AWARENESS LEVELS OF SOCIAL STUDIES PRE-SERVICE TEACHERS REGARDING METAVERSE USE

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Abstract. *In today's Technology Age, where communication technologies are gaining momentum, social, cultural, and technological competencies draw attention from individual and societal perspectives. Along with technological innovations, transformations are experienced in the societal development process in many areas, including education, communication, language, culture, economy, etc. In this context, innovative technologies in today's science and technology-oriented society bring applications of artificial intelligence and the virtual universe, exploring the interaction between humans and space and beyond. Metaverse stands out as a structure among these virtual universe applications. Metaverse, one of the popular artificial intelligence applications of recent times, emphasizes creating a virtual social environment beyond time with the understanding of space and beyond. Metaverse is a permanent three-dimensional world where many situations that we cannot experience in the real world can be experienced and where communication can be established with other people or virtual people. It is thought that it may be beneficial to support a course such as social studies, which includes many disciplines and aims to raise well-equipped citizens with technology. The social studies course is also noteworthy as an area focusing on developing digital competence and skills. In this direction, this research aims to reveal the awareness levels of pre-service social studies teachers about metaverse usage from various variables. The experimental scanning method from quantitative research methods was utilized during the research process. According to the results of the study, while the awareness of the pre-service teachers about the application of metaverse as a current, popular technology and communication source is not found to be significant in terms of variables such as gender, age, and class level, it is significant regarding the university they attend, frequency of*

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internet use, thoughts about using the internet/technology in education, digital environment and metaverse themed education, certificate program, and participation in courses.
Keywords: *Communication, metaverse, pre-service teacher, social studies, innovative technology.*

1. INTRODUCTION

In the process attributed to the Technology Age due to rapid developments in science and technology, societies primarily aim to cultivate individuals with technology-oriented digital competencies. Besides digital competencies in individuals, active, participatory development is also targeted in social and cultural development and language and communication skills (Maiier & Koval, 2021, p.11). As the basis of qualified and sustainable education in today's digital societies (Hyytinen et al., 2023, p.119), it is desired to reach future-oriented and visionary individuals. In this context, 21st-century skills also stand out in individual and social development with digitalization in technology and communication networks in recent years (Hrynko, 2019, p.65). Communication technologies and digital competencies are discussed within the scope of 'information, media and technology skills 'within the scope of 21st-century skills with the goal of advanced, social and participatory individuals with techno-pedagogical competencies and digital field skills (Kerneža & Kordigel Aberšek, 2022, p.836). In contemporary education, societies with a high level of communication, interest in innovative technologies, and catching up with the age by keeping up to date are emphasized (Broks, 2010, p.5). In the light of innovative technologies, all innovations based on interaction in the field of information and technology manifest themselves in all areas of daily life in terms of sustainability (Aydoğan et al., 2022, p.55; Park & Kim, 2022, p.4209). In this context, digital competencies are sought at every level of individual and social life within the framework of innovative technologies, and the emphasis on being conscious and aware of the positive and negative effects of media platforms is gaining importance (Deng & Matthes, 2023, p.2). Digital and technological skills and competencies are also emphasized in education by understanding qualified and sustainable education for technology and communication-oriented social environments (Snape, 2011, p.96; Direkçi et al., 2019, p.800). In the development of digital skills based on innovative technologies in educational environments, today's prominent technology-oriented communication channels attract attention (Kärkkäinen & Keinonen, 2010, p.28; Radhika & Bhuvaneshwari, 2023, p.68). In this respect, with a visionary approach, the process of digital identity acquisition, avatar creation and adaptation to innovative technologies are discussed in terms of raising individuals who catch the age in terms of social, cultural development and transformation (Kim, 2021, p.142; Lee, 2021, p.72; Alqirnas, 2022, p.777; Zalan & Barbesino, 2023, p.3).

