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What do university students think about the metaverse?

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Abstract

Metaverse is a new concept which is frequently discussed in many fields such as health, art, sports, entertainment, education, trade, and marketing. The scope and actuality of this concept, which expresses a new digital world beyond the universe, necessitated this study. In this study; gender, age, duration of social media usage and levels of metaverse knowledge, awareness and attitude of university students have been tried to be analyzed statistically in terms of variables such as playing digital games, using e-commerce, communicating with other individuals in virtual channels and the availability of crypto money. The survey model, one of the quantitative research methods, was preferred in the study. Independent Sample T Test and Pearson Correlation tests were used to analyze data with a normal distribution. The universe of the research includes students studying at Ağrı İbrahim Çeçen University in the 2021-2022 academic year, and the sample of the research includes 271 students (122 females and 149 males), studying in different departments of the same university. Apart from the personal information form, the 'Metaverse Scale' developed by Süleymanoğulları et al. was chosen as a data collection tool. According to the results, male participants' metaverse knowledge, attitude, and awareness levels are higher than females in the sub-dimensions of digitalization and lifestyle. While a positive and weak relationship was found between the participants' average daily social media usage time and the technology sub-dimension average score, the analysis results indicate that the levels of the participants who engage in e-commerce in the technology, digitalization, and lifestyle sub-dimensions are higher than the others. Finally, it has been found that the metaverse knowledge, attitude and awareness levels of the students with crypto money in the sub-dimensions of technology, digitalization and lifestyle are higher than those in the other group. According to the results of this study, it can be said that the metaverse attitudes, awareness and knowledge levels of the university students who constitute the research sample group differ depending on sociocultural and socioeconomic factors.

1. Introduction

Technology and innovation instruments have caused paradigm shifts in the last three decades. Innovations brought by the world of informatics have a central place in daily life since they direct and enrich communication, interaction and social relations. It has been underlined that the world order will be shaped around computers and communication in the 1990s, the web in the 2000s, mobile devices in the 2010s, and the 'metaverse' as of 2020 (Lee 2021). The word metaverse is derived from the words meta (beyond) and the universe; Metaverse is a concept that allows the creation of virtual communities beyond commerce and entertainment; it is a new generation of the internet that includes a three-dimensional

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virtual space where users can interact with their avatars; it is also observed to be described as the "digital big bang" in cyberspace (Duan et al., 2021; Lee, 2021; Lee et al., 2021; Ko et al., 2021; Seok, 2021).

Starting from the fact that the metaverse concept is a digital world element, it is necessary to talk about the history of digitalization. The foundations of today's digital world were shaped by the discovery of the solid form and abundant silicon element on the earth's surface. The discovery of the element silicon led to the invention of semiconductors and transistors, which regulate the intensity of electric current in circuits. Transistors have led to the invention of microchips that enable the operation of all electrically powered electronic devices in houses, workplaces, vehicles, and every part of life. The invention of microchips facilitated the invention of computers (Aksu, 2019).

Along with all these developments, with the introduction of the internet into daily life, the analog lifestyle has begun to evolve into a digital form. In this way, all manually analog operations were transferred into the computer environment, so the digitalization process started. A large number of data has been obtained with digitalization, which has been processed and opened the door to change and transformation in the social, economic, cultural and technological fields. Reaching new results by processing the obtained data is expressed as digital transformation (Aksu, 2019). It can be said that the concept of 'metaverse' emerged as the last stage of digital transformation. All these developments are shown in sequential order in Figure 1.

