, 1975) were needed. In the context of the questions in this study, the content validity rate is given in Table 2.

Table 2

Content validity rates of the interview form questions

Sub-Objective	Questions	KGO
	Do you know what Metaverse is and what it is used for?	1.00
What are the views of teachers in terms of metaverse and metaverse-related concepts?	What is an avatar, and what is it used for?	1.00
	Where did you first encounter the metaverse concept (films, books, work environment, internet, games, etc.)? Can you explain this encounter a little bit?	0.83
What are teachers' views on the future and use of metaverse?	How do you think the metaverse will affect humanity in the future? (What are as do you think the metaverse will affect in the future and how? What do you think about the security of the metaverse platform?)	0.83
	Is the metaverse important/unimportant? Why do you think it is important or unimportant?	0.66
	What do you think about the concept of education with metaverse?	1.00

What are teachers' views on the integration of metaverse applications into the education and training process?	How will the widespread use of Metaverse affect the education and training process?	1.00
	What problems can we solve with Metaverse support in the education and training process. How?	0.83
	What problems may arise as a result of the use of metaverse in the education and training process?	0.83
	What do you think in terms of technical support and infrastructure necessary for the integration of metaverse into the education and training process?	0.83
	If education applications with Metaverse become widespread, would you use these applications in education? Explain with reasons.	1.00

The items with positive content validity ratio values determined according to the Lawshe technique are tested for significance with statistical criteria. Accordingly, the minimum values related to the number of experts also indicate the statistical significance of the item. According to 12 experts, the minimum content validity ratio is 0.56 (Lawshe, 1975). The content validity index of the interview form is 0.89. According to expert opinions, questions with a content validity score below 0.56 were excluded from the study. The reasons for not including these questions in the study were that the question was too comprehensive, it went beyond the purpose, and it had the same purpose as the other questions.

The data were collected via interviews, which is a suitable method for in-depth examination and research of individuals' thoughts, attitudes, beliefs, and perceptions about a subject (Türnüklü, 2000). For this reason, the data were collected through face-to-face interviews and voice recordings. In addition, the teachers were informed before the interviews, and the semistructured interview form was distributed to them during the interviews.

The data were analyzed with a descriptive analysis method using MAXQDA software, and tables, graphs, and figures were created. In the descriptive analysis method, the collected data are explained and classified by examining the subdimensions of the study, and the results are reached with the interpretation of the researcher (Yıldırım & Şimşek, 2021). With descriptive analysis, it is ensured that a subject or phenomenon is not directly depicted, defined or explained (Ekiz, 2020). First, themes were created according to the questions in the research, and the codes of the themes were created in line with the answers received from the participants. Thus, it was ensured that the concept of metaverse was analyzed in depth and in detail under certain themes related to teachers' views. To show the expressions of the participants in the study clearly, each teacher was assigned codes T1, T2, ..., T57, and direct quotations were included for greater reliability.

In qualitative research, data analysis does not only take place at the end of the study. The relationship between the data obtained and the data sources has gradually emerged (Mertnes, 2019). First, the collected data were reviewed, and it was decided which qualitative research program would be most useful. Then, the data from the audio recordings and the semistructured interview form were transcribed and digitized by the data collector. Before MAXQDA was used to analyze the data, the raw data were transcribed and uploaded to the program. Thus, the data were ready for coding. Appropriate values were assigned to the codes created as a result of the answers received. After the coding was completed, certain patterns, models and groupings were reached through the MAXQDA program, and inferences could be made and categorized on the basis of the data. In addition, visualization of the coded data allowed the emergence of certain schemes.

Validity and Reliability

Validity is when the data used in the research accurately measure the investigated structure (Ercan & Kan, 2004). To ensure validity in qualitative research, the subject being researched is presented with all its reality, the data are collected objectively, and the collected data are classified, coded, and analyzed (Karaşahin, 2014). In addition, the validity of qualitative research depends on the researcher's mastery of the research field, methods, and techniques, empathizing with the participants and not being prejudiced. In qualitative research, reliability is seen as reflecting the recorded data accurately and comprehensively with all the reality. The methods and techniques applied to ensure the reliability of qualitative research are explained in detail, and the research is supported by the findings and results of other studies conducted on the same or similar subject (Karaşahin, 2014).

