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How digital natives in Türkiye use the metaverse: A qualitative research on problems and opportunities

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ABSTRACT

Metaverse is an interactive and multiplayer virtual universe created through the combination of virtual and augmented reality technologies, integrating the physical world with the virtual world. For digital natives, the metaverse is not only a realm of games and entertainment, but also a new platform where they can engage socially, enhance their creativity in education and work, as well as interact with multiple reflections closely resembling "real" life. In this platform, they can spend time, live with a twin identity aided by avatars, and encounter many reflections highly similar to real life. This study aims to examine how digital natives utilise the metaverse technology and explore its positive and negative impacts. For this study, a phenomenological design was employed using qualitative research methods. The use of qualitative analysis methods aims to uncover a detailed understanding of metaverse perceptions. In this regard, in-depth interviews were conducted face-to-face with 26 purposively sampled digital native individuals. The data obtained from these interviews was transferred to the Maxqda 2024 software for content analysis. Findings show that digital natives perceive metaverse as facilitating daily life and envision it as a technology of the future. Furthermore, it is noted that the metaverse is expected to change educational methods in the future, enhance study motivation, and facilitate learning through personal learning experiences. On the downside, concerns were raised about creating laziness among users. Issues such as lack of infrastructure readiness and accessibility difficulties were identified as expected challenges to be resolved. In terms of business, the metaverse is seen to increase productivity through spatial flexibility and is viewed as a new marketplace with a strong emphasis on filling legal gaps ethically. This study provides significant insights into the use of metaverse by digital natives in Türkiye, addressing both its conveniences and challenges, and offers important insights on how the metaverse may evolve in the future.

Keywords: ***Metaverse, digital natives, digital generation, social interaction, new society***

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INTRODUCTION

The concept of digital nativity is generally used to describe individuals born after the year 2000 and the youth of this period. These individuals have grown up intertwined with digital technologies and have accepted these technologies as an essential part of their daily lives. Digital natives have become familiar with computers, smartphones, the internet, and other digital tools from an early age and have effectively adopted these technology tools. This new generation has developed a unique learning style by growing up surrounded by technology and using digital tools from an early age (Prensky, 2001). The familiarity of this generation, which is also called as artificial intelligence (AI) natives (Eliot, 2022), makes them the leading users of platforms such as metaverse, the digital technology of the future.

In literature, metaverse was first used in science fiction writer Neal Stephenson's novel *Snow Crash*. In this novel, the idea of metaverse emerged by describing how people interact in the digital world (Kayacan & Batu, 2024). Metaverse is defined as a new digital universe in which people in the real world participate through their digital avatars. This field, which continues to develop today, covers multiple virtual spaces where users can interact on various metaverse platforms, instead of a single virtual universe (Batu & Kocaömer, 2023). In other words, metaverse is a post-reality universe defined as a persistent and multi-user space that combines the physical world with the digital virtual world (Mystakidis, 2022).

The digital world is remodelling the dimensions of economic and social interactions. Therefore, today's technological developments are seen as having an essential role in shaping the future of the digital world by directly affecting the emergence and evolution of the metaverse. In this regard, it is crucial to recognise concepts relevant to the metaverse, such as virtual reality, augmented reality, mixed reality, digital twin, avatar, NFT, blockchain, mirror world, and artificial intelligence.

Virtual reality (VR) is one of the core elements of the metaverse, providing users with a three-dimensional and immersive experience that makes them feel as if they are in the real world (Ning et al., 2021). To provide an engaging experience, real-time three-dimensional technologies such as VR and AR are seen as the main interaction interface (Duan et al., 2021). Virtual reality devices create the feeling of being in a virtual world while remaining in a real place and are different from today's systems. This technology creates a feeling similar to human experiences such as daydreaming, dreaming, and hallucinations (Ağralı & Aydın, 2021). For example, current virtual reality devices include Oculus Quest 2, HTC Vive Pro 2, DecaMove, and Vive Focus 3 (Künüçen & Samur, 2021).

The main reason for the rapid popularisation of VR is that new technologies, such as mobile phones and mobile applications, make VR easily accessible in any location (Ferhat, 2016). Although the first thing that VR brings to mind is games, it is not limited to just games. As it is created by software developers by integrating real and fictional worlds, this technology is effectively used in various fields such as health, education, and production (Cem, 2022).

Augmented reality (AR) refers to an immersive experience by embedding computer-assisted virtual elements into the user's vision (Kaya, 2022). This technology generally improves the physical world by supporting emotions such as visual, auditory, tactile, or smell with numerical data (Reaume, 2022). Augmented reality provides the user with

realistic visuals. In this context, it is based on the principle of developing and combining images taken from the real world using various digital technologies. The operating process is real-time and allows the user to interact dynamically with the objects around them (Cem, 2020).

One of the most popular examples of AR technology is the Pokemon Go game. This game enables users to find and catch characters called virtual Pokemon in the real-world environment. This interaction is shown as one of the most solid examples of how AR can be integrated into daily life by mixing the virtual and physical worlds (Kim, 2023). This technology is not limited to the gaming industry but is used in many different fields, such as education, health, art, and entertainment (Evren & Karauğuz, 2023).

While VR provides the opportunity for users to disconnect from the outside world during three-dimensional computer games, AR preserves the connection with the real world and makes it possible to experience real and virtual objects in the same environment by adding data and visuals to real world images (İçten & Bal, 2017). Unlike AR, VR provides a three-dimensional alternative world created completely with technological tools and offers users the opportunity to experience a virtual world in an environment where content created by artificial intelligence is combined (Batu & Kocaömer, 2023).

