Humanities & Social Sciences Communications

ARTICLE

https://doi.org/10.1057/s41599-023-01958-7 OPEN

A perspective from Turkey on construction of the new digital world: analysis of emotions and future expectations regarding Metaverse on Twitter

Ergün Hasgül[1], Mustafa Karataş[2]✉, Merve Deniz Pak Güre[3] & Veli Duyan[4]

Metaverse is a new digital world where the real and virtual worlds merge on a technological ground. After Mark Zuckerberg, CEO of Facebook hyped the metaverse, attention was drawn to it all over the world. In Turkey, the Metaverse was hyped in the "Teke Tek Bilim" program and Twitter users shared their views for days afterwards. This study aims to analyse Twitter users' feelings about the Metaverse and their expectations for the future. The 10,437 tweets shared in Turkey between 10 January 2022 and 17 January 2022 with the hashtag Metaverse were analyzed using sentiment analysis techniques. The findings of the study indicate the metaverse will increase technological investments, new services, products, and markets will emerge, it may lead to irregularities in ethical codes and rules, society may be unready for technological developments, and media addiction may occur.

[1] University of Health Sciences, Ankara, Turkey. [2] Kütahya Health Sciences University, Kütahya, Turkey. [3] Başkent University, Ankara, Turkey. [4] Ankara University, Ankara, Turkey. ✉email: mustafa.karatas@ksbu.edu.tr

Introduction

Metaverse is a hypothetical iteration of the internet, supporting persistent online 3D virtual environments through traditional personal computers and virtual and augmented reality devices (Weinberger, 2022). Metaverse enables human cognition to be included in an artificial physical climate thanks to computers, android devices, and 3D devices. In other words, the metaverse is the concept of a permanent, online world that brings together multiple virtual worlds (Mystakidis, 2022). In this respect, the metaverse can be considered the internet's future (Damar, 2021a). Metaverse thus enables users to work, meet, play games, and socialize in the 3D world it creates (Gadalla et al., 2013). The metaverse offers a new reality and creates infrastructure and interaction opportunities for cultural, intellectual, and economic production (Han, 2008; Turdialiev, 2022). The metaverse is fully unimplemented, but some platforms contain metaverse-like elements. At the core of the metaverse is an augmented reality where each user controls a character or avatar (Davis et al., 2009). The closest experience to the meta-universe is currently offered by video games, expanding the concept of gaming by creating virtual economies. However, blockchain applications like the metaverse already exist and offer people incomes to make a living (Dionisio et al., 2013).

The concept of Metaverse first appeared in Snow Crash, a science fiction novel published by Neal Stephenson in 1992 (Hazan, 2010). Metaverse, which defines a fictional world, was criticized as an exaggerated and speculative future perspective in the early days of its introduction. However, with the developments after this period, the interest in Metaverse has started increasing worldwide. Second Life, which appeared in 2003, was a primitive version of the metaverse (Lv et al., 2022). In this internet-based social media platform, actions such as connecting to a virtual environment with an avatar, performing the work done in daily life, playing games, and listening to music could be done (Babu and Mohan, 2022). In 2011, this concept rose again with the book Ready Player One. The Oculus Company, which works on virtual reality devices, and is one of the most essential Metaverse investors today, increased its investments (Nevelsteen, 2018). In 2020, Travis Scott performed a concert on the game Fortnite, and 12.3 hundred million people attended (Nalbant and Uyanık, 2021). Gaming platforms like Roblox have also started making significant R&D investments in this area (Ahn and Kwak, 2021). Facebook acquired Oculus at the end of 2021. Facebook has signed cooperation agreements with software companies like Microsoft in this field (Kraus et al., 2022). This development created a new ground-breaking discussion area for the metaverse to be heard and spread worldwide. These discussions mostly took place on social media platforms like Twitter. After Facebook's CEO Mark Zuckerberg introduced the Metaverse, users shared many tweets and expressed their feelings and thoughts (López-Díez, 2021).

Echoes of the metaverse in Turkey

Following these developments, studies on the metaverse have also started in Turkey. Turkey became the country that bought the most Metaverse land in a short time. It is known that regions like the Bosphorus, Kadıköy, and Moda coasts were entirely purchased in the Metaverse (İldaş, 2022). Open AR Cloud Association determined Ankara as the fourth test city in the metaverse. Ankara Metropolitan Municipality Mayor Mansur Yavaş announced the image of the capital Ankara in the Metaverse to the public with a Twitch broadcast (Bayram, 2022). Virtual meetings in health, education, sales and marketing, and engineering have started to be held through the metaverse. Many blog pages and forums related to Metaverse have been opened, and users have started sharing their views by becoming members of these platforms (Durana et al., 2022).

The developments taking place, the Metaverse field were discussed in the program announced "Teke Tek Bilim" presented by Fatih Altaylı in a similar period in Turkey. After this program, Twitter users in Turkey shared many tweets on 10 January 2022, and this topic became a trending topic on the country's agenda. Social media in Turkey provides a widely used platform for users to share their views and thoughts. 13.6 million people in Turkey use Twitter and Turkey ranks 7th among Twitter users worldwide (Durmaz and Hengirmen, 2022). Twitter users draw attention to the issue with the tweets they share, make it a trending topic, and shape the country's agenda. Sharing at least 500 tweets and tweets from at least 600 different accounts ensures the subject is brought to the agenda as a trending topic. 10,437 tweets were shared in Turkey during the 1-week period following the Teke Tek Bilim program. Metaverse topics remained at the top of the trend topics for five days and formed Turkey's agenda.