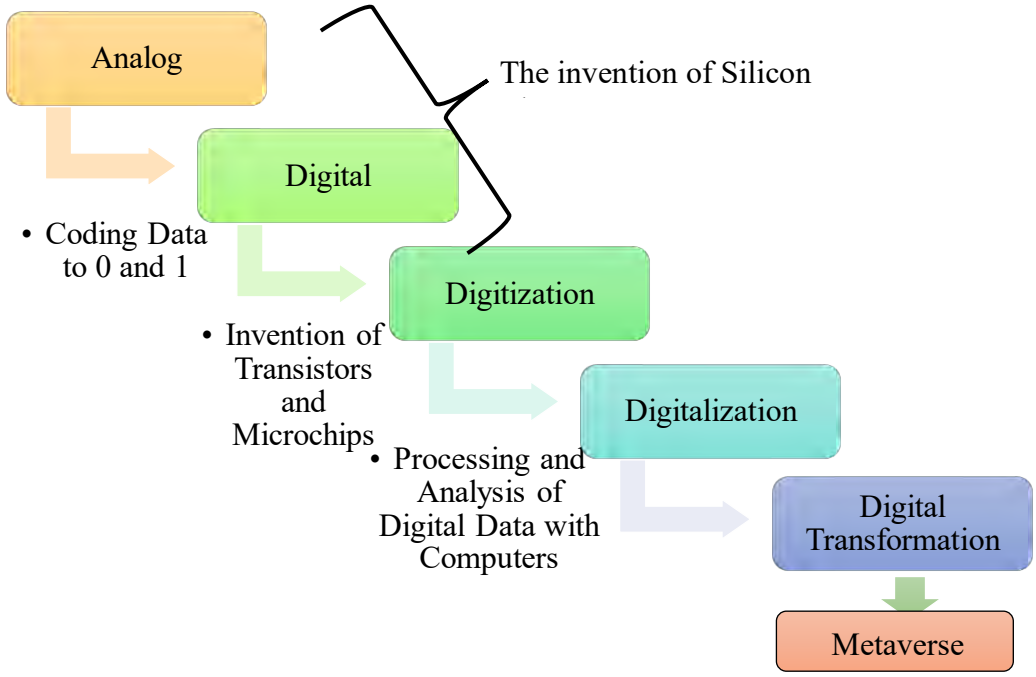

Figure 1. The Developmental Stage of the Metaverse (created by the authors inspired by Maltaverne, 2017).

In terms of end users, after three major waves of technological innovation centered around the introduction of personal computers, the internet and mobile devices respectively, the fourth wave of computer innovation appears to be spatial, immersive technologies such as Virtual Reality (VR) and Augmented Reality (AR) (Kunthara, 2021). Thanks to today's technologies, many large companies are currently trying to build proprietary hardware and software ecosystems to attract users by creating the infrastructure and standards to manage the metaverse (Bird, 2021). This construction is based on technologies that enable multi-sensory interactions with virtual environments, digital objects and people in the metaverse (Kunthara 2021).

Zuckerberg (2021), CEO of Facebook Inc., states that this multi-sensory world will exist within the Metaverse, offering the feeling of being side by side; It emphasizes that it will host experiences such as getting together with friends/family, shopping, working and having fun. In addition, it is possible to have completely different experiences beyond how we think about computers and phones today; For example, it means that you can teleport your office, work, or a friend in the form of a hologram. In addition to all these changes, it is often argued that the metaverse can cover educational activities and take all these activities to the next level. As a matter of fact, it has made essential transformations in the field of education, mainly due to the pandemic, and has gained an essential place in this transformation by being based on metaverse, VR, and AR. Although the use of AR and VR in academic education remains supportive and experimental, these opportunities have been reshaped by the necessity of distance education during the pandemic process.

With the pandemic, some universities realized their course contents and various training through VR; many technology companies have started offering more digital education solutions (PSU, 2018). Such applications can remove the time and space restrictions in education. However, problems such as learning delays and inability to understand may be encountered, especially in practice courses. Metaverse School is one of the most striking examples of this situation (Metaverse School 2022). Educational activities in different universities of the world have begun to be carried out with virtual campuses, which are a kind of metaverse product (Gavin, 2021).

There are recent scientific studies dealing with the concept of the metaverse or the issues associated with the concept of the metaverse. For example, Gadalla et al. (2013) examined the relationship between metaverse and retail service quality and presented a roadmap where 3D metaverse stores and retailers can increase their service quality. In their study titled "Teacher Perspectives on Mobile Augmented Reality: The Potential of Metaverse for Learning", MacCallum and Parsons (2019) examined the differences in students' perceptions of learning when teachers used the metaverse environment in their education and concluded that the use of metaverse in education has positive benefits. In their study titled "Technology Roadmap of the Future Trend of Metaverse based on IoT, Blockchain, AI Technique, and Medical Domain Metaverse Activity", Mozumder et al. (2021) mentioned that Metaverse is a universe that uses artificial intelligence and blockchain technology to create a digital virtual world that can safely and freely participate in social and economic activities that transcend the boundaries of the real world, accelerating the implementation of these cutting-edge technologies. Widerhold (2022), in his article titled "Ready (or Not) Player One: Initial Musings on the Metaverse", stated that the metaverse is on its way as an inevitable situation, whether it is inspiring or the end of civilization, and that all humanity will be affected by it. In their study titled "A Metaverse: Taxonomy, Components, Applications and Open Challenges", Parki and Kim (2022) conducted a comprehensive analysis that breaks down the concepts and critical techniques required to realize the metaverse into three components (i.e., hardware, software, and content) and three approaches (i.e. user interaction, application, and application).

