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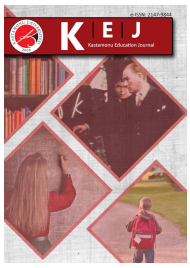

|Araştırma Makalesi / Research Article|

Trend Analysis of Augmented Reality Studies in Sports Science

Spor Bilimlerinde Artırılmış Gerçeklik Çalışmalarının Trend Analizi

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Keywords
1. Exercise
2. Futurology
3. Physical Education
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Abstract

Purpose: This study aimed to examine the studies related to augmented reality applications in sports science and discuss the results.

Design/Methodology/Approach: Articles selected for analysis were found through searching journals in the Web of Science database from 1975 to 2018 and were examined and searched using the keywords ("physical education" or "physical activity" or "sport$") and ("augmented reality").

Findings: As a result of the search, 44 articles were reached, and 11 articles were excluded from the research because they were unrelated to augmented reality applications or sports science. The publication classification form consists of "Years, Authors Number, Country, Journals, Age, Sample Size, Variables, Sample Method, Research Method, Data Collection Method and Data Analysis Method."

Highlights: A limited number of studies where sports and augmented reality technology are used and interact together. With the spread of augmented reality and similar technologies in the sports sciences, it is thought that such fields as health and education will be positively affected.

Öz

Çalışmanın amacı: Bu çalışmanın amacı, spor bilimlerinde artırılmış gerçeklik uygulamaları ile ilgili çalışmaları incelemek ve buna dayalı sonuçları tartışmaktır.

Materyal ve Yöntem: Web of Science Veritabanı kapsamındaki 1975-2018 yıllarına ait dergiler ("beden eğitimi" veya "fiziksel aktivite" veya "spor$") ve ("artırılmış gerçeklik") anahtar kelimeleri kullanılarak tarandı.

Bulgular: Tarama sonrasında 44 makaleye ulaşıldı. Artırılmış gerçeklik uygulamaları veya spor bilimleri ile ilgili olmadıkları tespit edilen 11 makale araştırma dışı bırakıldı. Yayın sınıflandırma formu "Yıl, Yazar Sayısı, Ülke, Dergi, Yaş, Örneklem, Değişkenler, Örnekleme Yöntemi, Araştırma Yöntemi, Veri Toplama Yöntemi ve Veri Analiz Yöntemi." başlıklarını içermektedir.

Önemli Vurgular: Spor bilimleri ile artırılmış gerçeklik teknolojisinin birlikte kullanıldığı ve etkileşimli olduğu çalışma sayısı sınırlıdır. Spor bilimleri alanında artırılmış gerçeklik ve benzeri teknolojilerin kullanımının yaygınlaşmasıyla birlikte, sağlık ve eğitim gibi alanların olumlu yönde etkileneceği düşünülmektedir.

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INTRODUCTION

Physical activity has been regarded as a component of a healthy lifestyle for a long time (Caspersen, Powell, & Christenson, 1985; Pate et al., 1995; World Health Organization [WHO], 2010). Physical activity involves memory (Chaddock-Heyman, Hillman, Cohen, & Kramer, 2014), selective attention, and concentration (Cadenas-Sanchez et al., 2017; Vanhelst et al., 2016), arithmetic skills (Moore, Drollette, Scudder, Bharij, & Hillman, 2014), linguistic reasoning abilities (Scudder et al., 2014), the level of well-being (Ruiz-Ariza, Torre-Cruz, Redecillas-Peiró, & Martínez-López, 2015), the skill of self-control ability (Donnelly & Lambourne, 2011), socialization (Kato et al., 2017; Tateno, Skokauskas, Kato, Teo, & Guerrero, 2016), and health-related quality of life parameters (Azevedo, Watson, Haighton, & Adams, 2014).

Physical activities affect health positively, so activities and planning for increasing the level of physical activity of individuals will contribute to improving public health (Althoff, White, & Horvitz, 2016; Haskell et al., 2007; Sparling, Owen, Lambert, & Haskell, 2000; WHO, 2010). Unfortunately, although many studies aim to increase physical activity, there is no globally effective method yet (Hallal et al., 2012; Marcus, Nigg, Riebe, & Forsyth, 2000; Sallis, Bauman & Pratt, 1998; WHO, 2010).

Physical inactivity is second on the list of preventable causes of death worldwide after smoking (WHO, 2010). Regular physical activities can prevent or reduce the effects of obesity, hypertension, and cardiovascular disease and provide opportunities for recreational activities (Huang & Reynoso, 2018). Obese children may experience health problems such as hypertension, diabetes, asthma, sleep disorders, liver disease, and psychological problems such as low self-esteem (WHO, 2014). Adding physical education to school curricula for all children and ensuring that children are active through sports by providing them access to adequate and safe facilities are recommendations for combating obesity in children and adolescents (WHO, 2018). Various technologies that use sensing and visualization encourage children and young adults to engage in physical activity (Tong, Gromala, Shaw, & Choo, 2016).

Interest in using information technologies for health services is increasing daily (Garza, 2016). The number of health and lifestyle management systems using wearable technologies and mobile applications is increasing (Yumak & Pu, 2013). Most technologies encourage behavioural changes to be healthy by combining gaming or competition principles (Marquet, Alberico, & Hipp, 2018). It would be appropriate to direct individuals with health problems based on exercise deficiencies to games that they can play with pleasure and, at the same time, increase their physical activity levels (Kim, Lee, Cho, Kim, & Hwang, 2018).

As an augmented reality application, wearable technologies provide extra information or sense to users. Wearable technology can collect data via sensors from the user environment and give a sense of absent material or information via reflectors (Erbas & Demirer, 2014). Augmented reality applications combine physical and virtual worlds into a single interface, allowing users to explore their physical environment, replacing still games with active games (Serino, Cordrey, Mclaughlin, & Milanaik, 2016). In other words, augmented reality creates an environment with virtual and natural materials for users to experience virtual materials without a permanent effect on the real environment (Erbas & Demirer, 2014). In conclusion, it can be said that augmented reality applications, which support the strategy of promoting physical activity among young people, enable participants to be physically active or exercise to play the game via virtual materials or information (Anderson, Steele, Oneill, & Harden, 2017; Clark & Clark, 2016).

Combining augmented reality technology with educational content creates a new type of automated application that enhances the effectiveness and attractiveness of teaching and learning for students in real-life scenarios (Kesim & Ozarslan, 2012). This new combination of educational technology has been used in educational environments for more than twenty years (Bacca, Baldiris, Fabregat, Graf, & Kinshuk, 2014; Chen, Liu, Cheng, & Huang, 2017). Furthermore, trend analysis studies on augmented reality applications show that researchers have used augmented reality in different education branches, including physical and sports education (Arici, Yildirim, Caliklar and Yilmaz, 2019; Bacca et al., 2014). İmamoğlu and İmamoğlu (2018) examined three-dimensional human modelling software in their research; the processes of human modelling, exposure, movement and their output are explained, and it is suggested that these will contribute to the fields of augmented reality, biomechanical studies, motion analysis, sports anatomy and physiology. A sample educational software (mobile application), including a skeletal-muscular system and warm-up exercises, has been developed with augmented reality technology, thus providing a detailed analysis opportunity with a three-dimensional representation of movements or objects without a time limit (İmamoğlu, 2020). Therefore, this mobile application can be an example of the use of augmented reality technology in sports education.

The importance of augmented reality applications in sports science is becoming clearer daily. Therefore, this study examines the studies related to augmented reality applications in sports science and discusses the results. The research questions of the study are listed below:

1. What is the distribution of the studies on augmented reality applications in sports science by years?
2. What is the distribution of studies on augmented reality applications in sports science according to the number of authors?
3. What is the distribution of studies on augmented reality applications in sports science by country?

4. What is the distribution of the studies about augmented reality applications in sports science according to the journals?
5. What is the distribution of the samples in the studies about the augmented reality applications in sports science according to the average age?
6. What is the distribution of the samples in the studies about augmented reality applications in sports science according to their size?
7. Which variables were used in studies related to augmented reality applications in sports science?
8. What sampling methods have been used in studies on augmented reality applications in sports science?
9. What are the research methods used in studies about augmented reality applications in sports science?
10. What data collection methods have been used in studies on augmented reality applications in sports science?
11. What are the data analysis methods used in studies about augmented reality applications in sports science?

METHOD

The content analysis method provides a systematic examination of the content of documents in order to classify and interpret the essential elements (Tavsancıl & Aslan, 2001). The content analysis method obtained detailed information about the selected topics and trends. In order to explain the data collected within the scope of the research, content analysis was applied from qualitative data analysis methods.

Within the scope of the research, journals in the Web of Science database from 1975 to 2018 were examined and searched using the keywords "physical education" or "physical activity", or "sport", and "augmented reality." As a result of the search, 44 articles were reached, and 11 articles were excluded from the research because they were unrelated to augmented reality applications or sports science. Seven articles in which augmented reality expression is used only in the text and focus on virtual reality, motion capture, algorithm analysis, and image-processing techniques are excluded. In addition, four articles contain augmented reality technology but are not directly related to sports and science. These articles compare the effects of two different augmented reality methods, examining the effects of augmented reality in environmental planning, application examples of augmented reality in archaeology, and using augmented reality in object scanning and modelling. These four articles are excluded from the review as they are unrelated to sports science. After removing articles unrelated to the research topic, 33 were included in the publication classification form developed by the researchers based on the "The Educational Technology Publication Classification Form" (Goktas et al., 2012). The publication classification form consists of "Years, Authors Number, Country, Journals, Age, Sample Size, Variables, Sample Method, Research Method, Data Collection Method and Data Analysis Method.". Thirty-three articles, which have been reviewed, have been listed in the attached table at the end of the article (Appendix 1).

FINDINGS

In this section, information about the year of publication of the studies related to augmented reality applications in sports science, distribution according to journals, distribution according to author numbers, distribution according to countries, research methods used, sample sizes, sampling methods, age averages of samples, data collection methods used, data analysis methods used.

The distribution of studies on augmented reality applications in sports science by years, and number of authors have been examined and given in Table 1.

Table 1. Distribution of studies by years, number of authors

Years	f	%	Number of authors	f	%
2018	10	30,3	One Author	5	15,15
2017	12	36,36	Two Authors	1	3,03
2016	2	6,06	Three Authors	8	24,24
2015	4	12,12	Four Authors	6	18,18
2014	1	3,03	Five Authors	5	15,15
2013	1	3,03	Six Authors	4	12,12
2012	2	6,06	Seven Authors	3	9,09
2009	1	3,03	Nine Authors	1	3,03
Total	33	100	Total	33	100

When the distribution of studies by year is examined, it is understood that the studies conducted in 2017 (f=12) and 2018 (f=10) are more than the studies conducted in previous years. The first study with research criteria was published in 2009 (f=1). A total of 11 studies have been published by 2017 and this number is insufficient. In 2017 and 2018, there was a remarkable increase in the number of publications.

When the studies were examined according to the number of authors, it was found that the number of authors varied between one and nine, but there were no eight authors. It is understood that the articles with three authors (f=8) were more than the other

articles. There is only one article with nine authors. Apart from these, the distribution of the number of articles is similar according to the number of authors.

The distribution of studies on augmented reality applications in countries and journals given in Table 2.

Table 2. Distribution of studies by countries and journals

Countries	f	%	Journals	f	%
USA	35	26,32	Games for Health Journal	3	9,09
Spain	14	10,53	Computers & Education	2	6,06
Germany	13	9,77	Computers in Human Behavior	2	6,06
Taiwan	12	9,02	JMIR Serious Games	2	6,06
Republic of Korea	11	8,27	Archives of Budo	1	3,03
Pakistan	6	4,51	Apunts Educación Física Y Deportes	1	3,03
Poland	6	4,51	Biomedical Engineering: Applications, Basis, and Communications	1	3,03
Tunisia	6	4,51	Cardiology in The Young	1	3,03
China	5	3,76	Etri Journal	1	3,03
Korea	5	3,76	IEEE/ACM Transactions on Audio, Speech and Language Processing (TASLP)	1	3,03
Brazil	4	3,01	International Journal of Advanced Computer Science and Applications	1	3,03
United Kingdom	4	3,01	International Journal of Health Geographic	1	3,03
Australia	3	2,26	International Journal of Sports Marketing and Sponsorship	1	3,03
Japan	3	2,26	JMIR Mhealth and Uhealth	1	3,03
Netherlands	2	1,50	Journal of Advanced Mechanical Design, Systems, and Manufacturing	1	3,03
Singapore	2	1,50	Journal of The American Heart Association	1	3,03
Austria	1	0,75	Journal of Human Sport and Exercise	1	3,03
Israel	1	0,75	Journal of Medical Internet Research	1	3,03
Total	133	100	Journal of Physical Therapy Science	1	3,03
			KSII Transactions on Internet & Information Systems	1	3,03
			Microsystem Technologies	1	3,03
			Mobile Networks and Applications	1	3,03
			Multimedia Tools and Applications	1	3,03
			Pattern Analysis and Applications	1	3,03
			Pediatric Exercise Science	1	3,03
			Public Health Research & Practice	1	3,03
			Science Advances	1	3,03
			Sustainability	1	3,03
			Total	33	100

When the distribution of the authors country is examined, it has been seen that the USA (f=35) is in the first place with a rate of 26.32%. The distribution percentages of authors by country are Spain (f=14) 10.53%, Germany (f=13) 9.77%, Taiwan (f=12) 9.02% and Republic of Korea (f=11) 8.27%. The distribution of studies, according to journals, shows a homogeneous structure.

The distribution of the samples according to the average age, sample size and variables are given in Table 3.

Table 3. Distribution of samples according to the average age, sample size and variables

Ages (years)	f	%	Sample size (person)	f	%	Variables	f	%
11-15	1	3,03	0-100	5	15,15	Physical Activity	13	24,07
16-20	3	9,09	101-200	5	15,15	Behaviors	7	12,96
21-25	3	9,09	201-300	3	9,09	Learning Outcomes	5	9,26
26-30	2	6,06	301-400	1	3,03	Usability	3	5,55
31-35	1	3,03	401-500	1	3,03	Demographic Variables	2	3,70
36+	1	3,03	501+	4	12,12	Enjoyment	2	3,70
Unspecified	22	66,67	Unspecified	14	42,42	Motivation	2	3,70
Total	33	100	Total	33	100	Others	20	37,03
						Total	54	100

When the average age of the samples in the studies is examined, it is seen that the trend is in the 16-20 (f=3) and 21-25 (f=3) age groups. The average age was not reported in 66.67% of the studies. The sample sizes in the study were divided into 100-unit categories and evaluated. When the sample sizes in the studies are examined, the first place with 15.15% is the researches in

which 0-100 (f=5) and 101-200 (f=5) individuals participate. The researchers with 501 and more individuals are in third place with 12.12%. Fifty-four variables, which have been grouped in nine categories, have been examined in studies. The most studied variables have been grouped under the Physical Activity (f=13) category, which covers variables related to physical activity. The next biggest studies category covers behavioral variables as named behavior (f=7). The next group usability (f=3) follows by demographic variables (f=2), enjoyment (f=2) and motivation (f=2). The biggest number of variables has been grouped as others (f=20), covering variables used just once in studies.

Sampling methods, and research methods are given in Table 4.

Table 4. Sampling methods, and research methods

Sampling methods	f	%	Research methods	f	%
Purposeful	10	30,30	Development	12	36,36
Easy Accessible	7	21,21	Predictive	9	27,27
Convenient	1	3,03	Weak Experimental	5	15,15
Voluntary	1	3,03	Correlational	3	9,09
Unspecified	14	42,42	Descriptive	2	6,06
Total	33	100	Literature Review	2	6,06
			Total	33	100

Four different sampling methods were used in the studies. When the sampling methods used in the studies are examined, purposeful (f=10) takes first place with 30.30%. Voluntary (f=1) and Convenient (f=1) sampling methods were used in only one study with 3.03%. In 42.42% of the studies, the sampling methods was not specified.

When Table 4 is examined, it is seen that six different research methods are used in the studies. When the research methods used in the studies are examined, the development method (f=12) is ranked first with 36.36%, and the predictive method (f=9) is ranked second with 27.27%. On the other hand, descriptive methods (f=2) and literature review (f=2) 6.06% of the studies have been the least preferred methods.

Data collection methods, and data analysis methods are given in Table 5.

Table 5. Data collection methods, and data analysis methods

Data collection methods	f	%	Data analysis methods	f	%
Questionnaire	10	33,33	Descriptive Analysis	13	21,31
Survey	4	13,33	Chi-Square	10	16,39
Observation	2	6,67	Anova	6	9,84
Physical Activity Monitor	2	6,67	T-Test	5	8,20
App Logs	1	3,33	Ancova	3	4,92
Electronic Medical Record	1	3,33	Correlations	3	4,92
Logs	1	3,33	Regression	3	4,92
Mobile Phone Data	1	3,33	Wilcoxon	3	4,92
Muscle Performance	1	3,33	Mann–Whitney U Tests	2	3,28
Iphone Health App	1	3,33	Structural Equation Modeling	2	3,28
Pokemon Go App Logs	1	3,33	Bonferroni	1	1,64
Postings	1	3,33	Fisher's Exact Test	1	1,64
System Logs	1	3,33	Linear Regression Model	1	1,64
Test	1	3,33	Manova	1	1,64
2x Survey	1	3,33	Multilevel Modeling Analysis	1	1,64
4X Test	1	3,33	Multiple Regression	1	1,64
Total	30	100	Robustness Test	1	1,64
			Sensitivity Analysis	1	1,64
			Spearman's Correlation	1	1,64
			Tukey	1	1,64
			Z-Test	1	1,64
			Total	61	100

Sixteen different data collection methods were used in the studies. However, when the data collection methods used in the studies are examined, it is seen that the questionnaire (f=10, 33.33%) is used the most. Therefore, it is thought that using the Questionnaire method more than other methods provides ease of data collection.

Twenty-one different analysis methods were used in the studies. Descriptive analysis (f=13, 21.31%) and Chi-square (f=10, 16.39%) take the first place.

RESULTS AND DISCUSSION

This study examines the studies on augmented reality applications in sports science and shows that the trend toward this subject has increased in recent years. Furthermore, the increase in the use of augmented reality in sports science generally coincides with the increase in the use of augmented reality applications in education.

Different field surveys show that the trend toward the use of augmented reality in education, which began at the end of the 2000s, has continued to increase for more than a decade as in augmented reality studies in sports education (Akçayır & Akçayır, 2017; Altinpulluk, 2019; Özdemir, 2017). According to the results of this study, although augmented reality applications in sports science have been studied for many years, it is clear that there has been a tendency to work more on these issues in recent years.

When the augmented reality studies in sports science were evaluated according to the number of authors, it was found that the studies with three authors (f=8) were the most. Three authors were followed by four authors (f=6), one and five authors (f=5), six authors (f=4), seven authors (f=3), and two and nine authors (f=1).

According to the content analysis process, 133 authors in the 33 studies examined, 26.32 per cent of the studies were carried out in the USA, and this was the most significant number of authors. Spain follows the USA with 10.53 per cent, Germany with 9.77 per cent, Taiwan with 9.02 per cent and South Korea with 8.27 per cent. The authors of the studies are from 18 different countries. The trend analysis results of augmented reality use in education in the decade between 2006 and 2016, the most studies were published by the authors in institutions in Taiwan (f=23) in the ten years. Taiwan is followed by the USA (f=8), Spain (f=3) and South Korea (f=3) (Altinpulluk, 2019). One study examined 55 studies published in SSCI index journals between 2011 and 2016; the most publications were published by Taiwanese (f=22) authors, followed by Spanish (f=12) and USA (f=9) authors (Chen et al., 2017).

According to the journals, the distribution of the studies examined in this study shows a homogeneous structure. Among the reasons why the distribution is in this way, no journal accepts only studies in the field of augmented reality. Instead, journals generally accept technology, education, and sports studies. As a result, 28 different journals have published studies.

When the participants in the study were examined according to their ages, it was observed that the participants in the 16-20 and 21-25 age groups (f=3) were the largest group, followed by the 26-30 (f=2) age groups and followed by 11-15, 31-35 and 36+ age groups in three studies. Among the reasons why these age groups are mainly involved in the studies is the use of technology in augmented reality. The applications of augmented reality technology in health will be practical, especially in older individuals. The age range of technology use is increasing daily, so it would be beneficial to conduct studies involving augmented reality applications for older individuals.

After the examination, it was seen that the largest group was the sample size in the range of 0-100 and 101-200 (f=5) participants. These groups are followed by the sample sizes of 501+ (f=4), 201-300 (f=3), 301-400 and 401-500 (f=1). Considering the prevalence of technology use, it can be argued that sample sizes are not sufficient. The sample size is not specified in 42.42% of the studies. The reasons for not specifying the sample size may show the difference between the methods used in the studies. When we compare the results according to the sample size, it is seen that the sample sizes of the studies examining the use of augmented reality in education are dealt with at different ranges. As a result of 25 experimental studies published in SSCI index journals between 2011 and 2016 and identified ten studies in the 30-59 sample size, seven with greater than 100 samples, six studies in the 66-99 sample size, and two studies in the 0-29 sample size (Özdemir, 2017). In the studies, the most frequently used sample size generally was found to be 30-200 (Bacca et al., 2014; Chen et al., 2017). In addition, sample size information was not included in 14 of 33 studies.

It has been seen that fifty-four variables were examined in 33 journal articles about using augmented reality in sports science. Variables have been listed: physical activity, behaviours, learning outcomes, usability, demographic variables, enjoyment, motivation and others. The third-largest variable group, learning outcomes, is organized according to learning outcomes, including verbal knowledge, intellectual skills, cognitive strategies, attitudes and motor skills (Gagné & Driscoll, 1988). Learning outcomes are the most studied variables in empirical studies with augmented reality (Özdemir, 2017). Also, other educational researchers found that learning outcomes are the most mentioned variables as part of the advantages of augmented reality in education (Akçayır & Akçayır, 2017; Altinpulluk, 2019; Bacca et al., 2014). Besides learning outcomes, usability, demographic variables, enjoyment and motivation are other standard variables between sports science and education in augmented reality studies.

When the studies using augmented reality in sports science are examined, it is seen that the most commonly used sampling method is purposeful (f=10) sampling. This sampling method is followed by the easily accessible (f=7), and it is also seen that voluntary and Convenient sampling methods are used in one study.

When the research methods used in the studies are examined, it is seen that the development (f=12) method is the most used research method. After the studies using the predictive (f=9) method, weak exp (f=5) and correlation (f=3) method, which is one of the most preferred research methods, were used. In addition, descriptive (f=2) and review (f=2) studies were determined in the literature. Finally, it is seen that the mixed method is the most commonly used research method in studies examining the use of augmented reality in education and in studies dealing with different time intervals (Altinpulluk, 2019; Bacca et al., 2014; Chen et

al., 2017). It is thought that the predominantly use of the development method is since augmented reality technology is a new technology and is in the process of development. The lack of literature review can also be explained by the fact that augmented reality is a new area and does not contain enough resources to investigate.

When the data collection tools in the studies are examined, it is seen that the questionnaire (f=10) is the most preferred method. In addition, survey (f=4), observation (f=2) and physical activity monitoring (f=2) are other standard data collection tools. When these results and the studies of augmented reality use in education are examined, the questionnaire is the most commonly used data collection tool (Altinpulluk, 2019; Bacca et al., 2014). However, in a study conducted between 2011 and 2016, tests were the most commonly used data collection tool (Chen et al., 2017).

When the augmented reality studies are examined in sports science; it is seen that the most commonly used data analysis method is Descriptive analysis (f=13). Descriptive analysis was followed by Chi-square (f=10), Anova (f=6), t-test (f=5), correlations, Wilcoxon, Ancova and Regression (f=3).

The topics, contents, and results of the articles reviewed are given below:

It is seen that nine articles have developed software/hardware products. The three studies identified one of the wearable technologies derived from augmented reality; It is recommended that feedback and other interactions from the digital glove, magnetic sensitive electronic skin and headphones will be helpful in the augmented reality and Sports area. In the other six articles, augmented reality technology is used directly in refined products. These products provide users with the help of objects defined by image processing. It can provide users with a wide range of content, such as advertising, distance measurements, digital objects drawn on physical media, athletes, and competitions. Some of the studies on the use of augmented reality in education between 2011 and 2016 did not use research methods. These studies revealed that system design was developed to use augmented reality in education (Chen et al., 2017).

Pokemon Go game; is based on the collection, development, and inter-competitive fighting of pokemon displayed around the real world with the help of augmented reality technology. Of the 33 articles examined, 17 were related to the Pokemon Go game. It is stated that Pokemon Go increases physical activity, positively affects social relationships, and promotes the discovery of the environment. In some cases, the need to have a high level of self-determination to play sports is not necessary for Pokemon Go. In these cases, it increases activity level, reducing the risk of developing cardiovascular diseases. In addition, individuals had higher levels of physical activity, were more socialized, and had a better mood on the days of playing Pokemon Go (Marquet, Alberico, Adlakha, & Hipp, 2017).

Six articles have an impact on individuals regardless of Pokemon GO. In these studies, augmented reality applications improve spatial orientation and estimation capacity, positively affect academic achievement and education by helping the instructor and learning, improve athletes' strength and technique, and increase patient cooperation.

In one of the articles, the relationship between real sports and their adaptations digitized using technologies such as augmented reality was analyzed using concrete examples. This article demonstrates the interdependence between sports and technology and states that digitalization directly affects communication about sports and sports.

CONCLUSION

In this research, the studies about augmented reality applications in sports science with the help of various variables are examined, and the current situation is revealed. A limited number of studies show that sports and augmented reality technology are used and interact together. Therefore, it will be beneficial to increase studies related to technology use in the sports sciences field. With the spread of augmented reality and similar technologies in the sports sciences, it is thought that such fields as health and education will be positively affected.

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Statements of publication ethics

We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

Researchers' contribution rate

The study was conducted and reported with equal collaboration of the researchers.

Ethics Committee Approval Information

As this research is a Trend Analysis study, an "ethics committee report" was not presented.