Digital twins is a technology that allows real-world places to be digitised and transferred to their virtual versions at regular periods. This technology is used in a broad range of application areas, from product design to smart city planning, by transferring the properties of real-world objects to the virtual environment (Lee et al., 2021). Physical objects can be described as digital twins created in the metaverse using three-dimensional modelling techniques and developed with the support of artificial intelligence and transferred to the user experience with extended reality (XR) devices. This process enhances the interaction between the physical and digital worlds, providing the user with a more realistic and more interactive experience (Cheng et al., 2022).

The mirror world presents an experience that is augmented with additional information, offering a realistic reflection of the real world in a virtual environment. As an example, both Google Earth and Microsoft Virtual Earth are platforms that present real-world locations with intricate digital models. This concept has its origins in David Gelernter's 1992 book, *Mirror Worlds* (Park & Kim, 2022). In the metaverse, users are represented by avatars, which affords users the capacity to navigate virtual environments without the need to interact with computers and mobile devices. This is in contrast to platforms such as Google Earth, which can be accessed through avatars. The creation of a digital copy of the real world by such software serves to contribute to the functioning of the metaverse as a mirror world (Batu & Kocaömer, 2023).

Blockchain technology is defined as a method of recording transactions in discrete, linked blocks, which are then combined into a chronological record of previous transactions. The technology is decentralised, and each block of transactions contains a summary of the data in the previous block. This increases the security of the blockchain system by making it difficult to change the data later (Kaya, 2022). In this context, blockchain makes it easier to monitor the fulfilment of orders, track payments, and update accounts. Data is stored in an incorruptible ledger and can be accessed by all participants (McKinsey, 2024). Blockchain technology covers a vast number of topics, including cryptocurrency and emerging cybersecurity systems (Feing, 2022). This technology is used in numerous fields, including financial services and voting systems (Rodeck, 2025).

AI and 5G technologies, which are significant tools for the development of the metaverse, enable computers to develop by imitating human-specific abilities such as learning, understanding, and decision-making (Stryker & Kavlakoglu, 2024). Interactive digital assistants and speech-based artificial intelligence applications are considered concepts that need user data by communicating online. These systems use data-based learning and improvement mechanisms to analyse user data and make interactions more accurate and personalised (Oracle, 2021).

Machine learning and deep learning are part of AI, and these technologies can be used to learn from the big data generated by the metaverse (Cheng et al., 2022). In this context, these technologies have an important role to play in the development of AI and the growth of the metaverse. The next generation of wireless 5G technology greatly improves digital experiences using machine learning. In particular, applications that require rapid response times, such as autonomous vehicles, require the integration of 5G with machine learning, deep learning, and artificial intelligence (Cisco, 2022). This technology seeks to offer faster Internet, less waiting, more reliable connections, and better user experience. In this context, the 5G network plays an essential role in enhancing user experience (Qualcomm, 2022).

This study aims to examine how digital natives in Türkiye use the metaverse technology and the possible positive or negative consequences of this use. For this purpose, the role of technology in the lives of digital natives in Türkiye and the challenges they face were examined. The study aims to answer the following questions:

- How do digital natives identify the metaverse?
- What are the contributions of the metaverse technology to digital natives in the educational context?
- What general problems do digital natives experience in the metaverse?
- What are the privacy and security issues that digital natives face in the metaverse?

METHODS

This research was designed with the phenomenological approach, which is considered within the framework of qualitative research methods. Qualitative research designs make major contributions to research in terms of providing access to individuals' views and experiences, feelings, and thoughts (Kara, 2016). The phenomenological design provides an in-depth examination of phenomena such as various events, experiences, perceptions, and concepts in the lived world. For researchers, the phenomenological design is applied to understand the experiences of individuals and the subjective meaning of these experiences. It is a preferred design, especially for investigating phenomena that exist in the conceptual worlds of researchers but which cannot be internalised (Yıldırım & Şimşek, 2021).

In this context, for a common understanding to emerge as a result of the research, the participants in the study should be selected from individuals who have experienced the said phenomenon in detail (Creswell, 2023). Phenomenology allows for a more detailed and in-depth understanding of a particular phenomenon. This approach leads research by providing concrete examples, detailed explanations, and individual experiences to define and understand the phenomenon. In this direction, a comprehensive understanding of the essence of the phenomenon is developed based on the experiences of the participants (Yıldırım & Şimşek, 2021).

This research project examined the potential impact and transformation of the rapidly developing metaverse ecosystem on digital natives. Given the expectation that the metaverse will have a wider user base soon, this research will be of particular interest to those studying how emerging digital technologies affect the lives of young people. The objective of this research is to obtain a comprehensive understanding of how the metaverse affect the lives of digital natives and to identify potential avenues for transformation within this emerging generation.

This situation is directly compatible with the research framework drawn by the phenomenological design. Accordingly, the study employed the in-depth interview technique to collect data. In-depth interview is a technique used to collect information through face-to-face, individual interviews. It is a method that allows for a comprehensive exploration of a given topic with open-ended questions and detailed responses (Uslu & Demir, 2023). This technique may be employed by communicating directly with the participants via telephone, audio, or video communication on online platforms (Ardahanoğlu, 2022).

To reach data saturation in qualitative research, the minimum sample size is 15 (Mason, 2010). The semi-structured interview form provides the researcher flexibility in time management and allows the researcher to obtain more regular, comparable data from different participants with the same interview form (Yıldırım & Şimşek, 2021). To address the researched topic as impartially as possible, proximity to the research field, obtaining comprehensive information through face-to-face interviews, and collecting information for a long period of time at the place where the event took place are basic elements that contribute to ensuring validity in qualitative research (Yıldırım & Şimşek 2021).