On the other hand, Metaverse has brought different concepts to the literature with its innovations. One of them, "MetaSport (MetaSport)," was defined by Süleymanoğulları et al. (2022) as “the virtual universe in which the metaverse infrastructure is created with the effect of technology and digitalization, in order to achieve competitive competition, superiority, entertainment or perfection within certain rules in the sports field”. This study examines university students’ attitudes, awareness, and knowledge about the metaverse concept.

This study was conducted to determine the attitude, knowledge and awareness levels of university students about the metaverse, which has recently become a popular topic and is thought to shed light on the future. This research is limited to students studying in different departments of Ağrı İbrahim Çeçen University; the validity of the data obtained; the period of the survey, the data provided by the available sources on the determined subject and the information obtained from the data collection tools. When the

literature is examined, it is understood that most of the studies on the metaverse are compilation studies. It is thought that practical studies should be done and this deficiency should be filled. From this point of view, this study is important for educators, users, researchers and the field.

2. Literature

Metaverse, one of the most critical concepts of recent days, is used in many areas such as health, art, sports, entertainment, education, trade and marketing. Virtual and augmented reality, blockchain, artificial intelligence, internet of things, smart factories and machines, which have entered our lives with the developing technology, have paved the way for the formation of the metaverse environment. When the literature is examined, it is seen that scientific studies have been carried out in different disciplines related to this concept: In their study titled "Metaverse-Retail Service Quality: A Future Framework for Retail Service Quality on the 3D Internet; In the metaverse world", Gadalla et al. (2013) found that the service quality of the products sold over the internet is relatively high. MacCallum and Parsons (2019), in their study titled "Teacher Perspectives on Mobile Augmented Reality: Metaverse Potential for Learning", stated that the metaverse concept establishes a connection between the virtual world and the physical world through augmented reality. As a result, they concluded that this connection contributed positively to the learning potential.

In their study titled "A Survey on the Metaverse: Latest Technologies, Technologies, Applications, Challenges"; Ning et al. (2021) stated that the Metaverse is a new type of internet application and social structure with multiple technologies, sociability, and hyper Spatio-temporal features integrating various new technologies. In addition, they defined the Metaverse's technical framework by introducing the Metaverse's development status from five perspectives: network infrastructure, management technology, standard core technology, virtual reality object connection, and virtual reality convergence. However, while introducing the nature of Metaverse's social and hyper-spatial-temporal nature in the study, they pointed out the first application areas of Metaverse and some of the problems and difficulties it may encounter.

In his work titled Metaverse World and Our Future, Lee (2021) tried to determine what the metaverse world is, and what awaits us in the future regarding this world, and he carried out his work mainly on children playing Roblox.

in their study titled "Metaverse: Taxonomy, Components, Applications and Challenges; By classifying the concept of the metaverse", Park and Kim (2022) stated that it has applications in many areas such as the online world, game world, virtual office, social life, marketing and education.

In his work titled “Ready (or Not) Player: First Thoughts on the Metaverse”, Wiederhold (2022) described the metaverse concept and talked about its development. In addition, he touched on the virtual universe in which the concept of metaverse interacts and revealed its relationship with digital games.

In their study titled Technology Roadmap of the Future Trend of Metaverse based on IoT, Blockchain, AI Technique and Medical Domain Metaverse Activity, Mozumder et al. (2022) talked about the technologies used in the metaverse universe and spoke about how the metaverse is used in the medical field.

3. Methodology

3.1. Research Type

In this study, the survey model, one of the quantitative research methods, was used. In this model, in which the opinions of the participants included in the research are taken about the event or phenomenon that is the subject of the study, the event, individual, or object that is the subject of the research is tried to

be defined as it is in its conditions and the current situation is attempted to be described as it exists (Büyüköztürk, KılıçÇakmak, Akgün, Karadeniz, et al. Demirel, 2012; Karasar, 2015).