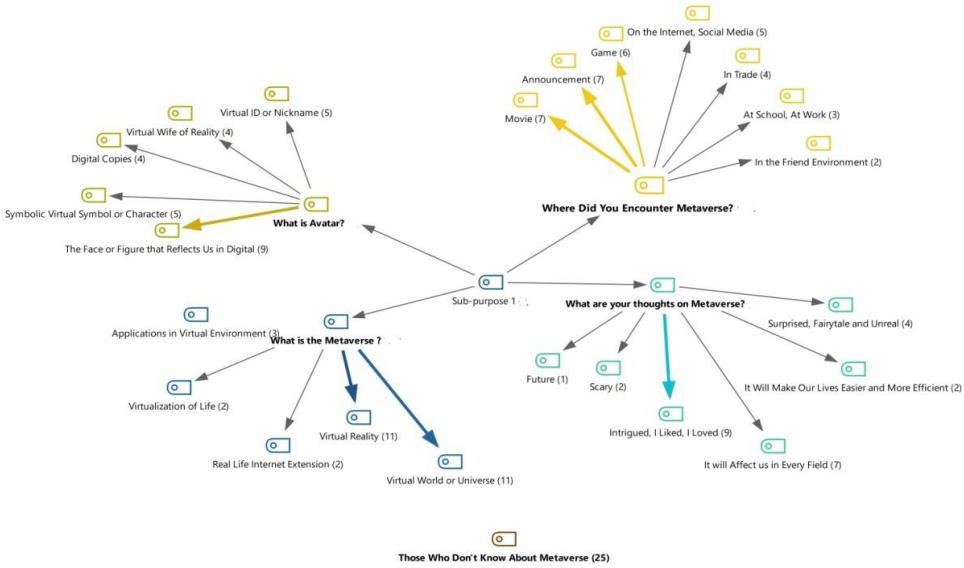
To ensure and increase reliability and validity in this study, the researchers distributed semistructured interview forms by hand and collected data through face-to-face interviews, and the interviews were audio recorded. Moreover, the data were coded, analyzed, and interpreted by turning them into figures and tables with MAXQDA software. By conducting a comprehensive literature review, studies related to or similar to the research topic in the past were examined and interpreted. Then, the researchers created a semistructured interview form by reviewing these studies and sent it to experts in the field to obtain their opinions.

FINDINGS

The findings obtained within the subobjective framework are presented in this section as figures. Teachers' views on the metaverse and concepts related to the metaverse are shown in Figure 1.

Figure 1

Teachers' views of the metaverse related to the metaverse



Definition of Metaverse and what it is used for

Figure 1 shows that teachers mostly expressed metaverse technology as virtual reality (f=11) and as virtual worlds or universes (f=11). T4 said, "Three-dimensional augmented reality is a virtual universe..." T18 said, "Metaverse is a virtual universe..." In addition, three teachers stated that metaverse technology is a virtual application. There are two teachers who expressed metaverse as the transfer of life to a virtual or internet extension of life. At this point, T13 said, "It is the transfer of the real world to virtual reality," and T12 said, "The metaverse is creating a living environment in a virtual environment. It is transferring real life to the virtual environment."

Definition of the avatar and what it is used for

There are teachers (f=9) who define an avatar as a figure or face that reflects us in the digital environment. They also expressed avatars as symbolic virtual icons or characters (f=5), virtual identities or nicknames (f=5), digital copies (f=4), and virtual mates of reality (f=4). Users usually customize their avatars by choosing them according to their image and expectations (Teng, 2017). Direct quotations of some teachers expressing avatars are as follows: T10: "Avatar is our digital reflection in the world I call the virtual universe." T15: "The avatar

is like a person's person picture, a profile picture. We can say that the profile picture that the person uses in his/her account is in the virtual environment. In other words, it is the reflection of his/her real life," T37: "The avatar is a three-dimensional drawing that represents people in the virtual environment. I mean that image. Nicky in the virtual environment."