Perspectives from the Sociology of expectations about the Metaverse

The sociology of expectations provides a theoretical framework that examines how expectations influence social behavior, interactions, and outcomes. This framework focuses on the role of beliefs, hopes, and expectations in shaping individual and social actions. When applied to the field of public events and hype, it provides insight into how the expectations and excitement surrounding these events can influence the future. The sociology of expectations can be involved in the Metaverse, which refers to a virtual reality space where people can interact through digital environments.

Metaverse is becoming a concept that attracts more and more attention with its technological, financial, and social aspects. It is closely related to the fields of virtual reality (VR), augmented reality (AR), artificial intelligence, blockchain, 5 G, wearable technologies, and sensor technologies. The expectations surrounding the Metaverse can influence technological development and innovation (Yemenici, 2022). Investors are taking the initiative to meet the expectations in this area. Financial investments by international companies for the metaverse will increase (Viscontri, 2022). This new universe can also be seen as a new market where virtual products and services can be bought and marketed. Hype and expectations may increase investments in virtual assets, digital currencies, and virtual markets.

Expectations about the Metaverse are often centered around its potential for social interaction and community building. This is because this new virtual world will allow users to experience a virtual environment that simulates real-world conditions. With the Metaverse, immersive digital and often three-dimensional simulations can be developed where users can explore, create and participate in experiences like gaming, education, shopping, listening to music, etc. (Falchuk et al., 2018). This structure, which can directly mimic reality by Metaverse, can create an attractive environment that will further encourage media addiction in society.

Alternative types of social relationships that form online and offline relationships integrated with the Metaverse may emerge. In the Metaverse universe, people will be capable to enter a digital universe through virtual reality or augmented reality and gain identity within this universe. In this way, new ways can be offered for individuals to express their identities and discover different aspects of themselves. These conditions may have an impact on self-identity, social norms, and cultural values (Bojic, 2022). The fact that rapidly spreading technological developments take place

in the market without analyzing their social effects may cause concern. Privacy, security, data ownership, digital rights, and ethical issues may cause problems. The possibility that the Metaverse may directly mimic reality may affect social power dynamics.

Insights from social media on Metaverse

Metaverse has been an important topic that has been interacting on social media since its inception. The Metaverse is likely to have significant social, cultural, and economic impacts. Social media is often a platform at the forefront of discussions around these topics. Social media can provide important insights to understand people's feelings and thoughts. There are many studies on sentiment analysis from data obtained from social networks (Birjali et al., 2017; Pozzi et al., 2017; Drus and Khalid, 2019). It is possible to have an idea about the future of these topics by examining current or popular topics with sentiment analysis over social network data. The critical situation discussed and focused on in this research is the changes in emotions and moods caused by the metaverse and its consequences. Technology alters how people feel, creates outlets for people to express their emotions, and provides social scientists with new tools and data on emotions (Shank, 2014).

Sentiment analysis on the metaverse can be critical for several reasons. The first is about understanding users' experience. Sentiment analysis can help researchers understand how users feel about their experience in the metaverse (Bhattacharyya et al., 2023). By analyzing user comments, feedback, and behavior, researchers can gain insight into what aspects of the Metaverse work appropriate, and what needs improvement (Ağrali and Aydin, 2021). The second of these is about identifying potential problems. Sentiment analysis can also help identify potential problems in the Metaverse, such as cyberbullying, harassment, or other harmful behavior. By analyzing user sentiment, researchers can quickly identify when users are experiencing negative emotions and take action to address the issue (Akkuzukaya, 2022). The third of these is about improving the virtual world design. Sentiment analysis can also help designers improve the virtual world's design by analyzing user feedback and identifying areas where changes are needed (Krittanawong et al., 2022). For example, if users consistently express frustration with a particular feature, designers can use that feedback to improve. The fourth of these is related to marketing and advertising. Sentiment analysis can help businesses understand how users feel about their products and services in the metaverse (Knox, 2022). It can be used to adapt marketing campaigns to the specific needs and preferences of the metaverse's user base (Sumayah et al., 2023).

Overall, sentiment analysis on the metaverse can provide valuable insights into user behavior and preferences, which can help designers, businesses, and researchers improve the virtual world's design and user experience (Ghosh and Roy, 2023). Especially in the COVID-19 pandemic, most people had to live with technology to maintain their daily needs. COVID-19 has caused obstacles in life almost everywhere in the world by causing the implementation of social distancing and eventually imposing the lockdown. This has become the reason for the increase in technology usage in daily life for professional life as well as for entertainment purposes (Limone and Toto, 2021). With the power of virtual reality, the Metaverse can profoundly affect people's emotions. This research is about how the spread of virtual reality created by Metaverse and the increasing interest in digital platforms affect people's emotions. Another interest of this research understands how emotionally predisposed people are to the metaverse. Using Twitter as an area for communities to express their feelings. So, this study aims to analyze the tweets about Metaverse shared by Twitter users in Turkey on the relevant dates. This qualitative study aims to explore Twitter users' perspectives on the Metaverse in Turkey. The research questions are as follows:

RQ1: "What are the sentiments of Twitter users in Turkey about the Metaverse?"

RQ2: "What are the future expectations of Twitter users in Turkey about the Metaverse?"