3.2. Universe and Sample

The universe of this study includes the students studying at Ağrı İbrahim Çeçen University in the 2021-2022 academic year. The sample of the research consists of 271 students (122 females and 149 males), studying in different departments (43 males, 30 females from the Faculty of Sport Sciences; 36 males, 26 females from the Faculty of Education, 24 males, 17 females from the Faculty of Economics and Administrative Sciences, 18 males, 14 females from the Faculty of Pharmacy and 28 males, 35 females from associate degree programs) of the same university. The research sample was randomly selected from volunteer students studying in the university's faculties and associate degree programs.

3.3. Data Collection Tools

The survey technique, which is frequently used in the survey method, was used for data collection in the research (Nachmias&Nachmias, 1996). Before the questionnaires were administered, the participants were informed and the valid data were transferred to the analysis program for evaluation. Apart from the 'Personal Information Form', the 'Metaverse Scale' developed by Süleymanoğulları, Özdemir, Vural and Bayraktar (2022) were used to collect data. The Metaverse scale, which consists of 15 items and a total of 4 sub-dimensions, 'Technology', 'Digitalization', 'Social' and 'Lifestyle', is in a 5-point Likert type. The lowest score that can be obtained from the scale is 15, while the highest score is 75. As the average score obtained from the scale increases, the participants' metaverse knowledge, attitude and awareness levels also increase. The validity and reliability of the scale developed by Süleymanoğulları et al., (2022) were ensured and the Cronbach's Alpha value was found to be .813. The Cronbach's Alpha reliability coefficient in this study was determined as .776. For the internal consistency value to be valid, the critical alpha value must be .70 and above (Özdamar, 2004).

3.4. Research Ethics

For the research, ethical consent was obtained from Ağrı İbrahim Çeçen University, Scientific Research Ethics Committee 22.06.2022 date and 190 decision no.

3.5. Analysis of Data

The valid questionnaire forms filled by the students within the scope of the study were transferred to the SPSS 26 statistical package program. Since the Skewness and Kurtosis values obtained in the sub-dimensions (Technology: -1.292; 1.032; Digitalization: -1.130; 0.822; Social: -0.964; 0.153; Lifestyle: -1.340; 0.505) after the normality assumption analysis of the data were in the range of -1.5 ~ +1.5 (Tabachnick&Fidell, 2013), it was determined that the data set had a normal distribution. For this reason, parametric tests were used in the study's statistical analysis. Descriptive statistics (frequency, arithmetic mean, percentile distribution, standard deviation); Independent Sample T Test (to examine the differentiation between participants' Metaverse sub-dimensions scores and gender, e-commerce status, the status of communicating with other individuals in virtual channels, presence of cryptocurrencies) and Pearson Correlation tests (to examine the relationship between participants Metaverse sub-dimension scores and age, average daily social media usage time) were used in statistical analysis (Bursal, 2019; Büyüköztürk et al., 2012).

4. Results

In this section, tables and explanations regarding the statistical analyzes of the data obtained within the scope of the research are given.

Table 1.

Statistics on demographic and some other characteristics of the participants

Variant	Category	N	%	X̄	sd	Min	Max
Gender	Female	122	45.0	-	.667	-	-
	Male	149	55.0	-	.723	-	-
Age	-	-	-	20,92	2.26	17	30
Daily Social media usage time (hours)	-	-	-	4,15	.889	1	6
Digital gaming status	Yes	143	52.8	-	.684	-	-
	No	128	47.2	-	.720	-	-
E-commerce use	Yes	229	84.5	-	.690	-	-
	No	42	15.5	-	.522	-	-
Communicating with other individuals on virtual channels	Yes	195	72.0	-	.687		
	No	76	28.0	-	.749	-	-
Cryptocurrency availability	Yes	137	50.6	-	.680	-	-
	No	134	49.4	-	.697	-	-

When Table 1 is examined, it is seen that a total of 271 students, 122 women (45%) and 149 men (51%), participated in the research. While the rates of participants who play digital games and own crypto money are close to each other (52.8%, 50.6%), 84.5% of them do e-commerce; It has been determined that 72% of them communicate with other individuals in virtual channels. The average social media usage time of the participants, whose average age is 20, is 4.15 hours per day.