When referring to innovative technologies encompassing the transition process from Web 2.0 to Web 3.0 (Sheridan et al., 2021, p.5), processes where real and virtual physical environments are connected and associated based on virtual and augmented reality applications in recent times (Buchholz et al., 2022, p.313) are at the forefront (Cheng et al., 2022, p.505). In the metaverse (Lee et al., 2021, p.2), which represents the enriched physical world environment in the virtual world, the aim is to reflect the physical environment to the digital world with the rich content presented in the virtual environment

(Weking et al., 2023, p.2). To raise individuals' digital awareness with metaverse, the experience environment offered in all areas of life represents the age of communication and technology with a focus on innovative technologies (Çelik, 2022, p.68; Zhao et al., 2022, p.60). Metaverse refers to one of the essential components of the digital world, which is shaped by internal and external sources of motivation and shaped by innovative interfaces and applications, especially Microsoft and Facebook, in the fields of "augmented reality, life diary, mirror worlds and virtual worlds" (Alkan & Bolat, 2022, p.273; Deng & Matthes, 2023, p.1). Therefore, in the metaverse, human-space interaction for socialization is discussed in the context of cultural commodities and metaverse according to virtual physical reality applications, supported by social interaction in today's technology societies (Ning et al., 2021, p.1; Türk & Darı, 2022, p.278; Braguez et al., 2023, p.505; Yang, 2023, p.2). The metaverse, which draws attention to human communication with the virtual world beyond space and space in a technology-based virtual environment, is seen as one of the artificial intelligence applications of the period with its versatile structure. The metaverse, which supports cultural bonding with space and beyond, is expressed as a virtual reality application based on artificial intelligence (Seidel et al., 2022, p.3). In this virtual environment, with the support of augmented reality applications, the basis is set on the individual exploring the real environment, space and beyond, and getting acquainted with the virtual physical world (MacCallum & Parsons, 2019, p.23; Aydoğan et al., 2022, p.56; Mystakidis, 2022, p.486; Türk, 2022, p.33).

Initially discussed as a utopian virtual environment for societal structure with its fictional dynamics, the metaverse has now gained popularity as a technology-based application benefiting various fields, especially education and communication, and as a socialization area (Laeeq, 2022, p.1; Lin et al., 2022, p.2; Talan & Kalınkara, 2022, p.336). The virtual reality application, metaverse, containing functional applications for different sectors with its rich vision, encapsulates the distinct developments in digital competencies within the current technological environment (Shi et al., 2023, p.1). By focusing on communication processes at the point of capturing the spirit of the age (Kuş, 2021, p.247), the metaverse creates rich content in which the real and virtual environments are structured together in techno-communication environments with technological innovations and digital perspectives (Weking et al., 2023, p.3). In this direction, in the metaverse (Wang et al., 2022, p. 2; Dolata & Schwabe, 2023, p.2) with its harmonious phenomena that guide socialization, it is emphasized to raise participatory individuals who are stimulating, dynamic, adapt to the age, closely follow technological innovations, use digital platforms consciously in their daily lives, have a command of artificial intelligence applications (Karakuş & Kılıç, 2022, p.324). In this respect, future generations need knowledge and interest in the metaverse as one of the technology-oriented practical artificial intelligence applications to make sense of space and beyond space and to show a tendency towards digital competencies (Kye et al., 2021, p.2). Therefore, today, digital environments (Leshchenko et al., 2020, p.106), which catch up with age, can keep up with technological development, are social, open to communication, and focus on participating individuals, are considered necessary to be applied with different technological applications in the education process. It is especially stated that including metaverse practice in educational environments contributes to qualified and sustainable education (Lee & Hwang, 2022, p.6). In this context, the research problem statement is: What is the

level of awareness of pre-service social studies teachers about using the metaverse?Based on the problem situation of the research, the variables sought for answers are listed as follows:

1. Do the awareness levels of pre-service social studies teachers about the use of the metaverse differ according to gender?
2. Do the awareness levels of pre-service social studies teachers about the use of the metaverse differ according to age?
3. Do the awareness levels of pre-service social studies teachers about the use of the metaverse differ according to university of study?
4. Do the awareness levels of pre-service social studies teachers about the use of the metaverse differ according to class level?
5. Do the awareness levels of pre-service social studies teachers about the use of the metaverse differ according to frequency of internet use?
6. Do the awareness levels of pre-service social studies teachers about the use of the metaverse differ according to the necessity/non-necessity of using the internet in education?
7. Do the awareness levels of pre-service social studies teachers about the use of the metaverse differ according to digital environment and metaverse-themed education, certificate program, and participation in courses?