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Appendix 1. List of Reviewed Journal Articles (In Alphabetical Order)

N	Selected Articles
1.	Barbero, E. M., Carpenter, D. M., Maier, J., & Tseng, D. S. (2018). Healthcare encounters for Pokémon Go: Risks and benefits of playing. Games for health journal, 7(3), 157-163.
2.	Barkley, J. E., Lepp, A., & Glickman, E. L. (2017). "Pokémon Go!" may promote walking, discourage sedentary behavior in college students. Games for health journal, 6(3), 165-170.
3.	Beach, C., Billstrom, G., Anderson Steeves, E. T., Flynn, J. I., & Steeves, J. A. (2019). The physical activity patterns of greenway users playing Pokémon Go: A natural experiment. Games for health journal, 8(1), 7-14.
4.	Bermúdez, G. S. C., Karnaushenko, D. D., Karnaushenko, D., Lebanov, A., Bischoff, L., Kaltenbrunner, M., ... & Makarov, D. (2018). Magnetosensitive e-skins with directional perception for augmented reality. Science Advances, 4(1), eaao2623.
5.	Cheikhrouhu, E., Jabri, I., Lakhoua, M. N., Mlouhi, Y., Battikh, T., & Maalej, L. (2015). Application of Image Processing Techniques for TV Broadcasting of Sporting Events. International Journal of Advanced Computer Science and Applications, 6(6), 138-148.
6.	Delabrida, S., D'Angelo, T., Oliveira, R. A. R., & Loureiro, A. A. F. (2016). Wearable hud for ecological field research applications. Mobile Networks and Applications, 21(4), 677-687.
7.	Escaravajal-Rodríguez, J. C. (2018). Pokémon GO and its Influence on Spanish Facebook Users. Apunts: Educació Física i Esports, (133).
8.	Freeman, B., Chau, J., & Mihrshahi, S. (2017). Why the public health sector couldn't create Pokémon Go. Public Health Res Pract, 27(3).
9.	Gómez-García, M., Trujillo-Torres, J. M., Aznar-Díaz, I., & Cáceres-Reche, M. P. (2018). Augment reality and virtual reality for the improvement of spatial competences in Physical Education. Journal of Human Sport and Exercise, 13(2proc), S189-S198.
10.	Hebbel-Seeger, A. (2012). The relationship between real sports and digital adaptation in e-sport gaming. International Journal of Sports Marketing and Sponsorship, 13 (2), 43-54.
11.	Hsiao, K. F. (2013). Using augmented reality for students health-case of combining educational learning with standard fitness. Multimedia tools and applications, 64(2), 407-421.
12.	Kao, C. H., Chen, C. C., Jhu, W. Y., Tsai, Y. T., Chen, S. H., Hsu, C. M., & Chen, C. Y. (2018). Novel digital glove design for virtual reality applications. Microsystem Technologies, 24(10), 4247-4266.
13.	Kim, H., Lee, H. J., Cho, H., Kim, E., & Hwang, J. (2018). Replacing self-efficacy in physical activity: Unconscious intervention of the AR game, Pokémon GO. Sustainability, 10(6), 1971.
14.	Kim, S., Choi, B., Jeong, Y., Hong, J., & Kim, K. (2014). Novel hybrid content synchronization scheme for augmented broadcasting services. ETRI Journal, 36(5).
15.	Koh, H. E., Oh, J., & Mackert, M. (2017). Predictors of playing augmented reality mobile games while walking based on the theory of planned behavior: web-based survey. JMIR mHealth and uHealth, 5(12), e8470.
16.	Krittanawong, C., Aydar, M., & Kitai, T. (2017). Pokémon Go: digital health interventions to reduce cardiovascular risk. Cardiology in the Young, 27(8).
17.	Lee, R. G., Tien, S. C., Chen, C. C., & Chen, Y. Y. (2012). Development of An Augmented Reality-Oriented Game System for Stroke Rehabilitation Assessment. Biomedical Engineering: Applications, Basis and Communications, 24(05), 435-445.
18.	Ma, B. D., Ng, S. L., Schwanen, T., Zacharias, J., Zhou, M., Kawachi, I., & Sun, G. (2018). Pokémon GO and physical activity in Asia: multilevel study. Journal of medical Internet research, 20(6), e9670.
19.	Mahmood, Z., Ali, T., Khattak, S., Hasan, L., & Khan, S. U. (2015). Automatic player detection and identification for sports entertainment applications. Pattern Analysis and Applications, 18(4), 971-982.
20.	Mahmood, Z., Ali, T., Muhammad, N., Bibi, N., Shahzad, I., & Azmat, S. (2017). EAR: Enhanced augmented reality system for sports entertainment applications. KSII Transactions on Internet and Information Systems (TIIS), 11(12), 6069-6091.
21.	Marquet, O., Alberico, C., & Hipp, A. J. (2018). Pokémon GO and physical activity among college students. A study using Ecological Momentary Assessment. Computers in Human Behavior, 81, 215-222.
22.	Marquet, O., Alberico, C., Adlakha, D., & Hipp, J. A. (2017). Examining motivations to play Pokémon GO and their influence on perceived outcomes and physical activity. JMIR serious games, 5(4), e8048.
23.	Moon, J., Koo, D., Kim, K., Shin, I., Kim, H., & Kim, J. (2015). Effect of ski simulator training on kinematic and muscle activation of the lower extremities. Journal of Physical Therapy Science, 27(8), 2629-2632.
24.	Muñoz-Cristóbal, J. A., Gallego-Lema, V., Arribas-Cubero, H. F., Martínez-Monés, A., & Asensio-Pérez, J. I. (2017). Using virtual learning environments in bricolage mode for orchestrating learning situations across physical and virtual spaces. Computers & Education, 109, 233-252.
25.	Nemet, D. (2017). Childhood obesity, physical activity, and exercise. Pediatric exercise science, 29(1), 60-62.
26.	Osaki, A., Taniguchi, H., & Miwa, Y. (2009). Collaborative aerial-drawing system for supporting co-creative communication. Journal of Advanced Mechanical Design, Systems, and Manufacturing, 3(1), 93-104.
27.	Ranjan, R., & Gan, W. S. (2015). Natural listening over headphones in augmented reality using adaptive filtering techniques. IEEE/ACM Transactions on Audio, Speech, and Language Processing, 23(11), 1988-2002.
28.	Rasche, P., Schlomann, A., & Mertens, A. (2017). Who is still playing Pokémon Go? A web-based survey. JMIR serious games, 5(2), e7197.
29.	Rauschnabel, P. A., Rossmann, A., & tom Dieck, M. C. (2017). An adoption framework for mobile augmented reality games: The case of Pokémon Go. Computers in Human Behavior, 76, 276-286.
30.	Ruiz-Ariza, A., Casuso, R. A., Suarez-Manzano, S., & Martínez-López, E. J. (2018). Effect of augmented reality game Pokémon GO on cognitive performance and emotional intelligence in adolescent young. Computers & Education, 116, 49-63.
31.	Witkowski, K., Sobecki, J., Maslinski, J., Cieslinski, W., Rokita, A., & Kalina, R. M. (2016). The use of augmented-reality technology to improve judo techniques. Premises, assumptions, methodology, research tools, preliminary scenarios-the first stage of the study. Archives of Budo, 12, 355-367.
32.	Wong, F. Y. (2017). Influence of Pokémon Go on physical activity levels of university players: a cross-sectional study. International journal of health geographics, 16(1), 1-12.
33.	Xian, Y., Xu, H., Xu, H., Liang, L., Hernandez, A. F., Wang, T. Y., & Peterson, E. D. (2017). An initial evaluation of the impact of Pokémon GO on physical activity. Journal of the American Heart Association, 6(5), e005341.

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| Research Article / Araştırma Makalesi |

Examining Gifted Students' Perceptions about COVID-19 and Distance Education Through Metaphors

Özel Yetenekli Öğrencilerin COVİD-19 ve Uzaktan Eğitim Hakkındaki Algılarının Metaforlar Aracılığıyla İncelenmesi

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Keywords
1. COVID 19
2.Distance learning
3.Gifted Students
4.Metaphor
5.Phenomenology

Anahtar Kelimeler
1.COVID 19
2.Fenemonoloji
3.Metafor
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Abstract

Purpose: Places where people could contact the coronavirus, have been closed, and schools and universities are also included in this scope. In order to ensure the continuity of education, distance education practices were started immediately, and children were expected to adapt to this process in a short time in the home environment. Computer and television-based education at all levels were brought to the fore, and the educational needs of children were tried to be met. However, in this process, the issue of unique and free programs implemented at home for gifted children who need personalized learning and teaching methods rather than standardized education has not been on the agenda. In this context, the perceptions of gifted students aged 5-12 about COVID-19 and distance education metaphors were analyzed with content analysis within the scope of qualitative phenomenology study, and the effect of this process on children was tried to be revealed.

Design/Methodology/Approach: This study was carried out within the scope of phenomenology to evaluate the opinions of gifted primary and secondary school students on COVID-19 and distance education metaphors. The study group of the research consists of 84 primary and secondary school gifted students between the ages of 5-12 who attend Istanbul Aydin Children's University in the spring semester of the 2019-2020 academic year.

Findings: Gifted students who were in a substantial period in terms of development answered the questions according to their perception of the questions, and it was seen that they mostly gave thought-value responses. The study was analyzed in five categories for how students perceive questions. It is seen that students perceive both concepts as behaviour, thought, emotion, knowledge and sensory and respond accordingly.

Highlights: The use of metaphors can provide easy-to-understand explanations for threatening and unexpected events and guide children's behaviour. When the relevant literature is examined, it is seen that there are no studies involving gifted students at the K-12 level to understand the metaphorical perceptions of distance education and COVID-19. For this reason, the research will be a source of relevant literature.

Öz

Çalışmanın amacı: Koronovirüsle beraber insanların temas halinde olabileceği yerler kapatılmış, okullar ve üniversiteler de bu kapsama dâhil edilmiştir. Eğitimin devamlılığını sağlamak üzere, uzaktan eğitim uygulamaları ivedilikle başlatılmış ve kısa sürede çocukların ev ortamında bu sürece adapte olmaları beklenmiştir. Her kademede bilgisayar ve televizyon merkezli eğitim ön plana çıkarılarak, çocukların eğitim ihtiyaçları giderilmeye çalışılmıştır. Ne var ki bu süreçte standardize edilmiş eğitimden ziyade kişiye özel öğrenim ve öğretim yollarına ihtiyaç duyan üstün potansiyelli çocuklar için evde uygulanan özgün ve özgür programlar konusu gündemde pek yer bulamamıştır. Bu kapsamda, 5-12 yaş arası özel yetenekli öğrencilerin COVİD-19 ve uzaktan eğitim metaforları hakkındaki algıları nitel olgu bilim (fenomenoloji) çalışması kapsamında içerik analiziyle incelenmiş ve bu sürecin çocuklar üzerindeki etkisi ortaya konulmaya çalışılmıştır.

Materyal ve Yöntem: Bu araştırma, özel yetenekli ilkokul ve ortaokul öğrencilerinin COVİD-19 ve uzaktan eğitim metaforlarına ilişkin görüşlerini değerlendirmek amacıyla fenomenoloji kapsamında gerçekleştirilmiştir. Araştırmanın çalışma grubunu 2019-2020 eğitim-öğretim yılı bahar döneminde İstanbul Aydın Çocuk Üniversitesi'ne devam eden 5-12 yaş arası 84 ilkokul ve ortaokul özel yetenekli öğrenci oluşturmaktadır.

Bulgular: Gelişimsel açıdan somut dönemde olan özel yetenekli çocuklar sorulara soruları algılayış biçimlerine göre cevaplarda bulunmuştur. Çalışma öğrencilerin soruları algılayış biçimi teması altında beş kategoriye ayrılarak çözümlenmiştir. Öğrencilerin her iki kavramı da davranış, düşünce, duygu, bilgi ve duyusal olarak algıladıkları ve ona göre cevap verdikleri görülmektedir.

Önemli Vurgular: Metaforların kullanımı, tehdit edici ve beklenmedik olaylar için kolay anlaşılır açıklamalar sağlayabilir ve çocukların davranışlarına rehberlik edebilir. İlgili literatür incelendiğinde K-12 düzeyindeki üstün yetenekli öğrencilerin uzaktan eğitim ve COVİD-19'a yönelik metaforik algılarını anlamaya yönelik çalışmalara yer verilmediği görülmektedir. Bu nedenle araştırma ilgili literature kaynak olacaktır.

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INTRODUCTION

The first death from the coronavirus occurred in Wuhan on January 9, 2020. Corona (COVID-19), which literally became an epidemic about three months after the first death, caused thousands of deaths around the world, and affected and continues to affect social and economic life. The education of 1.6 billion students, which corresponds to approximately half of the student population of all education levels, has been interrupted in the World due to the closure of educational institutions and the suspension of face-to-face education (UNESCO, 2020; UNICEF, 2020). In this period, children who have to receive their education from a distance try to develop naive theories about what is happening in the outside world by combining different sources of information. The media, the verbal messages (information, explanations) given by other adults and the emotional expressions of their parents greatly influence even children whose language comprehension skills are not fully developed (Bion, Benavides & Nespor, 2011). In particular, according to their structure, stress, self-perceptions, social development, and the dynamics of their own well-being can be different due to differences in perception of gifted students, who are different and more sensitive than us (Ogurlu & Yaman, 2010).

Today, children are surrounded by adults who wear masks and talk to each other about the infection, so they can easily perceive the problems experienced when they observe this situation. In this troubled process, children had to change some of their habits; for example, they adhere to strict hygiene standards and stay at home, reducing physical and social exchanges with their peers. Children may have lost an important person in their family for the first time. Unfortunately, currently, many parents also struggle to find verified and reliable information about their and their children's health safety during the pandemic (Shadmi et al., 2020).

Uncertainties can further fuel both adults' and children's fears and feelings of vulnerability. In this context, while the health policies adopted by different countries can help control and mitigate the spread of infection, they also represent severe restrictions on social relationships and habits for most families (Palamenghi, Barello, Boccia & Graffigna, 2020). Under constraints, especially gifted children's emotional development faced negative situations in many respects, and their parents' sought solutions that could improve this situation. Metaphors are one of the ways to reveal the emotions and social-psychological effects of children in the face of uncertain concepts such as COVID-19 and distance education. Metaphor is a good rhetorical tool that satisfies the need to make the unknown familiar, as it associates the new with an image of a familiar situation. In fact, metaphors are conceptual frameworks for interpreting reality (Lakoff & Johnson, 2015). Given that this perception of reality influences our responses to the pandemic, the priority of one framework over another is an important issue.

The use of metaphors can provide easy-to-understand explanations for threatening and unexpected events and can guide children's behavior (Sabucedo, Alzate & Hur, 2020). The use of metaphors can also be thought of as an interpretive tool. Thus, it allows the formation of a new perspective to be used to understand a complex situation and an analysis in the organizational context. The definition and coordination of new formations and the concrete expression of the new order explain the use of metaphors (Pipen, 2001).

When the relevant literature is examined, it is seen that there are no studies involving gifted students at the K-12 level to understand the metaphorical perceptions of distance education and COVID-19.

Purpose

The purpose of this research was to reveal the perceptions of gifted students attending primary and secondary school about distance education and COVID-19 through metaphors.

In this context, answers to the following research questions were sought:

1. What are the positive and negative metaphors that gifted students at the K-12 level attribute to distance education?
2. What are the positive and negative metaphors that gifted students at the K-12 level attribute to COVID-19?

METHOD

This study was carried out within the scope of phenomenology to evaluate the opinions of gifted primary and secondary school students on COVID-19 and distance education metaphors. Phenomenology is the model of this study. It is one of the qualitative research methods that examines the transformation of theoretical concepts in consciousness (Husserl, 1970), aims to gain an in-depth understanding of the meaning or nature of our experiences (Van Manen, 1990), and examines the phenomena that we name with unchanging structure or reality (Creswell, Hanson, Clark Plano & Morales, 2007).

Study Group

The study group of the research consists of 84 primary and secondary school gifted students between the ages of 5-12 who attend Istanbul Aydin Children's University in the spring semester of the 2019-2020 academic year. According to Table 1, 24 of the students participating in the study were girls and 60 were boys.

Table 1. Participant age and gender distribution

Age	Male	Female
5	4	1
6	1	3
7	14	5
8	14	6
9	9	3
10	7	3
11	7	2
12	4	1

The study group was selected with a criterion sample. A criterion sample is a sample that includes all children who meet certain criteria (Patton, 2014). Students who expressed their views on COVID-19 and the metaphors of distance education were deemed eligible to participate.

Data Collection

As a data collection method, two semi-structured questions prepared by the researchers were used to determine the metaphors developed by primary and secondary school students regarding Covid-19 and distance education. Although semi-structured questions have a standardized template, in-depth information can be obtained by obtaining open-ended answers (Merriam, 2013). From the students “Distance education ……. similar. Because ……./Coronavirus (COVID-19) ……. similar. Because ……." were asked to complete their sentences. Considering that the metaphor specified in these sentence structures will not be sufficient to reflect the meaning that the person attributes to the metaphor, it is considered important to ask the reason with the emphasis of "because".

The explanation with "because" provides the explanation of the causal relations that the metaphors are expressed. Thus, even if the metaphors likened to COVID-19 or distance education are the same, the reasons stated by different students in the explanation section will be separated from each other.

According to the template, students were given one class hour to express their thoughts by concentrating on only one metaphor. Since these metaphors created by the students constitute the main data source of the research, they were prevented from being affected by external factors. In addition, it was explained that they should not make any changes and that they should express their opinions appropriately.

Data Analysis

The analysis of the data was analyzed according to the content analysis within the scope of this case study, which was made as a result of obtaining the necessary permissions for the gifted students aged 5-12 at Istanbul Aydin Children's University. Content analysis is the categorization of many words obtained in the research under fewer words (Cosun, Altunısık, Bayraktaroglu & Yıldırım, 2015). The basic meanings found through content analysis are called categories and themes (Patton, 2014). While the category names the repetitions in the document; the theme categorizes these categories under a title. In the study, five categories were analyzed under the theme of students' perception of questions. The students' perception of the concepts as behavior, thought, emotion, knowledge and sensory and their answers accordingly shaped the content analysis categories.

Table 2. Content analysis themes and categories

	COVID-19 /Distance Education				
	THEMES	GENDER			
	Students' Perceptions of Questions	Frequency of female students	Frequency of male students	Percent	Metaphore
CATEGORIES	Experience and Behavior				
	Thought and Value				
	Emotion and Feeling				
	Knowledge				
	Sensory				

In order to start the analysis of the data, it was first checked whether the students answered both questions and those who filled in both the analogy of the metaphor and the reason for the metaphor were evaluated. Appropriate answers are numbered, starting from 1 to 84. A total of 84 papers were determined in accordance with the research. Metaphors were analyzed according

to the stages of examining the answers, examining the metaphors, developing a theme-category, distribution of metaphors to themes and categories, ensuring validity-reliability. (Corbin & Strauss, 2007).

Validity and Reliability

In order to ensure the validity of the research, the data categorization and data analysis processes are explained in detail (Merriam, 2013), the reasons for the formation of the themes are explained, and direct quotations are included as evidence. In order to ensure the reliability of the research, the themes given to the categories reached in the research were compared with the literature and checked (Yıldırım & Şimşek, 2013).

FINDINGS

In this section, the findings of gifted students between the ages of 5-12 regarding COVID-19 and distance education metaphors are included under the theme of "Students' Perception of Questions".

Views on COVID-19

Table 3. Metaphors developed by students for COVID-19

	COVID-19				
	THEMES	**GENDER**			
	Students' Perceptions of Questions	**Female(f)**	**Male(f)**	**Percent(%)**	**Metaphore**
CATEGORIES	Experience and Behavior	-	2	2	Stimulant, negative effect.
	Thought and Value	14	19	39	Angry star, monster, outer skin of the sun, king's crown, reverse hat, magic, cream milk, astronaut torn in space, thorn ball, cage, honey, braked car, sun, drinking cold milk, cactus, bridge, house arrest , rally, race car, small ball, beginning of the road, poisonous hedgehog, candy.
	Emotion and Feeling	3	8	13	Kind, worst thing in the world, silly, disturbing, danger, longing, trouble, evil, bad person, black death.
	Knowledge	6	28	40	Pneumonia, influenza, virus, flu, germ, disease, hand-foot disease, dirt, anxiety, electricity, round, allergy, oxygen, bacteria, sars.
	Sensory	1	3	4	Nightmare.

When Table 3 is examined, the category of "Thought and Value" with a rate of 39% ranks first with 23 types of metaphors. In this category, the small ball is the metaphor that comes to mind the most, expressed by 4 students. It is lined up one after the other as the beast and the outer layer of the Sun. The “Knowledge” category, with 40%, ranks second with 15 types of metaphors. In this category, the metaphor of virus is expressed by 7 students and is the metaphor that comes to mind the most. They are listed as flu, disease and microbe one after another. With 13%, the "Emotion and Feeling" category ranks third with 10 types of metaphors. In this category, the metaphor of bad person is the metaphor that comes to mind the most, expressed by 2 students. Each of the other metaphors was expressed once. The category of “Experience and Behavior” with a rate of 2% ranks fourth with 2 types of metaphors. In this category, each of the stimulant and negative effect metaphors was expressed by 1 student. With 4%, the "Sensory" category ranks fifth with 1 type of metaphor.

It is seen that COVID-19 is mostly compared to virus, flu and small ball as a metaphor. While information about COVID-19 is dominant in the first two metaphors, the impression of shape is dominant in the small ball metaphor. While metaphors such as monster, crown, thorn ball and car with a broken brake create concrete metaphors, metaphors such as devil, black death, magic and nightmare form abstract metaphors. Along with these, the metaphor of the beginning of the road is a metaphor that has concrete and abstract meanings.

When Table 3 is examined, while COVID-19 's metaphors such as king crown, sun, rally, racing car and small ball have positive connotations, metaphors such as pneumonia, flu, sars, anxiety, magic and nightmare have negative connotations. In addition, it was aimed to define the difficulty of COVID-19 by expressing difficult situations with metaphors such as an astronaut with a torn suit in space, a car with a broken brake and house arrest. In addition to Table 3, a sample metaphor for each category is presented in Table 4.

Table 4. Sample metaphors for identified categories related to COVID-19

	COVID-19	
	THEMES	
	Students' Perceptions of Questions	**Sample Metaphors**
CATEGORIES	Experience and Behavior	Similar to a stimulant, it taught the importance of family.(S82)
	Thought and Value	It's like a monster. Because it imprisoned us in houses. (S2) Coronavirus is like drinking cold milk because both make you sick. (S37) It is similar to a racing car because it is very fast.(S47) It is like a king's crown because it has antennae.(S5)
	Emotion and Feeling	It's like the worst thing in the world- it kills people and they couldn't find their vaccine.(S10) It is like a bad person because he destroys everything. (S63)
	Knowledge	It is similar to Sars virus because both are deadly.(S25) Pneumonia is an upper respiratory tract infection.(S75)
	Sensory	It's like a nightmare. Because it spreads to everyone and kills people.(S18)

Views on Distance Education

Table 5. Metaphors developed by students regarding distance education

	Distance Education				
	THEMES	**GENDER**			
	Students' Perceptions of Questions	**Female(f)**	**Male(f)**	**Percent(%)**	**Metaphore**
CATEGORIES	Experience and Behavior	6	10	19	Computer game, entertainment, dance, video call, game, documentary, cinema, memorization, TV show.
	Thought and Value	8	15	27	Lonely flower in pot, evil, banana pancake, vacation, cartoon, movie I dislike, bottomless pit, foreign song, ship, border, nothingness, remote control car, glass, polka dot, puppet, savior, train-to-train transport, incomplete education, tree, alien.
	Emotion and Feeling	4	11	17	Something boring, Chinese torture, excitement, uneasiness, unhappiness, greed, freedom, bad boring thing, prison, apathy.
	Knowledge	7	22	34	School, private teacher, home school, e-school, state of emergency, lesson, Zoom, education, virtual environment, communication, e-education, e-teacher, program, educational video.
	Sensory	-	1	1	Touchless environment.

When Table 5 is examined, the "Thought and Value" category with a rate of 27% ranks first with 20 types of metaphors. In this category, the metaphors of remote-controlled car, glass, and punctuation are the most common metaphors, each of which is expressed by 2 students. Each of the other metaphors was expressed once. The "Knowledge" category, with a rate of 34%, ranks second with 14 types of metaphors. In this category, the metaphor of school is the metaphor that comes to mind the most, expressed by 9 students. They are listed as courses and e-learning, one after the other. With 17%, the "Emotion and Feeling" category ranks third with 10 types of metaphors. In this category, the metaphor of "bad boring thing" is the metaphor that comes to mind the most, expressed by 4 students. It is listed as something boring and unhappiness one after the other. "Experience and Behavior" category, with a rate of 19%, ranks fourth with 9 types of metaphors. In this category, the metaphor of video calling was expressed by 4 students. They are listed as computer games and entertainment one after another. Having a rate of 1%, the "Sensory" category ranks fifth with 1 type of metaphor.

It is seen that distance education is mostly compared to school as a metaphor. This analogy shows that the function of distance education is understood by the students. While metaphors such as school, private teacher, home school, e-school and lesson form concrete metaphors, metaphors such as fun, apathy, ambition, unhappiness, freedom and excitement also create abstract metaphors. Along with these, the metaphors of the lonely flower in the pot and the bottomless pit are metaphors that have concrete and abstract meanings. Since metaphors such as computer games, video calls, virtual environments, e-schools and Zoom are related to the internet, they show that the same relationship is established with distance education.

When Table 5 is examined, while the metaphors that have positive connotations such as entertainment, dance, holiday and savior as metaphors for distance education, the metaphors I dislike, such as movie, abyss, nothingness, incomplete education, Chinese torture, prison and state of emergency, also have negative connotations. In addition, the fact that it can have positive or negative meanings from person to person with metaphors such as banana pancakes, memorization, foreign songs and educational videos means that distance education gains meaning according to personal perception. In addition to Table 5, a sample metaphor for each category is presented in Table 6.

Table 6. Sample metaphors for the categories identified for distance education

	Distance Education	
	THEMES	
	Students' Perceptions of Questions	**Sample Metaphors**
CATEGORIES	Experience and Behavior	It's like a video chat on the phone. Because it is no different than when we meet face to face (S59). Distance education is similar to online games. Because in my opinion it is, and we started very late in terms of online education in our country compared to other countries, so we have many shortcomings in terms of lessons.(S26)
	Thought and Value	It looks like a tree because my friends look like trees.(S73). It's like a lonely flower in a pot. It lives in pots but not like in nature. There are bees and insects in nature. It is the same in home education, it is not complementary like in school, it is complete with my teachers and friends.(S2).
	Emotion and Feeling	It is similar to an education system where I suffer 100 minutes of Chinese torture and get tired of it, because I cannot boil the lesson when distance education happens. I miss my school.(S22). Apathy, education should be versatile.(S74)
	Knowledge	It is similar to educational videos because it is digital and not very interactive, and it is difficult to add something to it.(S57)
	Sensory	It is like a non-touch environment because we listen to the teacher without touching it. (S52)

DISCUSSION

In this study, the images and perceptions of gifted students aged 5-12 regarding the COVID-19 pandemic process and the distance education experience they had in this process were examined within the scope of a phenomenology study. The study was analyzed by dividing into five categories under the theme of students' perception of questions. It is seen that students perceive both concepts as behavior, thought, emotion, knowledge and sensory and respond accordingly.

It has been determined that many of the metaphors developed by the students regarding the COVID-19 pandemic process are in the "Thought and Value" category. In this category, “little ball” and “outer layer of the sun” are among the metaphors that come to mind the most. In this context, when the students' explanations for these metaphors are examined, it is seen that the thoughts and values they have developed regarding the COVID-19 pandemic are mostly based on scientific data and observations. The fact that gifted students are easy and quick learners, and they like to learn information in depth and in detail is also prominent in this research (Akkanat, 2004; Ataman, 2009, 2007; Ataman, 2008; Çağlar, 2004; Levent, 2011; Özbay, 2013, Suveren, 2006). At the same time, their quick answers to questions also show their metaphorical thinking abilities.

When the existing explanations for the metaphors in the "Knowledge" category are examined, it is noticed that the students approach the pandemic process too realistically. While developing the metaphors, it is seen that they realistically transferred the process they experienced to their lives and produced realistic metaphors. In fact, the data obtained in the researchers conducted in this period; reveals that children commonly avoid asking questions about the epidemic as well as distraction and irritability (Chi et al., 2020). The fact that a social problem has affected children so much indicates that the epidemic should also be emphasized in terms of child psychology. The data obtained from this research show that the students involved in the research process can reach realistic information by asking too many questions. This situation can be interpreted as a behavior specific to gifted students.

When the metaphors in the category of "Emotion and Feeling" are examined, it is seen that the metaphor of bad person is the metaphor that comes to mind the most, expressed by 2 students. When such metaphors and the way students explain these metaphors are examined; It is noticed that the students perceive the process as threatening and dangerous, and they are very worried about the process. As in this study, when some children are exposed to unexplained and unpredictable behaviors, they may perceive the process as a threat and their anxiety may increase (Dalton, Rapa & Stein, 2020). As there is an aggressive tendency to a situation that is seen as a threat with harsh words, this situation can also bring anxiety disorder.

In the context of distance education, when the metaphors created in the "Thought and Value" category are examined, it is seen that they have developed a critical perspective on the concept of distance education. For example, while metaphors have positive or negative meanings, their explanations are critical of why these metaphors should be negative or positive. This kind of

approach is not a different situation that needs to be examined for gifted children. Because in the normal process; critical thinking skills are frequently encountered in gifted students (Özbay, 2013). Students evaluate and accept what they see, hear and read, not as they are, but by making them critical.

When the metaphors in the "Knowledge" category are examined, it is noticed that the students approach the process realistically and positively. It is noticed that students overlap distance education with the school and the actions taken at school. In the study by Bozkurt (2020), in which primary school students' images and perceptions of distance education were determined through metaphors, children often matched the concept of distance education with school.

When the metaphors in the "Emotion and Feeling" category were examined, it was determined that the metaphors in which negative emotions and feelings were dominant. It is thought that many of these metaphors are due to incomplete communication. Accordingly, it is concluded that educational communication in distance education and designing in this direction are of critical importance for the success of the applications. Compared to adults, children can be significantly affected by traumatic events such as pandemics and natural disasters and have negative thoughts, as they lack experience and skills in accessing resources where they can meet their own developmental, social, emotional, spiritual, and behavioral needs independently (Schonfeld & Demaria, 2015).