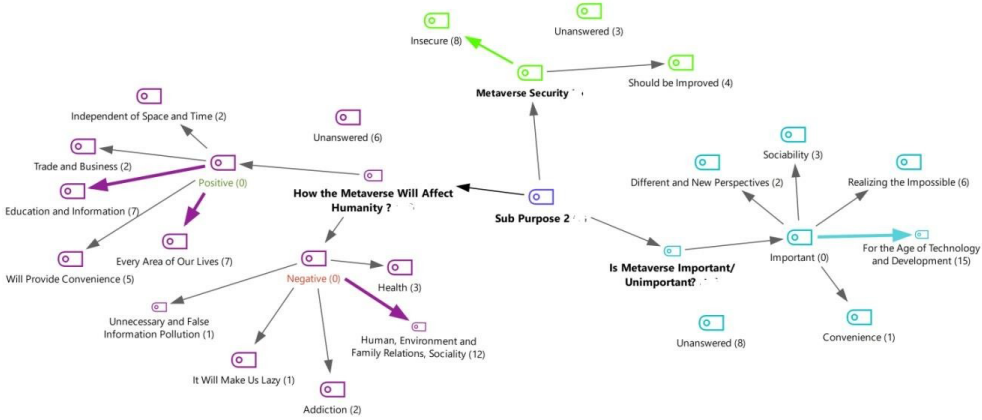
Reflections on the concept of metaverse

The direct quotations expressing the areas where teachers encountered metaverse feelings in films, news, and games are as follows: T31: "I liked it in the film at the beginning, but then I wondered what it would be like. I felt excited. It is a new development, technological development. I liked it. I'm glad." T47: "I wish I could play in the game; it aroused extreme curiosity, which it still does." In addition, teachers who stated that they heard about it in trade, school, workplace, and friend environments were also involved. Teachers (f=9) stated that when they first encountered metaverse technology, they became interested in it and liked it. There were some teachers (f=4) who stated that they were surprised by it as if it was fairly like and unrealistic, some other teachers (f=2) who stated that they found the two metaverse technologies frightening, and another group of teachers (f=2) who stated that it made them feel like they were in the future.

The codes created in line with the teachers' opinions are related to the metaverse technology and concepts in the literature. Therefore, we can say that the majority of the teachers participating in the research know of the existence of metaverse technology and are aware of the concepts and benefits of this technology. Teachers' views on the future and use of the metaverse are shown in Figure 2.

Figure 2

Teachers' views on the future and use of metaverse



Future use of the metaverse

Figure 2 shows that teachers believe that metaverse technology will positively and negatively affect humanity in the future. The teachers who believed it to affect positively stated that it would contribute to education and information (f=7) and that it would contribute to all areas of individuals' lives (health, education, trade, social relations, etc.) (f=7). In this regard, T13 said that it would facilitate access to information by saying, "I think that it will easily reach us to information or places that we cannot reach in many areas. If we think as an educator, I think that we can reach things that children cannot easily reach in the educational environment," while T37 said, "I think it can affect people in a good way in terms of speed in education, in terms of access to information or speed in any business. Everything will be better. You can have information even without going anywhere. You can easily do something right away." T17 mentioned that it would speed up both access to information and doing any work. However, T17 stated that "...since people can access everything very easily, it scares me" and stated that this situation scared him. T26, on the other hand, stated that "Of course, people are always after making their lives easier; of course, it will make many things easier. It will make communication easier, it will make trade easier, it will make education easier," and emphasized that it will make our lives easier in many areas.

Twelve teachers who thought that metaverse would have a negative effect emphasized "human, environment and family relations" and stated that it would negatively affect humanity in terms of sociability in the future. T42 said, "There may be some situations such as breaking the family bond...," T7 said, "Metaverse affects humanity negatively in the future because it makes humanity emotionless. Skills such as communication and sociability are atrophied" and suggest that the bond between individuals can be broken and that socialization can be prevented. In addition, three teachers stated that it would affect people negatively in terms of health. In addition to the teachers who stated that easy access to everything is positive, T37 said, "It will affect people negatively in terms of their social development or health. In addition, as I said about health, when people go out on the street in real life, they may forget or confuse things. There may be problems in terms of health. Constantly sitting or lying down in an environment with three-dimensional glasses, you know, VR glasses, will make people fat. It would be unhealthy in every way." He stated that it would negatively affect health, especially physical health. In addition to these negativities, T40 stated that the "Metaverse could be negative in terms of morality." T37 said, "You know, social enterprise people, in a virtual environment, people may have difficulties in complying with

the moral norms of the society, and when they unite in a virtual environment, they think that they do not have to comply with the moral norms of the society too much. " T40 stated that "I think that they can do everything that can be done where there is no human being," and the fact that they do not have to obey the rules in real life in the virtual environment will create a problem. T47 said, "I cannot say positive or negative without seeing it, but I hope it will be positive because it depends on the use of people and individuals; the future will show us this. ", while T42 said, "I think that especially or aimless use can lead to different risks," and stated that it could cause positive or negative results depending on the purpose of use.