Starting from the problem situation of the research, the aim of this study is to reveal the awareness levels of pre-service social studies teachers regarding the use of metaverse within the scope of innovative technologies, according to various variables. The study is considered to contribute to the field literature due to its focus on the metaverse as a current area within the scope of technological innovations and its inclusion of the awareness levels of pre-service teachers towards metaverse technology.

2. METHODS

This study, which examines the awareness levels of pre-service social studies teachers about the use of the metaverse within the scope of innovative technologies according to various variables, was conducted based on the experimental scanning model of quantitative research method. In quantitative research methods, researchers are expected to digitize application data related to factual phenomena with an objective approach and measure it repeatable (Sukamolson, 2007, p.2; Watson, 2015, p.44). The scanning model is a method conducted on large participant groups used to determine certain characteristics of a group (Büyüköztürk, 2016, p.2). Convenient sampling was chosen to easily, quickly, and effectively reach pre-service teachers during the application process (Küçük, 2016, p.98). The Metaverse Scale was used by obtaining the necessary permissions via email from the scale owners. Voluntary participation of the participating pre-service teachers was considered essential during the application process of the study, and participant consent was obtained. Moreover, ethical permissions necessary for implementing the related scale application were obtained.

For the application of the study, ethical permission was obtained from the Bartin University Social and Human Sciences Ethics Committee with the number 2023-SBB-0228.

2.1. Study Group

The study group of the research consists of social studies pre-service teachers studying at four different universities in the 2022-2023 academic year. At the beginning of the implementation process, it was aimed to reach an inclusive universe of 1400 people with participants from universities from seven different geographical regions of the country. At the beginning of the scale application process, all universities were reached as desired, although online education was started for compulsory reasons in the whole country (in Turkey). However, 3 universities whose number of valid attendances was below the expected were excluded from the data analysis process. In the last stage, the sample of the research consists of 350 pre-service teachers with voluntary participation, the number of valid scale participation.

When the field literature is examined, it is explained that it is acceptable to reach 5-10 times the number of scale items (15 items) (75-150 people) while determining the number of participants depending on the scale volume (Nunnally, 1978, p.3; Büyüköztürk, 2002, p.480). Again, in the selection of sample representation according to the size of the population, a sample of 286 people is accepted for a population of 1000 people based on 0.05 sample error; for a population of 2000 people, a sample of 333 people is accepted (Israel, 1992, p.3). In different studies, reaching 10%-30% of the estimated population is expressed as the number of acceptable samples (Özen & Gül, 2007, p.416). In this context, the study group, which constitutes the research sample, consists of 350 people. Demographic characteristics and descriptive data of the study group are given in the tables.

Table 1. Examination of demographic characteristics

		n	%
Gender	Female	209	59.7
	Male	141	40.3
Age	18-20	107	30,6
	21-23	185	52,9
	24 and above	58	16.6
University of education	University 1	113	32,3
	University 2	68	19.4
	University 3	73	20.9
	University 4	96	27.4
Grade Level	Freshman	93	26.6
	Sophomore	62	17.7
	Junior	115	32,9
	Senior	80	22.9
Frequency of Internet use	1-5 hours per week	26	7,4
	6-10 hours per week	79	22.6
	11-20 hours per week	104	29,7
	More than 20 hours per week	141	40.3
Thoughts on the use of Internet/Technology in education	I don't think it's necessary	6	1.7
	Indecisive	7	2,0
	I deem it necessary	337	96,3
Digital environment and metaverse training, certificate program, participation in the course	Yes	104	29,7
	No	246	70.3
Total		**350**	**100%**

59.7% of the participants were female and 40.3% were male; 30.6% were "18-20 years old, 52.9% were 21-23 years old, 16.6% were 24+ years old; 32.3% were university 1, 27.4% were university 4, 20.9% were university 3, 19.4% were university 2; 26.6%were 1st grade, 17.7% were 2nd grade, 32.9% were 3rd grade, 22.9% were 4th grade. In addition, 40.3% of the participants use the internet for 20 hours per week, 29.7% for 11-20 hours, 22.6% for 6-10 hours, 7.4% for 1-5 hours; 1.7% do not consider the use of internet/technology in education necessary, 2.0% are undecided about the use of internet/technology in education, 96.3% consider the use of internet/technology in education necessary; 70.3% did not participate in the digital media and metaverse training, certificate program, course, while 29.7% participated in the digital media and metaverse training, certificate program and course.