CONCLUSION AND RECOMMENDATIONS

It is seen that students have more metaphors regarding distance education compared to the " COVID-19 " pandemic. Since distance education is very different from traditional education, it has been determined that the explanations of the metaphors produced by the students about the subject are written with a critical point of view and are mostly positive. This shows that distance education is a viable learning model for young students as well as adult students. Similar results are found in studies conducted to determine the existing perception of distance education with metaphors (Bozkurt, 2020; Şahin İzmirli & Mısırlı, 2018; Yılmaz & Güven, 2015).

The suggestions given within the scope of the research findings can be evaluated within the scope of the action plans and distance education applications planned to be made during the pandemic. Firstly, alternative forms of service, such as mental health support, should be developed within ministries or directorates in order to close the emotional vacuum created by the COVID-19 pandemic on gifted students. It is recommended to switch to the blended learning model in order to keep the differences between students' independent learning flexibility, motivation and skills at a minimum level; because distance education at K-12 levels all over the world cannot go beyond live lectures and cannot be carried out very effectively. Professional development mechanisms should be established very quickly so that teachers and parents can support students in this new education method, which is also recommended. Parent academies to be established, such as teacher academies, can also enable families to be more systematically involved in the process.

It is thought that it would be beneficial to develop intervention strategies and/or approaches for gifted students in this period. It is suggested that instructional designs and methods used by teachers should be chosen in a way that will increase communication. Along with all these, it is necessary to analyze the social psychological area created by this period especially on disadvantaged children and, if necessary, measures should be taken on the basis of family and children.

Finally, it should be ensured that all students develop a positive perception towards distance education. It is thought that this perception will be developed more easily if the quality of the education given is increased and the teaching environment is supported with different learning outcomes.

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Statements of publication ethics

We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

Researchers' contribution rate

The study was conducted and reported with equal collaboration of the researchers.

Ethics Committee Approval Information

The two open-ended questions we requested to use in the research were examined by the Istanbul Aydin University Ethics Commission and were approved by the decision numbered 2020/7 on 31.08.2020.

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| Research Article / Araştırma Makalesi |

The Effect of Argumentation-Based Inquiry Approach Supported by Metacognitive Activities on Science Achievement of Preservice Teachers

Üst Bilişsel Aktivite İle Desteklenmiş Argümantasyon Tabanlı Bilim Öğrenme Yaklaşımının Öğretmen Adaylarının Fen Başarısına Etkisi

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Keywords

1. Argument Based Inquiry (ABI)
2.Metacognition
3.Science achievement

Anahtar Kelimeler

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Abstract

Purpose: This study was conducted with students in their third year at the Department of Science Teaching at Kastamonu University in the 2015-2016 academic year. The study's objective is to investigate the effect of the argumentation-based and argumentation-based inquiry approaches supported by metacognition activities on students' science achievement.

Design/Methodology/Approach: The study was carried out in 10 weeks with the participation of 69 students divided into three groups, namely, the ABI group, the ABI + metacognitive activity group and the group in which the traditional method was applied. An achievement test consisting of 25 questions and semi-structured interviews were used as data collection tools. In the data analysis, pre-post test evaluations and descriptive statistics were used.

Findings: The data obtained showed that there was a significant difference between the groups, which was in favour of groups where the ABI approach was applied, and that there was a slightly significant difference between groups of ABI and the ABI supported by metacognition activities, which was in favour of the ABI group supported by metacognition activities. The interviews with students revealed many significant and positive outcomes; they stated that they were satisfied with the ABI applications, that they would prefer ABI in their professional lives, and that the applications facilitated scientific thinking.

Highlights: Metacognition has an important place in scientific literacy and knowledge structuring. Because it provides metacognition to be aware of the individual's learning and learning process, it can be said that language practices such as discussion and writing, especially in the ABI process, activate cognitive and metacognitive mechanisms.

Öz

Çalışmanın amacı: Bu çalışma, 2015-2016 eğitim öğretim yılında Kastamonu Üniversitesi İlköğretim Fen Bilgisi Öğretmenliğinde öğrenim gören 3.sınıf öğrencileriyle gerçekleştirilmiştir. Çalışmanın amacı argümantasyon tabanlı bilim öğrenme yaklaşımının ve üst bilişsel aktiviteyle desteklenmiş argümantasyon tabanlı bilim öğrenme yaklaşımın öğrencilerin fen başarısına etkisini araştırmaktır.

Materyal ve Yöntem: Çalışma 69 öğrencinin katılımıyla; ATBÖ grubu, ATBÖ+üst bilişsel aktivite grubu ve geleneksel yöntemin uygulandığı grup şeklinde 10 haftada gerçekleştirilmiştir. Veri toplama aracı olarak 25 sorudan oluşan başarı testi ve yarı yapılandırılmış görüşmeler kullanılmıştır. Elde edilen verilerin analizinde ön-son test değerlendirmeler ve tanımlayıcı istatistik kullanılmıştır.

Bulgular: Elde edilen verilere göre, gruplar arasında anlamlı bir farkın olduğu, bu farkın ATBÖ yaklaşımının uygulandığı sınıflar lehine olduğu, ATBÖ ve üst bilişsel aktivite ile desteklenmiş ATBÖ grupları arasında ise çok az anlamlı bir farkın üst bilişsel aktivite ile desteklenmiş ATBÖ grubu lehine olduğu sonucuna ulaşılmıştır. Öğrencilerle yapılan görüşmeler sonucunda öğrencilerin ATBÖ uygulamalarından memnun olduklarını, ATBÖ'yü meslek hayatlarında tercih edeceklerini, uygulamaların bilimsel düşünme sürecini sağladığı gibi birçok önemli ve olumlu sonucuna ulaşılmıştır.

Önemli Vurgular: Bilimsel okuryazarlık ve bilginin yapılandırılmasında üst bilişin önemli bir yer bulmaktadır. Çünkü üst biliş bireyin kendi öğrenmeleri ve öğrenme sürecinin farkında olmasını sağlamakatadır. Özellikle ATBÖ sürecinde yer alan tartışma ve yazma gibi dil pratiklerinin bilişsel ve üst bilişsel mekanizmaları harekete geçirdiği söylenebilir.

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INTRODUCTION

Due to the developments in rapidly advancing information and communication technologies both in Turkey and in the world, the accumulation and sharing of information in many areas happen very quickly. However, circumstances where individuals approach subjects from a critical point of view and question the information they obtain, rather than accepting it as it is, are appreciated more in the education system. The aim is to raise individuals with strong social and communication skills who choose, question, and interpret information rather than those who will do whatever they are told (Aslan, 2014). Our students, who have the potential to become the leaders or decision-makers of society in the future, should be able to think about alternative explanations with an open-minded, sceptical and questioning approach when they make decisions regarding any issues they might encounter; they should be able to make informed decisions by critically evaluating the claims, justifications, and arguments brought forward in discussions (Tümay & Köseoğlu, 2011).

While determining the essential goals of science education and the tools that can be used to reach those goals, American National Science Education Standards (NRC, 1996) emphasized that inquiry is the heart of science education. In the Science Course Curriculum, which was prepared with an inquiry-based learning approach, an integrated perspective was adopted in regards to learning-teaching theories and practices; a learning strategy based on inquiry and the transfer of knowledge where students are responsible for their learning, and actively participate in the learning process was embraced in general (MNE, 2018 p.10). Students who research, inquire, construct the information in their minds, and explain and discuss their findings are at the centre of the learning process. Creating environments where students can actively participate in learning is related to selecting the appropriate teaching methods and techniques (Aydede & Matyar, 2009). Therefore, in formal and non-formal educational environments, different learning and teaching methods should be used (Günel, Uzoğlu, and Büyükkasap, 2009). Science classes, where inquiry-based activities are performed, are environments where students actively participate in the course (Günel, Kabataş Memiş and Büyükkasap, 2010). This was clearly stated in the science curriculum "The process of research and inquiry is considered to consist not only of 'discovery and experiment' but also as a process of creating an 'explanation and argument.' Inquiry-based learning is a student-centred learning approach where students have the desire to explore all that is around them, develop strong arguments by explaining the natural and physical world around them with strong justification, grow up as individuals who are enthusiastic about science and recognize its value, and in short, construct information in their minds by acting-living-thinking like scientists," (MNE, 2013 p.3).

Scientists emphasize the scientific discussion approach to understand nature through discussion, evidence, and ideas (Ford, 2012). The concepts of scientific discussion and discussion do not have the same meaning. The Turkish Language Association dictionary defines discussion as defending opposing ideas by different parties. In contrast to discussions with winners and losers, a scientific discussion is a process by which individuals exchange ideas with one another by introducing evidence (Küçük & Aycan, 2014). A scientific discussion aims to attain the correct result mutually (Kaya & Kılıç, 2008). The scientific discussion approach is an argument-based method (Uluay, 2012). The argument, a component of scientific discussion, which essentially consists of logical inferences based on specific information, is at the core of the philosophy of science (Newton, Driver and Osborne, 1999). According to Newton et al. (1999), the discussion is a logical process. From the days of Aristotle, the scientific discussion has been the principal activity of scientific meetings held to introduce ideas and discuss their admissibility, beginning with asking questions. Individuals who participate in scientific discussions by putting forward their arguments initiate the process by sharing their views about events and situations. For all the views presented or the discussions carried out to be considered scientific, the arguments put forward must be formed correctly (Küçük & Aycan, 2014).

The activities that support and facilitate scientific discussion in the classroom environment aim to improve students' inquiry, discussion, and evaluation skills (Aydın & Kaptan, 2014). In the course of scientific discussions in the classroom, students openly explain the reasons that support their views by using their prior knowledge and trying to prove the accuracy of those views. Students act as scientists throughout this process and develop and construct their arguments (Özkara, 2011). Students learn the rules of discussion with activities centred around scientific discussions and can achieve permanent learning due to these practices (Kaya & Kılıç, 2008). When people comprehend the nature of the scientific discussion and learn how to utilize effective means of discussing a scientific subject matter at an early age, they can participate more in scientific discussions and make informed decisions. Competence and experience in this area constitute an essential part of life in contemporary societies (Kaya, 2013).

Argumentation is a process centred around collaborative group discussions to develop and explain arguments. Questions are asked, evidence is collected, claims are explained, and alternative claims are evaluated and discussed throughout the activity (Chin & Obsorne, 2010). It is referred to as scientific discussion (Demirel, 2015). Argumentation is an effective teaching method that supports science literacy and improves thinking skills, which are essential to acquire in science education (Köseoğlu, Tümay and Budak, 2008). Argumentation, essential in commenting and developing models, and theories, contributes significantly to implementing the discussion-oriented teaching approach (Türkoğuz & Cin, 2013). Thanks to argumentation practices, students do not see science and scientific knowledge as absolute and immutable facts, and they can develop a more realistic understanding of the nature of science (Driver, Newton and Osborne, 2000). Argumentation enables students to develop scientific process skills and high-order scientific process skills such as analysis, synthesis and creating new hypotheses with the method of discussion by basing subject matters on scientific knowledge (Kabataş Memiş & Ezberci Çevik, 2017). The inclusion of students in the argumentation process in science classes, which is of paramount importance in terms of the production, progression, and

evaluation of scientific knowledge, enables them to understand better both the scientific structure of ideas and the social aspect of scientific ideas (Bell & Linn, 2000). Because argumentation is an approach that has the student at its centre, where students interact and utilize their mental skills (Türkoğuz & Cin, 2013). The teacher determines the details the students fail to grasp and guides them so they may arrive at the truth through their own experience.

Argumentation, addressed for the first time by Toulmin (1958), was determined to be a model (Aydın & Kaptan, 2014). According to Toulmin (1958), argumentation is a tool that can be used to test supported claims and ideas. In Toulmin's model, data, claim, warrant and backing are the basis of argumentation, and qualifier and rebuttal are the other elements of a more complex argument (Erduran, Simon and Osborne, 2004; Osborne, 2005). Argumentation, which can be dealt with within the context of the scientist's habits of mind, can be defined as the process of supporting arguments with data and having them approved after providing the necessary explanations (Tümay & Köseoğlu, 2011). The Toulmin method of argumentation consists of the claim, the evidence that supports the claim, the warrants that demonstrate the relationship between the claim and the evidence, the insufficient knowledge (backing) that reinforces the warrants, the qualifiers, and the rebuttal which recognizes that the claim is not always valid (Erduran et al., 2004). For students to understand and interpret science, they must improve their language skills, such as learning scientific concepts, expressing what they learn, doing alternative writing activities, and establishing a connection between daily language and the language of science (Demirbağ & Günel, 2014). Language practices such as oral expression and writing conducted in the classroom are essential elements of research and inquiry (Hand, Wallace & Yang, 2004; Hand, 2008). As an essential element of science education (NRC, 1996), writing must make sense of events and activities and record them (Kabataş Memiş & Seven, 2015).

Argumentation-Based Inquiry (ABI) (Kabataş Memiş, 2016) is one of the inquiry-based approaches that are used to help students learn scientific concepts, and it includes a series of objectives such as critical thinking (Sönmez, Kabataş Memiş, & Yerlikaya, 2019; Çakan Akkaş, 2017; Öz, 2020), discussing information, developing communication and linguistic skills, gaining scientific process skills.

Argumentation-Based Inquiry (ABI)

ABI is an approach that facilitates the production of scientific information through argumentation in research-inquiry environments and it also prompts cognitive and metacognition mechanisms with language practices (Günel, et al., 2010). This approach includes theoretical foundations related to the learning and teaching process such as constructivist learning, understanding the nature of science, scientific argumentation (Aydın, 2013). ABI consists of a series of activities that guide both teachers and students in regard to thinking and writing (Hand, Wallace, and Yang, 2004). These activities are given in Table 1.

Tablo 1. Student and teacher template

Student Template	Teacher Template
1. Beginning Ideas –What are my questions?	1. Exploration of pre-instruction understanding through individual or group concept mapping.
2. Tests – What did I do?	2.Pre-laboratory activities, including informal writing, making observations, brainstorming, and posing questions.
3. Observations– What did I see?	3. Participation in laboratory activity.
4. Claims – What can I claim?	4. Negatiation phase I- writing personal meanings for laboratory activity (For example, Journaling).
5. Evidence – How do I know? Why am I making these claims?	5. Negatiation phase II- sharing and comparing data interpretations in small groups (For example, making a group chart).
6. Readind – How do my ideas compare with other ideas?	6. Negatiation phase III- comparing science ideas to textbooks or other printed resources (For exampe, writing group notes in response to focus questions).
7. Reflection – How have my ideas changed?	7. Negatiation phase IV- individual reflection and writing (For exampe, writing a report or textbook explanation).
	8. Explanation of post instruction understanding through concept mapping.

ABI is a process that starts with students preparing the questions they want to research and continues as they design activities that will enable them to find the answers to the research questions, develop their claims that are part of the scientific process according to the findings they obtain as a result of the experiment, support their claims with evidence and defend their findings in small and large group discussions (Keys et al., 1999). The ABI approach introduces a new form of writing where the students prepare the initial questions; it guides the views, writing, and discussions of students about the conclusions they reach through data, claims, and evidence and how it relates to their prior knowledge (Hand & Keys, 1999). It is an inquiry-based method that

uses language practices such as reading, writing, and speaking, which facilitate the production of scientific information through argumentation (Hand, 2008).

Because ABI contains rich language practices and uses science teaching as a base through research and inquiry, it is used in educational environments. In ABI practices, ideas are introduced through research and inquiry; questions create arguments, claims, evidence, and reconciliation and negotiation procedures are carried out (Akkuş, Günel and Hand, 2007). Students investigate their questions themselves and make sense of scientific concepts through large and small group discussions on explanations, tests, claims, and evidence employing argumentation (Hand & Keys, 1999). Students reconstruct scientific concepts by discussing them throughout the ABI process. They do this through oral discussions and by creating written content where they convey their ideas and re-read the said content (Keys et al., 1999).

Compared to the traditional method, ABI has a bigger effect on student achievement (Yıldırım and Nakibolu, 2014; Yeşildağ Hasançebi and Günel, 2013; Ceylan, 2010; Kabataş Memiş, 2011; Newton et al., 1999; Hand and Yang, 2004; Hand and Keys, 1999; Chen et al., 2011). The scientific argumentation method emphasises an explicit reflective approach, improves scientific literacy (Jimenez Aleixandre, 2007) and encourages individuals to actively participate in the social structuring of scientific knowledge (Köseoğlu et al., 2008). Students actively participate in ABI practices; therefore, the learning becomes more meaningful and permanent (Uluçınar, Doğan and Kaya, 2008). ABI facilitates learning, improves self-confidence, and provides individuals with a sense of responsibility (Kabataş Memiş, 2014; Kabataş Memiş & Seven, 2015). It ensures that students learn science more meaningfully and effectively (Kabataş Memiş & Ezberci Çevik, 2017). ABI improves the problem-solving and data analysis skills of students and advances their interpretation and self-evaluation abilities (Tüysüz, Demirel and Yıldırım, 2014). This method helps students to grow up to be individuals who can solve problems, make decisions and think scientifically (Üstünkaya & Savran Gencer, 2012). In addition, ABI enables students to express themselves more comfortably and think critically (Kabataş Memiş, 2016; Sönmez, Kabataş Memiş and Yerlikaya, 2019). The relationship between metacognition and ABI was investigated to make inferences about the kind of effect ABI, which contains many learning outcomes, might have when supported by a metacognition activity.

Metacognition and ABI

Concepts such as "self-learning," "learning to learn", and "effective learning" has become more critical in recent years. The concept of metacognition came to the forefront with the thought that it helps the individual gain "self-learning" competence (Akpunar, 2011). Metacognition, which underlies thinking and encompasses all thinking skills, covers abilities such as determining the steps to take while acting, planning about an action or a subject matter, constantly reviewing the said plan, and feeling the need to correct the incomplete or faulty parts (Demir & Özmen, 2011). According to Flavell (1979), metacognition is the individual's knowledge of the cognitive process and its outcomes regarding a given situation. It can also be defined as using high-order mental processes for learning, such as when an individual plan to learn something, develops the necessary strategies and skills to solve a problem, makes predictions on a subject, and determines the limits of learning (Dunlosky & Thiede, 1998). Metacognition awareness means that the individual is aware of what s/he knows and does not know, takes responsibility for his/her learning, evaluates, plans, monitors his/her learning, as well as controls his/her mental processes (Bağçeci, Döş and Sarıca, 2011).

Educational writing activities (Yıldız & Büyükkasap, 2011) are considered to be some of the most important activities that improve high-order mental process skills in science classes and stimulate rich cognitive growth in learning science concepts (Günel et al., 2010). According to Klein (2000), writing is a process that helps students think critically and acquire new knowledge. Writing activities that include learning methods based on constructivism, which enable students to establish meaningful cognitive and affective connections among concepts through their expressions (İnaltekin, Başak Özyurt and Akçay, 2012), make it easier for students to comprehend more profound concepts (Prain & Hand, 1999). Writing increases students' awareness, enables more thinking, learning more effectively and deeply, and facilitates the transfer of information through intimate feelings and thoughts. All these characteristics make it an extraordinary, unique way of learning (Emig, 1977). Therefore the activity of writing positively supports metacognition. For these reasons, students were tasked with journaling as writing activity to support metacognition activity.

During the ABI process, students actively use writing practices; they revise the information and make sense of it before using it. While writing practices incorporating traditional approaches ensure that the existing knowledge is repeated and transferred to the paper as it is, writing practices using contemporary approaches help the information be seen from different perspectives. The literature review showed that many studies were carried out on the ABI approach. Based on the results of those studies, ABI increases the metacognition and logical skills of individuals (Kabataş Memiş & Ezberci Çevik, 2017); improve conceptual learning in students (Hand & Norton Meier, 2011), brings possible misconceptions into light (Kıngır, 2011) and enables students to achieve more permanent learning (Arlı, 2014; Kabataş Memiş, 2011).

Within this scope, this study aims to investigate whether supporting Argumentation-Based Inquiry, a method that activates metacognition skills with an additional metacognition activity, affects students' science achievement.

METHOD

The Research Method

"Argumentation-Based Inquiry," "Argumentation-Based Inquiry + Journaling Activity," and "traditional" methods were employed with 3rd-grade preservice science teachers on several physics subjects that are in the syllabus of the Science Teaching Laboratory Practices-I course. The subjects include density, horizontal force, inclined plane, horizontal velocity, motions, and free-fall. The results were examined to determine whether there is a significant difference in science achievement among these groups. A quasi-experimental research method was used as a quantitative research design in this study. Non-experimental descriptive analysis was used in the analysis of qualitative data used to support quantitative data. The groups were randomly selected as control and experimental groups, and the data were collected with pretests and posttests. While one of the experimental groups carried out laboratory work with ABI practices, in the other group, journaling activity, which activates metacognition, was used in addition to the ABI practices. The traditional method was used in the control group, and the course was conducted with experiments based on the same subjects, selected from the Science Teaching Laboratory Practices-I coursebook (Kesmez, 2010). The students conducted the experiments selected from the book by the teacher in accordance with the theme of each week, completed the test reports and handed them in during class. The Science Achievement Test was conducted as a pretest at the beginning of the process and as a posttest, after the practices were completed.

Sampling

The sample for this study consists of a total of 69 students, 47 of whom are female and 22 are male, in their third year at the Department of Science Teaching at Kastamonu University, in the fall semester of the 2015-2016 academic year. The students come from socioeconomically middle-class families and enrolled at the university between 2013 and 2017 with scores ranging from 199 to 260. Three different groups, as two experimental groups and one control group, were included in the study carried out within the scope of the Science Teaching Laboratory Practices-I course. For the experimental and control groups, groups of 3 or 4, as determined by the students, were formed without the intervention of the researcher. The students worked in these groups that they formed during the whole semester. The practices of the experimental groups and the control group were carried out by the same researcher.

The Research Period

The research carried out in groups of 3 or 4 people determined by the students at the beginning of the semester continued for 10 weeks. The Science Achievement pretest was conducted in the first week to determine the science achievement levels of the students. A preparatory activity was carried out for the students in the experimental groups to inform them about the argumentation process and help them understand it. The activity aimed to encourage the students to judge and discuss the concepts of claim and evidence. In the following weeks, the selected physics subjects (density, horizontal force, inclined plane, horizontal velocity, motions, and free-fall) were taught by the argumentation process, and discussions were shaped with the same approach. Two hours of class each week were dedicated to small group discussions, and two hours were dedicated to extensive group discussions. The students wrote their reports after classes using the ABI report template. In the experimental group where the ABI and journaling activity was adopted, the students wrote journaling in addition to writing reports. The journaling instructions prepared by the researcher each week were e-mailed to students after class.

Experiments from the Science Teaching Laboratory Practices-I course book were carried out with the students in the control group. The students in the control group attended classes in a learning environment employing the traditional method. In educational environments using the traditional method (Bayram, Patlı, and Savcı, 1998), where a teacher authoritatively instructs students, the student is in the listener position, and the teacher is the instructor who directly communicates information. In this scope, experiments selected from the book were conducted on each week's theme. The students in the experimental group carried out their writing activities by the homework instructions given to them. For the class duration, the researcher took on the role of a guide who answered students' questions when needed, participated in table discussions, or provided technical support. The students wrote reports on the experiments they conducted in that period and handed them in during class. The reports included the title and the purpose of the experiment, the data collected during the experiment, and the result of the experiment.

Data Collection

The Science Achievement test conducted at the beginning and the end of the study and semi-structured interviews conducted with selected students at the end of the study were used as the data collection tool. In line with the objective of the study, students were asked to write diaries to examine the development of their metacognition skills. The journaling were not subjected to any rating or evaluation by the researcher.

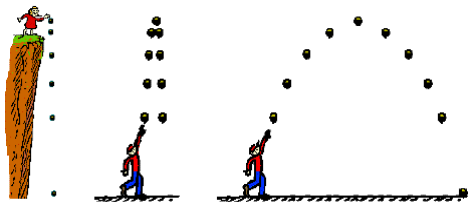
The Science Achievement Test

The science achievement test was developed by Kabataş Memiş, Günel and Büyükkasap (2009). The test, which includes 13 multiple choice and 12 open-ended concept questions, was conducted both as a pretest and posttest. Cronbach's alpha reliability coefficient of the Science Achievement Test was determined as .70. Students were given 50 minutes for the test. Since the Science Achievement Test consists of two types of questions, multiple-choice and open-ended questions, the questions were scored

differently. For the multiple-choice questions, unanswered questions and wrong answers were given 0 points and correct answers were given 3 points; one of the open-ended questions was given 6 points and the others were given 5 points, and the test was evaluated over 100 points. The key to the open-ended questions was prepared by the researcher and all open-ended questions were scored. Examples of the questions of the Science Achievement Test given to students are given below.

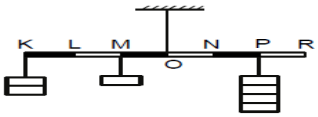
OEQ1 : While you were traveling with your younger sibling, they asked you "why you moved forward when the car's brakes were applied." How would you explain that to your sibling?

OEQ2 : A publishing house, which believes that your knowledge in physics is very reliable, sends you a physics book for you to edit. In this book, the picture below is included with the following statement: "The forces acting on the balls are different in all three pictures. But these different forces can move these balls." How would you interpret this statement by looking at the picture? Support your interpretation with vectorial expressions.



OEQ10 : 1 kg of cotton and 3 kg of iron balls with the same external volume are released from the h height at the same time. What would you say about the falling time of the objects?

MCQ1



7 identical objects are tied to the K, M, P points of an equal-split bar of insignificant weight hanging from the O point, as can bee seen in the figure.

Which of the following actions done before releasing it will keep the horizontal bar in a horizontal position?

A) Shifting the objects in K to L
B) Shifting the object in M to L
C) Shifting the object in M to N
D) Shifting the objects in P to N
E) Shifting the objects in P to R

MCQ4 : The masses of K, L liquids, each of which has a volume of V, are m and 2m, respectively. By mixing these liquids, a homogeneous mixture with a volume of 2V is created.

If the core mass of the mixture is d, what is the core mass of the K liquid?

A) 1/2 B) 2/3 C) 3/4 D) 4/3 E) 3/2

MCQ5 : If the speed of an object thrown in projectile motion is increased from Vo to 2Vo provided that the motion angle remains the same, how many times does the X distance it falls increases?

A)1 B)2 C) 3 D)4 E)5

Semi-structured Interviews

Semi-structured interviews were conducted by the researcher in order to reveal students' opinions about ABI, metacognition activity and traditional approach. Interview questions were prepared by the researcher and after consulting expert opinions, interviews were conducted with the final version of the questions. 6 students were selected from each group on a volunteer basis and a total of 18 students were interviewed.. Students with high, moderate, and low academic success were selected to create a homogeneous sampling and semi-structured interviews were held with the students. The interviews were recorded using a voice recorder and they lasted for 15 to 50 minutes. The students were asked questions about comparing the ABI approach and the traditional method, determining the roles of students and teachers in this process and metacognition activity (Journaling).

Data Analysis

To measure the academic science achievement of the students, pretest and posttest scores of students were taken into consideration. SPSS software package was used to analyze the pretest and posttest scores of the students. One-way ANOVA and descriptive statistics were used on the data to compare the scores of the groups. The effect size was calculated using Cohen's d to

determine the difference between group averages. To ensure the internal validity of the study, the groups were formed neutrally, and the data was collected in the same environment.

Descriptive analysis was used to interpret the qualitative data. At the end of the study, 6 students were selected from each of the experimental and control groups and semi-structured interviews were conducted with a total of 18 students. The names of the students who participated in the interviews were not shared in light of ethical considerations. Students were assigned codes names such as S_1, S_2, and S_3 and all the data were shared using these code names. The interviews conducted with the students were recorded with a voice recorder and were later transcribed and examined. Main themes such as "roles of the teacher," "roles of the student," "ABI-traditional method comparison" were taken into consideration in the examination of the ABI group, which was one of the experimental groups. In addition to these themes, the "journaling" theme was taken into consideration in the examination of the ABI + Journaling group. The activities students attended during the study, how they conducted group activities, the tasks the teachers undertook in the process, and how much they reflected the change that the process brought about in them were all analyzed.

FINDINGS

Science Achievement Pre-post test Analysis

At the beginning of the study, one-way ANOVA was applied to the data to determine whether or not there was a difference between the groups in terms of science achievement. The total score of the multiple-choice questions, the total score of the open-ended questions, the averages and standard deviations of the scores in the total test score are given in Table 2.