The phenomenological design aims to try to understand what and why an event happened by delving further into it (Husserl, 2012). In this context, the researcher can attain more personal experience and deep knowledge of the phenomenon. Phenomenology not only provides general and definitive results, but also experiences and examples to discover the true nature of an event or situation (Yıldırım & Şimşek, 2021). The reason for choosing the phenomenological design in this study is to try and understand in depth how digital natives perceive the metaverse, which is the purpose of the study, through the real experiences of the participants. This design was used in the study to comprehensively address the experiences of the participants regarding the metaverse and how they give meaning to these experiences.

Participant selection

Criterion sampling was used within the scope of purposeful sampling in the study to select 26 digital natives. The criteria for inclusion and exclusion are as follows:

Criteria for inclusion:

- A digital native individual between the ages of 18–24
- Have experienced the metaverse virtual world
- At least a high school graduate
- Have actively used digital technologies and the internet
- Have used different types of platforms (game, social network, education, etc.) in the metaverse

Criteria for exclusion:

- Have not had any metaverse experience

- Have not used any application in metaverse
- Less than 30 minutes of conversation
- Severe distraction or difficulty communicating during the interview
- Difficulty remembering metaverse experiences
- Displaying behaviour contrary to the objectives or ethical rules of the research

Limitations of the study

- Digital natives between the ages of 18–24
- Active presence in the metaverse
- The study was conducted between Sept 18 and October 18, 2024

Data collection and evaluation

For data collection, in-depth interviews were conducted using a semi-structured interview form. Within the framework of the phenomenological design, one of the main problems is how the participants perceive and use the metaverse. The in-depth interview questions were prepared in this direction. Due to the difficulties of the data collection process, interviews were conducted face-to-face. Before the interview, the participants were informed in detail about the research, and their approval was obtained. First, eight questions were asked to collect demographic characteristics. Next, a total of 19 questions were asked on the study topic itself, including five questions about how they identify and perceive the metaverse, three questions about their experiences in the metaverse, four questions about their thoughts on the business world of the metaverse, three questions about the role and characteristics of the metaverse in education, and foure questions about the characteristics of the metaverse and ethical issues.

The Maxqda 2024 program was used to evaluate the data collected from the interviews. The interview data was first transferred to the program and then assessed in the context of theme, category, and code. During the evaluation process, conceptual frameworks such as "experiences, perceptions, and facts" of the phenomenological design were considered. Since the questions were in line with this, the evaluations were made within this framework. The data was subjected to content analysis. By creating coding categories, data that is not visible in the texts can be revealed. Thus, the researchers can have a new perspective with connections that are not visible to them.

The Necmettin Erbakan University Social Sciences and Humanities Research and Publication Ethics Committee and Ethics Committee approval was also obtained to ensure the research adhered to ethical standards and academic integrity.

Validity and reliability

The data obtained were analysed by two researchers, and the codes were compared, discussed and corrected until a Cohen's Kappa score above 0.61 was reached. Codes that could not be mutually agreed upon by the researchers were excluded from the evaluation. After the code generation phase, the data was analysed in Maxqda 2024, a qualitative research software program,

In the literature, credibility criteria are categorised under four main groups: credibility, reliability, confirmability, and transferability (Guba & Lincoln, 1982). In this study, researcher triangulation was used for reliability. In collecting and analysing data with researcher triangulation, more than one researcher held meetings three times a week

and shared their progress. Thus, the findings were compared at each step. In addition, the analysis of the data in the Maxqda 2024 program is supportive of reliability. To ensure transferability, the research process was clear and detailed.

FINDINGS AND DISCUSSION

The interviews were initially reviewed in their entirety. Following this, the necessary arrangements were made, and the interview data were subsequently transferred to a Word document and saved in the MAXQDA 2024 program. Subsequently, the data from the interviews underwent a process of analysis, whereby themes were identified, and categories and codes were established. The data yielded six principal themes. The definition; usage and experiences of the metaverse; its role in the business world; its role in education; ethical values, and demographic characteristics associated with it. A total of 2,205 codings were made. Thematic analysis yielded the following frequencies: definition (560), usage and experiences (302), role in the business world (358), role in education (270), ethical values (351), and demographic characteristics (364).

Table 1. Demographics of study participants

Participant	Age	Gender	Education	City of residence
P1	26	Female	Undergraduate	Konya
P2	29	Male	Undergraduate	Konya
P3	23	Male	Undergraduate	İstanbul
P4	19	Male	Undergraduate	Ankara
P5	20	Male	Undergraduate	Konya
P6	24	Female	Undergraduate	Ankara
P7	21	Male	Undergraduate	Istanbul
P8	21	Female	Undergraduate	Istanbul
P9	24	Female	Undergraduate	Konya
P10	23	Male	Undergraduate	Istanbul
P11	23	Male	Undergraduate	Ankara
P12	24	Female	Undergraduate	Konya
P13	19	Male	Undergraduate	Ankara
P14	19	Female	Undergraduate	Konya
P15	23	Male	Undergraduate	Istanbul
P16	24	Female	Undergraduate	İstanbul
P17	20	Female	Undergraduate	Ankara
P18	22	Male	Undergraduate	Istanbul
P19	21	Female	Undergraduate	Ankara
P20	21	Female	Undergraduate	İstanbul
P21	20	Female	Undergraduate	İstanbul
P22	23	Female	Undergraduate	Ankara
P23	24	Male	Undergraduate	İstanbul
P24	23	Male	Undergraduate	Ankara
P25	22	Male	Undergraduate	İstanbul
P26	21	Female	Undergraduate	İstanbul

Definition of metaverse

To facilitate analysis, a total of five thematic categories were formed: Digital Concepts, First Reactions, First Sources, Daily Life, and an Overall Approach to Metaverse Technologies. In the category of Digital Concepts, the most significant emphasis was placed on virtual and augmented reality, virtual environments, and Web3 code. Furthermore, the transition across platforms, the concept of the multiverse, the gaming industry, the advent of an exciting new economic order, and the potential of interactive codes were all highlighted. In the category designated as Daily Life, the emphasis was placed on the code that will be effective in the future. Furthermore, the codes about social interaction, change, and the absence of impact were given particular emphasis. In the Initial Reactions category, the codes future technology, sense of detachment from reality, and excitement were identified as particularly salient. Moreover, the codes anxiety, creativity, industrial revolution, inspirational, game, lack of infrastructure, new business lines, lack of knowledge, and Matrix were emphasised.