Security of the metaverse

Some teachers believe that personal information and identity heft are likely to be insecure. T47 said, "Just like how personal information is stolen, how we are scammed, how we are exposed to bad and inappropriate content on the internet, there will be the same problems in the metaverse, and there may even be more." T18 said, "Is it very reliable because it is a new thing? This is debatable. I think I will settle in time. I mean, I just do not think it has approved security.' T14 said, "Regarding security, of course, inspections should be made. I mean, just as the internet is not seen as unlimited, we are talking about unlimited internet, but how safe is it? If applications are made to make it more secure, it may be necessary to provide a more secure environment for the metaverse in the same way for the coming years." Although the teachers thought that there would be security problems related to the metaverse, they stated that measures would be taken in time. They mentioned that this situation would be similar to the developments in the current internet.

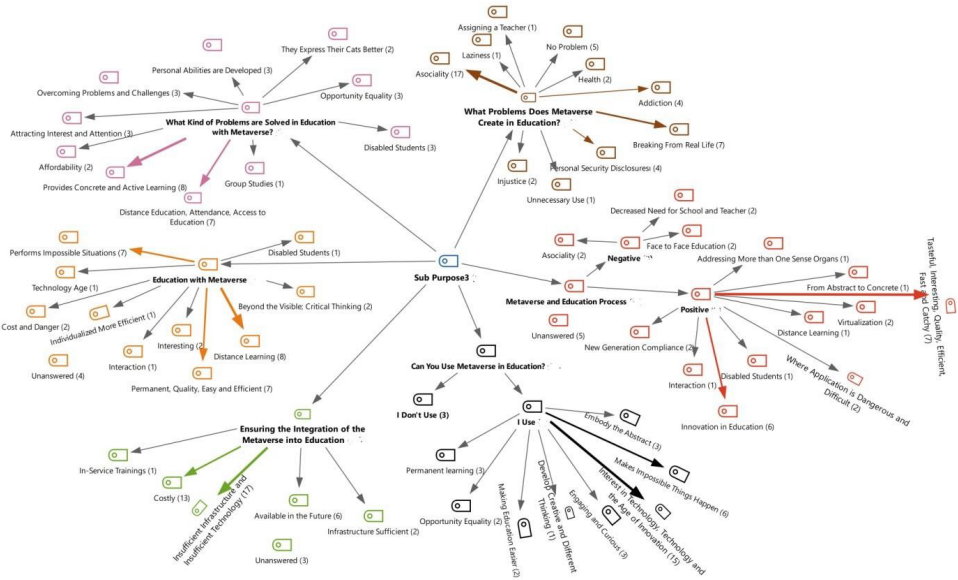
The importance of the metaverse

While the majority of the teachers stated that the metaverse is important, eight teachers stated that they could not comment on the importance of metaverse technology without using it and seeing its effects over time. The 15 teachers who thought that metaverse technology is important stated that time is the age of technology, and this development cannot be stopped. In this regard, S18 stated that "I think metaverse is an important development because we are in need of change. Change is our most important aspect. It is a digital universe. Why not?" S38 stated that "When we think about it, it looks like the technology of the future. People will also have the opportunity to socialize on this platform. I think it will also reflect our feelings in time." They stated that the metaverse is the technology of the future, which is inevitable, and that problems such as socializing can be solved in time. In addition, six teachers stated that the virtual environment would be limited by human imagination and would realize impossibilities. T36 said, "I think Metaverse is very important. I mean, it will be a new technology. For people, something they

cannot imagine in the past will be realized. Twenty years ago, no one would have believed if they said video calls, video calls with phones, WhatsApp calls." T13 said, "I also think that it opens the door to different things, different environments, different worlds and makes our creativity unlimited. Since it is a world within the framework of our imagination, we are talking about an infinite world in the context of whatever our imagination is enough. That is why it is important." T35, on the other hand, stated that the problems we experience as a society affect his/her opinion by saying, "If it were in the past, I would honestly think that it was not very important, but when we look at our current life, I think it is important, especially in the period of epidemics." Teachers' views on the integration of metaverse applications into the education and training process are shown in Figure 3.