Table 2. Findings related to the science achievement pretest of the students

Pretest	Study Groups	n	X	SD
TSMCQ	ABI	19	8.1	3.3
	ABI + Journal	26	7.8	3.9
	Control	25	7.2	4.3
TSOEQ	ABI	19	5.8	4.8
	ABI + Journal	26	5.0	4.4
	Control	25	4.3	3.3
TTS	ABI	19	13.9	6.8
	ABI + Journal	26	12.7	4.8
	Control	25	11.5	6.3

TSMCQ: Total Score of Multiple-Choice Questions
TSOEQ: Total Score of Open-Ended Questions
TTS: Test Total Score

One-way ANOVA was used to determine whether there was a significant difference between the groups. The findings related to the ANOVA test are given in Table 3. According to the results obtained from the data; no statistically significant difference was found between the total score of science achievement test ($F(2, 69) = .909$, $p=.408$, $n^2=.026$), total sore of open-ended questions ($F_{(2, 69)}=.753$, $p=.475$, $n^2=.022$) and total score of multiple-choice questions ($F_{(2, 69)}=.292$, $p=.748$, $n^2=.009$) of the groups at $p <0.05$ significance level.

Table 3. Findings related to the One-Way ANOVA of the science achievement pretest

		Total Sum of Squares	Degrees of Freedom	Mean Squares	F	p	η_p^2
TSMCQ	Intergroup	9.111	2	4.555	.292	.748	.009
	Intragroup	1046.332	67	15.617			
	Total	1055.443	69				
TSOEQ	Intergroup	26.344	2	13.172	.753	.475	.022
	Intragroup	1172.528	67	17.500			
	Total	1198.871	69				
TTS	Intergroup	64.275	2	32.137	.909	.408	.026
	Intragroup	2368.068	67	35.344			
	Total	2432.343	69				

The averages and standard deviations of the posttest scores of each group regarding the Science Achievement Test are given in Table 3. One-way ANOVA was used to determine whether there was a significant difference between the groups. The findings related to the one-way ANOVA are given in Table 4.

Table 4. Findings related to the science achievement posttest of the students

Pretest	Study Groups	N	X	SD
TSMCQ	ABI	19	8.7	4.2
	ABI + Journal	26	10.1	4.6
	Control	25	8.6	4.6
TSOEQ	ABI	19	30.8	8.6
	ABI + Journal	26	33.7	8.6
	Control	25	16.9	5.7
TTS	ABI	19	39.5	10.7
	ABI + Journal	26	43.8	9.8
	Control	25	25.5	7.7

Table 5. Findings related to the One-Way ANOVA of the science achievement posttest

		Total Sum of Squares	Degrees of Freedom	Mean Squares	F	p	η_p^2
TSMCQ	Intergroup	31.116	2	15.558	.760	.471	.022
	Intragroup	1370.827	67	20.460			
	Total	1401.943	69				
TSOEQ	Intergroup	3625.022	2	1812.551	30.868	.000	.487
	Intragroup	3816.725	67	58.719			
	Total	7441.746	69				
TTS	Intergroup	4402.242	2	2201.121	25.128	.000	.436
	Intragroup	5693.710	65	87.596			
	Total	10095.952	67				

One-way ANOVA results revealed a significant difference among the posttest total scores of open-ended questions ($F(2, 69)=30.868$, $p<.01$) and test total scores ($F(2, 69)= 25.128$, $p<.01$) of the experiment groups and the control group. Post-Hoc Tests (LSD) were used to determine between which groups this difference occurred. The results of this test revealed a significant difference between the "ABI" group (M=39.50, SD=10.7) and the control group (M=25.50, SD=7.7) in favor of the "ABI" group, and a significant difference between the "ABI+ Journaling" group (M=43.80, SD=9.8) and the control group (M=25.50, SD=7.7) in favor of the “ABI+ Journaling” group.

Cohen's d was calculated to determine the effect size of the group independent variable on the dependent variables. The calculated Cohen's d values are interpreted according to Cohen's (1992) "d" index. Cohen (1992) identified certain breakpoints for the interpretation of d. The effect sizes between d= 0.2 and 0.5 are categorized as "small," as "medium" if they are between d= 0.5 and 0.8, and as "large" if they are d= 0.8 and above. If the effect size value has a minus sign it only determines the direction. In Table 6 below, the effect sizes among the total score of multiple-choice questions, the total score of open-ended questions, and the test total scores were determined.

Table 6. Comparison of the effect sizes of the groups

Test	Group	Group	d	Size
TSMCQ	ABI	Control	-0.07	Negative
	ABI + Journal	ABI	1.07	Large
	Control	ABI + Journal	0	Negative
TSOEQ	ABI	Control	3	Large
	ABI + Journaling	ABI	0	Negative
	Control	ABI + Journal	3.7	Large
TTS	ABI	Control	2.6	Large
	ABI	ABI + Journal	-1.4	Large
	Control	ABI + Journal	4.3	Large

Table 6 shows that the large effect between the "ABI + Journal group" and the ABI group in the total score of multiple-choice questions in the Science Achievement Test posttest is in favor of the "ABI + Journal group." In the total score of open-ended questions, the large effect between the ABI group and the control group is in favor of the ABI group. Similarly, the large effect between the "ABI + Journal group" and the control group is in favor of the "ABI + Journal group." A review of the test total scores

of the test shows that there is a large effect between ABI and the control group. This effect is in favor of the ABI group. It can be concluded that the effect between the "ABI + Journal group" and the ABI group is large and this effect is in favor of the "ABI + Journal group." Similarly, there is a large effect between the control group and the "ABI + Journal group" and this effect is in favor of the "ABI + Journal group."

Semi-Structured Interviews

Interviews with the Experimental Groups

Various themes were created following an examination of the data obtained from the interviews. These themes are: Comparing the ABI approach and the traditional method, change in the student, journaling, teacher and student roles. Findings for each theme are given under separate headings. The themes, codes and frequencies resulting from the examination of the interviews are given in Table 7.

Table 7. Themes, Codes and frequencies resulting from the examination of the views of students on the practice of ABI and the journaling activity

Theme	Code	Frequency (%)
Comparing the ABI Approach and the Traditional Approach	A process that supports learning	5 (42%)
	Student activity	6 (50%)
	Ensuring permanent learning	6 (50%)
	Learning more than one information	3 (25%)
	Enabling discussion	7 (59%)
	Possibility of presentation	4 (34%)
	Preparing questions on their own	6 (50%)
	Approach preference	12 (100%)
Change in the Student	Being more attentive	3 (25%)
	Improved communication skills	6 (50%)
	Ability express themselves	3 (25%)
	Learning how to transfer information	4 (34%)
	Gaining critical perspective	5 (42%)
	Increasing self-confidence	6 (50%)
	Ability to interpret	5 (42%)
	Creativity	1 (9%)
	Inquiring	5 (42%)
	Better learning	12 (100%)
	Gaining the habit of writing	1 (9%)
	Gaining different perspectives	2 (17%)
	Taking responsibility	1 (9%)
Journaling	Transfer of information	3 (50%)
	Creating awareness	1 (17%)
	Ensuring learning	6 (100%)
	Ensuring permanence	3 (50%)
	Reinforcing knowledge	1 (17%)
	Inducing thought	1 (17%)
	Including sincerity/emotions and thoughts	5 (84%)
	Ability to interpret	2 (34%)
Teacher Roles	Questions	11 (92%)
	Transfers knowledge when needed	10 (83%)
	Summarizes at the end	1 (9%)
	Guides the discussion with questions	5 (42%)
	Critical	5 (42%)
	Supportive	3 (25%)
	Gives time to think	8 (67%)
	Listens	4 (34%)
	Supervisor	2 (17%)
Student Roles	Preparation before class	9 (75%)
	Active in class	4 (34%)
	Critical	2 (17%)
	Studies	3 (25%)
	Researches	5 (42%)
	Self-improving	2 (17%)
	Presenter	5 (42%)
	Discusses	4 (34%)

When the students compared the Science Teaching Laboratory class to the ABI approach and the traditional one, the topics they emphasized the most in the interviews were the discussions. They stated that in the previous years, they conducted experiments by following the steps laid out in the guides called "experiment sheets," that they reported the data without being

sure if it was correct or not, and that they could not receive any feedback about it. The students said that this semester, they researched the subjects they were curious about, designed their experiments and conducted them in the laboratory, presented their experiments to other groups and discussed the subject matters. The Student with code S1 expressed the importance of the discussion in the ABI process with the following sentences: "*…We used to receive sheets titled "Experiment 1," "Experiment 2" We would only follow the directions on them. And then, we would make comments according to the results of the experiments. However, now we have discussions, talk to each other, and everyone participates in the dialogue. We learn many things instead of just one thing. Everyone conducts an experiment they are curious about and explains it in discussions. I think this approach is more informative. Also, we did not use to inquire into things in laboratory classes, but now, if we do not understand something, we can ask our questions during discussions. That way, information becomes more permanent.*" Student coded S5 offered a similar statement and explained that the discussion opportunity ensured the information's permanence and improved their self-confidence.: *"…There was no discussion opportunity in the previous semesters. There were only individual groups. However, now we have large groups where we present our ideas. These groups ensure the permanence of information. Also, my self-confidence has improved, and I can now express my ideas more comfortably. I was not such an active person before.*" Student coded S6 mentioned that they learned by discussing the information during class and adopted this approach in their daily lives: *"...I have learned about the scientific discussion. I have learned how to handle a topic discussed outside of class when I go into a different setting. Conducting classes with this approach has taught me how to discuss if nothing else.*" These statements show that the discussion process positively affects students and improves their reasoning skills.

Students stated that they had learned the information better with the ABI approach and thought it had become more permanent. Student coded S4 described the process that shaped the information as it passed through various stages: *"… First, we research the subject. Then we determine questions according to our research. Then we look into those questions, and we do experiments. Then we discuss what we did with the groups and with you. Finally, we recall all the stages and report on them*.". Student coded S1 said that these practices made the knowledge they acquired more permanent: *"...In this way, information is more permanent, more memorable. It is a very instructive method…*"

In the semi-structured interviews, the students described the changes they had experienced in themselves as; being more attentive, improved communication skills, expressing themselves comfortably, learning how to transfer information, gaining a critical perspective, improved self-confidence, gaining the ability to interpret the ability of inquiry, adopting the habit of Writing, learning better, gaining different perspectives and taking responsibility. The students stated that this process increased their self-confidence and that they learned how to give criticism. The Student coded S5 stated these improvements: *"...I can now criticize all the groups. I do not know what the other party thinks about my idea; they might like it or not. That does not make me uncomfortable*." Students coded S12 stated that they gained a critical perspective and learned how to be more open to criticism in this process: *"...I have become a little more open to criticism. Because I was not open to criticism, I can now appropriately respond to criticism and properly criticize others.*" Student coded S6 gave a similar statement and summarized the changes in themselves: *"… I started noticing the things that I did not before in daily life. I used to think rather simply, but now I have a broader point of view. This process had great advantages for me in terms of expressing myself*." Another student, coded S3, said: "… *In the first week, I could not even articulate the things I knew during my presentation, but in recent weeks I have become so comfortable speaking that I can almost convince the class of anything I want. My self-confidence has improved... I have learned how to speak in front of a crowd*" stating that the process improved their self-confidence and communication skills.

Students coded S1 stated that they could view ordinary events from a scientific perspective and that they had become more attentive, describing the changes that the process has created in them with the following sentences: *"…I have become more attentive. My point of view has changed. I no longer say, ' The leaf is swimming in the water,' but I articulate, ' Because it has less density than water, it floats.' Also, I used to have no idea how to convey this information to my future students, but now I have learned how to do that, and I know the method of transferring information.*"

The students expressed the changes they had experienced as learning how to transfer information, increased awareness, better learning, the permanence of information, reinforced knowledge, thinking more, conveying sincere emotions and thoughts and gaining interpretation skills. Students coded S6 stated that they learned more quickly through Writing and that writing information down repeatedly while journaling was beneficial in terms of permanence of the information: *"... Writing helps me learn. I repeat everything as I write, and then I read it all. I check to see if the person reading it will understand it. I keep repeating those as I read. This repetition helps me to learn better.*" The same Student also said that journaling facilitated the transfer of information because it had room for emotions and thoughts and provided an intimate atmosphere. "...*I improvise as I write as if there is someone in front of me. I convey the information I have more comfortably in a conversational mood.*" The Student coded S4 made a similar statement: *"...I do not think journaling should be formal. I wrote comfortably and sincerely in light of my feelings and thoughts. That helped me learn.*" They added that they had found a way to transfer information while journaling by saying, *"...I have learned how to teach a subject to my students in a way that they can understand when I start teaching in the future. I came up with examples; I wrote stories. It has helped me improve.*" These comments show that the Student coded S4 was satisfied with this activity.

In light of the answers given by the students, the researcher examined the position of the teacher in the class in two categories passive and active. The teacher who gives students time to think to answer questions, listens to their presentations and observes them is passive in the classroom with these roles. The teacher who asks questions transfers information when needed, criticizes,

guides the discussion with questions, supports the students during the discussion, summarizes the subject at the end of the class, and is active in the classroom with these roles.

Student coded S3 stated that the teacher visited the groups during small group discussions and gave the students time to think before answering questions posed: *"...You asked us questions, but did not want an immediate answer. You gave us around 10 minutes to think. Moreover, we tried to find the answers to your questions*." Another student coded S4 stated, *"...The teacher was like a supervisor. S/he corrected us whenever necessary. S/he also criticized us when necessary and asked us questions about our experiment set-ups. S/he never directly pointed it out if something was wrong*." The same Student also stated that the teacher gave directions that would make the students more active in the process.

"*I think it was completely a student-focused study. For example, when we created our set-ups incorrectly, s/he did not directly reject them. S/he made the students see it for themselves. S/he was thinking, 'Do it yourselves so you can learn.*" A similar statement was provided by the Student coded S2: *"...You criticized our questions, asking whether they were meaningful or not. You visited the groups and asked questions about the subjects and the experiments. I think that encouragement stimulated our prior knowledge. You gave us time to think about the questions you asked. Moreover, when we asked you a question, you would reply, 'I do not know; you can demonstrate that for us.' So, the goal was to keep us active throughout the process*."

Student coded S11 said, "*The teacher was an observer. S/he was trying to determine 'What are the students doing, how are they doing it, what are the misconceptions they have?' and trying to correct them by guiding us with questions. If s/he did not get an immediate response, s/he has the students some time to think. Moreover, they summarized the subject at the end of the class*" and emphasized that the teacher did not provide the information directly. However, that s/he tried to eliminate the students' misconceptions by asking them questions. Another student coded S6 said: *"… The teacher never told us we were wrong, even when we made mistakes. The teacher did not give us fish, s/he taught us how to fish*," emphasizing that the Student was at the centre the whole time and that the teacher was trying to teach them how to learn.

After the questions posed to the students by the researcher regarding their roles in the process, the students were found to have roles such as preparing before the class, actively participating in the class, studying, criticizing, inquiring, constantly improving themselves and participating in discussions. The sample statements of the students on this subject are as follows: S1: "*We read the theoretical information before the class, which probably will not be recalled the next day. However, we see and prove this information during the class, so it becomes more permanent.*" S4: "*The students do research before class. They do scientific research. Moreover, they conduct and present their experiments during class. So, they are presenters."* S6: "*Students improve themselves. They come to the class prepared. Moreover, they present their experiments*." S9: "...*We prepare before class to better grasp the theoretical subjects. We present what we did during the experiment to the class and try to reach the truth by discussing the points that draw criticism*." The students' statements showed that coming to class prepared is the most critical role the students have in the argumentation process. The Student coded S3 emphasized the importance of coming to class prepared by saying, "*One can always tell which Student is unprepared for the class. If the Student wants to learn something, s/he should study and be prepared for the class*." Similarly, the Student coded S7 said, "*If the Student comes to the class without having done any research, s/he cannot do anything during or after the class. S/he can learn a couple of things during discussions at the most. There is no point in coming to class if you have not done any research beforehand*" and underlined the importance of coming prepared for the class.

Interviews with the Control Group

Examinations of the data obtained from the interviews with the control group students revealed different themes. These themes are the course process and the roles of the teachers and the students. Findings related to each theme were examined under separate headings. The themes, codes and frequencies resulting from the examination of the interviews are given in Table 8.

Table 8. Themes, codes and frequencies resulting from the examination of the interviews with the students in the control group

Theme	Code	Frequency (%)
Course process	Using experiment sheets	6 (100%)
	Not providing permanent learning	6 (100%)
	Memorization	6 (100%)
	Easy experiments	3 (50%)
Teacher Roles	Supervisor	6 (100%)
Student Roles	Not preparing before class	5 (66%)
	Writing the report in class	6 (100%)

As a result of the interviews conducted with the control group students, they stated that the activities they performed using the traditional method were not really efficient and that achieving an obvious result did not facilitate learning more. The statement of the student coded S_{14} can be given as an example. *"…"We just do the experiment, we state everything that happened and move on.. But in the end, it does not give us anything else. It only provides us with verbal information."* Another student, coded S_{15} similarly stated that they would quickly forget what they learned: *"Since I study only for the exam, I forget the information once it is over."* The student coded S_{15} stated that the students did not come to class prepared most of the time, and the fact that the coursebook had all the steps that they needed to follow for the experiment made things easier for them. *"We were told a week in advance what experiments we were going to do. And the materials that we needed to use for the set-ups were all listed in the*

coursebook. We just bought them, set them up, and did the experiments. The result was already known, so we kept the experiment going until we reached that." revealing that they conducted experiments based on memorization and results.

The students stated that the role of the teacher in the classroom in the traditional method, was more passive and that they needed the guidance of the teacher. *"I would like the teacher to go up to the board and explain things, to be honest. I would like to have some theoretical knowledge about the exam, the course of the experiments, and the application methods,"* said the student coded S_{16}, and added that they needed the teacher's knowledge and that learning from the teacher is the best way. *"That's the way it has always been. I expected the teacher to teach things."*

The control group students were briefly informed by the researcher about the ABI approach and asked whether they wanted the class to be conducted in this way. Student coded S_{14} stated that they would indeed prefer this method, saying, *"I would like to try that approach. Because I think it will help me learn more. I will do everything myself as if I am starting from scratch. I will learn by experience, without obsessing about whether it is right or wrong. I will enjoy that more."* The student coded S_{16} supported that statement and said that the efficiency of a discussion environment was the main reason for preferring the ABI approach. They said *"Mistakes can be detected more easily in a discussion environment. And that ensures better learning."*

DISCUSSION and CONCLUSION

The research was carried out to investigate whether there was a significant difference in the science achievement of groups of students in subjects taught with the ABI approach supported by a metacognition activity, taught by using the ABI practices alone, and the groups taught with the traditional approach. The results of the studies carried out with this purpose showed that the science achievement of students in a learning environment where the ABI approach was supported with a metacognition activity was higher than that of students in learning environments using a traditional approach and ABI practices. This difference between students was detected in line with the Science Achievement Test and student interviews.

Examination of the pretest findings revealed that the experimental and control group students had similar success levels at the beginning of the study. When the Science Achievement Test posttest findings were examined, it was concluded that there was a significant difference between the experimental and control groups' total scores on the open-ended questions and the total test score. The students in the experimental groups were found to be more successful than the control group students. This result is consistent with the opinions and studies of Keys et al. (1999), who stated that the ABI approach increased the concept learning levels of students at different grade levels.

ABI requires students to think, establish relationships between data, interpret data, and explain results by making connections between claims and evidence, which improves their high-order thinking skills (Kabataş Memiş, 2011). Since ABI, which can have all the effects mentioned earlier when used on its own, is considered to produce better results when supported by metacognition activities, journaling activity was added to ABI practices in the study. Many studies show that ABI practices create significant differences in the posttest scores of students (Akkus et al., 2007; Hand and Keys, 1999; Hohenshell & Hand, 2006). The results of those studies can be said to be consistent with the results of our study.

There was no statistically significant difference in science achievement between the experimental group where argumentation practices were supported with metacognition activity and the experimental group where argumentation practices were done independently. However, in terms of group averages, it was concluded that the average science achievement of the experimental group, where journaling activity was used, was higher than the science achievement of the group where only argumentation practices were performed, and that metacognitive activity had a positive effect.

There is a connection between learning, a mental activity, and writing (Emig, 1977). Writing has always been essential for individuals to convey their ideas about science. Writing practices can serve as a means of learning for both the writer and reader (Klein, 2000). While writing practices incorporating traditional approaches ensure that the existing information is repeated and transferred to the paper, those using contemporary approaches enable the information to be handled from different perspectives. During the ABI process, where students actively use writing practices, they can revise the information and make sense of it before using it. Expressing opinions and thoughts in writing requires being mentally active. Expressing things in writing facilitates the definition of problems, mental interpretations, reasoning, making inferences and expressing oneself better (Doğanay & Ünal, 2006). Writing helps students improve their high-order cognitive skills, better understand their learning methods and develop their metacognition awareness regarding learning strategies (Prain & Hand, 1999). This ABI process, supported by metacognition activity, will considerably increase learning efficiency. The argumentation process is an application that activates the cognitive and metacognition mechanisms with language practices (Günel et al., 2010). Therefore, supported by writing activities, the ABI approach will increase the success rate even more.

In the interviews, the students emphasized that they were constantly interacting with their peers throughout the ABI process, that they learned what they did not know from each other, they had the opportunity to think more about the subjects by doing experiments on them, and that they tried to find answers to their questions through discussions inside and among the groups. Students gained the ability to inquire more because they were constantly experiencing a reasoning process during ABI practices. Students go through an inquiry-based discussion process and actively learn science concepts with the claim-evidence construct. During the interviews, the students stated that they were looking for answers to their questions and were active in the process. In the traditional approach, the students stated that they carried out the experiments assigned to them by rote, following the

exact order of the necessary steps, that they were aware that they would reach an already-known result, and that it did not make the lesson attractive to them. The students also stated that the information they learned with the experiments they carried out by following the book was not very permanent and that they could not learn very well. These statements showed that those activities included in the traditional approach were inadequate in learning the information and that the permanence of the information learned was lower.

Students experience a scientific discourse during the ABI process. Discourse, which has an important place in the creation of scientific information, includes the interpretation made by students regarding alternative explanations, their reasoning about which of these explanations they prefer and why they prefer them. Throughout the discourse, students achieve a more precise conceptual understanding by challenging their peers, expressing their doubts, offering alternatives, and evaluating options (Driver et al., 2000). In this study, students actively participated in learning and structured the concepts with their peers. In addition, dialogues that the students participate in as part of the discourse activities are a powerful tool for developing high-order thinking skills (Erduran et al., 2007). The ABI process provides students with the opportunity to construct rich field knowledge and help them gain scientific literacy skills, which are frequently emphasized by national and international standards (Hand et al., 2004). This approach also provides access to cognitive processes, aims to develop students' critical thinking and communication skills, improves scientific literacy, encourages students to speak and write, creates a scientific culture, and enables students to socialize and develop their inquiry skills (Newton et al., 1999).

Experimental group students stated that they experienced specific changes at the end of the process, which was in the desired direction. The students who have stated that they have experienced positive changes in speaking in front of a crowd, expressing themselves, and defending an idea in line with certain principles, which show that they have gained self-confidence, a sense of responsibility, and a critical point of view. We can also conclude that the students in the ABI group who also did journaling activity are better able to express their feelings and thoughts thanks to journaling. Because putting information down on paper while revising helps them see how they can explain a subject more efficiently and increases their sense of responsibility. In addition to the ABI process and the student's writing and speaking, journaling activities enable them to express information differently, ensuring deep conceptual learning (Hand et al., 2004).

Since the students went through a continuous reasoning process, we can conclude that they have gained the ability to inquire. Awareness of the changes in themselves enabled the students to use their metacognition skills. Journaling, a metacognitive activity, is essential in enabling students to think more deeply about a subject and how they can convey it better. When students try to convey scientific concepts related to a subject, they have to mould it into a form that the reader can understand, which is the daily language used in everyday life. This effort stimulates metacognitive thinking (Wallace & Hand, 2004). Students revise information through writing. They can also find the opportunity to evaluate themselves within the process through self-evaluation. During the interviews, the students stated that self-evaluation helped them realize their deficiencies and positively move the process and their learning.

In conclusion, using the ABI approach in learning environments facilitates conceptual learning and the development of higher-order thinking skills. The benefits provided by the ABI approach should be used more in educational environments, and students should be able to experience this process frequently. Using the ABI approach in science classes improves students' positive attitude towards science, helps them achieve more meaningful and permanent learning, and teaches them to respect and care about other ideas. ABI activities improve problem-solving, decision making and critical thinking skills and encourage high-order thinking (Hand, 2008). With the help of ABI activities, individuals achieve significant outcomes academically and for use in daily life. Metacognition, essential for science learning, is an important dimension of scientific literacy (Ulu & Bayram, 2014). Reading and writing activities that facilitate information structuring depend on metacognition, one of the most critical components of scientific literacy. Günel et al. (2010) stated that ABI is an approach that activates cognitive and metacognition mechanisms with language practices in inquiry-based learning environments. It can be concluded that laboratory work supported by metacognition activities is more successful than performing it with classical approaches and methods. In light of these results, we can say that popularizing the ABI approach and the ABI supported by. Metacognition activities are critical in raising individuals who are self-confident, self-improving, actively learning and able to use language more competently.

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Statements of publication ethics

We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

Researchers' contribution rate

The study was conducted and reported with equal collaboration of the researchers.

Ethics Committee Approval Information

Ethics Committee Approval is not required since the data of the our article is before 2020.

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| Research Article / Araştırma Makalesi |

Effectiveness Of Social Studies Teaching With Storıes According To Social Studies Teacher Candidates

Sosyal Bilgiler Öğretmen Adaylarına Göre Öykülerle Sosyal Bilgiler Öğretiminin Etkililiği

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1.Social studies
2. Use of story
3. Teacher candidate
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Abstract

Purpose: Using literary works such as stories within the scope of the social studies course is considered supporting teaching material. Thus, it is essential for social studies teacher candidates to practice using stories in their lessons before their professional life. This study aims to determine the opinions of social studies teacher candidates on using stories.

Design/Methodology/Approach: The sample group of the survey designed according to the case study of qualitative research designs is 20 social studies department second-year teacher candidates studying at a state university in Turkey in the spring semester of the 2020-2021 academic year. Semi-structured interview form was used as a data collection tool in the study. The data collected within the scope of the research were analyzed by the descriptive analysis method.

Findings: As a result of the research, it was ascertained that the use of stories, according to social studies teacher candidates, provides many gains both in the course process and individually, including the teaching of various concepts in the course content and the acquisition of values and skills determined in the curriculum.

Highlights: It was revealed that according to social studies teacher candidates, the use of stories in the course process has effects on making lessons more interesting, reinforcing what is learned and providing permanent learnings.

Öz

Çalışmanın amacı: Sosyal bilgiler dersi kapsamında öykü gibi edebi eser kullanımı, dersi destekleyici öğretim materyali olarak değerlendirilmektedir. Bu nedenle, sosyal bilgiler öğretmen adaylarının meslek yaşantılarından önce derslerinde öykü kullanımına yönelik pratik kazanmaları önemlidir. Bu araştırmanın amacı sosyal bilgiler öğretmen adaylarının eğitimde öykü kullanımına ilişkin görüşlerini belirlemektir.

Materyal ve Yöntem: Nitel araştırma desenlerinden durum çalışmasına göre tasarlanan araştırmanın örneklem grubunu 2020-2021 eğitim-öğretim yılı bahar yarıyılında Türkiye'de bir devlet üniversitesinde öğrenim gören 20 sosyal bilgiler bölümü ikinci sınıf öğretmen adayı oluşturmaktadır. Araştırmada veri toplama aracı olarak yarı yapılandırılmış mülakat formu kullanılmıştır. Araştırma kapsamında toplanan veriler betimsel analiz yöntemiyle çözümlenmiştir.

Bulgular: Araştırma sonucunda sosyal bilgiler öğretmen adaylarına göre öykü kullanımının ders içeriğindeki çeşitli kavramların öğretimi ve öğretim programında belirlenen değerlerin ve becerilerin kazandırılması şeklinde hem ders sürecine hem de bireysel anlamda birçok kazanım sağladığı tespit edilmiştir.

Önemli Vurgular: Sosyal bilgiler öğretmen adaylarına göre ders sürecinde öykü kullanımının derslerin daha ilgi çekici olması, öğrenilenlerin pekiştirilmesi ve kalıcı öğrenme sağlamasında etkileri olduğu ortaya çıkmıştır.