In the categories of Daily Life and First Reactions, the formation of sub-code links between innovative experiences and social interaction codes was also evidenced. In the initial category of sources, the code about social media is of particular significance. Furthermore, codes about personal experience, news sites and, social environments were given particular emphasis. Concerning the category of attitude toward metaverse technologies, was highly stressed while the negative response was identified as a notable exception (see Figure 1).

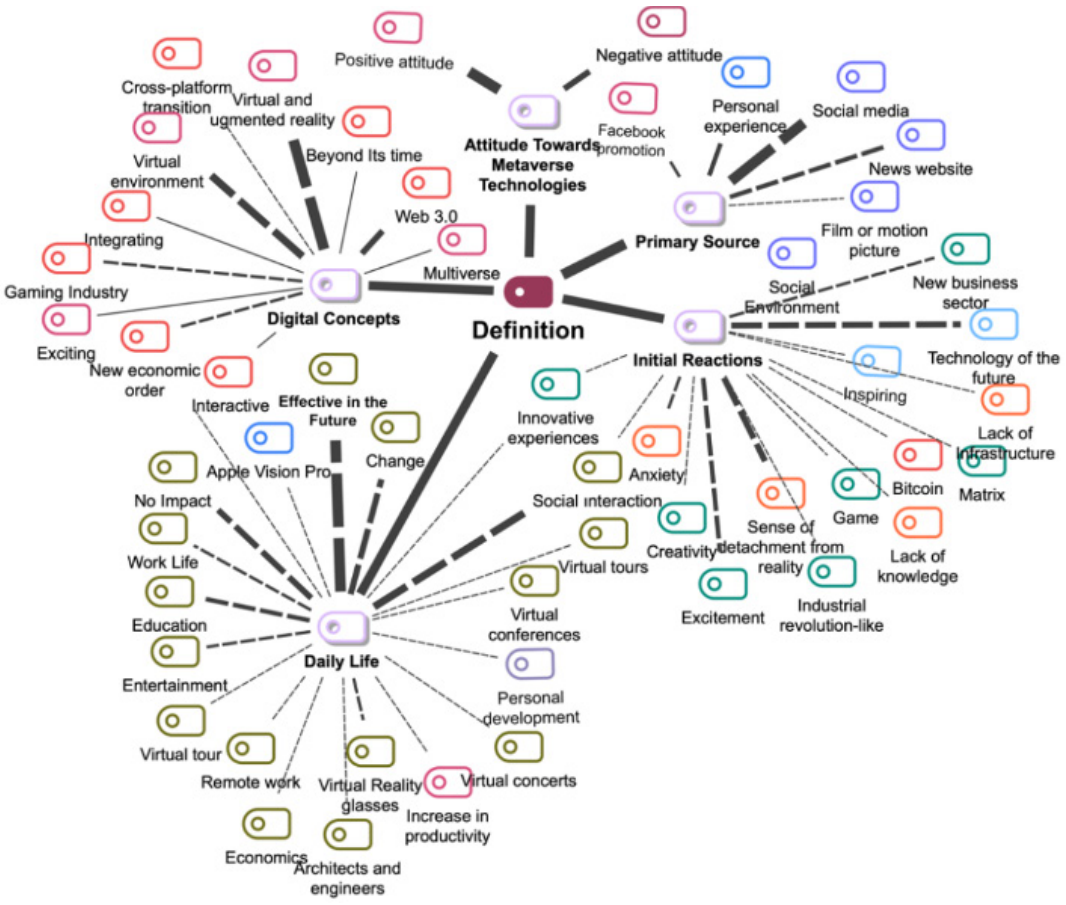

Figure 1. Metaverse as a definition

Batu and Kocaömer (2023) definitively defined the metaverse as a virtual twin world that can be accessed using various platforms and is very similar to the real world. They made it clear that in this virtual world, you can experience almost all of the experiences you can have in the real world. The findings of this study confirm that the metaverse is not yet effective in daily life in Türkiye. However, it will undoubtedly become so in the future and can be used in education, business, and entertainment.

Kuş (2021) was explicit in his definition: The metaverse is a space that serves the interests of some companies, restricts people's freedoms, and turns them into products. Furthermore, it was stated that this virtual realm has the potential to sever users' ties with the tangible world, consequently reducing their social interactions. This study, however, found that despite initial concerns about losing touch with reality, many participants expressed a strong sense of excitement and curiosity about the metaverse.

Okkay (2023) rightly emphasised that the metaverse technology should not only focus on technical details, but also on the experiences of users and their social effects. This study found that the metaverse technology is not yet broadly adopted, with technical features such as ease of use and widespread use of virtual (VR) and augmented reality (AR) glasses being more highly rated than social effects. Karagöl (2023) defined the metaverse as a multimedia structure containing many elements. This study confirms that the participants also viewed the metaverse as a multiverse and cross-platform transition element.