Materials and methods

Design. This research is aimed to analyze the shared tweets related to Metaverse. The qualitative research method was used. In the research, an analysis was carried out on the feelings and future expectations regarding the Metaverse. In the research, sentiment analysis techniques were used. Sentiment analysis, or opinion mining, is a natural language processing technique used to determine the sentiment or emotion expressed in a text. It uses algorithms to automatically identify and extract subjective information from text data, like social media posts, product reviews, news articles, and customer feedback (Basarslan and Kayaalp, 2020).

Procedure. The MAXQDA 2022 program was used to obtain and analyze the data needed within the scope of the research. The MAXQDA 2022 program can access and analyze tweets. These opportunities were used to acquire and analyze data. Code arrangements have been made regarding the analysis of the data.

Within the scope of the research, the process of sentiment analysis involved the following steps:

1. Data collection: the research was based on tweets shared in a week (10 January 2022–17 January 2022) after the metaverse was discussed in a television program called Teke Tek Bilim. The hashtag determined in these tweets has been determined as 'metaverse'. The tweets shared with this hashtag are in Turkish and shared in Turkey are among the criteria for inclusion in the research. Retweets should have been taken into consideration in the data obtained regarding the identified hashtag. Within the framework of the research topic, 10.437 tweets were evaluated and analyzed.
2. Pre-processing: text data are not preprocessed to remove noise and irrelevant information such as stop words, punctuation, and special characters.
3. Feature extraction and classification: features such as word frequency and a fragment of speech tags were extracted from text data. After the tweets were transferred to the MAXQDA 2022 database, coding started. In the free coding, the data related to Metaverse were categorized according to their content and subject. The data sets consist of the tweets' date, time, hashtag, and tweet sentences. During the coding process of the data, the tweets were read and analyzed by the researchers one by one. It has been seen that some of the tweets related to Metaverse are shared in their visual photos and videos. These photos and videos were analyzed according to their subjects and included in the code system. In particular, the discourses used were also analyzed within the scope of analyzing the emotions related to the Metaverse. Tweets that appear to contain a Metaverse ad were unconsidered. In addition, responses to tweets were included in the analysis. Retweets are excluded from the scope of the research. Metaverse-related emotions in some tweets have also been analyzed in metaphors. The contents considered essential for the research are given weight points (importance score), and these discourses are included in the findings according to their importance.

4. Visualization: visuals are created to gain insights and make data-based decisions. The categories that were thought to be related to each other were brought together to form themes. In this way, an inductive analysis design was made, and the data was planned systematically and meaningfully. As a result of the analysis, nine themes and 18 categories were created. A code-subcode map was prepared and added to the study to understand the analysis better.

Validity and reliability. This study has been conducted by researchers with an average of more than five years of experience in qualitative studies. The data were compared with the literature to understand the consistency of the obtained data. The issues, repetitions, highlights, or patterns of behavior identified by the researchers in the document to be analyzed have been codified by the theoretical framework and approaches employed. To understand the findings, multiple professional perspectives were used to interpret the dataset. Investigator triangulation was used to utilize numerous methods or data sources to develop a comprehensive understanding of phenomena in the research. Finally, the researchers employed two external observers to determine any similarities or differences in interpreting the data to evaluate the consistency of the findings. The studies' reliability was calculated using the Miles and Huberman (1994) formula for the number of consensus and disagreement in comparisons (Reliability = consensus/consensus + disagreement). The coding control ensures internal consistency and anticipates at least 80% consensus among coders. In this direction, a comparison was made with the other coder in the calculations made regarding the reliability of the research. A similarity was observed in 12 intermediate codes. A disagreement arose about three codes, the formula calculation was 82%, and its reliability was ensured.

Results

The themes were shaped within the scope of emotions and future expectations, which are the focus of the research. In this direction, the emotions section was determined as curiosity, anger, helplessness in real life, dissatisfaction, worries, and fear. Regarding the expectations for the future and sustainability of Metaverse, expectations regarding virtual life were determined as themes.

Emotions regarding the Metaverse. The emotional states obtained from the analyses made from the tweets regarding Metaverse are curiosity, anger, real-life desperation, dissatisfaction, worries, and fear (Fig. 1).

Findings related to the concept of concern were found in the coding made on the data obtained from the social media shares shared about the Metaverse. In this context, findings such as the Metaverse being a tool of exploitation, its danger, its point of view towards being late for developments, irregularities in ethical codes and rules, being unprepared for this process of technology, accepting and addicting to developments.

The developments related to Metaverse are used as a means of exploitation in coding, the development of technology is tried to be named as Metaverse, virtual land sales are aimed at defrauding people, there is not enough illumination due to the lack of institutional structure related to Metaverse, the land sales in question are once the metaphor of "the church selling land title deed from heaven". It has been found that people who need more knowledge about the subject invest in this field and this will be inconclusive, and this cannot go beyond a virtual deception. Some of the posts on this subject are as follows:

"At the end of the day, the metaverse is the visual and auditory bullying of users who want to make money."

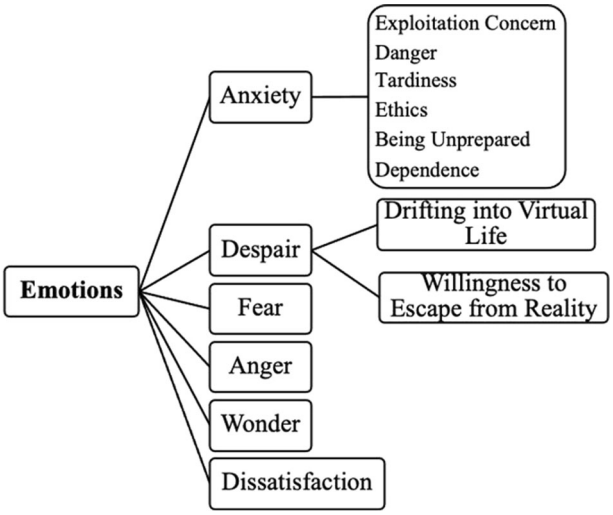


Fig. 1 Emotions regarding the metaverse.