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INTRODUCTION

The social studies course aims to raise responsible citizens in the learning-teaching process along with various social sciences disciplines that also constitute the course's content in a holistic way. The organization of learning in a social structure is directly associated with the development of individuals, and the function of the social studies course, which plays a vital role in this process, is also expanding. Teachers should familiarize themselves with each student individually and have a perception of their interests and talents. In this sense, a method based on broad teaching that reflects student differences in a multidimensional manner should be followed in today's classrooms (Zarrillo, 2016). In the social studies course, assisting children in understanding themselves and the community they belong to becomes possible as they are involved in activities that attract their attention and help them achieve social and individual gains (Şimşek, 2015). Although these activities cover various teaching methods and techniques during the course process, the teaching materials and student-centred practices applied in this process help to achieve the learning gains of the course. Literary works that will be included in the textbooks as the primary source and brought to the classroom environment through various sources are also essential elements in achieving the goals of the social studies course, thanks to the features of their contents.

Individuals, who learn by experiencing social studies education through literary works, become responsible citizens with the awareness of using various resources in their work lives. The fact that these efficient citizens can think critically/analytically and develop attitudes and values separate from dogmas necessitates the development of verbal and written language skills. In this respect, the richness of social studies content becomes one of the most important tools for various reading, writing and speaking activities (Öztürk & Otluoğlu, 2011). Among literary works, stories are defined as "the narrative of a real or realistic event verbally or in writing" (Turkish Language Association, 2015). From this point of view, stories are becoming learning environments that facilitate children's evaluation of various events and relationships they observe and experience in the context of cause and effect. In addition, the protagonists' solutions to the words, behaviours or problems in the stories also serve as role models and examples for children (Akdağ, 2020). Due to its similar benefits, stories are also included in primary school curricula, which have undergone some transformation. In the curricula in which the constructivism approach is dominant, examples from daily life are given, and the topics are determined within the scope of authentic learning. Accordingly, it can be claimed that stories are essential in ensuring the increase in real-life experiences in social studies education (Sever, 2017). The Ministry of National Education (2018) underlined that the social studies course should be supplemented with stories and similar literary works in the social studies curriculum. Students should be encouraged to read literary works that will make them love the course subjects. Moreover, direct gains related to the use of various literary works such as stories are expressed in the curriculum.

In literary works such as stories, everyday life characteristics existing in the period of the storyline are beneficial in providing the cognitive field acquisitions of the social studies course; on the other hand, the attitudes and behaviours of the protagonists in these works help provide the affective field acquisitions of the social studies course. In addition, students will develop both their mother tongue learning and self-expression skills by acquiring the skills of reading, listening, speaking and writing (Çelik, 2019). Stories assume the role of a tool in the recognition, adoption and cultural transfer of the values and moral systems in the social structure in which the child exists. In the case of stories, it is possible to observe real-life exemplary behaviour practices in interpreting protagonists and content for concepts such as good and evil, right and wrong (Akdağ, 2020; Demir & Akengin, 2011; Karatay, 2007). Acculturation and socialization (Öztürk & Otluoğlu, 2011), which covers the affective field rather than the cognitive and psychomotor field, cannot be fully achieved in the student's immediate environment with the family. Stories also become a reality in students' lives as individuals through the messages they convey and contribute to their socialization through the enhancement of communication with the society they live in (Akdağ, 2020). In addition, stories that are also appropriate for contextual learning because they ensure integrity with the past are mainly preferred by social studies teachers due to the intensive historical structure of the social studies course (Kaymakçı, 2013; Ünlü, 2016; Ünlü & Ay, 2017). It is an essential factor that short, meaningful events and situations enable convenience and flexibility in imparting the targeted skills and values in the frequent preference of stories in the social studies course process. In addition, the inclusion of various concepts and phenomena in the stories' contents is also essential.

Stories are an alternative teaching tool so that social studies could be intertwined with the targeted life and based on student experiences, away from rote learning. It is a supplementary material with various teaching methods and techniques adopted in the learning-teaching process (Demir & Akengin, 2011). The best way to benefit from the fiction of the stories in the course process is to consider each story as a supplementary tool and to encourage students to read and evaluate the stories independently, away from specific concerns (Zarrillo, 2016). However, using stories as supplementary teaching materials in the social studies course requires various teacher competencies. These competencies include having theoretical knowledge on the subject and professional skills, experience and effort to implement such knowledge (Avcı & Asma, 2017; Öztürk & Otluoğlu, 2011). Teachers should assess the stories they will benefit from in their courses in line with the criteria of determining the type, quality, suitability for student development level, literary language, time, space, person and grammar structure and accessibility (Akdağ, 2020; Ünlü & Ay, 2017). Otherwise, stories that are used as a reading activity implemented only at certain intervals during the course without any plan and purpose, and that are not analyzed with questions and are not suitable for the course content will not contribute to the success of the students (Ünlü & Ay, 2017; Şimşek, 2015). Given the difficulties mentioned, it is

clear that the selection and use of stories as teaching materials during the course should be arranged within the framework of specific criteria. In this sense, the training of teachers should also be provided within the scope of competencies.

When the literature is analyzed, it is understood that the studies evaluating the use of stories within the scope of social studies teaching are limited. To set an example, studies on the use of stories in social studies involving primary school students (Combs & Beach, 1994; Sidekli, Tangülü and Yangın, 2013; Şimşek, 2006), studies involving social studies teachers (Er & Kaymakçı, 2018; Ünlü, 2016; Sömen & Göksu, 2017), studies involving pre-service teachers (Kolaç & Özer, 2018; Yeşilbursa & Sabancı, 2015) and studies involving both teachers and pre-service teachers (Beldağ & Aktaş, 2016) can be considered. No study in the literature involves the practices for the concept, value and skill areas and various achievements through case story reviews of pre-service social studies teachers. Accordingly, this study is essential in terms of questioning what pre-service teachers should pay attention to when choosing stories as a learning-teaching aid as the social studies teachers of the future and their review experiences in evaluating the teaching curricula of stories for three main areas such as concept, value and skill teaching. In this context, the purpose of the study is to determine the reflections of using the stories in social studies courses on the teaching process in line with pre-service teachers' views. To this end, the study aims to determine the reflections of using the stories on the concept, value and skill learning, teaching process and student achievements within the scope of social studies lesson, in line with pre-service teachers' views. Following sub-questions assessing the views of pre-service teachers were determined by the purpose of the study:1. According to pre-service teachers, which concepts/subjects can be taught by using stories in social studies course?

2. According to pre-service teachers, which values can be taught by using stories in social studies course?

3. According to pre-service teachers, what skills can be acquired by using stories in social studies course?

4. According to pre-service teachers, what are the possible contributions of using the stories in social studies course to the teaching process?

5. According to pre-service teachers, what are the possible contributions of using the stories in social studies lessons to students?

METHOD/MATERIALS

This study aims to examine the reflections of using the stories in the Social Studies course on the teaching process from the perspective of the pre-service teacher, which is designed according to the case study, which is one of the qualitative research designs. In the case studies, the factors related to one or more cases are investigated with a holistic approach; and in-depth research is conducted on both how they affect the relevant case and how they are affected by the case in question (Yıldırım & Şimşek, 2013). Merriam defines qualitative case studies as "the intensive, holistic identification and analysis of an example, phenomenon or social unit" (Merriam, 1998, p.27). It is informed that case studies are of different kinds in the literature. This research was conducted based on an explanatory and descriptive case study design. In such studies, one or two case studies are used to provide information about a situation. Such exceptional cases try to make unfamiliar situations more familiar and allow the reader to interpret the subject. The selected space should be a typical place with significant changes and should contain a small number of situations to draw the reader's attention (Datta, 1990; as cited by Aytaçlı, 2012, p. 3). In this research, the views of pre-service social studies teachers on the use of stories in the course were described in detail.

Study Group

The study group of the research consists of pre-service social studies teachers. In determining the study group, convenience sampling, one of the purposeful sampling methods, was applied. In this direction, 20 sophomores studying in a state university's social studies teaching department were selected. The reason for selecting the sophomores is that these students were informed about "Social Studies Teaching with Stories" within the scope of the Social Studies Learning and Teaching Approaches course before the study. It is predicted that students, who are informed about the benefits of the story used in the course, will make more evaluations regarding the effects of stories on subject concepts, skills, values and student behaviours.

Data Analysis

The data acquired in the study were analyzed by descriptive analysis, which is one of the qualitative data analysis approaches. As part of the descriptive analysis, direct quotations are included in order to reflect the opinions of the interviewees in the most effective way (Yıldırım and Şimşek, 2013). First of all, the interviewees were assigned sequence codes as "K1" and the interviews were transcribed. The categories acquired as a result of the descriptive analysis were converted into frequencies and then arranged visually and tabulated. In order to ensure the reliability of the research, the formula of inter-coder consensus (reliability) was used. The data were coded by both researchers and reliability was determined to be between 88 and 90.3 for five questions. This indicates the inter-coder consensus.

Data Collection Tools

In the research, three stories included in the 6th grade textbook of the Ministry of National Education (2019) were used as data collection tools. A semi-structured interview form with 5 open-ended questions was applied for each of these stories. To

seek opinion, the prepared interview form was presented to a Social Studies and Turkish education specialist. In line with the feedback provided, the questions were reviewed and the interview form was finalized and the interviews were conducted accordingly.

FINDINGS

The findings, which are acquired in line with the research questions, are supported by direct quotations from the opinions of teacher candidates in accordance with the descriptive analysis approach and presented below.

Within the scope of the study, the participants were asked "Which concepts/subjects can you contribute to teaching your students by using this story in the course?" . The responses given by the participants are shown below:

Table 1. Views on which concept/subject the stories can be used in teaching

The story of Parking lot		The story of the English Channel		The story of Life	
Code	**(f)**	**Code**	**(f)**	**Code**	**(f)**
Democracy	13	Affirmative action	13	Stereotype	14
Justice	12	Bias against women	13	Prejudice	13
Equality	10	Equality	12	Considering the differences	13
Freedom	10	Women's rights	11	Discrimination	12
Respect	10	Values	9	Respect	10
Responsibility	9	Gender discrimination	8	Empathy	10
Independence	9	Democracy	8	Responsibility	9
Rights and freedoms	8	Justice	7	Marginalization	8
Election	5	Social and political representation of women	7	Living in harmony	6
Sensitivity	5	Rights granted to Turkish women	7	Hardworking	4
Solidarity	5	Struggling	5	Hope	3
Republic	4	Believing	4	Endeavoring	3
Peace	4	Violence against women	4	Self-Control	3
Human rights	4	Civil code	3	Love of reading	2
Active citizenship	3	Self-confidence	1	Self-awareness	1
Political representation	2	Responsibility	1	Fulfilling the dreams	1
Patriotism	2				
Referendum	1				

When Table 1 is examined, the participants stated that they could use the Parking lot story given to them in teaching the concepts/subjects related to "*democracy (13), justice (12), equality (10), freedom (10), respect (10)*" at the most and "referendum (2), patriotism (2), political representation (2)" at the least, respectively. The participants stated that they could use the short story titled "*The Story of the English Channel*" in the teaching of the concepts/subjects related to "*positive discrimination (13), prejudice against women (13), equality (12), women's rights (11*)" at the most, and the concepts/subjects related to "*responsibility (1), self-confidence (1), civil code (3)*" at the least, respectively. For the short story of the Life, the participants stated that they could use it in teaching the concepts/subjects related to "*stereotypes (14), prejudice (13), considering the differences (13), discrimination (12)"* at the most, and the concepts/subjects related to "fulfi*lling the dreams (1), self-awareness (1), love of reading (2)*" at the least, respectively.

Participants believe that the Parking Lot story can be used in teaching the subject of Democracy at the most. For instance, K6, one of the participants, explains this situation with the following words: "*Democracy, respect for human will, election, freedom of thought, the uncertainties and negativities between people and societies. We can use it in teaching the subjects of providing a decent environment, without the need for violent things, by respecting ideas and people, and reinforcing this with election and Democracy.*". Participants believe that this story will be used most in teaching subjects related to justice in the second place. One of the participants, K19, expressed this idea with the words "It *can be used in teaching justice, democracy, free will, election, vote, equality, citizenship rights*". For this story, another participant, K5, thinks that it can enable teaching of various concepts and subjects related to the referendum: "*This story can be used on various subjects such as a referendum, affirmative action, will and freedom, respect, democracy, sovereignty, independence, rights and active citizenship*". The participant expresses his/her views with the words above.

Participants think that the story of the English Channel, which is given secondly, can be used in teaching positive discrimination and bias against women at the most. One of the participants, K14, expressed his/her views on this subject with the concepts of "*positive discrimination, women's rights, women in social life, equality*," on the other hand, one of the participants, K3, expressed his/her views with the concepts of "*positive discrimination, justice, freedom, democracy and universal values, equality of women and men*". Furthermore, it is observed that the least emphasized concepts related to this story are "responsibility and self-confidence", each of which is mentioned by one participant. K16, another participant, expressed that this story can teach struggling and self-confidence during the course with the words, "*This story teaches students to struggle; it demonstrates that self-confidence will bring success even if you are among your opponents in very challenging conditions*".

Participants think that "*the story of life*" can be used in teaching stereotypes, prejudice and considering the differences at the most. Regarding this finding, participant 17 emphasized that the story could be used on social issues such as stereotyping and prejudice with the statement, "*I think it is related to the field of Individual and Society learning*". One of the participants, K1, expresses his/her views on this subject with these words "*I think it can be used when teaching subjects such as prejudice, discrimination, responsibility, environment, effort, chasing dreams, what is the perspective of such people in society?*" "I*t can be used when explaining the issues of adapting to society, respecting different preferences, not being biased against differences, and how biased behaviours damage relationships".* K2, one of the participants with similar views, explains that the story can be used in "*teaching subjects such as living in harmony in society, questioning prejudices against differences, empathy*". However, it is also understood that there are participants who think that this story will be used in teaching self-awareness and fulfilling one's dreams.

Within the scope of the study, the participants were asked, "*Which values can your students achieve from using this story in your course?".* The responses given by the participants are shown below:

Table 2. Views on what values the stories can be used to acquire

The story of Parking lot		**The story of the English Channel**		**The story of Life**	
Code	**(f)**	**Code**	**(f)**	**Code**	**(f)**
Respect	16	Respect	17	Respect	15
Freedom	14	Hardworking	14	Benevolence	14
Justice	12	Equality	13	Hardworking	13
Equality	12	Patriotism	12	Equality	12
Independence	11	Freedom	12	Sensitivity	12
Responsibility	11	Responsibility	9	Solidarity	12
Sensitivity	9	Sensitivity	8	Responsibility	11
Solidarity	9	Justice	7	Love	4
Patriotism	8	Love	7	Justice	3
Peace	7	Solidarity	4		
		Independence	1		

When Table 2 is examined, the participants stated that they could use the story of Parking lot given to them in acquiring the values of "*respect (16), freedom (14), justice (12), equality (12*)" at the most and "*peace (7) and patriotism (8)*" at the least, respectively. The participants indicated that they could use the story of the English Channel to acquire the values of "*respect (17), hard work (14), equality (13)"* at the most and "*independence (1), solidarity (4)*" at the least, respectively. The participants expressed that they could use the story of Life to acquire the values of "*respect (15), benevolence (14), hard work (13)*" at the most and "*justice (3), love (4*)" at the least, respectively.

Participants remark that the story of Parking lot can be used to acquire the value of "*respect*" at the most. K7, one of the participants explained his/her views as "*The use of this story in the course or its inclusion in the textbook contributes to the conveyance of our values such as respect, justice and sensitivity to the students*". On the other hand, K10, one of the participants, similarly expressed his/her views with the words "*This story teaches the values of respect, respecting for every result, equality, responsibility*". It is noteworthy that they associate the story with the value of freedom most in the second place. K2 expresses this view with these words: "I think this story is very suitable to benefit from while teaching the values of justice, freedom, independence and equality". On the other hand, the value of "Peace" is the least associated value by the participants. For instance, K2, one of the participants, expressed this with the statement of "*the value of justice, peace, freedom, independence and equality can be taught with this story*".

The participants are of the opinion that the story of the English Channel will be utilized most in teaching the value of "respect", in exactly the same way as the story of Parking lot. One of the participants, K1, expresses his/her view with the sentence "*I believe we can teach the values of freedom, respect, love, responsibility, respect for other thoughts, respect for differences, respect for rights and freedoms, justice, hard work and sensitivity*". K12, one of the participants who expressed similar values, voiced oneself with the words of "*Surely, this story teaches respect, respect for differences, hard work, love of people and humanity*". It is seen that the least emphasized value is the "independence" which is only mentioned by a participant: "*It is associated with the value of independence, patriotism, equality and hard work.*" (K2).

Participants arrived at the consensus that the work titled " the story of Life" could be used in teaching the values of "respect" at the most, as in the first two stories. For example, P18, one of the participants, explained his/her views with the statement of "*We can use this story to teach values such as respect, that people should be respectful to each other, moreover, solidarity and benevolence, the necessity of helping the those in need".* Furthermore, one of the participants, K16, explained his/her views with the words: "*This story teaches the values of respect, patriotism, equality and hard work*". Although it is the least number of participants, three participants noted that the value of "justice" can be taught by benefiting from this story. K3, one of the participants mentioned above, stated his/her opinion with the sentence of "*In my opinion, it is associated with the values of respect, justice, equality, benevolence and sensitivity*".

Within the scope of the study, the participants were asked "Which skills can your students achieve from using this story in your course?" . The responses given by the participants are shown below:

Table 3. Views on what skills stories can be used to acquire

The story of Parking lot		The story of the English Channel		The story of Life	
Code	**(f)**	**Code**	**(f)**	**Code**	**(f)**
Social participation	14	Entrepreneurship	14	Recognizing stereotypes and prejudice	14
Critical thinking	13	Empathy	13	Empathy	13
Decision-making	12	Recognizing stereotypes and prejudice	12	Self-Control	12
Innovative thinking	12	Social participation	9	Social participation	12
Perception of the space	11	Decision-making	8	Critical thinking	11
Environmental literacy	11	Innovative thinking	8	Entrepreneurship	11
Entrepreneurship	9	Perception of the change and continuity	7	Decision-making	10
Political literacy	9	Critical thinking	7	Communication	9
Cooperation	7	Communication	5	Problem solving	9
Communication	7	Media literacy	4	Environmental literacy	5
Legal literacy	5	Political literacy	4	Observation	4
Empathy	4	Legal literacy	3	Innovative thinking	4
Perception of change and continuity	3			Cooperation	3
Observation	2				

When Table 3 is analyzed, the participants indicated that they could use the story of Parking lot given to them in acquiring the skills of "social participation (14), critical thinking (13), decision making (12), innovative thinking (12)" at the most and the skills of "observation (2), perception of change and continuity (3)" at the least, respectively. For the story of the English Channel, the participants declared that they could use it in acquiring the skills of "entrepreneurship (14), empathy (13), recognizing stereotypes and prejudices (12)" at the most and "legal literacy (3), political literacy (4), media literacy (4)" at the least, respectively. Lastly, the participants stated that they could use the story of Life in acquiring the skills of "recognizing stereotypes and prejudices (14), empathy (13), self-control (12), social participation (12)" at the most, and "cooperation (3), innovative thinking (4), observation (4)" at the least, respectively.

It is seen that the participants expressed that they could use the story of Parking lot in the teaching of "social participation" and "critical thinking" skills at the most. K13, one of the participants, explained his views on this subject with the following words: "*I believe that this story could teach individuals decision-making skills. Individuals would make a decision by saying yes or no. By voting, they learn social participation skills. The story also provides problem solving and research skills*". One of the participants, K5, verbalized his/her views on this subject as "*It could teach the skills of critical thinking, decision-making, social participation, legal literacy and innovative thinking*". Participants associated the story with the skill of "observation" at the least. K19, one of the participants, ranked and noted this skill as "*decision-making skills, social participation skills, critical thinking and observation skills*".

It is observed that the participants mostly associate the story of the English Channel with the teaching of "entrepreneurship" and "empathy" skills. Accordingly, K1, one of the participants, reflected his/her view with these words: "*I believe that a teacher, who uses this story in a social studies course, can easily teach entrepreneurship, empathy, perception of change and continuity, critical thinking, recognizing stereotypes and prejudice, decision making, social participation, and innovative thinking*". One of the participants, K15, declared his/her view with the following statement: "*We can emphasize social participation entrepreneurship, empathy, innovative thinking, recognizing stereotypes and prejudice and media literacy skills*". However, it is understood that the participants stated that they could teach "legal literacy" skills in this story at the least. One of these participants, K4, stated that "*From my standpoint, the best skills to be taught are legal literacy and social participation skills*".

It is seen that the participants mostly associate the story of Life, which is the last story given, with the teaching of "recognizing stereotypes and prejudice" and "empathy" skills. For example, while one of the participants, P11, expressed his/her views as "*Obviously, I think this story is directly associated to prejudice, stereotyping, problem solving, empathy, communication skills*", K14 among the participants with similar views declared that "*We can use the story while teaching empathy, observation, communication, recognizing stereotypes and prejudice, decision making, and self-control skills*". However, students associated this story with "collaboration" skills at the least. One of the participants, K2 explained this situation with the following words: "*I believe this story helps to teach environmental literacy, empathy, recognizing stereotyping and bias, observation and cooperation skills very well in the course*".

Within the scope of the study, the participants were asked "What can be the contributions of using this story in your course?" . The responses given by the participants are shown below:

Table 4. Students' views on the advantages of using stories for the course

The story of Parking lot		The story of the English Channel		The story of Life	
Code	**(f)**	**Code**	**(f)**	**Code**	**(f)**
Increasing clarity	14	Motivation for the lesson	14	Motivation for the lesson	13

Motivation for the lesson	13	Ensuring permanence	14	Preventing prejudice	13
Ensuring active participation	13	Ensuring active participation	13	Ensuring active participation	12
Reinforcing the subject	12	Reinforcing the subject	13	Reinforcing the subject	12
Complying with classroom rules	12	Understanding gender discrimination	12	Valuing people	12
Creating a democratic environment	11	Avoidance of uniformity	12	Preventing boredom	11
Ensuring permanence	11	Making it more appealing	11	Respectfulness	10
Ensuring better understanding	11	Creating an environment for discussion	11	Providing empathy	9
Teaching respectfulness	10	Creating an environment of respect, tolerance	10	Ensuring permanence	8
Concretization	10	Ensuring better understanding	10	Ensuring better understanding	8
Making it more appealing	9	Teaching how to be a fighter	8	Being a fighter	8
Preventing boredom	8	Popularizing the course	6	Teaching the values	3
Raising awareness of responsibility	3	Being a good role model	4	Being a good role model	2
Providing critical thinking	3	Providing critical thinking	2	Developing reading habits	1
Being a model material	1	Increasing entrepreneurship	1	Critical thinking	1

When Table 4 is examined, the participants reported that the story of Parking lot story given to them have the most advantages of "increasing comprehensibility (14), motivation for the lesson (13) and ensuring active participation (13)", while the least advantages are "being a model material (1), providing critical thinking (3) and raising awareness of responsibility (3)". For the story of the English Channel, it was stated that there are the most advantages of "motivation for the lesson (14), ensuring permanence (14), ensuring active participation (13)"; on the other hand, it was noted that it would provide the least advantages of "increasing entrepreneurship (1), providing critical thinking (2), being a good role model (4)". For the story of Life, it was stated that there are the most advantages of "motivation for the lesson (13), preventing prejudice (13), ensuring active participation (12)" and the least advantages of "critical thinking (1), developing reading habits (1), being a good role model (2)", respectively.

During the research phase, the participants were first given the story of Parking lot. K5, one of the participants, thinks that the use of the parking lot story will increase the permanence and comprehensibility of the course. The participant explains his/her views on this subject with the following words: "*Using this story in the lesson ensures that the concepts we will teach become permanent and understandable. It will improve the student's thinking skills. Instead of direct instruction, it gains the student thinking skills, teaches values and prevents the lesson from becoming boring* ". K11, another participant, expresses his/her thoughts on the use of the parking lot story for the scope and functionality of the concepts, especially in concretization of the learning of abstract concepts, with the following statements: "*Democracy is an abstract concept. This story allows them to learn an abstract concept, thus enabling them to see how things operate and what is done in a democratic society. By teaching this story, the question-answer method can be used in the course, so that an environment of vitality and active participation will be established. The course will be more permanent. Especially with the theme underlining the democracy, the acquisition of rights, responsibility and justice are attempted to be explained and reinforced with these and similar stories.* " Similarly, one of the participants, P7, expressed his/her opinion that the use of this story ensures the permanence of learning during the course process as follows: "*The use of this story in the course provides an example of how to instruct the subject more easily. It enables students to understand the subjects more quickly and make learning more permanent. It demonstrates the importance attached to Turkish women in production, political and social life, from past to present period, and the things Turkish women can achieve if given the opportunity, and it stands as a material that makes it easy to convey to the students that Turkish women are a source of inspiration*". One of the participants, K20, indicated that, by directly associating the use of story with classroom management, it can be beneficial in creating classroom order and ensuring various acquisitions in the learning-teaching process: "*This story teaches to comply with classroom rules. It teaches the person to ask for the floor and to be respectful to each other while expressing his/her opinion on a subject. It gives a sense of responsibility. Moreover, it teaches that order and justice can be achieved by applying democracy in the classroom environment* ".

The second story given to the participants within the scope of the study is the story of the English Channel. One of the participants, K4, who thought that the story of the English Channel would provide advantages such as motivation for the lesson, attracting attention and learning by modeling, gave his/her opinions with these words: "*Telling such stories in the lesson makes the lesson more appealing. In this way, the student comes out of its inner world and concentrates on the lesson. This is a story that strongly reveals the achievements of Turkish women. So, students are provided with the opportunity to recognize role models that represent our country with their achievements around the world and raise national awareness. It allows students to take good, beautiful, moral role models as an example*". Similarly, K13, one of the participants, explains the advantages of using this story for attention and motivation components in the teaching process by preventing the course from becoming stagnant as follows: "*Examples of real life help make the course more interesting and attract students' attention. The story prevents the lesson from being monotonous. The messages to be conveyed in the story arouse curiosity and enable more effective teaching of the course*". K7, who is another participant, expressed his/her views with these statements: "*The use of this story in the course sets an example to explain the subject more easily, and it not only helps the students to understand the subject more quickly, but also makes the learning more permanent. With the use of this story in the course, it is shown that Turkish society reflects the importance attached to Turkish women in production, political and social life from the past to the present period, the things they can achieve if given the opportunity, and it has been a material and facilitated in conveying and adopting that Turkish women*

are a source of inspiration to the students ". By giving these statements, the participant emphasized the intermediary role of the using the English Channel story as a facilitating tool and making the learning permanent in providing the learning outcomes of the course. A participant, who believes that the story makes the lesson entertaining by motivating the students as well as ensuring active participation of the students, supports this opinion with the following words: "*Since it is a subject that can attract the students' attention, it can enable them to teach the lesson in an entertaining way. It can make students more active by creating an environment for discussion*." (K14).