Table 2.

Independent Sample T-Test results of Metaverse sub-dimensions scores by gender

Sub-Dimensions	Category	N	X̄	sd	t	p
Technology	Female	122	3.027	.852	-1.025	.306
	Male	149	3.137	.902		
Digitalization	Female	122	2.740	.022	-3.317	***.001***
	Male	149	3.181	.163		
Social	Female	122	3.147	.125	-0.339	.735
	Male	149	3.198	1.287		
Lifestyle	Female	122	3.155	.993	-2.554	***.011****
	Male	149	3.472	1.039		

***p<0,05, **p<0,01**

It was found that there was a significant difference between the genders of the students participating in the study and the sub-dimensions of digitalization and lifestyle; In both sub-dimensions, it was determined that the metaverse knowledge, attitude and awareness levels of male students were higher than the levels of female students.

Table 3.

Pearson Correlation Test Results of Participants' Metaverse Sub-Dimension Scores by Age

		Age	Technology	Digitalization	Social	Lifestyle
Age	r	1	.021	.054	.075	.037
	p		.729	.376	.217	.544

As a result of the Pearson correlation analysis, no statistically significant relationship was found between the ages of the participants' metaverse sub-dimension mean score.

Table 4.

Pearson Correlation Test Results of Participants' Metaverse Sub-Dimensions Scores According to Average Daily Social Media Usage Time

		Duration	Technology	Digitalization	Social	Lifestyle
1. Duration	r	1	.136	.065	-.090	.094
	p		.025*	.290	.138	.124

***p<0,05**

Pearson correlation analysis results indicate that there is a weak positive relationship (Büyüköztürk et al., 2012) between participants' average daily social media usage time and technology sub-dimension mean score (r= ,136; n=72; p<.05)

Table 5.

Independent Sample T-Test results according to the e-commerce status of Metaverse sub-dimensions scores

Sub-dimensions	Category	N	X̄	sd	t	p
Technology	Yes	229	3.1990	.871	6.143	***.000***
	No	42	2.4796	.660		
Digitalization	Yes	229	3.0757	1.131	3.238	***.001***
	No	42	2.4762	.928		
Social	Yes	229	3.2249	1.228	1.573	.117
	No	42	2.9048	1.116		
Lifestyle	Yes	229	3.4396	1.027	4.938	***.000***
	No	42	2.7302	.820		

****p<0,01**

The analysis results indicate a significant difference between the e-commerce status and metaverse knowledge, attitude, and awareness levels in the sub-dimensions of technology, digitalization and lifestyle. They show that the levels of the e-commerce group are higher than the non-doing group.

Table 6.

Independent Sample T-Test results according to the metaverse sub-dimensions scores according to the status of communicating in social environments

Sub-dimensions	Category	N	$\bar{X}$	sd	t	p
Technology	Yes	195	3.1092	.862	.648	.518
	No	76	3.0320	.928		
Digitalization	Yes	195	3.0342	1.068	1.130	.261
	No	76	2.8509	1.246		
Social	Yes	195	3.1769	1.247	.036	.972
	No	76	3.1711	1.135		
Lifestyle	Yes	195	3.3436	0.970	.328	.743
	No	76	3.2939	1.173		

Table 6 shows that there is no significant difference between the status of communicating in social environments and the metaverse knowledge, attitude and awareness levels of the students who voluntarily participated in the study. When the table is examined, another finding of this analysis is that the average score of the students who communicate in social environments is higher than the other group.

Table 7.

Independent Sample T-Test results according to the cryptocurrency availability of Metaverse sub-dimensions scores

Subdimension	Category	n	$\bar{X}$	sd	t	p
Technology	Yes	137	3.247	0.833	3.065	***.002***
	No	134	2.924	0.900		
Digitalization	Yes	137	3.160	1.119	2.667	***.008***
	No	134	2.801	1.099		
Social	Yes	137	3.306	1.182	1.805	.072
	No	134	3.041	1.238		
Lifestyle	Yes	137	3.462	.950	2.159	***.032****
	No	134	3.194	1.090		

***p<0,05; **p<0,01**

The data in Table 7 show a significant difference between the availability of cryptocurrencies and students' metaverse knowledge, attitude and awareness levels in the sub-dimensions of technology, digitalization and lifestyle. It was concluded that the students with crypto money in these sub-dimensions are higher than those in the other group.