2.2. Data Collection Tools

In the data collection process of the research the "Metaverse Scale" prepared by Süleymanoğulları et al. (2022) was used. The scale was prepared in a 5-point Likert type and consists of 15 questions about awareness about the use of metaverse. The Likert options in the scale are listed as 'Disagree (1) 'and'Agree (5) '. In this respect, the score that can be obtained from the scale varies between at least 15/at most 75. There are 4 sub-dimensions in the Metaverse Scale: 'technology, digitalization, social, lifestyle'. In the scale, the technology sub-dimension was 7 items, the digitalization sub-dimension was 3 items, the social sub-dimension was 2 items, and the lifestyle sub-dimension was 3 items.

2.3. Data Collection and Analysis

During the data collection phase, the researchers applied the scale items to the participants via online Google forms. The data were transferred to IBM SPSS Statistics 23 software and completed. While evaluating the study data, frequency distribution (number, percentage) was given for categorical variables, and descriptive statistics (mean, standard deviation, minimum, maximum) for numerical variables. A normality test was performed to determine whether the data showed normal distribution, and it was seen that the data showed normal distribution and analyzes were made with parametric tests. Independent sample t-test was used to determine whether there was a difference between the two groups, and one-way analysis of variance (One Way ANOVA) was used to determine whether there was a difference between more than two groups. The Bonferroni test was used from post-hoc tests to determine the group that made a difference due to the one-way ANOVA test. In addition, Cronbach's alpha value was used for scale reliability. $p < 0.05$ was considered significant.

Descriptive findings of the metaverse scale and its sub-dimensions are given in Table 2.

Table 2. Metaverse scale and sub-dimensions descriptive information

	mean	ss	min	max	Cronbach Alfa
Technology	25,24	3,96	13	35	.768
Digitalization	10,16	2,67	3	15	0.834
Social	6,97	1,97	2	10	.801
Lifestyle	11.75	2,14	3	15	0.824
Metaverse scale	54.12	8,27	30	75	0.869

According to Table 2, the metaverse scale mean score (between 15-75 points) is 54.12±8.27, the technology sub-dimension mean score is 25.24±3.96, the digitalization sub-dimension mean score is 10.16±2.67, the social sub-dimension score is 6.97±1.97, and the lifestyle sub-dimension score is 11.75±2.14. One of the most frequently used criteria in evaluating scale reliability is Cronbach's alpha, an internal consistency measure. Calculations were made for the scale and sub-dimensions, and Cronbach's alpha value was calculated. These values are higher than the generally acceptable value of 0.700 (Nunnally, 1978, pp. 45-46).

3. RESULTS

In this part of the study, the findings obtained in line with the purpose of the study and comments based on these findings are included.

Findings related to the use of metaverse according to gender variable

The findings regarding the awareness of Social Studies pre-service teachers according to the gender variable are presented in Table 3.

Table 3. Awareness level regarding the use of metaverse by gender

	Technology	Digitalization	Social	Lifestyle	Metaverse scale
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
Gender					
Female	25.22±3.37	10.08±2.12	6.83±1.75	11.67±1.81	53.79±6.3
Male	25.27±4.72	10.28±3.33	7.17±2.25	11.89±2.55	54.61±10.54
t / p	-0.097/0 .923	-0.655/0.513	-1.525/0 .129	-0.891/0.374	-0.825/0 .410

F: One-way ANOVA test, t: Independent sample t test*:p<0.05

According to Table 3, there was no statistically significant difference between the female and male participants with an average of 53.79 and 54.61 in terms of metaverse scale and sub-dimension scores in terms of gender variable (p>0.05). Based on the findings, it can be said that the participants, women and men, have a close level of awareness about using metaverse.

Findings related to the use of metaverse according to gender variable

Findings regarding the awareness of Social Studies pre-service teachers about the use of metaverse according to the age variable are presented in Table 4.