The title of the third story given to the participants is the Story of Life. One of the participants, K1, argues that the use of this story during the course process could make the student more active by preventing prejudice and marginalization behaviors. The participant in question explains this idea with the following sentences: "*Since this story tells the importance of valuing people by keeping a distance from prejudices and without marginalizing anybody, using the story in courses can increase students' active participation by enabling them to think critically. The student becomes more active during the course. Student acquires knowledge by conducting research on the concepts we apply in the course. Moreover, a discussion environment is established in the course* ". Similarly, P12, one of the participants, explains that the use of stories will guide the student to empathize and make him/her active in the course with the following words: "*This text allows students to think about and make inferences. Starting the course with a sequence taken from daily life will keep the perception of the students open and will draw their attention and enable them to listen to the subject better. Students will give examples through similar events. They will actively participate in the course and understand the subject more effectively because they empathize*." One of the participants, K19, emphasizes the facilitating function of the story in guiding the roles and behaviors of individuals in social life with these statements: "*This story avoids allowing any kind of mixing of behaviors, roles and attitudes that differ from each other on the basis of gender in the student. When gender is addressed as an important organizing principle of social life, it makes an important contribution to the course*." P15, one of the participants emphasizing the potential of the use of given story to create both the method and the desired behavior, explains his/her views with the following words: "*This story makes students like the course because a course that is disconnected from life and is taught by direct instruction technique does not appeal to the student. Students begin to look at each other without sense of prejudice since it creates an atmosphere of love and respect in the course. After the story, students can have a reading activity in the course as the value of reading books is explained in the story.*"

Within the scope of the study, the participants were asked "What can be the contributions of using this story in your course to the students?". The responses given by the participants are shown below:

Table 5. Views on the effects of stories on student behaviors

The story of Parking lot		**The story of the English Channel**		**The story of Life**	
Code	**(f)**	**Code**	**(f)**	**Code**	**(f)**
Act democratic	13	Valuing women	13	Being tolerant	14
Obeying the rules	12	Not to discriminate against gender	13	Respect for differences	14
Knowing one's rights	12	Being influenced/aspired by success	12	Avoidance of prejudice	14
Being fair	11	Being a fighter	12	Being helpful	13
Being an effective citizen	10	Showing empathy	11	Showing empathy	11
Respectfulness	10	Being tolerant	10	Resisting challenges	11
Being tolerant	10	Egalitarian thinking	10	Being sensitive	10
Right to vote	9	Avoidance of stereotyping	8	Valuing people	8
Positive attitude towards the course and school	9	Being self-confident	7	Respectfulness	8
Decision-making	8	Respectfulness	7	Being a fighter	8
Egalitarian thinking	6	Development of personal skills	4	Being a good role model	4
Voicing one's opinion	2	Being fair	2	Learning values	1
Being impartial	2	Being a model material	1	Providing critical thinking	1
Ability to take responsibility	1	Gaining national consciousness	1		
Environmental awareness	1				

When Table 5 is analyzed, the participants believe that the story of Parking lot will improve the students' behaviors of "acting democratic (13), obeying the rules (12), knowing one's rights (12) at the most, respectively, and the behaviors of the environmental awareness (1), ability to take responsibility (1) and being impartial (2)" at the least. Participants, on the other hand, think that the story of the English Channel will develop the behaviors of "valuing women (13), not to discriminate against gender (13), being influenced/aspired by success (12)" at the most, and the behaviors of "gaining national consciousness (1), being a model material (1) and being fair (2)" at the least, respectively. For the story of Life, it was stated that they would develop the behaviors of "being tolerant (14), respect for differences (14), avoidance of prejudice (14)" at the most and the behaviors of "providing critical thinking (1), learning values (1) and being a good role model (4)" at the least, respectively.

During the research phase, the participants were first given the story of Parking lot. Research participant K4, expresses his/her views on the importance of individuals acting within the framework of mutual respect with the awareness of citizenship duty and responsibility in solving social problems with these words: "*First of all, the student will learn that in solving a problem concerning everyone in public places, it is necessary to make decisions by taking the opinions of everyone altogether. The student learns that he/she is a citizen and has the right to make a decision (vote). The student is aware of this fact and acts accordingly*

and puts his/her behaviors into action. The student or citizen who is not aware of this fact may not respect the decisions of others by acting self-ordained. Therefore, the use of stories in courses raises students' awareness of what is right and wrong behavior." In a similar way, participant K17 stated his/her thoughts that learning gains can be achieved by using the story in terms of concepts such as the importance of election, rights and equality in democracies with these sentences: "*As we can understand from the story, it contributes to the children to think egalitarian in a possible election or social life, that everyone has a say in the election without distinction between rich and poor, women and men, and that everyone has the right to vote, and that they are more egalitarian and fair individuals towards their environment in this way. The story will contribute to the understanding that whenever there is an event or problem concerning the society, it can be resolved with a civil, impartial vote without the need for chaos and disturbance. This story makes positive changes in students' behaviors so that they can become more democratic, egalitarian and fair individuals. They understand that people respect each other's decisions and learn to be more respectful. They become more respectful and tolerant citizens*." Another participant, K14, described his/her views on the role of this story in students' development of various thinking methods, internalizing values such as respect and acquiring skills of social participation by saying: "*First of all, we would provide students with various skills and values such as decision-making, critical thinking, empathy, being an active citizen, and taking responsibility. Students will be more conscious about voting and fulfill their responsibilities. They will learn to respect the counter-views, even if they disagree with them. They will be socially involved in the many different things that take place in this story.* " K18, on the other hand, similarly underlines the importance of democratic life features and sensitive, respectful and egalitarian perspectives with the following words. "*This story emphasizes the equality to the students. So, it ensures that the students will respect to equality and the ideas of others. The fact that the residents of the neighborhood are satisfied with the democratic environment reflects the positive aspect of democracy to the students and enables them to take part in democratic practices. It guides students to show sensitivity on issues that concern themselves and their environment. It also arouses the desire to live in environments dominated by a democratic atmosphere.*"

The second story given to the participants within the scope of the study is the story of the English Channel. K20, one of the participants, explains the contribution of the English Channel story to students by emphasizing the importance that the story will enable them to evaluate their various preferences in their lives beyond concepts such as gender discrimination and sexist approaches: "*Our students will act more sensitive about gender discrimination and value all people. They will learn to help, regardless of whether a woman or man is exposed to violence somewhere. In particular, they do not look at professions in terms of gender, but in terms of whether they can achieve or not. They will make their professional choices in this way, and they can modify their behaviors to become respectful, fair, more sensitive individuals*." Participant K6 stated that with the use of this story, students will move away from prejudices and develop their empathy skills by making these statements: "*The story enables students to learn the importance of gender equality once again in their social lives by fully understanding it. They will understand what women can achieve if they are valued and supported by the society. Many changes will occur in the behaviors of our students. The student will get rid of stereotypes and develop empathy, which will also trigger formation of many other behaviors. In other words, it reinforces the positive behaviors of the students by ensuring that they act more moderate and humane towards the individuals in the society*." Similarly, K1, one of the participants, stated that the use of this story would be beneficial for students to gain self-confidence with a sense of achievement within the framework of respect with these words: "*Students are aware that everyone has equal rights in order to achieve success. This awareness gives students self-confidence. The students will learn to be more respectful of differences in society. An individual's preconceived notion that he/she cannot succeed turns into a notion that he/she will achieve success*." Participant K9, on the other hand, expressed his/her views on the fact that by overcoming social prejudices and filling the concept of human rights, attracting students' attention to the course, ensuring their motivation, their entrepreneurial desires will develop with the following words: "*We will break down the prejudices about the social value and place of women. It clarifies the concept of human rights. It leads other women from social aspects. It is a learning tool for students. While attracting students' attention, it increases their motivation towards the subject and the course. It allows the students take lessons from life and also enables us to simplify the information and convey to the students. Moreover, it increases the entrepreneurial potential of students.* "

The title of the third story given to the participants is the Story of Life. K6, one of the participants, explains the contribution of the Story of Life to student behaviors as individual achievements by emphasizing concepts such as environmental awareness, benevolence, respecting differences, and being tolerant: "*When we use this story or similar stories in a straightforward way in the course and convey them to our students, they will be sensitive to their environment, free from prejudices and inclined to be helpful. They can maintain their relationships within the framework of tolerance and empathizing in their future social lives and relationships by respecting the lives, opinions, and physical characteristics of different individuals in the society*." Another participant, K2, associates the benefits of using this story with instilling the love of reading to students: "*Students who see how the child wants to study with determination and enthusiasm and how he/she succeeds despite all the difficulties in order to improve oneself, will also understand that they should do their best to study after reading this story. They break down the prejudices of the individuals living in the society and their sense of empathy are improved*." In a similar manner, K19, one of the participants, states that the use of this story will help students move away from negative behavior patterns and contribute to raising sensitive individuals, who have overcome the dilemma of prejudice-empathy with the following words: "*First of all, students will look at the individuals, people and groups around them from a different perspective. They will avoid prejudice and will not look down on other people. Author Azra Kohen claims that 'prejudice is the greatest disease of thought'. Thanks to this story, students will not be prejudiced, they will be able to empathize and also help and respect people. Sensitive, high-quality*

individuals will be raised." K3, one of the participants, declared with the following words that the diversity of social life, respect and tolerance in establishing unity can be achieved through the use of this story for the students: "*If we use this story in the course, students will learn that different people exist in the society, that they should respect them, that it is a wrong behavior to judge people by their appearance, not to act with discrimination and prejudice against people with different lives, and then the students will apply what they have learned in their own lives.*"

CONCLUSION, DISCUSSION AND SUGGESTIONS

This study, which investigated the effectiveness of teaching social studies with stories from the views of pre-service social studies teachers, yielded mixed results. According to the study's results, as a first question, the pre-service teachers were asked which concepts/subjects could be taught using the three pre-determined stories. Pre-service teachers indicated that they could use the story of the Parking lot given to them in the teaching of the concepts/subjects of "democracy, justice, equality, freedom, respect" at the most and the concepts/subjects related to "referendum, patriotism, political representation" at the least, respectively. They also stated that they could use the short story titled "The Story of the English Channel" in the teaching of the concepts/subjects of "positive discrimination, prejudice against women, equality, women's rights" at the most and the concepts/subjects related to "responsibility, self-confidence, civil law" at the least, respectively. Moreover, for the short story titled the Story of Life, it was reported that they could use in the teaching of the concepts/subjects of "stereotyping, prejudice, considering the differences, discrimination" at the most and the concepts/subjects related to "fulfilling the dreams, self-awareness, love of reading" at the least, respectively. Suppose the stories are not used appropriately in the lesson plans. In that case, this may cause the acceptance of events and facts as they are, the inability to reach scientific information, and thus the acquisition of stereotypes by children (Şimşek, 2015, Ünlü and Ay, 2017). However, stories improve students' learning of some social knowledge and experiences they cannot experience in their lives and create a fun learning environment for students with their friends (Akdağ, 2020). Similarly, the study revealed that pre-service teachers thought values such as democracy, justice and equality within the scope of positive discrimination and skills such as stereotypes and prejudice could be taught as concepts by using stories in the courses.

Within the scope of the study, as a second question, pre-service teachers were asked which values could be taught using the previous three stories. Pre-service teachers stated that they could use the story of the Parking lot in order to acquire the values of "respect, freedom, justice, equality" at the most and "peace, patriotism" at the least, respectively. The participants indicated that they could use the story of the English Channel to acquire the values of "respect, diligence, equality" at the most and in the acquisition of the values of "independence, solidarity" at the least, respectively. They expressed that they could use the story of Life to acquire the values of "respect, benevolence, hard work" and the values "justice, love" at the least respected. Stories can be an effective tool in value education thanks to their structures that explain human relations in Social Life and the negativities seen in these relations (Ünlü & Ay, 2017). It was concluded that the values determined by the pre-service teachers in the stories given to them also reflected most of the values expressed in the social studies curriculum. It can be claimed that this conclusion is because the stories can address various areas of the affective aspects in Daily Life to take lessons along with their overall content structure. In addition, pre-service teachers participating in the research noted that values such as equality, justice and benevolence, especially respect, were reflected in the first place for all three stories. This can be explained by the fact that these values bear the quality of base value.

Similarly, in the studies conducted by Kolaç and Özer (2018), it was concluded that pre-service teachers primarily associated with values such as sensitivity, patriotism and respect in their lesson plans prepared using literary products such as stories and that pre-service teacher had the opinion that values such as love and respect could be taught to students by using literary works. In another study, Salı (2019) investigated the effect of teaching activities, which are integrated with stories, on sixth-grade students' value development, attitude and motivation. According to the results of this study, value education activities integrated with science history-based stories and scientific stories positively affected students' value development and attitudes. The study revealed that the use of stories developed compassion, determination, hard work, tolerance, sacrifice and responsibility values. In a similar vein to the results of the study, in the storybook titled the Little Prince, which was examined within the scope of value learning in social studies by Eryılmaz and Çengelci Köse (2018), it was concluded that the values related to the themes of science, aesthetics, hard work, benevolence, respect, sensitivity, courage, patriotism, friendship, fairness, orderliness, responsibility, honesty, love, power and hedonism were reflected.

Within the scope of the study, as a third question, pre-service teachers were asked which skills could be taught using the previous three stories. Pre-service teachers indicated that they could use the story of the Parking lot given to them in acquiring the skills of "Social participation, critical thinking, decision making, innovative thinking" the most and the skills of "observation, change and perception of continuity" at the least, respectively. For the story of the English Channel, the pre-service teachers stated that they could use it to acquire the skills of "entrepreneurship, empathy, stereotyping and recognizing prejudice" at the most and the skills of "legal literacy, political literacy, media literacy" at the least, respectively. Lastly, pre-service teachers reported that they could use the story of Life in acquiring the skills of "recognizing stereotypes and prejudices, empathy, self-control, social participation" at the most, and the skills of "cooperation, innovative thinking, observation" at the least, respectively. The study concluded that the skills determined by the teacher candidates in the given stories also reflected most of the skills expressed in the social studies curriculum. Reaching such a conclusion can be explained by the fact that these stories included in the social studies textbook aim to provide skill teaching by the social studies curriculum. Historical empathy and

creative thinking skills can be developed through story completion activities to be applied in the course process (Ünlü & Ay, 2017; Faiz, 2020). The study by Kaymakçı (2013) concluded that using literary genres in social studies effectively acquired skills such as critical thinking and empathy. Kabapınar et al. (2019) carried out a study, and the students were given stories included in the social studies curriculum. According to the results of this study, it was revealed that students could empathize with the beings in the stories at the end of the learning process in the classroom. Similarly, according to pre-service teachers, Kolaç and Özer's (2018) studies concluded that using literary works during the course improves students' ability to think critically, empathize, and look at events and situations from multiple perspectives.

Within the scope of the study, as a fourth question, pre-service teachers were asked what could be the benefits of using three stories determined for the course. It is observed that pre-service teachers describe their opinions with similar expressions. Although the codes generated for all three stories are similar, there is a change in the number of frequencies. Accordingly, it was found that pre-service teachers associated the story of the Parking lot with increasing the intelligibility of the course, motivating the course, ensuring active participation in the course, reinforcing the subject, complying with the classroom rules at the most; and being model material, providing critical thinking, and sense of responsibility at the least. For the story of the English Channel, it was reached out that they associated the story with motivating the course, ensuring permanence, ensuring active participation, reinforcing the subject, understanding gender discrimination, preventing boredom in the course at the most; and increasing entrepreneurship, providing critical thinking, and being a good role model at the least. Considering the story of Life, it was concluded that they associated the story with motivating the course, preventing prejudice and marginalization, ensuring active participation, reinforcing the subject, valuing people the most; and critical thinking, developing reading habits and teaching values at the least. Stories that are historical or whose subject is entirely fictional can be used for motivational purposes in courses (Şimşek, 2015). In the study conducted by Beldağ and Aktaş (2016), it was found that teachers and pre-service teachers stated in their justifications about which literary works they use/will use in their course practices as providing motivation, realizing the goals of the course, critical thinking, being a role-model, raising awareness, ensuring permanent learning, making the subject understandable (concretization) and developing reading habits. This finding bears a resemblance to the result of our study. As part of the study performed by Sömen and Göksu (2017), the opinions of social studies teachers on the reasons for preferring the literary works they benefit from during teaching history subjects were asked. According to the results of the study above, the reasons such as ensuring the reinforcement of the subjects, providing permanence, being exciting and attention-grabbing, preventing boredom in the course, facilitating the lecturing, and creating an effective learning environment are at the forefront of the preference of using literary works like stories in a similar manner to our study.

On the other hand, its effects on the teaching process are listed as being attractive, attention-grabbing, reinforcement, ensuring permanence, increasing the intelligibility of the subject, increasing success and creating an effective learning environment. Also, Er and Kaymakçı's (2018) studies on the justifications of social studies teachers for using literary works in the course found that literary works attract students to the lesson, arouse their interest, and contribute to teaching complex subjects. It is understood that the results of the study support the results of our research.

Within the scope of the research, as a final question, pre-service teachers were asked what could be the benefits of using the three pre-determined stories for the students. It is seen that pre-service teachers generally define the behavioural changes that the use of stories in social studies can guide in students with similar expressions. Accordingly, pre-service teachers think that with the use of the Parking lot story, students would acquire the characteristics of being democratic, obeying the rules, knowing their rights, being fair, being an active citizen, being respectful, being tolerant at the most; and the characteristics of taking responsibility and environmental awareness at the least. For the story of the English Channel, it was concluded that the participants think that the students would acquire the characteristics of valuing women, not discriminating against gender, being affected by success, being a fighter, empathizing, being tolerant, egalitarian thinking at the most; and the characteristics of being a model material and gaining national consciousness at the least. On the other hand, it was found that pre-service teachers believe that by using the story of Life, the students would acquire the characteristics of being tolerant, respecting differences, being free from prejudice, being helpful, empathizing, resisting difficulties, being sensitive at the most; and the characteristics of learning values and providing critical thinking at the least. In the study conducted by Beldağ and Aktaş (2016), the opinions of teachers and pre-service teachers were asked whether the use of literary works in the courses would be beneficial or not. According to this study, it was revealed that the features of lesson comprehension, teaching, reinforcing, drawing attention, developing national and spiritual feelings, permanence, gaining a different perspective, and developing reading habits would contribute to the course process with the use of stories.

Similarly, Combs and Beach's (1994) study determined that the use of stories effectively increased the permanence of the information acquired during the social studies course. The plain pattern of events in the stories, which consist of a short and straightforward narrative, facilitates students' reading and understanding and ensures that learning is permanent (Öztürk & Otluoğlu, 2011; Sever, 2017). In the study performed by Kolaç and Özer (2018), it was concluded that literary works contributed significantly to students' access to accurate and perceptible information, the permanence of the information they acquired, the acquisition of knowledge, skills and values, the improvement of their affective and cognitive characteristics, developing imagination and creativity, better focusing, gaining different perspectives, facilitating learning and understanding, and providing willingness to participate in the course.

In the light of the results acquired by the study, the following suggestions can be made concerning the use of stories in the social studies course: Teachers, who benefit from textbooks as the primary source in their lessons, should include stories in the course process in order to make their lessons more interesting, reinforce what is learned and provide permanent learning. It should be noted that the selected stories distributed to various learning areas in social studies textbooks will have current, eye-grabbing features and are associated with the values in the curriculum and include the dimensions of skill acquisition. Pre-service teachers studying in the social studies teaching undergraduate programs of education faculties should be recommended with qualified stories that they can use in their professional lives. Also, examinations and evaluations should be made regarding using stories in relevant undergraduate courses. Furthermore, it should be explained to the pre-service teachers which methods of the stories can be used most effectively during the course process.

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Statements of publication ethics

We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

Researchers' contribution rate

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| Research Article / Araştırma Makalesi |

Investigation of Science Teachers' Professional and Scientific Attitudes

Fen Bilimleri Öğretmenlerinin Mesleki ve Bilimsel Tutumlarının İncelenmesi [1]

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Keywords

1. Attitudes towards teaching profession
2. Scientific attitudes
3. In-service teachers
4. Teaching competencies
5. Science education

Anahtar Kelimeler

1. Öğretmenlik mesleğine yönelik tutum
2. Bilimsel tutum
3. Görev yapan öğretmenler
4. Öğretmen yeterlikleri
5. Fen eğitimi

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Abstract

Purpose: This study investigates the level of science teachers' professional and scientific attitudes, whether these variables differ according to gender and the relationship between the two variables.

Design/Methodology/Approach: It is conducted through survey design based on quantitative research. 174 science teachers (91 females and 83 males) working in public middle schools participated. The data were collected using the "Attitudes towards Teaching Profession Scale" and "Scientific Attitudes Scale". Additionally, qualitative data were collected through the "Demographic Information Form" to support quantitative findings. Descriptive statistics, independent samples t-test and Pearson correlation analysis techniques were used in quantitative data analysis. Besides, the descriptive analysis technique was used to analyze qualitative data.

Findings: Results revealed that science teachers possessed highly positive attitudes towards the teaching profession, and their scientific attitudes were at a moderate level. While female teachers' professional attitudes were more optimistic, scientific attitudes did not change by gender. There was a moderate and positive relationship between the two variables. Science teachers choose their profession mainly for affective reasons such as loving teaching. Moreover, although teachers mostly attended in-service training programs, they were not trained on nature, history or philosophy of science to improve scientific attitudes. Finally, it was discovered that TUBITAK publications were popular among science teachers.

Highlights: Although science teachers possess positive attitudes toward their profession, their scientific attitudes are moderate. Parallel to the significant changes observed in science and technology in the information age, teacher competencies have also changed rapidly. Teachers with highly positive attitudes towards their profession are open to innovations and strive more to improve themselves. As well as science teachers' attitudes towards their profession, their scientific attitudes are of great importance in the 21st century in which developing individuals who question, judge, use information technologies, and have problem-solving skills are needed for the economic and social development of societies. Only science teachers with highly positive scientific attitudes can provide their students with an understanding of science's nature, history, or philosophy. To support teachers' scientific attitudes, in-service training on science's nature, history, or philosophy can be developed, implemented, and evaluated.

Öz

Çalışmanın amacı: Bu çalışmanın amacı fen bilimleri öğretmenlerinin mesleki ve bilimsel tutumlarının hangi düzeyde olduğunu, incelenen tutum değişkenlerinin cinsiyet açısından nasıl değiştiğini ve her iki değişken arasındaki ilişkiyi incelemektir.

Materyal ve Yöntem: Nicel araştırma yaklaşımına dayalı tarama modeli kullanılarak gerçekleştirilen bu çalışmaya devlet ortaokullarında görev yapan 174 (91 kadın ve 83 erkek) fen bilimleri öğretmeni katılmıştır. Veriler "Öğretmenlik Mesleğine Yönelik Tutum Ölçeği" ile "Bilimsel Tutum Ölçeği" kullanılarak toplanmıştır. Ayrıca nicel bulguları desteklemek için "Demografik Bilgi Formu" kullanılarak nitel veriler toplanmıştır. Nicel verilerin analizinde betimsel istatistikler, bağımsız örneklemler t-testi ve Pearson korelasyon analizi teknikleri kullanılmıştır. Ek olarak, nitel verilerin analizinde betimsel analiz tekniği kullanılmıştır.

Bulgular: Araştırmanın sonucunda fen bilimleri öğretmenlerinin mesleklerine yönelik yüksek düzeyde olumlu tutuma sahip oldukları ve bilimsel tutumlarının orta seviyede olduğu görülmüştür. Kadın öğretmenlerin mesleklerine yönelik tutumlarının daha olumlu olduğu bulunurken, öğretmenlerin bilimsel tutumları cinsiyet değişkeni açısından değişiklik göstermemiştir. İki tutum değişkeni arasında orta düzeyde ve pozitif yönde anlamlı bir ilişki tespit edilmiştir. Fen bilimleri öğretmenlerinin mesleği seçme nedenleri ağırlıklı olarak öğretmeyi sevme gibi duyuşsal özellikleri içermektedir. Ayrıca katılımcıların hizmetiçi eğitimlere katılım oranının yüksek olduğu ancak bilimin doğası, bilim tarihi ya da felsefesi gibi bilimsel tutumlarını geliştirmeye yönelik eğitimler almadıkları görülmüştür. Son olarak, TÜBİTAK yayınlarının fen bilimleri öğretmenleri arasında popüler olduğu bulunmuştur.

Önemli Vurgular: Fen bilimleri öğretmenlerinin mesleklerine yönelik tutumları olumlu olmasına rağmen bilimsel tutumlarının orta seviyede olduğu bulunmuştur. Bilim ve teknolojide gözlenen önemli değişimlere paralel olarak Bilişim Çağında öğretmen yeterlikleri de hızla değişmektedir. Mesleklerine yönelik yüksek olumlu tutumlara sahip öğretmenler, yeniliklere açıktır ve kendilerini geliştirmek için daha fazla çaba gösterirler. Toplumların ekonomik ve sosyal gelişimi için sorgulayan, yargılayan, bilişim teknolojilerini kullanan ve problem çözme becerisine sahip bireyler yetiştirmenin gerekli olduğu 21. yüzyılda, fen bilimleri öğretmenlerinin mesleklerine yönelik tutumları kadar bilimsel tutumları da büyük bir önem taşımaktadır. Yalnızca olumlu bilimsel tutumlara sahip fen bilimleri öğretmenleri, öğrencilerine bilimin doğası, tarihi ve felsefesi hakkında bir anlayış kazandırabilir. Öğretmenlerin bilimsel tutumlarını geliştirmek için bilimin doğası, tarihi ve felsefesi konularında hizmet içi eğitimler geliştirilebilir, uygulanabilir ve değerlendirilebilir.

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INTRODUCTION

Human beings are always curious about objects, facts and events surrounding them. When the progress of scientific knowledge is examined, it is observed that learning and teaching activities date back to ancient times. Initially, scientific studies were guided by the human endeavour to learn about nature to survive. Over time, people's pleasure while discovering their surroundings has led them to investigate, learn and convey knowledge. The knowledge developed in time was shared by founding schools where adverse opinions were presented and attempted to be proven (Topdemir & Unat, 2014). For instance, in Milesian School, founded before the Christian era, ion opinion was developed by being conveyed from generation to generation. The most famous ancient-time philosophers raised in this school were Thales (B.C. 624-548), his student Anaximander (B.C. 610-545), and his student Anaximenes (B.C. 585-525). Therefore, one of the oldest professions of human history is teaching. Although the immediate circle of an individual performed teaching at first, it became a profession in time.

Even though understanding of education has changed from ancient times, teaching has never lost its significance, and teachers have become indispensable for education systems. In the globalizing world, access to and dissemination of (scientific) information has gained more importance which in turn caused the education system to be reconsidered. Today teacher's purpose is not to impart information but to assist students in developing skills. To achieve this goal, teachers need to support making meaning of accessed information and transfer their learning to real-world settings on their own.

Only when individuals in a society have the skills required by the era can the future be shaped. The most important objective of education is that the next generations have these target skills. Here the task falls on teachers as the essential elements of the education system because they are exclusively important in raising the next generations properly and qualitatively and maintaining peace and welfare in society (Celik et al., 2018). According to Serin, Gunes and Degirmenci (2015), whether a student attains a negative or positive behaviour depends on teachers' knowledge, attitude, enthusiasm and personality. However, these features are primarily defined as cognitive, and teachers' affective reactions and attitudes towards their profession are also considered necessary (Semerci & Semerci, 2004). Competencies required by teachers include field knowledge, general knowledge and professional teaching knowledge. Teachers' personality traits, teaching styles, professional competencies and attitudes are fundamental for the effectiveness of teaching (Sural, 2013). Therefore, a teacher's affective characteristics like having positive attitudes toward the profession are also important, as well as cognitive ones such as having field knowledge.

The concept of attitude, which first appeared in social psychology research, has eventually become a study subject for many disciplines, including educational sciences. The importance of the attitude variable can be explained by its vital role in describing many behaviours in individual and social dimensions (Demirtas-Madran, 2012, p.2). It is possible to encounter different definitions of attitude in the literature. Rosenberg and Hovland's (1960, p.1) first definition is "predispositions to respond in a particular way toward a specified class of objects". Krech, Crutchfield and Ballachey (1962, p.139) also defined it similarly: "As the individual develops, his cognitions, feelings and action tendencies concerning the various objects in his world become organized into enduring systems called attitudes". Correspondingly, Smith (1968, p.458) defines attitude as "inferred dispositions, attributed to an individual, according to which his thoughts, feelings and perhaps action tendencies are organized concerning a psychological object". Moreover, Inceoglu (2010, p.13) expands the previous definitions and explains attitude as "a cognitive, affective and behavioural predisposition that individuals organize towards themselves or any object, social matter or event in their surrounding based on their experiences, knowledge, feelings and motivations".

Regarding the teaching profession as the attitude object, three components of attitude towards the profession are presented in Figure 1. Even though attitude is defined in different ways in the literature, the definitions come together in that attitude comprises three components cognitive, affective and behavioural (Krech, Crutchfield & Ballachey, 1962). Individuals' attitude-related opinions and beliefs are included in the cognitive component; positive, negative and neutral feelings in the affective component, and action tendencies in the behavioural component. Accordingly, the cognitive component involves teachers' knowledge of professional competencies like field knowledge, up-to-date pedagogical approaches, or educational technologies; the affective component includes their love for the profession, attribution of sentimental value or happiness in the classroom environment; and the behavioural component comprises of a tendency to use contemporary approaches in class or collaborate with colleagues. These three components should be consistent; in other words, each should indicate a positive attitude for the sustainability of attitudes.