5. Discussion and Conclusion

When the studies in the literature are examined, the impact of the metaverse concept is undeniable. For this reason, it is thought that it will be a meaningful effort to determine university students' attitudes, awareness, and knowledge levels when following the current developments from all kinds of media.

A total of 271 university students, 122 females and 149 males, participated in this research. While the rates of participants who play digital games and own crypto money are close to each other (52.8%,

50.6%), 84.5% do e-commerce, 72% communicate with other individuals in virtual channels. The average social media usage time of the participants, whose average age is 20, is 4.15 hours per day.

After the research, it was concluded that male participants' metaverse knowledge, attitude and awareness levels were higher than Gender participants in the sub-dimensions of digitalization and lifestyle. This finding obtained from this study can be attributed to a sociocultural reason. With the influence of the roles and stereotypes determined by society, the expected behavior and personality traits of individuals can be associated with gender differences (Savaş, 2018).

The result that there is a weak positive relationship between the participants' average daily use of social media and their technology sub-dimension mean score can be associated with students' following the developments in the metaverse through social media.

The results of the analysis indicate that the levels of participants engaged in e-commerce in the sub-dimensions of technology, digitalization and lifestyle are higher. In particular, the experience of remote shopping, which is one of today's trends, can have a significant impact on metaverse attitude, awareness and level of knowledge.

Finally, it has been determined that the metaverse knowledge, attitude and awareness levels of the students who have crypto money in the sub-dimensions of technology, digitalization and lifestyle are higher than those in the other group. Due to the recent identification of the metaverse concept with cryptocurrencies, it can be argued that individuals with cryptocurrencies are more familiar with the metaverse concept.

When the literature was examined, it was seen that the studies on the metaverse were mostly compilation studies. Some of these studies are given in the literature section. This study is application-based. Therefore, the discussion of the study with the literature could not be made.

As a result, it can be said that the metaverse attitudes, awareness, and knowledge levels of university students who constitute the sample group of this study differ depending on sociocultural and socioeconomic factors. Studying the concept of metaverse on individuals with other demographic characteristics in different cultures; handling different variables apart from the independent variables used in this study; To understand the concept of metaverse correctly, it can be suggested that experts in their fields should carry out seminars, conferences, and similar informative activities. It can be suggested that educators use it as a resource, as it will enable them to understand the students in the metaverse better. In order to determine the different results of the study, it may be suggested to researchers work with different sample groups, apart from university students. It is recommended that groups of researchers from different disciplines come together and carry out multidisciplinary studies, as it is crucial for the development of the concept of the metaverse and its adaptation to the whole society.

References

Aksu, H. (2019). Dijitopya: Dijital Dönüşüm Yolculuk Rehberi. İstanbul: PusulaYayınevi.

Bursal, M. (2019). Spss ile Temel Veri Analizleri. Ankara: Anı Yayıncılık.

Büyüköztürk, Ş., Kılıç Çakmak, E., Akgün, Ö. E. Karadeniz, Ş. ve Demirel, F. (2012). Bilimsel Araştırma Yöntemleri. Ankara: PegemAkademi.

Çınar, O., ve Dursun, A. (2012). Mobbing, Örgütsel Bağlılık ve İş Tatmini İlişkisi: Atatürk Üniversitesi Araştırma Hastanesinde Yapılan Bir Alan Araştırması. Ekev Akademi Dergisi, 52.

Duan, H., Li, J., Fan, S., Lin, Z., Wu, X., and Cai, W. (2021, October). Metaverse For Social Good: A University Campus Prototype. In Proceedings of the 29th ACM International Conference on Multimedia. 153-161.

Gadalla, E., Keeling, K., and Abosag, I. (2013). Metaverse-Retail Service Quality: A Future Framework for Retail Service Quality in the 3D Internet. Journal of Marketing Management, 29(13-14), 1493-1517.

Gavin, O. (2021), "British Tech Companıes Ma-King The Tech Educatıon and Traınıng Meta-Verse A Realıty", Fenews, https:// www.fenews.co.uk/skills/british-tech-companies-ma-king-the-tech-education-and-training-metaverse-a-re-ality/. (ErişimTarihi: 23 Ocak 2022).