Table 4. Awareness level regarding the use of metaverse by gender

	Technology	Digitalization	Social	Lifestyle	Metaverse scale
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
Age					
18-20	25.38±4.08	10.26±2.87	7.04±2.06	11.98±2.36	54.66±8.27
21-23	25.08±3.91	10.08±2.59	6.9±1.99	11.57±2.07	53.62±8.12
24 and above	25.5±3.97	10.24±2.6	7.05±1.76	11.93±1.9	54.72±8.76
F / p	0,342/0,711	0.195/0 .823	0.237/0 .789	1,510/0,222	0.721/0 .487

F: One-way ANOVA test, t: Independent sample t test*:p<0.05

When Table 4 is examined, there is no statistically significant difference in terms of metaverse scale and sub-dimension scores according to the age variable ($p>0.05$). Based on the findings, it is seen that the participant pre-service teachers have a close level of awareness regarding the use of metaverse.

Findings related to the use of metaverse according to the university variable

Findings regarding the awareness of Social Studies pre-service teachers about the use of metaverse according to the age variable are presented in Table 4.

Table 5. Learning awareness level regarding the use of metaverse according to the university seen

	Technology	Digitalization	Social	Lifestyle	Metaverse scale
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
University of education					
University 1	24.12± 3.19 b	9.7± 2.32b	6.62±1.73	11.24±1.93 b	51.67± 6.35 b
University 2	26.13± 3.94a	10.47± 2.65 b	7.04±2.07	12.04±1.96	55.69± 8.65a
University 3	27.15± 4.52 a	11.62± 3.05 a	7.19±2.48	12.92± 2.10 a	58.88± 9.85a
University 4	24.49± 3.72b	9.38± 2.30b	7.15±1.67	11.27± 2.17 b	52.28± 6.90b
F / p	**12,017/0 ,000 ***	**12,545/0 ,000 ***	1.804/0 .146	**12,575/0 ,000 ***	**15,460/0 ,000 ***

F: One-way ANOVA test, t: Independent sample t-test:p<0.05*
a,b: shows mean differences between groups (a: highest mean)

As can be inferred from Table 5, there is a statistically significant difference between the universities regarding metaverse scale and technology, digitalization and lifestyle sub-dimension scores ($p<0.05$).

Accordingly, metaverse scale and technology sub-dimension scores in those who are in university 2 or university 3, according to those who are in university 1 or university 4,

The digitalization sub-dimension score of those in University 3 compared to those in University 2, University 1 or University 4. The lifestyle sub-dimension score of those in University 2 and University 3 is higher than those in University 1 or University 4. Based on the findings, it can be said that universities have an effect on pre-service teachers' awareness regarding the level of metaverse use.

Findings related to the use of metaverse according to the grade level variable

Findings regarding the awareness of Social Studies pre-service teachers about the use of metaverse according to the age variable are presented in Table 4.

Table 6. Awareness level regarding the use of metaverse by grade level

	Technology	Digitalization	Social	Lifestyle	Metaverse scale
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
Grade Level					
Freshman	25.77±4.12	10.22±2.99	7.28±1.97	11.9±2.47	55.17±9.06
Sophomore	24.84±3.36	10.05±2.52	6.58±1.9	11.31±2.08	52.77±6.82
Junior	24.95±4.15	10.34±2.5	6.74±2.02	11.84±2.06	53.87±8.39
Senior	25.36±3.93	9.93±2.66	7.23±1.88	11.8±1.86	54.31±8.14
F / p	1.008/0.389	0.425/0.735	2.586/0.053	1.136/0 .334	1.100/0 .349

F: One-way ANOVA test, t: Independent sample t-test:p<0.05*

There is no statistically significant difference in terms of metaverse scale and sub-dimension scores according to grade level in Table 6 (p>0.05). Based on the finding, it is understood that the grade level does not significantly affect awareness about the use of metaverse.

Findings related to the use of metaverse according to the frequency of internet use variable

Findings regarding the awareness of Social Studies pre-service teachers about the use of metaverse according to the frequency of internet use variable are presented in Table 7.