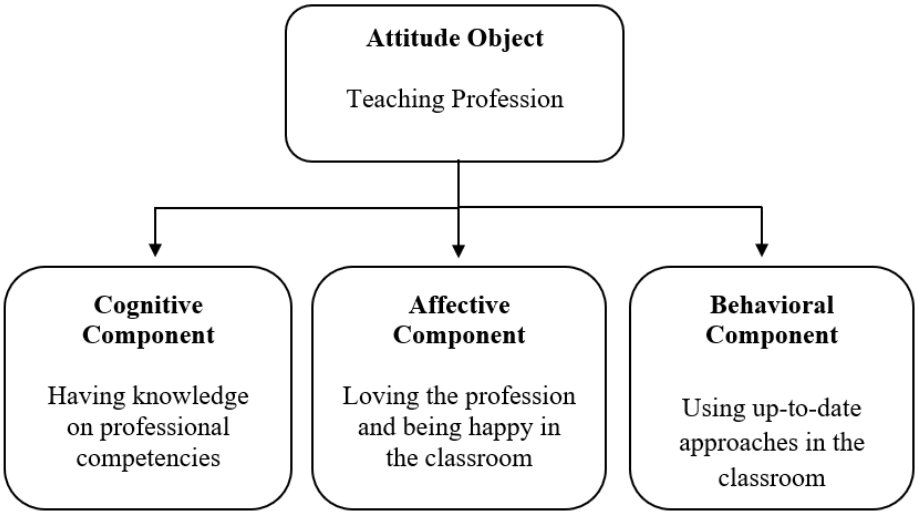


Figure 1. Three components of attitude towards teaching profession

According to Terzi and Tezci (2007), attitude and perception toward teaching are among the most important factors affecting success in the profession. Since teachers with positive professional attitudes practice the profession with love and pleasure, they endeavour more to struggle against difficulties. When teachers love their profession, they support student development in and out of the classroom. It also reflects on teachers' behaviours, and they approach students more insightfully, warmly and kindly. Likewise, Celikoz and Cetin (2004) state that a teacher with a positive professional attitude meets profession-related requirements better uses the time more efficiently and is open-minded. Furthermore, he/she helps students become more qualified individuals affecting them through more effective communication.

On the other hand, considering the current era is based on science and technology, the scientific attitudes of teachers, especially science teachers, are of great importance and their attitudes towards their profession. Basaran (1982, p.300) defines *scientific attitude* as "interpreting problems, events and situations that an individual encounters based on intellectual evidence by avoiding emotions as much as possible". When it is considered that today's students will shape the future, raising individuals with the necessary scientific and technological skills is essential. Similarly, Buyukozturk (1999) emphasizes that it is required for the objectives of the education system to include raising individuals who know how to investigate, produce and share knowledge, and have a scientific attitude. These objectives are only accomplished when teachers have the necessary scientific attitudes. These teachers are eager to follow developments in science and technology and share new information with their students. Science teachers play a vital role in developing students' scientific attitudes; they must have the proper scientific perspective.

In the literature in which attitudes towards the teaching profession are investigated, it is observed that primarily pre-service teachers' professional attitudes have been studied (Aydin & Saglam, 2012; Bozdogan, Aydin & Yildirim, 2007; Bulut, 2009; Haciomeroglu & Sahin-Taskin, 2010; Ozder, Konedrali & Zeki, 2010; Serin et al., 2015; Sundberg & Ottander, 2013; Uyanik, 2017; Ustuner, 2006). On the other hand, it is noteworthy that the number of studies with in-service teachers is limited (Bayhan, 2009; de Vocht & Laherto, 2017; Tufan, 2016). In these studies, attitude towards teaching has been examined with different variables such as teachers' self-efficacy beliefs (Dogan, 2013; Ghaith & Yaghi, 1997; Kazempour, 2014; Tufan, 2016), job satisfaction (Bayhan, 2009; Bozca, 2015; Zoroglu, 2014), teaching styles and classroom management methods (Sural, 2013). However, no research has been conducted investigating teachers' professional and scientific attitudes. As explained earlier, in the information age, for countries' development and to have a say in the future world, every country needs to raise a knowledge society that can compete in science and technology. Future citizens and prospective scientists need to understand how science works and possess positive feelings regarding scientific practice. Since science teachers are responsible for teaching scientific attitudes at schools, efforts directed at their scientific attitudes are as significant as other variables associated with science teaching. However, earlier research reveals that many teachers hold an incorrect or misleading understanding of some aspects, such as the objectivity of scientists (Abd-El-Khalick & Lederman, 2000, Cofré et al., 2019; McComas & Clough, 2020). These deficiencies implicitly lead science teachers to talk about these issues, resulting in students with an inadequate understanding of how science functions. Only teachers with high positive attitudes toward their profession can be willing to overcome these obstacles and put a high effort into improving their teaching. Besides, it is observed that studies on scientific attitude have been conducted primarily with primary education students (Afacan, 2008; Bekmezci,

2014; Canak, 2017; Gumilar, Wardani & Lisdiana, 2019), and that there has been minimal research on teachers (Bell, Mulvey & Maeng, 2016; Cakir, 2012; Hanuscin, Lee & Akerson, 2011; Kenduzer, 2017). Therefore, science teachers' scientific attitudes and attitudes toward their profession must be determined, and training programs can be developed and implemented to overcome the observed deficiencies.

This study examines in-service science teachers' professional and scientific attitudes by the relevant literature. Accordingly, the present study aims to investigate the level of science teachers' professional and scientific attitudes, whether these attitudinal variables differ according to gender, and the relationship between the two variables. In line with this purpose, answers were sought to the following questions:

1. What is the level of science teachers' attitudes towards professional and scientific attitudes?
2. Do science teachers' professional and scientific attitudes differ by gender?
3. Is there a significant relationship between science teachers' professional and scientific attitudes?
4. What are the reasons for science teachers to choose their profession?
5. What are the in-service training programs that science teachers attend?
6. What are the scientific publications that science teachers follow?

METHOD

This study, aiming to identify professional and scientific attitudes of in-service science teachers, was conducted based on survey methodology as a type of non-experimental quantitative research (Fraenkel, Wallen, & Hyun, 2012). Teachers' attitudes were measured through self-reported data.

Sample of the Study

The target population of the study involves science teachers working at public schools in Turkiye, and the sample comprises of science teachers at public schools in various districts of Tokat province. In this context, scales were distributed to all science teachers in the city center of Tokat and districts of Turhal, Pazar, Erbaa, Artova, Zile, Niksar, Almus, Yesilyurt, Sulusaray and Resadiye.

Within the scope of the study, the data were collected from a total of 174 in-service science teachers as 91 females (52.3%) and 83 males (47.7%). Participants' ages vary from 24 to 62 ($\bar{X}$ =36.41, *SD*=7.84). The district-based frequency and percentage values are presented in Table 1. Considering the number of science teachers working in the districts, difference is observed in the frequency values. The number of teachers in the central district is higher than that of other districts, and the former constitutes 40.2% of the participants. On the other hand, the number of teachers in Sulusaray is smaller compared to other districts, and the volunteer teachers here comprise of only 1.7% of the participants.

Table 1. Distribution of science teachers participating in the study based on districts where they work

District	Frequency (f)	Percentage (%)
Central	70	40.2
Erbaa	21	12.1
Turhal	20	11.5
Niksar	16	9.2
Pazar	12	6.9
Zile	11	6.3
Resadiye	7	4.0
Artova	6	3.4
Yesilyurt	5	2.9
Almus	3	1.7
Sulusaray	3	1.7
Total	174	100.0

Data Collection Tools

Three data collection tools including the Attitudes towards Teaching Profession Scale, Scientific Attitudes Scale and Demographic Information Form were used in the study.

Attitudes towards Teaching Profession Scale

To measure attitudes of science teachers towards their profession, "Attitudes towards Teaching Profession Scale" developed by Fatma Nezihe Ozgur (1994) for her dissertation under the guidance of Prof. Dr. Adil Caglar was utilized. The one-dimensional scale comprised of 33 items as 20 positive and 13 negative items (3, 5, 11, 12, 14, 20, 23, 26, 27, 28, 29, 31, 32). Ozgur (1994) calculated Cronbach Alpha internal reliability coefficient as .63.

In the 5-point Likert scale, positive attitude statements were coded as 1=strongly disagree, 2=disagree, 3=undecided, 4=agree and 5=strongly agree. As for negative attitude statements, reverse coding was performed. For instance, 1 was attained to Strongly Agree. The scores for science teachers' attitudes towards teaching profession were calculated by adding their scores from 1 to 5 for each item. Consequently, the scores for the scale varied from 33 to 165.

While calculating the level of teachers' professional attitudes, the possible score range to be obtained from the scale was divided by the number of Likert scale [Level = Possible Score Range/Likert Scale = (165-33)/5 = 26.4]. Then, the boundary values and evaluation criteria were determined by adding the value of 26.4 to the possible minimum value. Accordingly, the results between 33.0-59.4 were evaluated as "highly negative", 59.4-85.8 as "negative", 85.8-112.2 "moderate", 112.2-138.6 as "positive" and 138.6-165 as "highly positive" attitudes.

Scientific Attitudes Scale

This scale utilized to identify participants' scientific attitude was developed by Moore and Foy (1997) and adapted to Turkish by Demirbas and Yagbasan (2006). The 5-point Likert scale had 20 positive and 20 negative items as 40 items in total. The responses were coded as 1= strongly disagree, 2=disagree, 3=undecided, 4=agree and 5=strongly agree. Moore and Foy (1997) calculated the Cronbach Alpha reliability coefficient as .78 for the whole scale while Demirbas and Yagbasan (2006) calculated it as .76 in their study.

In both the original study and Turkish adaptation study, scale items were designed considering six dimensions: "Structure of scientific laws and theories", "structure of science and its manner of approaching events", "displaying scientific behavior", "structure and purpose of science", "the role and importance of science in the society" and "willingness to conduct scientific research". However, in both studies, factor analyses for validity do not support the six-dimension factor structure (Demirbas & Yagbasan, 2006; Moore & Foy, 1997). Researchers claim that it may result from teachers' lacking the necessary scientific attitudes. On the other hand, considering the total score obtained from the scale, variance is observed in scientific attitudes of both high and low scoring groups. Therefore, it is indicated that the scale can be considered as one-dimensional; accordingly, results regarding total scores of the scale were included in the present study.

Scientific attitude scores of science teachers were calculated by adding up the scores from 1 to 5 obtained from each item following the reverse coding for negative items. Accordingly, the scores for the scale varied from 40 to 200. While calculating the level of science teachers' scientific attitudes, the possible score range to be obtained from the scale was divided by the number of Likert scale [Level = Possible Score Range/Likert Scale = (200-40)/5 =32]. Then, the score of 32 was added to the possible minimum value, and boundary values and evaluation criteria were determined. Consequently, the results between 40-72 were evaluated as "highly negative", 72-104 as "negative", 104-136 as "moderate", 136-168 as "positive" and 168-200 as "highly positive" scientific attitudes.

Demographic Information Form

With the "Demographic Information Form" developed by the researchers, information on participants' gender, age and district of work was collected. In addition, participant teachers were requested to state their reasons for choosing the profession in order to examine their professional attitudes more thoroughly. Similarly, to evaluate participants' scientific attitudes, they were asked about the in-service trainings they received and scientific publications they followed.

Data Collection Process

In order to conduct research in middle schools located in the city center and districts of Tokat, first, necessary permission was received from Tokat Provincial Directorate of National Education. With the permission, school principals were visited and informed about the study, and science teachers were contacted with their help. Before distributing the scales, science teachers were ensured that the scales would be used only for research, responses would be kept confidential, and proprietary information would not be requested. The scales were distributed to teachers who volunteered to participate in the study. They responded to the items immediately and filled in the documents in the presence of the first researcher.

Data Analysis

In the analysis of quantitative data obtained from the scales, SPSS software was used. In this study based on survey model, descriptive statistics (minimum value, maximum value, mean and standard deviation) were utilized to identify the level of science teachers' professional and scientific attitudes. In order to test whether professional and scientific attitudes of science teachers differ according to gender, two separate independent samples t-tests were implemented. Independent samples t-test is used when a continuous dependent variable shows a normal distribution for each group, and independent variable is a two-level categorical variable (Buyukozturk, 2014). Assumptions of normality and homogeneity of variance are presented in the "Findings" section. To identify the relationship between professional and scientific attitudes of participants, Pearson correlation coefficients were calculated. The size of the relationship between two variables was evaluated through the criteria ($.10 \leq r \leq .30$ low, $.30 < r < .50$ medium and $r \geq .50$ high) suggested by Gravetter and Forzano (2012).

The data obtained from Demographic Information Form developed by the researchers for qualitative data analysis were analyzed through descriptive analysis. Codes deciphered as a Word document were organized, and frequency values for each code

were presented in tables in the findings section. Codes of the reasons for choosing the profession were categorized in three themes as intrinsic, extrinsic and altruistic (Akbaba, 1994; Bastick, 2000; Bruinsma & Jansen, 2010; Boz & Boz, 2008; Chou, 1996; Kasser & Ryan, 2001; Ubuz & Sari, 2008; Yu & Bieger, 2013). According to Kasser and Ryan (2001), intrinsic motives include close relationships, self-acceptance and physical health whereas extrinsic motives comprise of recognition, wealth and economic success. Akbaba (1994) describes altruism as the behavior of helping other individuals. Moreover, Chou (1996) defines altruism as voluntary and intentional behaviors that an individual exhibits for the sake of others in the society. Themes, codes and frequencies identified by considering these studies in the literature were presented in the tables. As for the in-service trainings that participants received, codes were divided into six themes based on their contents after expert opinion was taken. The themes determined (pedagogical competence, field competence, personal competence, technological competence, special education, and other) were presented in tables together with in-service training contents and frequencies. Finally, the names and frequencies of scientific publications that participants followed were also given in the tables.

FINDINGS

Descriptive statistics calculated to answer the first research question investigating the level of science teachers' professional and scientific attitudes are presented in Table 2.

Table 2. Descriptive Statistics for participants' professional and scientific attitudes

Variable	N	Possible Range	Minimum Value	Maximum Value	$\bar{X}$	SD	Level
Attitudes towards Teaching Profession	174	33-165	84	165	131.32	15.58	Positive
Scientific Attitudes	174	40-200	77	130	105.04	9.94	Moderate

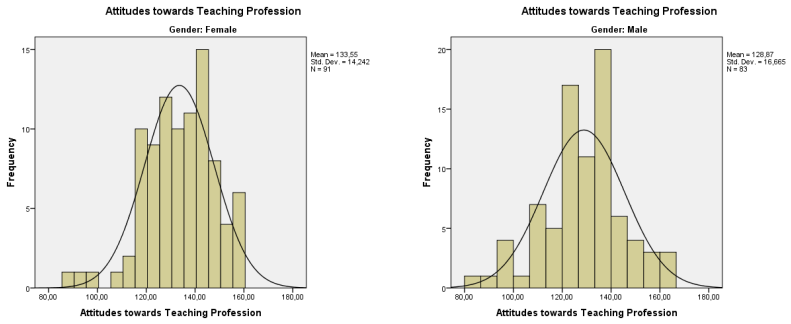
While scores of science teachers' attitudes towards their profession vary between 84 and 165, mean is 131.32 and standard deviation is 15.58. The result falls within the 112.2-138.6 score range, and it reveals that science teachers have positive attitudes.

Teachers' scientific attitude scores vary between 77 and 130 while mean is 105.04 and standard deviation is 9.94. As the mean falls within 104-136 score range, it indicates that participants' scientific attitudes are at moderate level.

In order to answer the second research question investigating whether science teachers professional and scientific attitudes differed by gender, two separate independent samples t-tests were implemented. Before interpretation of the results of the analyses, assumptions of normality and homogeneity of variance were checked for dependent variables (attitudes towards teaching and scientific attitudes). Stevens (2009) states that as a distribution's skewness and kurtosis values are closer to zero, it exhibits a normal distribution. In Table 3, it is observed that skewness and kurtosis values of both variables calculated for female and male teachers vary between (-.609) and (+.669). In addition, considering the histograms presented in Figure 2 and Figure 3, both dependent variables ensure assumption of normality for both groups. To test the assumption of homogeneity of variance, Levene's Test results were checked, and both dependent variables also met this assumption (p>.05).

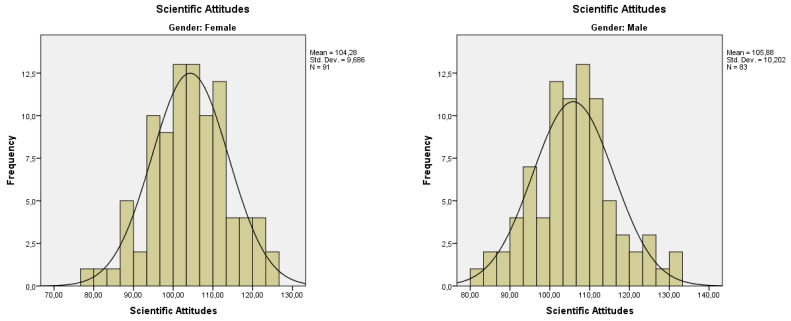
Table 3. Skewness and kurtosis values for professional and scientific attitudes by gender

Variable	Female		Male	
	Skewness	Kurtosis	Skewness	Kurtosis
Attitudes towards Teaching Profession	-.609	.669	-.325	.386
Scientific Attitudes	-.178	.201	.178	.097



(a) (b)

Figure 2. Histograms of attitudes towards teaching profession for (a) females and (b) males



(a) (b)

Figure 3. Histograms of scientific attitudes for (a) females and (b) males

After assumptions were checked, results of independent samples t-tests were interpreted (Table 4). The results revealed that attitudes of female teachers towards their profession ($\bar{X}$=133.55, *SD*=14.24) were more positive [$t(172)=1.994$, $p< .05$] than those of their male colleagues ($\bar{X}$=128.87; *SD*=16.66). On the other hand, independent samples t-test results for scientific attitude variable indicated no statistically significant difference [$t(172) = -1.06$, $p>.05$] between female ($\bar{X}$=104.28, *SD*=9.69) and male ($\bar{X}$=105.88; *SD*=10.20) teachers.

Table 4. Results of independent samples t-tests regarding science teachers' professional and scientific attitudes by gender

Variable	Gender	N	X̄	SS	sd	t	p
Attitudes towards Teaching Profession	Female	91	133.55	14.24	172	1.994	.048*
	Male	83	128.87	16.66			
Scientific Attitudes	Female	91	104.28	9.69	172	-1.06	.290
	Male	83	105.88	10.20			

*significant at p<.05 level

In order to answer the third research question inquiring the relationship between science teachers' professional and scientific attitudes, correlation analysis was performed. Pearson correlation coefficient (r= .32, $p< .01$) indicated that there was a moderate positive relationship between the two variables. Accordingly, scientific attitudes of science teachers with positive professional attitudes are also positive. Nevertheless, the variance determined equals to only 10.24% of the relationship between the two variables.

In the fourth research question, science teachers' reasons for choosing teaching profession were investigated to interpret their attitudes towards their profession. The codes divided into three themes as intrinsic, extrinsic, and altruistic, and presented in Table 5.

Table 5. Themes, codes, and frequencies of science teachers' reasons for choosing teaching profession

Themes	Codes	f_{male}	f_{female}	f_{total}
Intrinsic	Love for teaching	17	25	42
	Love for the profession	22	16	38
	Love for kids	8	16	24
	Love for learning	3	9	12
	Love for science	3	8	11
	Love for students	5	6	11
	Dream job	3	6	9
	Being open to development	3	4	7
	Being happy at school	-	2	2
	Love for discovery	-	1	1
	Being patient	1	-	1
	Being brave	1	-	1
	Leadership	1	-	1
Extrinsic	Getting enough scores for university replacement	16	15	31
	Ease of finding a job	14	6	20
	Impact of a role-model teacher	4	7	11
	Proper working conditions	2	9	11
	Ideal profession for females	-	8	8
	Family profession	2	5	7
	Prestigious profession	3	1	4
	Number of holidays	2	1	3

	Perception as a sacred profession	1	1	2
	Graduating from Teacher Training High School	-	2	2
	Being guided to the profession	1	1	2
	Fidelity of students	1	-	1
Altruistic	Training qualified individuals	7	5	12
	Raising individuals for the society	3	4	7
	Contribution to personal development of individuals	-	1	1

When Table 5 is examined, it is observed that, regarding the reasons for choosing the profession, participants mostly listed motives such as love for teaching (f_{male}=17, f_{female}=25), love for the profession (f_{male}=22, f_{female}=16), love for kids (f_{male}=8, f_{female}=16), love for learning (f_{male}=3, f_{female} =9) in the intrinsic theme; getting enough scores for university replacement (f_{male}=16, f_{female}=15), ease of finding a job (f_{male}= 14, f_{female}= 6), impact of a role-model teacher (f_{male}=4, f_{female}=7), proper working conditions (f_{male}=2, f_{female}=9) in the extrinsic theme; and training qualified individuals (f_{male}=7, f_{female}=5) and raising individuals for the society (f_{male}=3, f_{female}=4) in altruistic theme.

In the fifth research question, in-service trainings that participants received were investigated to interpret their scientific attitudes in detail. Among participants, 139 teachers (79.9%) stated to have taken in-service trainings whereas 35 teachers (20.1%) did not attend any program. The contents of the in-service trainings that science teachers got were divided into themes (pedagogical competence, field competence, personal competence, technological competence, special education and other) by the researchers. The themes, contents and frequencies for in-service trainings are presented in Table 6.

Table 6. Themes, contents, and frequencies for in-service trainings of science teachers

Themes	Contents of In-Service Training	f_{male}	f_{female}	f_{total}
Pedagogical Competence	Classroom Management	6	9	15
	Counselling	5	3	8
	Professional Development	7	-	7
	Teaching Techniques	1	5	6
	Assessment and Evaluation	5	2	6
	Psychology	1	-	1
Field Competence	STEM	5	4	9
	Change in Science Curriculum	3	5	8
	Methods of Science Teaching	2	5	7
	Science Laboratory Tools	2	3	5
	Material Development for Science	2	-	2
	Laboratory Use	1	1	2
	Project Development	2	-	2
Personal Competence	Occupational Safety	1	8	9
	First Aid	3	2	5
	Life Coaching	1	1	2
	Chess	1	1	2
	Communication Skills	1	1	2
	Diction	-	1	1
	Speed Reading	-	1	1
Technological Competence	Fatih Project	4	6	10
	Smart Board Use	4	2	6
	Computer	2	3	5
	Arduino	3	1	4
	EBA	2	1	3
	Software/Robotic Coding	3	-	3
	Information Technologies	2	1	3
	Internet Use	2	-	2
Special Education	Special Learning Difficulty	3	6	9
	Special Education	5	3	8
	Inclusive Students	1	2	3
	Familiarity with Gifted Students	1	1	2
	Home-Schooled Kids	1	-	1
	Gifted Kids	1	-	1
	Education for the Handicapped	1	-	1
	Autism	1	-	1

	Braille Alphabet	-	1	1
Other	Evaluation of Trainees	1	1	2
	Scholarship Exam	1	-	1
	Dormitory Management	1	-	1
	Administrative Issues	1	-	1
	School Health	-	1	1

When the responses regarding the contents of in-service trainings are evaluated, it is revealed that the most preferred trainings are classroom management (f_{male}=6, f_{female}=9) in pedagogical competence, STEM (f_{male}=5, f_{female}=4) in field competence, occupational safety (f_{male}= 1, f_{female}= 8) in personal competence, Fatih Project (f_{male}=4, f_{female}=6) in technological competence, special learning difficulty (f_{male}=3, f_{female}=6) in special education and evaluation of trainees (f_{male}=1, f_{female}=1) in other contents.

Finally, to interpret science teachers' scientific attitudes in more detail, besides the contents of in-service training programs they attended, scientific publications they followed were investigated in the sixth research question. Among participants 119 teachers (68.4%) stated to follow scientific publications whereas 55 participants (31.6%) did not. The names and frequencies of scientific publications followed by science teachers are presented in Table 7.

Table 7. Names of scientific publications that science teachers follow and their frequencies

Name of Publication	f_{male}	f_{female}	f_{total}
Science & Technique	36	39	75
Science for Kids	8	15	23
TUBITAK Publications	5	9	14
Popular Science	3	1	4
National Geographic	-	3	3
Science for Teens	2	-	2
Researcher Kid	-	2	2
Curios Kid	-	1	1
Cancer Agenda	1	-	1
Biotechnology	-	1	1
Maker	-	1	1
Instructables	1	-	1
NASA	-	1	1
Astronomy Magazines	1	-	1
Atlas	-	1	1

When the scientific publications followed by science teachers are examined, Science and Technique (f_{male}= 36, f_{female}= 39), Science for Kids (f_{male}= 8, f_{female}= 15) and other TUBITAK publications (f_{male}= 5, f_{female}= 9) are observed to be the most popular publications.

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

This study has revealed that participants have positive attitudes toward their profession, which is similar to the results of earlier studies (Akpinar, Yildiz & Ergin, 2006; Aksoy, 2010; Bozdogan, Aydin & Yildirim, 2007; Ceyhan, 2014; Ozkan, 2017; Ozder, Konedrali & Zeki, 2010). For example, in their study conducted with pre-service science teachers, Akpinar et al. (2006) discovered that participants' attitudes towards teaching were positive. Similarly, Ozkan (2017) conducted a study with pre-service science and primary teachers and identified that they also had positive attitudes towards the teaching profession.

Science teachers' reasons for choosing the profession mainly reflect compelling features such as love for teaching, the profession, kids and desire to train qualified individuals, and reveal that teachers have positive attitudes towards their profession. Furthermore, in this study, supported by qualitative data, science teachers' responses regarding reasons for choosing the profession have indicated their positive attitude towards teaching. These findings in this study are similar to other research results (Boz & Boz, 2008; Eskicumali, 2002; Ovet, 2006; Ubuz & Sari, 2008; Yong, 1995). For instance, Eskicumali (2002) conducted a study on pre-service teachers' reasons for choosing the teaching profession, and love for kids was placed near the top. Moreover, pre-service teachers indicated that their social circle and teachers affected their professional preferences. In the study by Boz and Boz (2008), motives such as love for teaching, contribution to society and love for a teacher were among the reasons why secondary school pre-service chemistry and math teachers chose the teaching profession. Similarly, in their study, Ubuz and Sari (2008) indicated that pre-service primary teachers preferred the profession based on their university entrance examination scores, the guidance of their families and social circles, their love for kids and teaching, and their perception of teaching as a sacred profession.

In previous studies, it has been observed that reasons for preferring teaching as a profession were categorized as intrinsic, extrinsic and altruistic in the light of qualitative findings (Boz & Boz, 2008; Ubuz & Sari, 2008). Identically, in this study, factors including love for the profession, kids and learning were evaluated as intrinsic motives; factors like proper working conditions, ease of finding a job and family guidance as extrinsic motives; and factors such as the desire to train individuals who are qualified and helpful to the society as altruistic motives.

In addition, when participants' attitudes towards their profession are examined by gender, it is observed that the professional attitudes of female teachers are more favourable than those of their male colleagues. Studies supporting this result are encountered in the literature (Akdag, 2014; Aksoy, 2010; Bozdogan, Aydin & Yildirim, 2007; Capri & Celikkaleli, 2008; Dogan & Coban, 2009; Ozkan, 2017; Terzi & Tezci, 2007; Uyanik, 2017). For example, Akdag (2014) studied pre-service social sciences teachers and identified that the professional attitudes of females were higher. Likewise, professional attitudes were discovered to differ significantly in favour of females in the study by Bozdogan, Aydin and Yildirim (2007). Capri and Celikkaleli (2008) revealed in their study that professional attitudes were higher in female pre-service teachers. Another study was conducted by Aksoy (2010), and it was determined that the professional attitudes of female pre-service teachers from various branches were higher than those of males. Uyanik (2017) also identified that female pre-service teachers who were senior students had more positive attitudes towards the profession. Contrary to this study, there are also studies in the literature that no difference is observed in attitudes towards the teaching profession based on gender variables (Bulut, 2009; Haciomeroglu & Taskin, 2010; Ozder, Konedrali & Zeki, 2010; Semerci & Semerci, 2004).

Qualitative findings in this study indicate that teaching is perceived as an ideal profession for females. This belief, which is quite common in our country, is one of the primary factors for females to choose teaching as a profession. The view that female provides the basis for a family also affects the choice of profession. With its working hours and holidays, teaching enables females to allocate more time for their families than other professions. Similarly, Korkut-Owen, Kepir, Ozdemir, Ozlem and Yilmaz (2012) indicate in their study that female teachers prefer teaching as a profession based on gender roles in society.