Karasar, N. (2015). Bilimsel Araştırma Yöntemi. Ankara: Nobel AkademikYayıncılık

Ko, S. Y., Chung, H. K., Kim, J. I., and Shin, Y. (2021). A Study on the Typology and Advancement of Cultural Leisure-Based Metaverse. KIPS Transactions on Software and Data Engineering, 10(8), 331-338.

Kunthara, S. (2021), VCs Will Spend Billions More to Make the Metaverse a Reality, Crunchbase, (16 Kasım 2021), https://news.crunchbase.com/news/me-taverse-startups-funding-investors/. (ErişimTarihi: 25.05.2022).

Kuş, O. (2021). Metaverse: 'Dijital Büyük Patlamada' Fırsatlar ve Endişelere Yönelik Algılar. Intermedia International e-Journal, 8 (15) 245-266.

Lee, B. K. (2021). The Metaverse world and our future. Review of Korea Contents Association, 19(1), 13-17.

Lee, L. H., Braud, T., Zhou, P., Wang, L., Xu, D., Lin, Z., ... & Hui, P. (2021). All one needs to know about metaverse: A complete survey on technological singularity, virtual ecosystem, and research agenda. arXiv preprint arXiv:2110.05352.

MacCallum, K., and Parsons, D. (2019, September). Teacher Perspectives on Mobile Augmented Reality: The Potential of Metaverse for Learning. In World Conference on Mobile and Contextual Learning (pp. 21-28).

Maltaverne, B. (2017). "What is the Digital Transformation of Procurement Really About?"https://medium.com/procurement-tidbits/what-is-the-digital-transformation-of-procurement-really-about-9d2148e04638(ErişimTarihi: 21.06.2022).

Metaverse School, https://metaverse.school/. (ErişimTarihi: 01 Haziran 2022).

Mozumder, M. A. I., Sheeraz, M. M., Athar, A., Aich, S., and Kim, H. C. (2022). Overview: Technology Roadmap of The Future Trend of Metaverse Based on IoT, Blockchain, AI Technique, and Medical Domain Metaverse Activity. 24th International Conference on Advanced Communication Technology (ICACT) (pp. 256-261). IEEE.

Nachmias, C. F., Nachmias, D. (1996). Research Methods in The Social Sciences. (5th Edition). New York: St. Martin's Press.

Ning, H., Wang, H., Lin, Y., Wang, W., Dhelim, S., Farha, F., and Daneshmand, M. (2021). A Survey on Metaverse: The State-of-the-art, Technologies, Applications and Challenges. arXiv:2111.09673.

Özdamar, K. (2004). Paket Programlar ile İstatistiksel Veri Analizi. Eskişehir: Anadolu Üniversitesi Yayınları

Parkı, S. M., and Kim, Y. G. (2022). A Metaverse: Taxonomy, Components, Applications and Open Challenges. IEEE Access. 1(1); 99-111

PSU, (2018), World Campus Researches Effectiveness of VR Headsets and Video in Online Classes, https://www.psu.edu/news/research/story/wor-ld-campus-researches-effectiveness-vrheadsets-and-vi-deo-online-classes/. (ErişimTarihi: 25.05.2022).

Savaş, G. (2018). Türkiye'de Yaşayan Bireylerin Toplumsal Cinsiyet Eşit(Siz)Liği Algısı. Akdeniz Kadın Çalışmaları ve Toplumsal Cinsiyet Dergisi, 1(2); 101-121.

Seok, W. H. (2021). Analysis of metaverse business model and ecosystem. Electronics and Telecommunications Trends, 36(4), 81-91.

Süleymanoğulları, M., Özdemir, A., Bayraktar, G., and Vural, M. (2022). Metaverse ölçeği: Geçerlik ve Güvenirlik Çalışması / Metaverse Scale: Study of Validity and Reliability. Anatolia Sport Research, 3(1), 47-58.

Tabachnick, B. G., Fidell, L. S., & Ullman, J. B. (2007). Using multivariate statistics (Vol. 5, pp. 481-498). Boston, MA: Pearson.

Wiederhold, B. K. (2022). Ready (or Not) Player One: Initial Musings on the Metaverse. Cyberpsychology, Behavior, and Social Networking, 25(1); 1-2.

Zuckerberg, M. (2021). Founder's Letter, https://about.fb.com/news/2021/10/founders-letter/. Erişimtarihi: 30.05.2022.