"Everyone is talking about the metaverse and Bitcoin. Another time when dreams sold so well. It makes more sense to buy a plot from heaven in the middle ages than the Metaverse."

"Do not let the metaverse scare you. Let people's greed, the greed to earn money without effort, scare the minds that do not question and reason. The money spent there is doomed to disappear. Pulling the plug ends the game, similar to the banking game played with online money."

There are findings that the metaverse poses a danger to humanity, that there may be disturbing phenomena such as cyber bullying, that the authorities should take precautions, that it can be experienced. There may also be healthcare problems and economic problems with the metaverse.

"Cyberbullying has reached serious proportions with the Metaverse and virtual reality. According to the research, some violations disturb the players in virtual reality-based games."

"Metaverse is not such a technology to be exaggerated. It might have been surprising if it had been released in the 1970s, but it is no different from a VR game in this period. Just a big ad. By the way, it is like epilepsy that will create serious health problems."

"Very soon, Metaverse scam news will start coming in. I hope I am wrong the loss table in the last 1 year is large. I hope the small investor will not make a mistake to compensate for this loss."

Some discourses contain concerns about the tardiness of metaverse developments. In the shares, some regrets not investing in Metaverse may cause regret in the future. İt is wrong for the country to watch this technological development, and it may be late to benefit from its financial return.

"I greatly care about the Metaverse and see it as a revolution. I hope our country sees this. We should not allow the developed countries to open the gap between us on this issue."

"We will be left behind as a nation in the Metaverse. In a few years, the economy will worsen, the nation will improve, and we will regress several times. What will we do?"

In the posts about ethics and social rules, there are problems that it is unknown that ethical codes will be the most in Metaverse. There are no rules regarding moral behavior, and it is essential to set rules by the authorities There may be a future far from ethics, and economics and emotional dilemmas may be experienced due to the need for more regulation and institutionalization.

"What about ethics in the metaverse?"

"Governments should set laws and prohibitions about the Metaverse. Otherwise, there will be no governments and states."

It was found that there need to be more preparation for the Metaverse, there were discomforts due to unpreparedness, and there were concerns about how to switch to reality-oriented applications.

"I lost my sense of reality. I'm curious to know if I live in a Metaverse world. I've never dreamed of it like this. I was not ready for it at all."

"I am unready to move on to the Metaverse."

Findings related to addiction were obtained in the posts related to the metaverse. People may become addicted to virtual environments. If restrictions and regulations are not made, addictions to the virtual world may increase and there may be a risk of spending material assets to shop in the virtual environment.

"Imagine if your husband is trying to sell your diamond by saying "I am going to buy a plot from the metaverse." God save us."

"I am a technology fan. I am aware that technology is needed. However, if the metaverse is unrestricted, humans will be the property of artificial intelligence in the future."

Another emotion in the posts for Metaverse is desperation. In the analyses, regarding drifting into virtual life, situations such as unemployment, loneliness, and anxiety about the future have a dragging effect on virtual environments. Life conditions can be more accessible in Metaverse, there is a widespread belief that unfavorable life conditions will not be experienced in virtual environments, and artificial algorithms are developed.

"Can you say no to the world presented to you by a system that knows you, knows what you like and what you fear? You cannot say! So how will the system recognize you? The social networks we have been in for years…"

"It seems humankind will be imprisoned in pleasure with the Metaverse."

In the study, it was seen that the desire to escape from reality includes harmful living conditions, life in the virtual environment can be preferred instead of living in unfavorable living conditions, individuals prefer virtual environment.

"Augmented reality is a story and a mask we put on reality to escape reality. The Metaverse will serve to escape."

"The Metaverse is a place made for those who cannot live a happy and fulfilling life, and it is the opium of the new world."

It has been stated that fears are rising from uncertainties in Metaverse, uncertainties regarding the behavior of communities that grew up far from reality create fear, and that a virtual environment with unknown borders can create uncertainties and tensions, primarily due to the processing of the virtual environment in movies.

"Is the metaverse just making me nervous? I always think of Black Mirror, The Matrix, and others. The idea of being imprisoned. The possibility of being disconnected from reality. Do you need it?"

"Itis unbelievable how quickly everyone got used to this metaverse idea or something. Were you born with virtual glasses? Is it just scary to me?

"The metaverse seems very dystopian to me. It's the fear of the unknown in its borders."

There are expressions of anger. In this direction, it has been seen that those who do not have sufficient knowledge and economic status try to enter the virtual environment, and technological developments remind old age.

"What should I do with virtual reality, the life I can't touch? Damn it…!!"

"The Metaverse pisses me off so much, I guess we're getting old."

It has been determined that people's orientation to virtual environments increases interest, virtual land sales attract attention, and its unknown aspects make Metaverse even more attractive.