> *Metaverse is a work with great potential. However, it has not been successful due to the lack of today's technology and poor user experience.* (P11)

> *I can define the Metaverse as a 3D virtual universe…* (P7)

Usage and experiences

Under the theme of usage and experience, three categories were formed: Platforms used in Daily Life, Reasons for Use, and Challenges Encountered. In the first category, VR glasses received the highest emphasis. In addition, AI, the Sandbox, and Ray-Ban VR glasses codes were also highlighted. In the category of Reasons for Use, the game code received the highest emphasis. In addition, education and work-life codes were also emphasised. In the category of Difficulties Encountered, eye health, infrastructure problems, and ease of use were identified as key issues. In addition, asociality, addiction, depression, attention disorder, lack of emotional development, glass malfunctions, cyberbullying, lack of content production, health problems, and connection error, etc., were also highlighted.

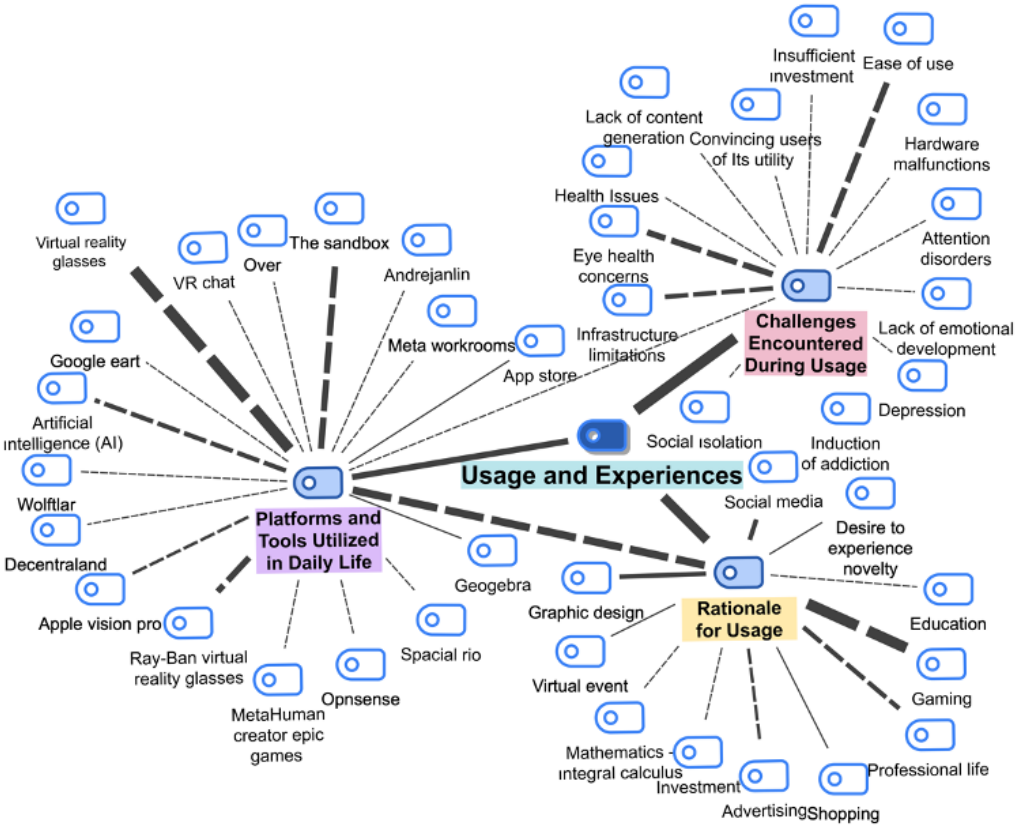

Figure 2. Usage and experiences

Digital natives need to use the metaverse effectively, interact in more innovative ways, and understand metaverse that will make their daily lives more digital. A good understanding of metaverse and its concepts is crucial for digital natives to make the most of the advantages offered by this technology, including innovative services. In his study on the role of metaverse in daily life, Yılmaz (2023) stated that it will take a long time for one to have an intense metaverse experience. The participants in this study mentioned the use of Ray-Ban virtual reality glasses and Apple Vision Pro glasses in daily life. It should be noted that while metaverse first emerged in gaming and entertainment, over time, it will be actively applied in education and businesses.

Metaverse is a virtual world that fosters the creativity and development of users through gaming (Yuan & Yang, 2022). However, the data obtained in this study shows that it can venture rapidly beyond the game world. In their research on metaverse, Han et al. (2021) found that metaverse is creating a culture through gaming. Similarly, participants in this study suggested that although metaverse started with gaming, it affects many different areas, such as work and social activities. This study also corroborates with Ulubaş Hamurcu's research on metaverse and online mobile work in 2022, which found that online mobile platforms and the metaverse contribute to the decentralisation process in the digital world.

According to Baudrillard (2011), modern societies live in a simulation universe where reality is reproduced. In the simulation theory that emerged by questioning and investigating the perception of reality, it is posited that reality is reproduced through machines and technologies (Önk, 2009). Similarly, the present study concludes that the metaverse reshapes the existing reality.

Meta's Ray-Ban glasses allow me to live my daily life as if I had stepped into the Metaverse universe by merging the real world with the digital world. (P16)

The Metaverse is not a very developed sector yet, so it usually starts with gaining experience through gaming. (P25)

Role in the world of work

Under the theme of metaverse's role in the business world, four categories emerged: Existing Workforce, Moving Forward in Time, Potentials in the Business World, and Productivity. In the Current Workforce category, positive impact was the most highlighted. In addition, codes on real estate, developed countries, daily jobs, engineers, virtual offices, fear, change, shrinking, graphic design, virtual insecurity, remote working and economy, advertising, and spacelessness also stood out. In the second category, the code for new professions was obvious. Also, information on pollution, development opportunities, not popular and no workspace codes were created. In the Productivity category, the code for accelerating business processes was strongly emphasised. Time-saving and virtual meeting codes also received high scores. For the Potentials in the Business World category, more emphasis was placed on codes of profession, stock exchange, and new marketplace.