Figure 3

Teachers' views on the integration of metaverse applications into the education and training process



Education with metaverse

Figure 3 shows that eight teachers said metaverse education would contribute to distance education, seven teachers said it would make education permanent, high quality, easy, and efficient, and seven teachers said that this technology would make events and situations impossible to achieve in the current situation. Emphasizing distance education, T28 stated, "Everyone will create an alive classroom environment wherever they are. Since I am a teacher, distance education comes to my mind first." T14 stated that "distance education is a very

popular field at the moment. Metaverse education provides this ... especially in today's conditions, and as a result of the pandemic, distance education may gain more importance; distance education may become more popular in this application as a result of gaining more functionality." In addition, there are also teachers who think that it will contribute to the education of disabled students. In this vein, T17 stated that "It can be a positive thing for disadvantaged groups, let us say that we can provide a positive opportunity for individuals with physical disabilities or individuals with disabilities (visual, auditory) who cannot participate in classroom environments, when we cannot reach individuals with disabilities (visual, auditory)" and stated that it could have positive effects on the education of disabled students.

The impact of the metaverse on the education and training process

The teachers stated that the widespread use of Metaverse in education would provide a contemporary, enjoyable, interesting, high-quality, efficient, and permanent education and training process. Plus, it would bring great innovation to education. In addition, there were also teacher opinions stating that the metaverse is suitable for the new generation, can appeal to more than one sense organ, will turn abstract concepts into concrete concepts, will cause students to interact, will provide support in difficult or dangerous situations, and will accelerate education. In this vein, T14 stated that "It is certain that it will make education more modern. In addition, this will make education at a more developing point." T25 said, "The widespread use of metaverse accelerates education. It will contribute to accessing more than one piece of information in a short time. In addition, it will make education and training more enjoyable, high quality, and suitable for today's age." T31 stated that "... I think it can be accelerated slightly more with metaverse. I mean, this will accelerate the education and training process, and I think it will be a more efficient education." Although the majority of the teachers stated that it would affect education positively, there were also teachers who stated that it would affect education negatively. The teachers who expressed negative opinions were two teachers who stated that the effect of school and teachers will decrease, students may become antisocial individuals, the effect of face-to-face education will decrease and lose its importance, and nothing can replace face-to-face education. T29 said, "There will be no need for teachers and schools...." Teacher T34 said, "I think it will reduce socialization, that is, individualization will come to the fore because, in the metaverse, people will come together in virtual worlds without leaving their environment."

Benefits of the Metaverse

Different opinions have emerged about what kind of metaverse problems can be solved in education. T14 stated, "The problems related to the student's

absenteeism from school can be solved..." T18 stated, "Instead of just watching the experiments, students can do them in a concrete way in a virtual environment. It concretizes the information and thus saves them from memorization." T27 stated that it would provide active learning. In addition, T27 said, "We can concertize everything. This is already the main problem in education. Everything is in the air, and all information is in the air because we cannot concertize enough. It is difficult for the student to keep something abstract in mind... They can keep in mind things that are seen with the eye. It stays in the mind longer, and we will be able to make this possible with Metaverse." T29 said, "It can contribute to the education and training of disabled students in terms of access to information. We can reach the students who are away from education because of their disabilities or who cannot be included in this process with this technology." All of these opinions include positive features for the metaverse.

Problems encountered in using Metaverse

Regarding the problems that may arise as a result of the use of metaverse in the education process, 17 teachers stated that this technology could cause problems antisocially in students, and seven teachers stated that they could break away from reality by moving away from real life. For example, T26 stated, "When they return to the real world, antisocial individuals may be formed. This happened in some games where you know they try to apply what they see or do on the internet to real life. They can sometimes confuse the real and the virtual. These kinds of problems may occur." In his statement, the teacher mentions the possibility of confusion between the real and virtual worlds, which can affect individuals' social lives. T47 "It can be addictive, just like games, or people who will confuse real life and virtual life, and it can affect face-to-face interaction badly; it can accustom us to laziness." T25 stated that metaverse can be addictive in his expressions by saying, "When they spend too much time in the digital environment, digital-dependent individuals may be raised." In addition, personal security problems may arise during the education process. T27 stated, "The supervision mechanism needs to be examined very well in terms of security, in terms of the safety of children, or that supervision mechanism needs to work very well. Regardless of how beautiful it is, when there is a security problem, when there is a security gap, it can be dangerous. No person of any age should have access to everything. This is wrong in terms of children's development. Therefore, this research needs to be limited in some way. How much will we restrict access to what? Who and what will we restrict? How I think this is the biggest problem because everyone, every age group, should not have access to everything." From a different point of view, T56 stated that "Teachers' assignment work may decrease, or AI may provide education, and there will be no need for teachers in this system" and that there may be an obstacle in front of the teacher profession. T35 stated that emotional bonds weaken with the following statement: "Emotions, needs, and wishes that come

from human genes become more superficial. In other words, the emotions, jealousy, jealousy, love, and touching sensations that are in people's structures are incomplete sentences. I think that these will decrease, that is-are, in genes. I think that they will take different forms. The senses, needs, and wants to come from human genes will be more superficial."