Table 7. Awareness level regarding the use of metaverse according to the frequency of internet use

	Technology	Digitalization	Social	Lifestyle	Metaverse scale
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
Frequency of Internet use					
1-5 hours per week	24.38±4.51	9.31± 2.71b	6.81±1.86	11.19±1.92	51.69±7.82
6-10 hours per week	24.52±3.9	9.49± 2.67 b	6.78±1.92	11.56±1.82	52.35± 7.59b
11-20 hours per week	25.88±3.94	10.91± 2.70a	6.72±2.21	12.04±2.1	55.55± 8.51a
More than 20 hours per week	25.34±3.87	10.13±2.52	7.28±1.8	11.76±2.35	54.51±8.35
F / p	2.216/0 .086	**5,481/0,001***	2,004/0,113	1.440/0 .231	**3.143/0 .025***

F: One-way ANOVA test, t: Independent sample t test:p<0.05*
a,b: shows mean differences between groups (a: highest mean)

Table 7 shows a statistically significant difference between internet usage frequencies in terms of metaverse scale and digitalization sub-dimension scores (p<0.05). Accordingly, the metaverse scale score in those who use the internet for 11-20 hours a week compared to those who use 6-10 hours a week,

The digitalization sub-dimension score is higher in those who use the internet for 11-20 hours a week than those who use 1-5 hours and 6-10 hours a week. According to the findings, it can be said that the frequency of internet use is significant in favor of those who use the internet for 11-20 hours per week across the digitalization sub-dimension and the metaverse scale on the awareness of pre-service teachers about the use of metaverse.

Findings on the use of metaverse according to the variable of seeing/not seeing the use of internet/technology in education

Findings regarding the awareness of Social Studies pre-service teachers about the use of metaverse according to the variable of seeing/not seeing the use of internet/technology in education are presented in Table 8.

Table 8. Level of awareness regarding the use of the internet/technology in education according to necessary/not necessary use of the metaverse

	Technology	Digitalization	Social	Lifestyle	Metaverse scale
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
Thoughts on the use of Internet/Technology in education					
I don't think it's necessary	20.5± 5.01b	8.5±4.46	7±2.53	10.5±3.02	46.5±12.32
Indecisive	24.43±5.88	10.29±4.23	6.14±2.67	11.29±2.29	52.14±14.02
I deem it necessary	25.34± 3.86a	10.19±2.6	6.98±1.95	11.79±2.12	54.3±8.01
F / p	**4.646/0 .010***	1.183/0 .307	0.623/0.537	1,239/0,291	2.857/0.059

F: One-way ANOVA test, t: Independent sample t-test*:p<0.05
a,b: shows mean differences between groups (a: highest mean)

When Table 8 is examined, there is a statistically significant difference between the opinions about the use of internet/technology in education in terms of technology sub-dimension score (p<0.05). Accordingly, the technology sub-dimension score of those who consider the internet/technology necessary in education is higher than those who do not. According to the findings, it can be said that the level of awareness of pre-service teachers about the use of metaverse reflects positively on the technology sub-dimension in favor of those who consider the use of internet/technology necessary in education. In addition, although there is no significant difference in the metaverse scale, it is noteworthy that those who consider it necessary to use the internet/technology in their education have a higher average.

Findings related to the use of metaverse according to the variable of the digital environment and metaverse training, certificate program, participation in the course

Findings regarding the awareness of Social Studies pre-service teachers about the use of metaverse according to the variable of the digital environment and metaverse education, certificate program, and participation in the course are presented in Table 9.

Table 9 shows a statistically significant difference between the digital environment and metaverse education, certificate, and program participation in the course regarding metaverse scale and technology, digitalization sub-dimension scores (p<0.05).

Accordingly, it can be said that the metaverse scale and technology, digitalization sub-dimension scores are in favor of the participants in the variable of education, certificate program, and participation in the course regarding the level of awareness about the use of metaverse.