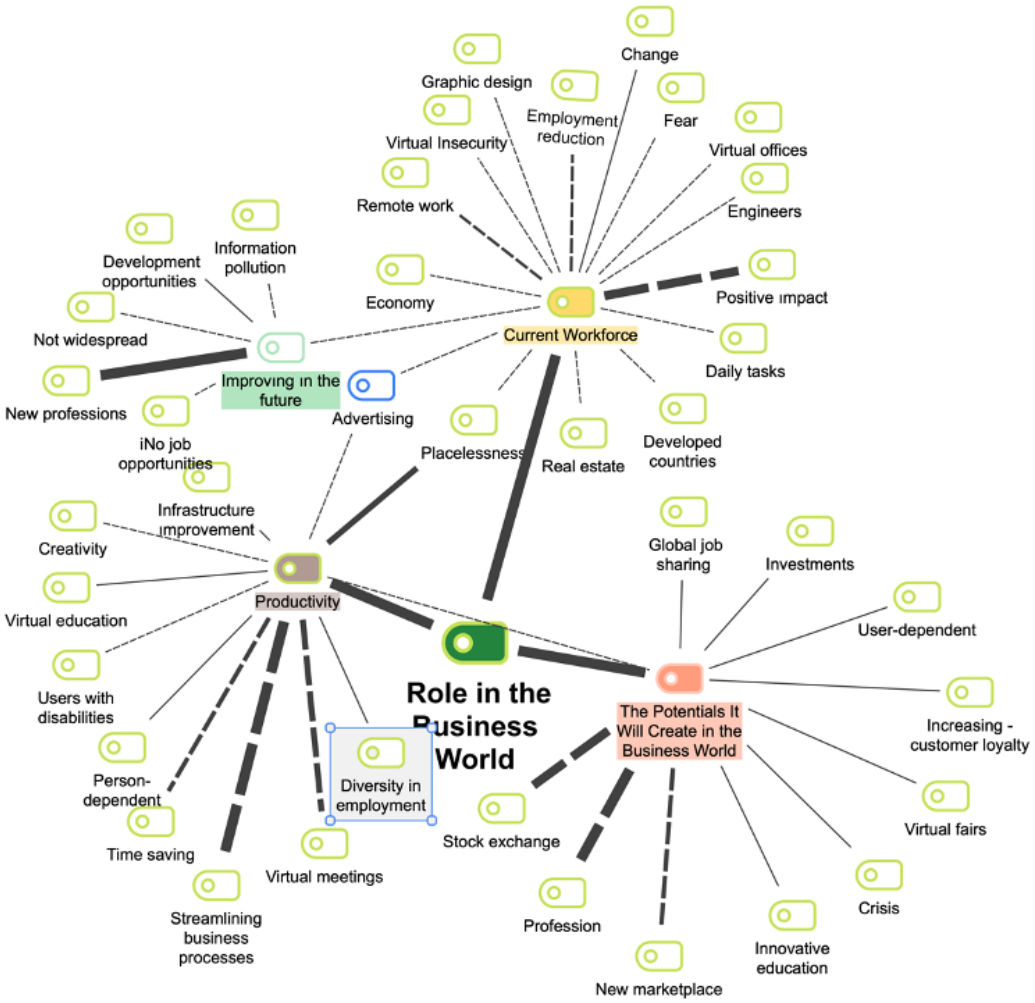

Figure 3. Role in the business world

In a Pew Research Center study conducted by Elon University with Imagining the Internet Center in 2022, most of the participants (54%) stated that metaverse will affect positive thoughts in daily work until 2040; however, a large portion of the participants (46%) stated that the negative effects of Metaverse will be more severe (Baltacı, 2023). This study found that the metaverse does not have an impact today and was mostly seen as the technology of the future.

The findings are similar to Özkaynar's work (2022) which examined the formation of the metaverse by addressing virtual structuring. The study contended that the metaverse is in the development stage but will become a huge marketplace, requiring large investments and digital workforce. Similarly, this study's findings reveal that the metaverse is seen as a new marketplace, heralding new professions and progressing over time. According to Latino and colleague (2024), who examined changes of metaverse in the business world, this technology will increase productivity and customer loyalty for organisations. The present findings concur that the metaverse will increase productivity and creativity in the business world.

Koçak (2023), in his study examining the opportunities offered by metaverse, stated that with the emergence of remote working, conferences and business meetings around the world have shifted to virtual environments, and as a result, a virtual world has emerged. He also mentioned that this new virtual world creates a new economy for social interaction, trade, digital activities, and digital producers. Similarly, this study found that the metaverse will provide diversity in employment, virtual education, virtual conferences and virtual meetings, and global job sharing. The present study also corroborates with Gider et al. (2022), who studied the Teamworks platform in the metaverse and found that disabled employees experienced rapid adaptation. Findings show that individuals with disabilities can have an easier work and social life with the help of the metaverse technology.

> *I believe that both digital natives and the entire business sector will use it in the coming years, but I don't think it has a very active role right now.* (P22)

> *Metaverse is a marketplace that brings people together to trade.* (P10)

Role in education

With regard to metaverse's role in education, two categories were revealed: Personal Learning Experiences and Impact on Education Systems in the future. In the category of Personal Learning Experiences, the codes for not active today and interactive learning obtained the highest importance. In addition, artificial intelligence-supported learning, motivation for the new generation, and age restriction were also spotlighted. Codes on medical courses, history and infrastructure is not ready were also emphasised. In the category of Impact on Education Systems in the Future, the codes of new education, training models and positive approaches were strongly emphasised. In terms of access and equality, the codes called attention to convenience, global perspective, virtual classrooms code, the fact that it will end face-to-face education and the negative approach. In terms of the positive approach code, the idea that the quality of education will increase was emphasised.