Technological İnfrastructure Required for the Metaverse

When the teachers' opinions about the technical support and infrastructure required for the integration of metaverse into the education and training process were analyzed, seventeen teachers stated that the infrastructure or technology is inadequate in the current conditions of Turkey. They also stated that the cost of metaverse technology is an obstacle to the economic conditions of our country. In addition, six teachers stated that these deficiencies can be overcome in the future. Two teachers stated that Turkey has sufficient resources and equipment for adapting this technology to education and that the infrastructure and technology are sufficient. T3 said, "I think that there is no such infrastructure at the moment because I think that some schools still do not have smart boards and classroom equipment, and the state cannot make a contribution." T12 said, "I think our country does not have enough technology in this sense. If a good investment is made with R&D work in the future, I think that it can be used in education, although not in all courses, at least in certain areas." They stated that the infrastructure was insufficient. On the other hand, there were teachers who thought that the internet would be sufficient. This opinion was expressed by T33 as follows: "It will be costly to deliver it to the students, and they will be able to afford this cost. There will be a limited number of people. I think that a certain group of people will obtain and use this technology." T31 said, "I think that the infrastructure is partially sufficient. During the distance education process, this internet infrastructure was sufficiently built. Therefore, I find the infrastructure sufficient. We can pass if we want."

The use of the Metaverse in the Education and Training Process

According to the teachers' opinions about whether they will use these applications in education and training if metaverse education applications become widespread, many teachers said that they would use metaverse technology in education, while three teachers stated that they would not use this technology in education and training. Among the teachers who said that they would use it, 15 of them stated that technology, which is one of the greatest benefits of our age, is inevitable, the new generation is interested in technology because they were born in the age of technology, and we are in the age of technology and innovation. These opinions were stated as follows: T38: "I am a person who is open to the future and technology. I definitely use it because this is one of the latest innovations in the digital world. In addition, we should not be left behind. In this way, every student

can have a practical education. As a result, I can say that I make learning more comprehensive, detailed, realistic, and fun. Moreover, thus, I can make education more permanent." T1: "I use it. Those who do not use it will be left out of the reality of the technology we live in and what the age brings." An opinion stating that everyone will have equal opportunities by accessing education was expressed by T3 as follows: "I will try to use it because it will provide equal opportunities for our children, and in the future, everyone will be able to access education easily thanks to technology." In addition, teachers clearly stated that they would use metaverse technology in the education and training process because of its positive contributions, such as permanent learning, concretizing abstract concepts in teaching, facilitating education, enabling students to develop creative different and critical thoughts in the education process, and arousing curiosity in students toward education. Direct quotations of some teachers are as follows: T32: "Yes, I would use it. I think it is truly interesting, I think students will enjoy it in the education process in order to attract them to the lesson, and I think it will provide better permanent learning." T12: "If the metaverse becomes widespread in education, I will try to improve my use of it. As educators, we should be open to innovations so that we can benefit our own student population. If we cannot keep up with age, we cannot provide an efficient education and training process for them. Therefore, I try to improve myself as much as I can."

RESULTS

This study aimed to examine metaverse teachers' views on education. As a result of the interviews, teachers are generally asked to have sufficient knowledge about metaverse technology. The teachers who participated in the interviews first encountered metaverse technology in films, news, or games. Therefore, we can say that teachers are aware that metaverse technology exists as a new technology. Teachers defined metaverse technology as the virtual world, virtual reality, and adaptation of life to digital and avatars as figures reflecting themselves in digital, virtual identity, and virtual mates of reality. Considering the definitions of metaverse in the literature (Chen, 2022; Çeliböven, 2022; Di petro & Crescie, 2021; Kim, 2021; Lee, 2021; Seok, 2021), it can be said that the teachers participating in the study used similar expressions with the definitions we expressed in the literature section about metaverse technology and concepts.