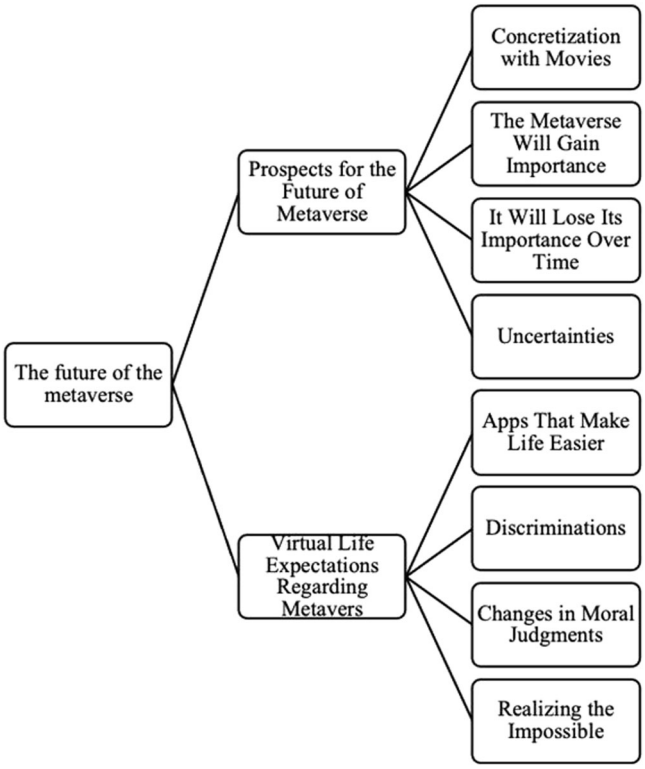


Fig. 2 Prospects for the metaverse.

"I do not know of a technological development that excites me as much as the metaverse. I imagine it as a paradise where philosophy realizes itself. A cross-border where we will dominate our dream!"

"You are as attractive as you are scary in the metaverse."

Prospects for Metaverse. It was found that Metaverse will gain or loses its importance in the future. There are uncertainties and the use of movies as metaphors within the scope of concretization of the Metaverse (Fig. 2).

There are tweets that Metaverse will gain significant importance in the future. It has been stated that Metaverse will be more realistic in the future, that many sectors currently serving can develop and new service sectors can be formed, that the development of Metaverse will continue in parallel with the development of technology, and that the investments of world-renowned companies in Metaverse will increase.

"The future is in the metaverse. It will be widespread indeed."

"An attempt to explain everything with a conspiracy. If one wants to deceive oneself, one does not need the Metaverse. The metaverse is the next era."

"Metaverse started to be studied years ago and even experimental tests were conducted with brands such as Audi and Ford. I believe Metaverse, a project that will create serious changes in our lives, will be a pioneer."

It has been stated that Metaverse provides life-enhancing applications such as shopping and entertainment. The choices regarding meeting the requirements will be made practically and efficiently in the virtual environment, conveniences can be provided in public services, and practical and realistic access to many educational activities can be achieved.

"Imagine trying the most expensive brands while sitting at home. Sounds good, doesn't it?"

"I can easily shop in the virtual world without going to my favorite store."

"This Metaverse is just one thing. You press a button and start painting, swimming in an Olympic swimming pool."

There are also opinions that the Metaverse will lose its importance over time, contrary to its importance. It has been stated that Metaverse will lose its functionality over time, adequate development cannot be achieved because technological developments cannot be fully adapted, it will lose its effectiveness because it will not be used for its intended purpose, and it is likely to collapse due to the cost of producing enough content.

"We still have not been able to go out and colonize space. Our technology still needs to catch up to the laws of physics. Let's not add too much meaning to the Metaverse either."

"Turkey is without a fiber internet infrastructure. A generation that strives only to watch porn and play games… The Metaverse do's not thrive here."

"The end of the Metaverse will be like 3D movies, and it will collapse because insufficient content can be produced. It is very costly to produce content."

It has been stated by those who shared that there may be uncertainties about the future of the virtual world. With these uncertainties, there are concerns about whether the services will be efficient in sharing, how Metaverse will function in case of power supplies are disabled, there are concerns about how the absence of legal regulations regarding Metaverse will affect life, and whether the emergence of new versions can be confusing due to the constant renewal of technology.

"What will happen if someone unplugs the internet after people integrate into this realm?"

"Even if we think it is successful and not defrauding the public, something that comes out first in the tech space is never the best version. How will people adapt to technological developments?"

In the tweets about Metaverse, some discourses about expectations for virtual life have been put forward. These are the realization of impossible situations, changes in moral judgments, the fact that virtual life can be maintained in an increasingly high-quality environment, discrimination in the world will not be in the virtual environment, and the Metaverse can bring applications that make life easier.

There are findings that it is possible to do things that cannot be done in real life with existing possibilities in the Metaverse. It is possible to have imaginary assets more easily in virtual environments, it is thought that any religion or belief will not exist in the Metaverse environment, and based on this, there will be no conflict environment, and existing problems in life can be overcome in the virtual environment. Records of inheritance, rights, and obligations can be kept in these environments even after death. And the consciousness of dead people can be kept alive in the virtual environment, ad other cases were observed in the analysis.

"The human body is mortal by nature. The first thing to be realized with the Metaverse is that thoughts, desires, feelings, and a kind of soul, will be immortalized. For example, a deceased relative will be able to consult with virtual reality on some issues."

"Has anyone ever bought a religion, church, or mosque on the Metaverse?"

"Maybe the Metaverse is the world's trial and error path that we will use to reduce the problems in your life to the very minimum."