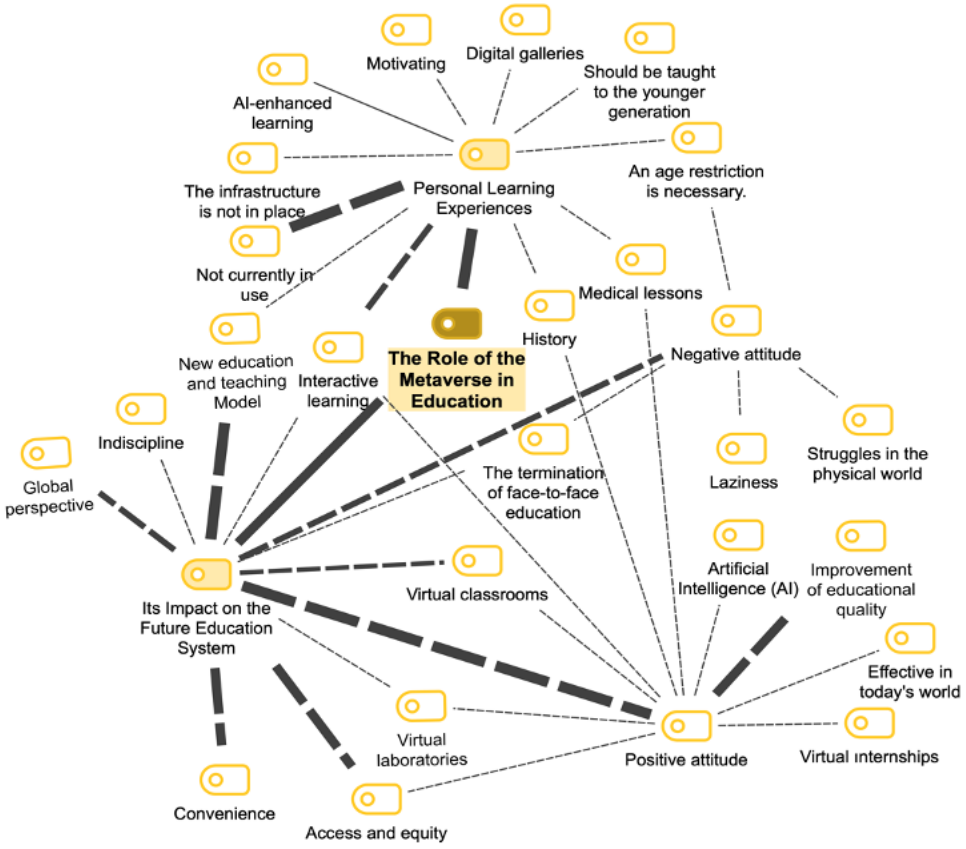

Figure 4. Role of the metaverse in education

Şentürk et al. (2022), in their study of VR technologies applied in education, found that the metaverse, as opposed to traditional educational environments, captured students' attention with advanced visualisation, leading to students participating more. Gamification techniques are some of the benefits that allow students to become actively engaged. However, disadvantages were also highlighted, such as altering face-to-face communication and high costs. The current study's findings highlighted similar positive and negative effects of metaverse such as social isolation and laziness as well as a global perspective in the future, respectively.

The findings also concur with Tokgöz and Karabatak (2023) who found that metaverse can help learners prevent or reduce loss of time by providing a self-learning experience, thanks to the spacelessness it creates. In this study, findings show that in future education systems supported by metaverse, motivation will increase, but the ease offered by personal learning experiences will cause laziness in users. Göktaş and Hazarhun (2024) carried out a focus group interview with Süleyman Demirel University students on the effectiveness of metaverse and found that participants were excited but would prefer face-to-face education with a stress-free learning style. Respondents also highlighted shortcomings such as IT facilities and internet connections in some places that will not be able to support the metaverse program. Similarly, this study's findings found that while metaverse can enhance the quality of education and provide interactive learning, on the downside, the current infrastructure may not be ready yet.

The findings obtained in this study are also similar to the results of Akyüz and Gülten's (2023) study in which they examined the metaverse's role in digital

transformation. In the future, metaverse-based virtual universities will be established and education will expand more in digital environments. Based on the findings, this study too predicts that education will continue completely through virtual classrooms and schools that will provide flexible and interactive learning. In addition, the findings also suggest that metaverse-based digital education will completely replace face-to-face education and that emotional intelligence will become more important than knowledge in the future.

In their study, Perinpasingam and colleagues (2023) emphasised that a virtual learning environment enables and encourages teachers to try different approaches to learning, which turn motivates students more. Based on this study's findings, the metaverse technology does provide ease in learning, and the quality of education will increase. In a different study on scouting with VR technology, Abdul Rahman et al. (2024) contended that VR technology makes complex concepts fun and facilitates the learning process. The findings obtained in this study concur that metaverse technology can provide an interactive learning experience.

> *The potential of the Metaverse in education is truly exciting. The Metaverse plays a major role in engaging and motivating students by making their learning experiences more interactive and participatory.* (P16)

> *It could revolutionize education, providing more accessible and flexible learning opportunities, especially through virtual classrooms and laboratories.* (P2)

Ethical values

In the ethical values theme, two categories emerged, namely Social Life as well as Privacy and Data Security. In the Social Life Category, the codes for lack of information, unethical thinking, social isolation and abusive behaviour were emphasised intensely. In the category of Privacy and Data Security, the codes for hiding information, thinking that it is unethical, insecurity and safe were emphasised.