Table 9. Training on digital media and metaverse, certificate program, awareness level regarding the use of metaverse according to the status of participation in the course

	Technology	Digitalization	Social	Lifestyle	Metaverse scale
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
The digital environment and metaverse training, certificate program, participation in the course					
Yes	25.95±4.63	11.24±2.43	7.32±2.02	12.02±2.1	56.53±9.24
No	24.94±3.61	9.7±2.64	6.82±1.93	11.64±2.15	53.11±7.62
t / p	**1,980/0,049***	**5,090/0 ,000 ***	2.185/0 .030*	1.509/0.132	**3,330/0,001***

F: One-way ANOVA test, t: Independent sample t-test*:p<0.05
a,b: shows mean differences between groups (a: highest mean)

4. DISCUSSION

In this study, which aims to reveal the level of awareness of social studies pre-service teachers about the use of metaverse as a prominent subject within the scope of today's innovative technologies, gender, age, university, grade level, frequency of internet use, seeing/not seeing the use of internet/technology in education, education on digital media and metaverse, certificate program, and participation in the course were discussed.

The study emphasizes technological competency, knowledge, and skills for individuals to keep up with today's technology age, focusing on technology-centric education and promoting technology-based designs within the school culture (Snape, 2011). The study by Kärkkäinen & Keinonen (2010), which discusses the relationship between technology and the individual, draws attention to students' perceptions of technology. It underscores the necessity to encourage the relationship between technology and education while revealing limited processes in integrating technology into their daily lives. Aydoğan et al. (2022), who consider metaverse as a fictional area beyond the real in the virtual environment, touch on the hybrid process related to real and digital-based fictional realities, explaining the development of digital knowledge and skills in the framework of technological innovations, primarily in education and art fields. Focusing on opinions about the use of metaverse in educational environments, the study, conducted according to the mixed method, states that while the participating students are unfamiliar with the concept of metaverse in the classroom environment, they highlight the importance of including it for quality, up-to-date, and sustainable education. The view that metaverse, as a multifaceted concept, can find its place in all areas of life, is emphasized (Talan & Kalınkara, 2022). Kuş (2021), in a study examining individuals' perceptions regarding metaverse in the digitization process, touches on both the encouraging and worrying

aspects of the process in every area of societal life, besides revealing the potential of metaverse. The study that draws attention to the empowerment of women in all areas of life, particularly in education, through the use of virtual reality sensors in learning environments on a female sample stands out (Brahma et al., 2023). Yang (2023), who uses both practical and storytelling processes over user experiences with male/female participants from different countries in metaverse as a technology-centric communication and socialization environment, has questioned the 'reality' perception in real and virtual environments with augmented reality technology in the creation of cultural metaverse in the digital environment. In a case study focusing on metaverse as an area reflecting digital socialization in a technology-based environment, where real-life experiences are transferred to the digital environment in the transition process from Web 2 to Web 3, the relationship between the individual and society on the digital platform is discussed in the context of socialization (Türk & Darı, 2022). In a study addressing the awareness and consciousness of future teachers regarding the use of social network platforms, it is stated that a generation with digital competencies will develop and support different aspects, especially communication skills, creativity, and digital literacy skills. In the practical aspect of the study, the contribution of individual and collective activities in educational environments to digital competencies is emphasized (Hrynko, 2019). In a mixed-method study conducted to improve the digital competencies of pre-service teachers through the use of digital resources, suggestions are provided on how to support their digital competencies and attitudes at each stage (Maiier & Koval, 2021). Braguez et al., (2023), who draw attention to learning experiences related to metaverse, state that applications like metaverse for digital competency reveal educational experiences related to daily life for different purposes such as education, gaming, and draw attention to social interaction in digital platforms. The study, which aims to inform by focusing on information and communication technologies within the scope of social interaction with metaverse technology, encourages social entrepreneurship in the process of socialization (Weking et al., 2023). A study examining the literature on metaverse within the scope of technology-based education through compilation is approached from the perspectives of knowledge, communication, creativity, and socialization aspects of the use of metaverse in educational environments, emphasizing the education-technology relationship in line with the requirements of the age (Göçen, 2022). Metaverse technology, which emphasizes the potentials of the physical environment in the virtual world, supports the study concerning the currency of the metaverse field. This is done by providing samples from all walks of life within the context of information and communication applications (Dwivedi et al., 2022) and focusing on the support of metaverse applications centered on Blockchain technologies, structured with innovative technologies (Huynh-The et al., 2023). Accordingly, the study, which approaches the metaverse application where the virtual world and physical environment are merged on the digital platform from the perspective of technology-oriented individual development, draws attention to the opportunities that can be captured concerning future innovative technologies (Zhao et al., 2022). The study, which refers to the foundations, purpose, scope, and difficulties that may be experienced in the experience acquisition process of the innovative technology of the recent period, metaverse, emphasizes information and communication technologies in connection with the metaverse, seen as the technology of the future. The interaction of human, time, and