There may be positive or negative changes in moral judgments in the Metaverse. It has been revealed that immoral practices can be carried out in the virtual environment, and this can cause moral collapse. Digital dating practices will become widespread in the Metaverse, digital infrastructure can be used to realize crimes such as human trafficking, digital instruments of unknown origin can affect moral regulations, and sexuality can gain a new dimension.

"The Metaverse will also end the mafia. Because in an environment where everyone can be the person they want and fall into the bosom of anyone they want, you cannot blackmail anyone over a sex tape. This is the biggest problem in the world right now. Sex and blackmail rule the states."

"Products that never went into mass production. Digital currencies of unknown origin and Metaverse, have no ethical, legal and moral regulations."

"Love and sexuality may occur without leaving the house in the metaverse environment."

It has been seen that technological developments have shaped the Metaverse, and there are expectations about what may happen in the future. It has been determined that Metaverse is developed specially by games, that there can be realistic games in the Metaverse environment, and that especially communities against technology may have to adapt to the Metaverse. That inability to adapt to Metaverse may cause technological problems.

"The cultural and ideological implications of the expansion of cyberspace promise to be interesting. In addition, it seems that the first team to be shocked by the decentralized global flow intensified by Metaverse will be the conservative nationalist groups of the countries."

"If we consider the historical chronology, people first tried to feed, then sought shelter, then gave importance to clothing. We, too, live in the early ages of the Metaverse. Our shelter is the Metaverse, and our universe is what has left."

The research has thoughts about how discrimination will happen in the metaverse. The belief was shared that people can have the chance to be whomever they want, that digital bullying can be done especially towards freedom of belief, that the virtual environment can eliminate differences, and that Metaverse will be offered to members of upper-class families more attractively, that everyone will be in an equal virtual environment without discrimination.

"There will be no religions and ideologies in the Metaverse. Where the individual is free and builds his world."

"The metaverse allows me to be who I want to be. A universe where we can live without discrimination. A world without gender discrimination."

"The metaverse will eliminate the discrimination of religion, language, race, and gender."

Discussion

This study examined the reactions that emerged after hyping the Metaverse to large masses within the framework of emotions and future expectations. The research findings indicate that Twitter users have curiosity, anger, real-life desperation, dissatisfaction, worries, and fear.

After the hyped of Metaverse, Twitter users expressed their reactions through tweets. These reactions included a variety of emotions. One of these feelings was anxiety. Among the reasons for anxiety, there are situations such as the new virtual world may be dangerous for human life, the thoughts of being late for these developments unprepared, and dependent on the new virtual world. The fact that a new digital world is so vast and inclusive can be alarming. This anxiety may be related to how individuals will adapt to a new life order that they have not experienced before. There are also studies in the literature that reach similar findings. Doko (2021) states that breaking away from the hybrid universe that extends to the virtual world will be uneasy and that people will become dependent on technology in a short time. Zhang et al. (2021) state that the virtual human prototyping system produced in the metaverse may cause anxiety in humans.

In the study, some opinions using Metaverse can reveal both advantages and disadvantages. Among the advantages are that the applications in the virtual world will facilitate human life, records of inheritance, rights, and obligations can be kept in these environments even after death, and the consciousness of the deceased can be kept alive in the virtual environment. Among the disadvantages are that people will continue to live in a virtual world by disconnecting from reality, ethical violations may occur, and discrimination dynamics will be activated. There are also findings in the literature that this ambivalence is experienced. Doko (2021) states that the development and use of the metaverse will not have to turn into a dystopia and will bring many innovations to make life easier. Ağralı and Aydın (2021) state that the metaverse is a cause for serious concern as society carries the risk of causing severe harm to the future of humanity. It is also said that the metaverse will provide an essential opportunity for people to share their ideas and feelings. According to Damar (2021b), thanks to the metaverse, it is possible to interact between reality and emotions. According to Çelikkol (2021), digital tools in the Metaverse will enable people to experience cyberspace. This will provide a more effective way to strengthen users' relationships with the virtual world.

In the research, opinions were put forward that the metaverse is perceived as a threat. These views are related to the fact that the virtual world can change the perception of reality and negatively affect the dynamics of daily life, and this situation will spread worldwide. This situation causes the emergence of two extremes of thought that the metaverse will continue to develop or go out of fashion over time. There are also findings supporting this in studies in the literature (Rhee, 2021). Kuş (2022) states that in his research, users interpret the metaverse as a complete break from the physical world. It can be expressed in relation to the risk of not recognizing problems in the physical world, the tendency to establish a new virtual world, and the risk of asocialisation.

The research has findings that the metaverse may cause ethical problems. The basis of these thoughts is the social rules have not been determined in the construction of the metaverse, the states do not make legal arrangements to control the relations in the metaverse, and because of these reasons, people may violate their rights. Similarly, Kuş (2022) makes discussions about freedom. It is stated that issues such as detaching humanity from reality and condemning it to the virtual world, pacifying society, digital domination, and digital hierarchy may come to the fore. Çifteci (2018), on the other hand, states that the metaverse will change self-perception. Therefore essential problem areas may arise in protecting personal freedoms. Özcan (2021), on the other hand, states that although technological advances that provide great opportunities and comfort for humanity are used in perceptual universe designs to be made with virtual reality devices such as metaverse, negative results may arise. These negative results suggest the possibility of actions that may harm people within the scope of ethical principles.