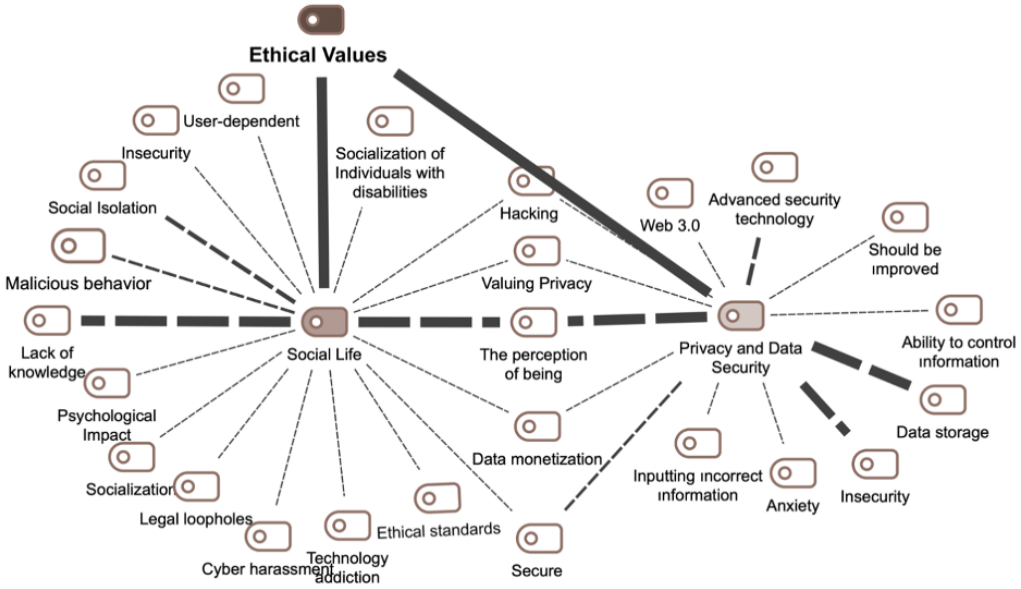

Figure 5. Ethical values

Emrem's 2022 study on digital technologies and the metaverse proved that this technology provides legal guarantees through the blockchain technology and smart contracts. This creates a fair, transparent, and reliable information basis for consumption relationships in virtual worlds. However, this study's participants expressed negative sentiments towards metaverse as its information storage creates a sense of insecurity. The study also identified online malicious behaviour and legal gaps as two important causes to social isolation.

The findings of this study, however, align with the findings of Noyan and Özpençe (2023). Noyan and Özpençe's study (2023) clearly show that the metaverse should introduce a similar set of rules to social media and that it is essential to implement legal regulations and measures. This study also has shown that legal gaps need to be filled regardless of the reliability of blockchain technology. It is crucial to address the legal gaps in blockchain technology to protect the rights of data owners and increase the security of the system (Pelin & Gündal, 2024). It has also been identified that the technology is capable of hurting people's social lives and their feelings through exposure to malicious behaviour.

Likewise, the findings of this study align with the findings of Yılmaz's 2023 study on the legal issues surrounding the metaverse. Yılmaz is right in arguing that new laws need to be created to accommodate the unique evolving rules and settings of the metaverse.

> *Since these are web 3 based cloud systems, I can say that they are more secure than normal web 2 sites, especially since the Blockchain system is used.* (P24)

> *... current laws are not sufficient, there is no law anyway.* (P20)

CONCLUSION

This study analysed how digital natives use the metaverse technology as well as the benefits and shortcomings they encountered. Findings show that digital natives perceive the metaverse as both an opportunity and a convenience. Study participants regard the metaverse as a place where they can experience social activities and increase their creativity on multiple platforms. Digital natives consider the internet and the digital world as not only a different virtual world, but also as a part of their daily lives. Additionally, the extent of their metaverse adoption is directly related to their aptitude for technology and their online experiences.

However, there are some concerns about privacy, security, and ethical values in the usage and application of metaverse. These issues may shed some light on the sustainability of the metaverse. Further, the study's findings also reveal that the long-term use of the metaverse can lead to eye problems, a sense of disconnection from the real world, difficulty in balancing the real world and the virtual world, as well as technical problems. Additionally, excessive indulgence in virtual worlds may lead to social isolation and physical health problems.

Digital natives are aware of the ways that the metaverse can be harnessed in education and businesses. They are convinced of its potential, especially in professional development and education, which require innovative solutions to get ahead of competition. Digital natives are also very experienced in using the metaverse through various platforms

for business, entertainment, and education. Digital natives define the metaverse as a virtual environment for entertainment, social interaction, and new opportunities that can be exploited for businesses. They are also certain that the metaverse can facilitate and support their learning process and journey.

It is highly likely that the metaverse will eventually replace face-to-face education, and it will begin in primary schools. Despite the advantages, digital natives are also aware of some of the shortcomings of the metaverse including the lack of investment in this field as well as infrastructure and internet connection problems. These issues must be addressed immediately. Long-term use of VR goggles also causes eye problems. Additionally, digital natives demand strict privacy and ethical standards and are eager for the law to catch up with the rapid evolution of technologies such as metaverse.

In summary, this study has revealed that there is a optimistic outlook towards the metaverse and digital natives will undoubtedly make this technology a part of their daily lives. However, privacy, security, ethical, and infrastructural problems must be addressed with urgency for its sustainability as well as wider adoptions and applications.

Recommendations

One main limitation of this was that it was conducted in Türkiye only and from the perspective of digital natives there; which reduces the generalisability of its findings. Future studies can expand the present study by looking at the opportunities and threats of the metaverse for digital natives as well as adopting a quantitative analysis across Türkiye.

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