space is handled within the framework of technology integration (Shi et al., 2023). Zalan & Barbesino (2023), who handle the reality dimension of the metaverse application through the relationship between the virtual and real environment, question the metaverse platform in terms of existence, and develop suggestions through the basic components created, carry importance with their systematic approach. The study, which contains a multi-faceted approach to today's understanding of the metaverse, stands out in terms of creating new terms by questioning the situation where the metaverse, which exists in today's conditions, can turn into multiple areas in the future (Buchholz et al., 2022).

Other studies that support the results of the work, primarily in terms of using the metaverse in all areas of life including education, by offering solutions to possible problems and promoting the use of the metaverse in technology-oriented educational environments for sustainable and quality education, based on applications like the metaverse etc., primarily benefitting from the metaverse and more specifically the use of technology and the internet, university, class, age, and gender (Parsons et al., 2019; Ning et al., 2021; Fitria et al., 2022; Hwang & Chien, 2022; Kerneža & Kordigel Aberšek, 2022; Kuloğlu et al., 2022; Lin et al., 2022; Yoleri & Anadolu, 2022; Zhang et al., 2022; Buchner & Kerres, 2023; Chua & Yu, 2023; Deng & Matthes, 2023; Gürkan & Bayer, 2023; Thohir et al., 2023), appear to be in harmony with the study results.

In this study limitations, quantitative research method, experimental scanning model and awareness levels of pre-service social studies teachers about the use of the metaverse.

5. CONCLUSIONS

According to the results of this study, which examines the awareness levels of pre-service social studies teachers about the use of the metaverse within the context of innovative technologies across various variables, it is observed that there is no significant difference in the awareness levels regarding the use of the metaverse among pre-service teachers based on 'gender, age, and class level' variables. In terms of awareness of metaverse usage, based on the variables of gender, age, and class level, which do not contain differences, it can be said that in today's world, where technological advancement is accelerating, they have similar interest levels regardless of gender, age, and the class level they are in, as evidenced by the general scoring of the scale. It is understood that there is a significant difference according to 'university, frequency of internet use, thoughts about internet/technology use in education, education on digital environment and metaverse, certificate program, and participation in the course'. According to the university, positive results in terms of technology, digitalization, lifestyle and metaverse scale are noteworthy at the level of metaverse awareness. Regarding the frequency of internet use, it is understood that the metaverse awareness level of pre-service teachers who use the internet between 11-20 hours per week is positive for digitalization and metaverse scale in general. It is seen that the metaverse use awareness level of those who consider the use of the internet/technology necessary in education is significant for the technology sub-dimension. It is noteworthy that the level of awareness of pre-service teachers about the use of metaverse, education on digital environment and metaverse, certificate program, participation in the course, technology, digitalization sub-dimensions and metaverse scale developed positively to the level of awareness of the participants

throughout the scale. In this context, it can be said that the technological equipment and facilities of the university, the time allocated to the use of the internet, technology in the education process, the necessity of using the internet, education on digital media and metaverse, certificate program, and participation in the course contribute to the development and awareness of pre-service teachers regarding the use of metaverse. In conclusion, within the necessity of keeping up with the times, putting forth the awareness related to the usage of the metaverse in a pattern correlated with different variables among social studies pre-service teachers - who prepare individuals for life - is important for the prominent implications of the study.

This study could encourage researchers interested in the topic to adapt to innovative technologies and to incorporate today's latest technologies, including metaverse, into educational environments. For sustainable, high-quality, and lasting learning in social studies classes, it is recommended to support the development of communication, social, and digital competencies through metaverse knowledge and awareness. The adoption of innovative technologies on an individual and societal level, across different educational and discussion platforms is thought to contribute to the field by discussing social, digital-based technology environments and processes, such as the metaverse, for the proliferation of high-quality and sustainable education.

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