In the research, the motivations of the users to use the metaverse were also revealed. Curiosity comes to the fore in tweets about what the metaverse will be like, what opportunities it will provide for users, how they can make economic gains, and how they can do things in the metaverse that they cannot do in the real world. The literature frequently emphasizes that the sense of curiosity provides an orientation toward using the metaverse (Dozio et al., 2022). For example, in a study that deals with the reasons for users to be in and prefer Second Life, it is stated that they can do things like socializing, people with disabilities can move quickly, and earn money they cannot do in the world through the metaverse (Uzun and Aydın, 2012; Riva and Wiederhold, 2022).

This study has some limitations. One of these limitations is that the tweets included in the study cover a specific time period. This time slot includes tweets shared after the Teke Tek Bilim program. In future studies, it may be recommended to examine tweets that deal with a broader time interval. Another limitation of the study is that it is not known what the sociodemographic characteristics of Twitter users who share tweets about the metaverse are.

Conclusion

The study results revealed that Twitter users have feelings about the metaverse. These emotions include anxiety, fear, curiosity, uncertainty, and helplessness. On the other hand, these feelings also reveal reflections on the future of the metaverse. Discussions on the future of the Metaverse are basically divided into two. The first of these is related to the fact that the metaverse has no future and will be erased from the stage of history. The other is related to the fact that the metaverse will become widespread with technological developments.

Data availability

The data that support the findings of this study are available from the corresponding author, [M.K], upon reasonable request.

Received: 16 June 2022; Accepted: 17 July 2023;
Published online: 07 August 2023

References

Ağralı Ö, Aydın Ö (2021) Tweet classification and sentiment analysis on metaverse related messages. J Meta 1(1):25–30
Ahn JK, Kwak C (2021) A study on interest factors of game-based metaverse: focused on the topic analysis of <animal crossing> user community. J Converg Inf 11(10):1–9
Akkuzukaya G (2022) Sentiment analysis on the metaverse: twitter data. Sakarya Univ J Comput Inform Sci 5(2):147–156
Babu MA, Mohan P (2022) Impact of the metaverse on the digital future: people's perspective. Paper presented at 7th International Conference on Communication and Electronics Systems, 22–24 June 2022
Basarslan MS, Kayaalp F (2020) Sentiment analysis with machine learning methods on social media. Adv Distrib Comput Artif 9(3):1–126
Bayram A (2022) Metaleisure: leisure time habits to be changed with metaverse. J Meta 2(1):1–7
Bhattacharyya M, Roy A, Midya S, Mitra A, Ghosh A, Roy S (2023) An emoticon-based sentiment aggregation on metaverse related tweets. Paper presented at The 3rd International Conference on Artificial Intelligence and Computer Vision, 5–7 March 2023
Birjali M, Beni-Hssane A, Erritali M (2017) Machine learning and semantic sentiment analysis-based algorithms for suicide sentiment prediction in social networks. Procedia Comput Sci 113:65–72
Bojic L (2022) Metaverse through the prism of power and addiction: what will happen when the virtual world becomes more attractive than reality? Eur J Futures Res 10(1):1–24
Çelikkol Ş (2021) Metaverse dünyasi'nin, tüketici satin alma davranişlari açisindan değerlendirilmesi. İst Kent Unv İnsan ve Top Bil Derg 3(1):64–75
Çifteci V (2018) Geçmişten geleceğe kendiliğe bir bakış: özgünlük, zaman ve özgürlük. MetaZihin: Yapay Zeka ve Zihin Felsefesi Derg 1(2):195–210
Damar M (2021a) Metaverse ve eğitim teknolojisi. In: Taylan T (ed) Eğitimde Dijitalleşme ve Yeni Yaklaşımlar, 1st edn. Efe Akademi Yayınevi, İstanbul, p 92–95
Damar M (2021b) Metaverse shape of your life for future: a bibliometric snapshot. J Meta 1(1):1–8
Davis A, Murphy J, Owens D, Khazanchi D, Zigurs I (2009) Avatars, people, and virtual worlds: foundations for research in metaverses. J Assoc Inf Syst 10(2):1
Dionisio JDN, William III GB, Gilbert R (2013) 3D virtual worlds and the metaverse: current status and future possibilities. ACM Comput Surv 45(3):1–38
Doko E (2021) Alternatif bir dünya arayışı: metaverse. Lacivert 1(1):1–3
Dozio N, Marcolin F, Scurati GW, Ulrich L, Nonis F, Vezzetti E, Ferrise F (2022) A design methodology for affective virtual reality. Int J Hum Comput 1(1):102791
Drus Z, Khalid H (2019) Sentiment analysis in social media and its application: systematic literature review. Procedia Comput Sci 161:707–714