The majority of the teachers participating in the research believe that metaverse technology will be important in the future. They said that since the age in which we live is the age of technology, there is no escape from innovations and technology. The positive aspects of the metaverse are likely to benefit education, business life, trade, and health. According to the opinions of teachers who stated that adversity has negative effects, the following problems were generally mentioned: real-world detachment, decreased social behaviors, a lack of

communication between individuals, addiction, and health problems. Slater et al. (2020) stated that children, adolescents, and individuals with psychotic tendencies cannot make a good distinction between the real world and virtual reality. As a result of excessive use, they expressed the harm it would give to people, such as health-related problems (obesity, musculoskeletal, eye, etc.) and addiction, their social relationships, and the environment. Metaverse causes identity confusion and identity search on digital platforms (Ilgaz & Sönmezer, 2022). Therefore, the damage caused by the metaverse can be predicted. Despite these negative opinions, teachers have a more positive view of metaverse technology than they did in the past and are aware of the importance of this technology. In addition, the majority of the teachers stated that metaverse will affect many areas of life (economy, health, education, entertainment, etc.) in the future. This shows that metaverse technology is needed in today's technological age, and its use in our future life is inevitable.

While metaverse technology was first perceived as a life platform where games were played and time was spent, this perception changed with the COVID-19 pandemic. During the pandemic, people started working from home, which prompted institutions to produce alternative solutions (Balaman & Hanbay Tiryaki, 2021). Trainings, conferences and events have started to be held online worldwide. Another reason why online platforms have become so widespread is the increased use of internet technologies on all devices. The fact that the internet is used everywhere, including at home, in the office, in schools, and outside, thanks to mobile devices, has accelerated the process. With the steps taken with today's technology, people will be able to spend more time in the metaverse universe in the future, and all components of daily life will be available there. Developments in technology and the demands of people will cause this process to progress even faster (Güler & Savaş, 2022). Therefore, the positive impact and contribution of metaverse technology to the education and training process is indisputable.

The majority of the teachers stated that as a result of the integration of metaverse technology into education and training processes, they will become more qualified, efficient, and permanent in the future. They also stated that students who cannot continue their education could be included in the education process by receiving distance education thanks to metaverse technology. Chen (2022) and Suh and Ahn (2022) reached similar results in their metaverse studies. In the interviews we conducted, some teachers stated that if metaverse technology is used in education, concrete and active learning will be provided with opportunities for gaining experience in costly and dangerous situations.

Wu and Gao (2022) and Duan et al. (2021) stated that if metaverse technology is adapted to education, some students (disabled students) will be included in the education and training process by removing time and space barriers, education will not be limited to schools, and access to rich resources will be easier. Some teachers stated that, thanks to metaverses, innovation in education will be

provided, students will be attracted to the lesson, and more enjoyable and permanent learning opportunities will be provided. Similarly, Eschenbrenner et al. (2008) stated that metaverse technology enabled students to participate in the education and training process, work in cooperation, perform experiments and produce original ideas.

In addition, teachers mentioned that certain problems may arise in the adaptation of metaverse technology to the educational process. One of these problems is the cost of the equipment used in metaverse technology. Christopoulos et al. (2021) stated that the high cost of equipment used in metaverse technology is an obstacle to mass adoption and use, which is in line with the views of teachers. According to Diaz et al. (2020), for virtual reality not to slow down or interrupt connections, both the internet and the equipment used must have good hardware, such as processing capacity and graphics cards. Since this is not a situation that every user can reach, they stated in their studies that it may cause inequality of opportunity in education.

As a result, the answers, comments, and expressions about the metaverse technology received from the teachers who participated in the study are in line with the literature. After all, the vast majority of the teachers mentioned the positive aspects of metaverse technology and clearly stated that they would use this technology in the educational process if it became widespread.

Recommendations

Considering the positive aspects of metaverse technology, it is thought that its use in the education process would benefit students. It is expected that having a teaching environment in which metaverse technology is well integrated into the teaching process will benefit students. However, teachers' metaverse awareness was low. In this direction, it may be recommended to provide in-service training to teachers. In addition, school administrators can work on applying metaverse technology in the educational environment.

The qualitative nature of this study caused the study to include a limited number of teachers. It may be recommended that quantitative studies be conducted with larger sample sizes. Qualitative, quantitative, or mixed studies can be conducted in which students', parents', and administrators' opinions are taken. In addition, experimental studies can be conducted on the application of metaverse technology in the education and training process.

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