Durana P, Krulicky T, Taylor E (2022) Working in the metaverse: virtual recruitment, cognitive analytics management, and immersive visualization systems. Hum Resour Manag Rev 10(1):135–148
Durmaz N, Hengirmen E (2022) The dramatic increase in anti-vaccine discourses during the COVID-19 pandemic: a social network analysis of Twitter. Hum Vaccin Immunother 18(1):1–16
Falchuk B, Loeb S, Neff R (2018) The social metaverse: battle for privacy. IEEE Technol Soc 37(2):52–61
Gadalla E, Keeling K, Abosag I (2013) Metaverse-retail service quality: a future framework for retail service quality in the 3D internet. J Mark Manag 29(13–14):1493–1517
Ghosh A, Roy S (2023) An emoticon-based sentiment aggregation on metaverse related tweets. Paper presented at The 3rd International Conference on Artificial Intelligence and Computer Vision, 5–7 March 2023
Han HW (2008) A study on typology of virtual world and its development in metaverse. J Digit Contents Soc 9(2):317–323
Hazan S (2010) Musing the metaverse. In: Ioannides M, Addison A, Georgopoulos A, Kalisperis L, Brown A, Pitzalis D (eds). Heritage in the Digital Era, Multi-Science Publishing, Essex, p 15–16
İldaş G (2022) Metaverse 101 under the theory of diffusion of innovations. A'dan Z'ye İletişim Çalışmaları 5:433–473
Knox J (2022) The metaverse, or the serious business of tech frontiers. Postdigital Sci Educ 4(2):207–215
Kraus S, Kanbach DK, Krysta PM, Steinhoff MM, Tomini N (2022) Facebook and the creation of the metaverse: radical business model innovation or incremental transformation? Int J Entrep Behav Res 28(9):52–77
Krittanawong C, Isath A, Katz CL, Kaplin S, Wang Z, Ma M, Lavie CJ (2022) Public perception of metaverse and mental health on Twitter: a sentiment analysis. Prog Cardiovasc Dis 76:99–101
Kuş O (2022) Metaverse:'dijital büyük patlamada'fırsatlar ve endişelere yönelik algılar. Intermed Int E J 8(15):245–266
Limone P, Toto GA (2021) Psychological and emotional effects of digital technology on children in Covid-19 pandemic. Brain Sci 11(9):1126
López-Díez J (2021) Metaverse: year one. Mark Zuckerberg's video keynote on Meta (October 2021) in the context of previous and prospective studies on metaverses. Pensar la Publicidad 15(2):299
Lv Z, Shang WL, Guizani M (2022) Impact of digital twins and metaverse on cities: history, current situation, and application perspectives. Appl Sci 12(24):12820
Miles MB, Huberman AM (1994) Qualitative Data Analysis. SAGE, London
Mystakidis S (2022) Metaverse. Encyclopedia 2(1):486–497
Nalbant KG, Uyanık Ş (2021) Computer vision in the metaverse. J Meta 1(1):9–12
Nevelsteen KJ (2018) Virtual world, defined from a technological perspective and applied to video games, mixed reality, and the metaverse. Comput Animat Virtual Worlds 29(1):e1752
Özcan N (2021) Dijital etik üzerine nitel bir araştırma. Gençlik Arş Derg 9(25):89–108
Pozzi FA, Fersini E, Messina E, Liu B (2017) Challenges of sentiment analysis in social networks: an overview. In: Pozzi FA, Fersini E, Messina E, Liu B (eds). Sentiment analysis in social networks, 1st edn. Elsevier, New York, p 1–11
Rhee H (2021) Necessity of establishing new concept of empathy across metaverse for AI era. J Korea Game Soc 21(3):79–90
Riva G, Wiederhold BK (2022) What the metaverse is (really) and why we need to know about it. Cyberpsychol Behav Soc Netw 25(6):355–359
Shank DB (2014) Technology and emotions. In: Stets JE, Turner JH (eds). Handbook of the Sociology of Emotions, 3rd edn. Springer, New York, p 94–97
Sumayah S, Sembiring F, Jatmiko W (2023) Analysis of sentiment of Indonesian community on metaverse using support vector machine algorithm. J Tek Inform 4(1):143–150
Turdialiev MA (2022) The legal issues of metaverse and perspectives of establishment of international financial center in metaverse. Oriens 2(8):239–249
Uzun K, Aydın CH (2012) Kullanıcı profilinin ve bireylerarasi ilişkilerin gerçek yaşamla karşilaştirilmasi: second life örneği. Eskişehir Osmangazi Unv Ikt ve Id Bil Derg 7(2):263–290
Viscontri RM (2022) From physical reality to the metaverse: a multilayer network valuation. J Meta 2(1):16–22
Weinberger M (2022) What is metaverse?—a definition based on qualitative meta-synthesis. Future Internet 14(11):310
Yemenici AD (2022) Entrepreneurship in the world of metaverse: virtual or real? J Meta 2(2):71–82
Zhang M, Wang Y, Zhou J, Pan Z (2021) SimuMan: A Simultaneous Real-Time Method for Representing Motions and Emotions of Virtual Human in Metaverse. Paper presented at International Conference on Internet of Things, 8–11 November 2021

Author contributions

All authors contributed significantly to an article and approved the submitted version. Contributors to the concept or design of the article: MK Contributed to analysis and interpretation of data for the study: MDPG Drafting work or critically revising it for important intellectual content: VD and EH Final approval of the version to be published: MK Agreement to be responsible for all aspects of work in ensuring that questions regarding the accuracy or completeness of any part of work are properly investigated and resolved: MDPG.

Competing interests

The authors declare no competing interests.

Ethical approval

This article does not contain any studies with human participants performed by any of the authors. Examination of tweets in the research can be considered a document analysis technique. This technique has no direct effect on humans or animals. For this reason, ethics committee approval is not required within the scope of the research. However, in order not to go beyond the ethical principles, although the tweets shared are open to everyone, the Twitter users' information in the excerpts included in the study is kept confidential, and anonymity is ensured.

Informed consent

This article does not contain any studies with human participants performed by any of the authors.

Additional information

Correspondence and requests for materials should be addressed to Mustafa Karataş.

Reprints and permission information is available at http://www.nature.com/reprints

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this license, visit http://creativecommons.org/licenses/by/4.0/.

© The Author(s) 2023