In the study, love for kids is also given as a reason for preferring the profession by females more than males. Regarding these results, it can be stated that female teachers mostly choose their profession considering affective factors. As a result, it is identified that intrinsic motives have more impact on female science teachers. Other studies also determined that intrinsic motives are more effective in females' preference for teaching as a profession (Acat & Yenilmez, 2004; Cermik, Dogan & Sahin, 2010; Manuel & Hughes, 2006; Ovet, 2006).

Regarding the reasons for choosing the profession, male teachers state more quickly finding a job after graduation than females. The common belief can also explain that males need to support their family financially more than females. Korkut-Owen et al. (2012) obtained similar results in their study and discovered that better income was a reason for preference primarily by male teachers.

On the other hand, when the scientific attitudes of science teachers are examined, they are identified to be at a moderate level. In Onen's study (2013) with pre-service science teachers, their scientific attitudes were found to be at a high level. It is an unexpected result that in-service science teachers' scientific attitudes are lower than pre-service teachers. Considering the gender variable for scientific attitude, no difference has been identified between female and male teachers. In the literature review, there are studies supporting this result (Altinok, 2004; Genc, 2001; Kenduzer, 2017).

When in-service training programs that participants attended are evaluated, it is observed that teachers who were primarily trained on pedagogical and technological subjects lacked training for developing scientific attitudes such as the ones on nature, history, or philosophy of science. Considering the workforce will rise in the information age, science teachers are expected to be more qualified in scientific attitudes. Therefore, it is necessary to conduct studies to identify in-service science teachers' misconceptions -if there are any- and improve their scientific attitudes. Indeed, science teachers' level of participation in in-service training is high, which shows that they have the potential to improve themselves with the help of future in-service training they will receive on the nature, history, or philosophy of science. Besides, science teachers' level of following scientific publications has been high. It is assumed that their knowledge will expand with scientific publications, and their moderate scientific attitudes will be improved.

When the relationship between professional and scientific attitudes of science teachers is investigated, a moderate positive relationship is identified between the two variables. Before the study, the results were anticipated to be higher by the researchers. However, when the results obtained are observed, it is revealed that they are not at the expected level. Since no sample study has been encountered in the literature, the results cannot be compared. Increasing the level of science teachers' professional and scientific attitudes with in-service training is possible.

Demographic information is presented in the study to describe participants, define the study sample limits, and inform the reader about the groups to which research findings can be transferred. In conclusion, the study is restricted to Tokat province. It is recommended that more comprehensive research be conducted with groups having different demographic features in future studies.

This study which involves science teachers working in public schools, can be expanded by including teachers who work in private schools. Besides, studies with teachers from different branches can be conducted to compare results better and evaluate teachers' professional and scientific attitudes. Finally, considering the contents of in-service training teachers received, no contents such as the nature and history of science have been encountered. In order to support teachers' scientific attitudes, training related to the functioning of science can be developed, implemented, and evaluated.

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Statements of publication ethics

We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

Researchers' contribution rate

The first author carried out the following processes under the supervision of the second author: conceptualization of theoretical framework, determining the research questions, designing the method, collecting the data, analyzing the data, and discussing the results. The first author wrote a Turkish draft of the manuscript on which both authors worked in cooperation. The second author edited the English version, applied the article template before submission, and submitted the manuscript to the journal. Both authors followed the publication processes and contributed to the final version of the manuscript.

Ethics Committee Approval Information

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| Research Article / Araştırma Makalesi |

Investigation of Preschool Teachers' Art Activity Practices

Okul Öncesi Öğretmenlerinin Sanat Etkinliği Uygulamalarının İncelenmesi[1]

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Keywords

1. Preschool period
2. Art activities
3. Early childhood
4. Art education
5. Preschool teachers

Anahtar Kelimeler

1. Okul öncesi dönem
2. Sanat etkinlikleri
3. Erken çocukluk
4. Sanat eğitimi
5. Okul öncesi öğretmenleri

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Abstract

Purpose: The purpose of the study is the investigation of preschool teachers' art activity practices.

Methodology: The study is qualitative research conducted with a phenomenological design. Semi-structured interviews were conducted with preschool teachers in the study. The study group consists of 15 preschool teachers.

Findings: It was found that one-third of the teachers accepted themselves as competent in art activities, and two-thirds accepted themselves as partially competent. While all of the teachers stated that they had semi-structured art activities done, a few teachers stated that they also realized unstructured activities. Within the context of art activities, teachers were identified to do technique-oriented activities (colouring, cutting and sticking, based on artists and artworks, etc.), skills-oriented activities (creativity, fine motor skills and sensory development), and realize environmental arrangements (art centre, school garden and sensory table use). Additionally, teachers were reported to use art materials, natural materials, waste materials, and manipulative materials the most.

Highlights: In preschool teacher education undergraduate programs, art education courses should be conducted in a qualified and functional intended for the early childhood period. Preschool teachers and experts working on early childhood arts education should be brought together with online or face-to-face training. Teachers' knowledge of the subject should be strengthened in theory and practice. Teachers should be supported with in-service training about art education in early childhood. Teachers should integrate art and other activities and combine artistic experiences and outdoor learning opportunities.

Öz

Çalışmanın amacı: Araştırmanın amacı okul öncesi öğretmenlerinin sanat etkinlikleri kapsamında gerçekleştirdikleri uygulamaların incelenmesidir.

Materyal ve Yöntem: Çalışma nitel bir araştırma olup, fenomenolojik desende yürütülmüştür. Çalışma grubu 15 okul öncesi öğretmeninden oluşmaktadır. Araştırmada okul öncesi öğretmenleri ile yarı yapılandırılmış görüşmeler gerçekleştirilmiştir.

Bulgular: Araştırmada öğretmenlerin üçte birinin sanat etkinliklerinde kendisini yeterli, üçte ikisinin ise kısmen yeterli gördüğü bulunmuştur. Öğretmenlerin tamamı yarı yapılandırılmış sanat etkinlikleri yaptırdıklarını ifade ederken, birkaç öğretmen yapılandırılmamış etkinlikler de gerçekleştirdiğini belirtmiştir. Öğretmenlerin sanat etkinlikleri uygulamaları kapsamında teknik odaklı (boyama, kesme yapıştırma, sanatçı ve sanat eserinden yola çıkılan vb.), beceri odaklı (yaratıcılık, küçük kas becerileri ve duyu gelişimi) etkinlikler yaptıkları ve ortam düzenlemeleri (sanat merkezi, okul bahçesi ve duyu masası kullanımı) gerçekleştirdikleri tespit edilmiştir. Ayrıca öğretmenlerin sanat etkinliklerinde sırasıyla en çok sanatsal materyaller, doğal materyaller, artık materyaller ve manipülatif materyaller kullandıkları bulunmuştur.

Önemli Vurgular: Okul öncesi öğretmenliği lisans programlarında sanat eğitimi derslerinin erken çocukluk dönemine yönelik nitelikli ve işlevsel bir şekilde yürütülmesi gerekmektedir. Okul öncesi öğretmenleri ve erken çocukluk sanat eğitimi konusunda çalışan uzmanlar, çevrimiçi veya yüz yüze eğitim ile bir araya getirilmeli ve öğretmenlerin konuyla ilgili mevcut bilgileri teorik ve uygulamalı olarak güçlendirilmelidir. Öğretmenler, erken çocukluk döneminde sanat eğitimi konusunda hizmet içi eğitimlerle desteklenmelidir. Öğretmenler, sanat etkinliklerini diğer etkinliklerle bütünleştirmeli ve sanatsal deneyimler ve açık havada öğrenme fırsatlarını bir araya getirmelidir.

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INTRODUCTION

Before obtaining ways to transfer their thoughts and feelings via words, children use art to convey their understanding and interpretations of the world (Danko-McGhee & Slutsky, 2003). Art activities provide vast opportunities for children to detail their ideas, interests, feelings and experiences about the world. Children find symbols to express themselves through art activities and share them with others (Bea, 2004; Korn-Bursztyn, 2002).

Art activities in the preschool period contribute to all children's developmental areas. Through art activities, children's early literacy and school readiness skills increase (Phillips et al., 2010). The use of art materials supports the development of sensory-motor integrity, fine motor skills and hand-eye coordination. Working together by cooperation and sharing in the art centre contributes to children's social skills development. Talking about art studies and materials supports concept development and enrichment of vocabulary. While children mix colours and textures, observe changes emerging from the combination of different materials and classify materials; their mathematical and scientific skills are supported (Fox & Schirrmacher, 2014). Children's use of different materials and techniques in art activities supports their creative potential. Exploring ideas individually or in a group and discussing them with other children and adults provides opportunities for developing communication skills. (Novaković, 2015). In addition, the children's attitudes towards art develop positively when they meet with different artists and works of art in art activities (Kisida et al., 2018). Creating a rich art environment in preschool is essential for developing children's aesthetic awareness, artistic abilities, and critical and creative thinking skills (Cutcher & Boyd, 2018).

Art is one of the critical components in different early childhood approaches and programs worldwide. According to the philosophy of Reggio Emilia approach, which started in Italy, searching for beauty and esthetics is a natural part of humanity and an essential element of Reggio Emilia program (Cutcher, 2013; Vecchi, 2010). According to Malaguzzi (1993), "a child has a hundred languages," and hereunder, children use different symbolic tools for expressing themselves, such as play, dance, drama, painting, sculpture and drawing (cited in Cutcher, 2013). According to the approach that places art at the centre of the curriculum, learning takes place through the use of artistic materials, imagination and self-expression of the child (Cutcher, 2013; Sullivan, 2006). In Reggio Emilia schools, children join in art activities in ateliers. An art teacher called "atelierista" work in cooperation with children and other teachers (Cutcher, 2013). As another approach, Waldorf emerged in Germany and focused on the child's holistic development as a heart-hands-mind. In this approach, art plays a vital role in improving the ability of children to perceive both the internal and external world. Art is essential for the harmonic development of the child's inner life, and art is included in the curriculum. This approach that attracts attention to the fact that children develop sensitivity to colour, line, shape and texture with art aims to develop willpower, emotion, thought and eventually self-consciousness in children (Easton, 1997; Hallam et al., 2016). The significant effect of art on development in the early childhood period was considered while preparing our country's preschool curriculum. While art activities took place among leisure time activities in the Ministry of National Education 1994, 2002 and 2006 programs, art is addressed as a different activity type and a learning centre in the 2013 Preschool Education Program (Gelişli & Yazıcı, 2012; MoNE, 2013). In the program, art activities were defined as opportunities for the child's creativity, imagination, and problem-solving and help the child to know her/himself, her/his own culture and different cultures. The necessity to provide the child opportunities to choose by enabling variety in art activity types and materials was stated (MoNE, 2013). Moreover, besides planning and implementing activities independently, the program supports integrated activities, in which more than one type of activity comes together. Integrating art activities with different activity types enables interdisciplinary connections by ensuring art is associated with different areas of life (Kandır et al., 2016).

Teachers have as much importance as the teaching programs that are prepared for children to encounter quality art practices in the learning environments. According to Brittaine (1979), the quality of art experiences provided to children in preschool depends heavily on the teacher's expertise. This is because teachers are the implementers of the education program, who prepare the art materials and determine the art activities (cited in Bea, 2004). It is crucial that the preschool teacher respects the need of the child to do artwork and gives them the necessary time to develop their ideas (Novaković, 2015). Teachers should be equipped in terms of art (Bilir Seyhan & Ocak Karabay, 2018). In order to support children's creativity, the teacher should provide choices instead of giving the same topic and tools, provide different materials and activity types, materials and study environments adequate to children's developmental levels should be given by taking their interests and needs into consideration (Novaković, 2015; Yolcu, 2009). Teachers should consider that children are more interested in open-ended activities that enable them to make independent discoveries rather than unstructured activities that focus on shaping a product based on a model (Avcı & Sağsöz, 2018). Additionally, preschool teachers should introduce children to the art world by directly comparing children with artworks in museums and galleries or using quality reproductions (Zupancic & Duh, 2009). In summary, teacher competence, types of art activities, styles of structuring the activities and materials provided to children are the main factors for qualified art activities in the preschool period.

For preschool teachers to be sufficiently equipped for art education, teacher training undergraduate programs have enormous importance. When the teacher training programs, which the Council of Higher Education updated in 1998, 2006 and 2018, were examined, it was seen that various changes were made in the art education course in the preschool teaching undergraduate program over the years. The art education course included as a compulsory course in the fifth semester named "Painting Teaching I" with 3 credits and in the sixth semester named "Painting Teaching II" with 3 credits in the undergraduate program published in 1998 (Council of Higher Education, 1998). On the other hand, in 2006, the fact that the name of the course was changed to "Visual

Arts Education" and took place only in the fifth semester as a required course with 3 credits attracted attention (Council of Higher Education, 2007). Teacher training programs were updated in 2018. In this context, the preschool teacher training program included an art education course as a 3-credit compulsory field education course in the fifth semester. The content of the course under the name of "Art Education in Early Childhood" includes subjects such as the definition and function of art, the definition and importance of creativity and art education in early childhood, children's painting and features according to developmental stages, and preschool art education methods and techniques (Council of Higher Education, 2018a).

Even though art education courses took place in preschool teaching undergraduate programs in the past years; research shows that teachers did not consider the course they took in their undergraduate programs sufficient (Büyükyıldırım, 2018; Özkan & Girgin, 2014; Şahin, 2020). Similarly, in studies conducted with senior preschool teacher candidates, it was found that the candidates took courses related to art education or art, but most of them did not consider these undergraduate courses sufficient for preparing and implementing art activities (Aydoğdu & Ayanoğlu, 2020; Büyükyıldırım, 2018). Teachers mentioned that they did not consider this course they took in undergraduate education sufficient because it was theory-oriented, not intended for preschool children, and the instructor was not an expert in the field, etc. (Özkan & Girgin, 2014; Şahin, 2020). Being unable to take a suitable art education course in undergraduate education may cause preschool teachers not to be competent and equipped at the desired level in planning, implementing and evaluating art activities. In the study conducted by Akyıldız (2020) with 267 preschool teachers, self-efficacy perceptions of teachers in bringing in artistic and aesthetic values to children were not very high, and they were lower in art practices. In our country, the professional development of teachers can be supported via in-service training. As the in-service training of the Ministry of National Education Teacher Training and Development General Directorate between the years 2001-2020 related to art education for preschool teachers are analyzed; courses named "Language of the Painting", "Art Education in Preschool", and "Improving Creativity in Preschool" were seen to have been organized (MoNE, 2021). However, it was seen that these trainings are few and could not reach many teachers.

Studies researching art activities conducted by teachers reveal that teachers mostly do activities such as colouring, paperwork, kneading and collage (Çelik & Yazar, 2009; Ünal, 2018), colouring, tearing/cutting-sticking (Büyükyıldırım, 2018; Özkan & Girgin, 2014; Şahin, 2020), paperwork, three-dimensional studies and colouring (Avcı & Sağsöz, 2018), drawing and colouring, paper folding and origami, cutting-sticking and kneading (Bulut, 2020). When materials used in art activities were examined, it was found that teachers mainly used paint and paper (Avcı & Sağsöz, 2018), also included natural materials (Çelik & Tuğluk, 2020) and used kneading materials such as play dough, salted ceramic and pastry dough (Çelik & Yazar, 2009). Furthermore, preschool teachers expressed that art activities support children's psychomotor skills and creativity (Bulut, 2020; Gökdemir, 2019; Özkan & Girgin, 2014; Özyürek & Aydoğan, 2011), social-emotional skills, language skills, cognitive skills and self-care skills (Bulut, 2020), fine motor development and handcraft (Gökdemir, 2019).

Although children face learning opportunities that will contribute to their creativity during free play and art activities, the teacher needs to be able to guide them in art activities and have the required qualities to sufficiently contribute to development areas. Preschool teachers who will ensure art education for children should be equipped in terms of skill and knowledge (Bilir Seyhan & Ocak Karabay, 2018). Teachers' lack of knowledge, experience and pedagogics in art education may cause problems in practice (Ulutaş & Ersoy, 2004). From this viewpoint, the research aims to investigate preschool teachers' art activity practices. Previous research investigated the competence of teachers, activities they realized and materials they used. In addition to these points, this study aimed to investigate the structuring types of art activities and the materials used in more detail. In line with these purposes, the question of "What do preschool teachers do within the context of art activities?" is researched.

METHOD

The research was conducted using phenomenological research design. Phenomenological research defines what individuals experience about a concept or a phenomenon, how they experience it and what those experiences mean for them (Creswell, 2007). The researcher tries to understand the phenomenon from the perspective of the individuals, who experienced it (Güçlü, 2019). The phenomenon of this research is art activity. Art activity is one of the activity types that preschool teachers implement in preschool education classes. In the Ministry of National Education 2013 Preschool Education Program, it is stated that art activities can be held in a learning center or as a separate activity during the day and they can be integrated with all other types of activities (MoNE, 2013). In this study, in parallel with this statement, art activity includes all the art practices that teachers perform during the day (planned activities, practices in the learning center, arrangement of the educational environment for art, etc.). Art activity, which is the phenomenon of this research, was examined in detail with the views of preschool teachers.

Participants

Criterion sampling method among purposive sampling types was used in the research while determining participants. Accumulation of knowledge individuals have regarding a topic may shape their perspectives and experiences about that topic. Because of this reason, teachers participating in this study were selected based on educational status related to art education in early childhood period in preservice and after-service periods, professional experience periods and volunteering for the research. Polkinghorne (1989) recommends that the study group should consist of 5-25 individuals in phenomenological studies (cited in Creswell, 2007). Study group of this research includes 15 preschool teachers working in Ankara city center during 2019-2020 academic year. All teachers participating in the study are female and work in state-funded preschool education institutions. While

12 of the teachers work in independent preschools; 3 (T-12, T-14 and T-15) of them work in kindergarten classes incorporated in primary schools. All of the teachers have an art center in their classrooms. Characteristics of the teachers in the study group are presented in Table 1.

Table 1. Characteristics of the teachers in the study group

Code	Professional experience (years)	Educational background	Educational situation about art education
T-1	22	Undergraduate	No
T-2	10	Undergraduate	Yes
T-3	18	Undergraduate	No
T-4	12	Undergraduate	No
T-5	10	Undergraduate	Yes
T-6	10	Undergraduate	No
T-7	10	Undergraduate	Yes
T-8	19	Undergraduate	Yes
T-9	13	Undergraduate	Yes
T-10	20	Associate degree	Yes
T-11	5	Undergraduate	Yes
T-12	1	Undergraduate	Yes
T-13	10	Undergraduate	No
T-14	2	Undergraduate	Yes
T-15	1	Undergraduate	Yes

When the table is examined, professional experience durations of teachers seem to vary between 6-10 years for 5 teachers, 1-5 years for 4 teachers, 16-20 years for 3 teachers and to be over 20 years for one teacher. One of the teachers has an associate degree; while the rest 14 of them have an undergraduate degree. While 10 teachers included in the study group have an experience of art education in preschool; 5 of them do not have any training on this topic.

Data Collection Tools

Information regarding the type of institution the preschool teachers are working, their educational background, professional experience duration and whether they have educational experience regarding preschool art education or not were obtained via the demographical information form prepared by the researchers.

In phenomenological research, data is collected from people who have experienced the phenomenon and interview is accepted as the main data collection technique (Creswell, 2007). Compatible with the research design, semi-structured interviews were conducted, in order to determine the practices of preschool teachers regarding art activities. Semi-structured interview form consists of five open-ended questions prepared to reveal teachers' experiences regarding art education in preschool, their competence perception about art activities in preschool, structuring types of activities they realize, and what kind of techniques and practices they use within the context of art activities. The researcher occasionally asked some additional questions to the participants during interviews, with the purpose of gathering more detailed information about the experiences and thoughts teachers conveyed.

Data Collection Process

After the necessary permissions for the research were obtained, the data collection process started. The researcher went to the institution of the participant teachers, explained the purpose of the research and their approval was received through consent forms. Interviews were conducted in a quite location at the school on a convenient day and time determined by the teacher and the researcher. Interviews were voice recorded. Interviews lasted 25-30 minutes on average.

Data Analysis

Content analysis with an inductive approach was realized in data analysis compatible with the research design. In the study, Şimşek and Yıldırım's (2016) four-step content analysis method was applied. These steps are (1) data coding, (2) developing themes, (3) organizing code and themes and (4) defining the findings. Interview records were converted into text form by the researchers. Codes were obtained from these texts and codes, sub-themes and themes were identified from the obtained codes. Phrases were used as the smallest unit while conducting content analysis. Frequency distribution is generally used in the use of phrases as the smallest unit (Berg and Lune, 2016). While transforming data into findings, T-1, T-2, …, T-15 codes were given to teachers, in order to assure the privacy of participants. Reliability processes recommended by Gibbs (2007) were followed for the reliability of the research. While converting voice records into texts, careful controls were completed, codes and data were

compared continuously during coding process and transcoding controls were performed. After the coding controls were completed and it was determined that the data analysis results represented the data set, the inter-coder reliability, which is another reliability strategy of qualitative research, was calculated. The inter-coder reliability of the codes coded by both researchers was calculated according to the Miles and Huberman (1994) formula. Inter-coder reliability was found as 95%.

In the research, peer review strategy, which is among the qualitative research validity strategies, were used. Researchers receive ideas from other researchers in this strategy (Glesne, 2013). After the interview questions were prepared by the researchers, opinions of five experts working in the area of preschool education were taken and them interview questions were finalized. One other qualitative research validity strategy used in the research is rich and detailed description. Researchers use a type of writing that will allow the readers to get in context (Glesne, 2013). In line with this validity strategy, study group was defined in detail, data collection process and data analysis were stated in detail and thoughts of participants were presented with direct quotes.

FINDINGS

This section includes findings regarding preschool teachers' educational status on art education, their competences about art activities, structuring types of art activities, and their thoughts for techniques, practices and materials used within the context of art activities.

Table 2 shows findings about the educational experience of preschool teachers in the study group regarding art education

Table 2. Educational experience of preschool teachers regarding art education

Theme	Sub-themes	Codes	N
Educational experience	Teachers with education	As a course in the undergraduate program	5 (T-2, T-5, T-11, T-12, T-15)
		Through personal interest and research	2 (T-7, T-8)
		Through other courses taken in the undergraduate program	2 (T-10, T-14)
		Through in-service training	1 (T-9)
	Teachers without education	Did not receive any education.	5 (T-1, T-3, T-4, T-6, T-13)

When Table 2 is analyzed, two sub-themes seem to emerge as "Teachers with education" and "Teachers without education" in the educational experience theme. While 10 teachers participating the research in the "teachers with education" sub-theme mentioned receiving education related to art education; 5 teachers declared receiving no education about art education.

The teacher coded T-11 expressed having taken an art education course in her undergraduate education with the following sentences:

"I took an art course at university…We reviewed the works of artists, talked about how we will examine these works with children. We talked about materials we can use with children." T-11

Teacher coded T-15 mentioned taking an art course in her undergraduate education, however did not evaluate the course adequate as follows:

"I took the course but the instructor was from another faculty. That is, what the instructor told was not intended to children. It contributed me in terms of art but it was not very useful for thinking what I could do with children." T-15

Teacher coded T-8 expressed the education she received through personal interest and research with the following sentences:

"…Now if they would say preschool teachers are to branch out as well, I would choose art. Art is my area of interest, an area I like. I did not take a course in the university but I go to exhibitions whenever I have time. I contribute to myself and think what I can do at the classroom with the things I see at the exhibition. For instance, I got interested in art therapy lately; I saw it on the Internet and immediately joined that certificate program. I read lots of resources, do research from the Internet, look at the articles…" T-8

Teacher coded T-14, who stated to have been informed about art education within the context of an another course she took in her undergraduate education, mentioned her experience as follows:

"We did not especially take an art course; however, we were occasionally told in other courses we took about what we could do in art activities. For instance, in children literature course, an instructor addressed it a little while we were analyzing the pictures in the books." T-14

Teacher coded T-9, who stated that she participated an in-service training in which preschool art education took place, conveyed her experience as follows:

"I have attended an in-service training in a city I used to work. As much as I remember, we were told about materials in art activities and what kinds of activities are done..." T-9

Teacher coded T-13 indicated not taking any courses related to art education as follows:

"I remember art and music courses were elective in the university. I had chosen music; I remember taking a music course but not art…I did not have the chance to get training after I became a teacher. I usually follow Orff trainings." T-13

Findings about the thoughts of preschool teachers regarding their competence for art activities are shown in Table 3.

Table 3. Preschool teachers' thoughts regarding their competence for art activities

Theme	Sub-themes	Codes	N
Teacher competence	Partially competent	Lack of up-to-date knowledge and education about preschool art education	4 (T-6, T-13, T-14, T-15)
		Lack of knowledge about materials	2 (T-2, T-7)
		Art being out of the area of interest	1 (T-10)
		Having problems in planning art activities	1 (T-9)
		Necessity to give importance to school readiness skills	1 (T-4)
		Having problems in sparing time	1 (T-1)
	Competent	Being able to plan effective art activities	3 (T-3, T-11, T-12)
		Has knowledge and ideas adequate for children	1 (T-5)
		Art being an area of interest and being able to observe children effectively	1 (T-8)

When the findings are analyzed, sub-themes of "Partially competent" and "Competent" can be seen under the "Teacher competence" theme. Ten teachers participating in the research stated to find themselves partially competent about art activities, 5 teachers on the other hand stated to find themselves competent.

Teacher coded T-14 in the "partially competent" sub-theme transferred her thoughts as follows:

"I cannot say I am completely competent. Because we live in a fast changing and developing world. You need to continuously follow modern ideas and novelties about art; there are many things I do not know." T-14

Teacher coded T-15 expressed why she does not perceive herself completely competent under the "partially competent" sub-theme with the statements below:

"To be honest I am trying to do my best but I do know I have shortcomings. I think I need more training on this topic…." T-15

Teacher coded T-7 mentioned having a lack of knowledge about materials with the following sentences:

"So, of course it is not enough. There is need for continuous improvement. There are points where I do not know how to use the material, or a result different than I expected is achieved when the materials are combined. On that topic, I see by trying and doing." T-7

Teacher coded T-4 under the "partially competent" sub-theme explained why she did not perceive herself completely competent because she thinks she needs to give more importance to school readiness skills:

"Frankly, I do not think I am very competent… Because in any way, we need to give priority to how the child holds the pencil. It is caused by the preparation process to primary school, it is caused because of my program but I still try to combine it with an art activity. This is the summary of the situation." T-4

Teacher coded T-3 under the "competent" sub-theme declared her thoughts with below statements:

"Yes, I am competent… I make plans in which children meet with writers, artists, painters and participate effectively." T-3

Teacher coded T-5 conveyed her thoughts about being competent with the statements below:

"…In this way, of course we need to learn something any moment but at least I think I have ideas and knowledge enough for children right now. Feedback I receive from children during activities supports my competence." T-5

Teacher coded T-8 declared her thoughts about her competence in art activities with the sentences below:

"I think I am competent. Why? In my opinion first it is my area of interest, an area I like….On the other hand I observe children very well. My education program is actually them. Yes, we have a program, books, articles in our hands but that field is entirely different. They present very precious things when I observe them. Let me tell a little anecdote, recently one of my children said 'let me draw a crack'. Believe me, it was something I never heard before. Usually there are directions such as draw a house, draw a car and draw a sun. That moment I said to myself, let me try this for the whole class. It attracted the attention of all children, all of them came to the art center saying 'I will draw as well'. I saw how clear creativity is in children…" T-8

Findings regarding the structuring types of art activities implemented by preschool teachers are presented in Table 4.

Table 4. Structuring types of art activities

Theme	Sub-themes	Codes	N
Structuring type	Semi-structured	Activities which materials are given but instructions are not and original products are produced	11 (T-1, T-2, T-3, T-4, T-5, T-7, T-10, T-11, T-12, T-13, T-14)
		Activities which materials and instructions are given and original products are produced	6 (T-6, T-8, T-9, T-10, T-11, T-15)
	Unstructured	Activities which children are completely free in material selection and activity process	6 (T-1, T-2, T-4, T-5, T-7, T-9)

When the table is analyzed, all preschool teachers participating in the research seem to prefer semi-structured activities; while 6 of them prefer unstructured activities as well.

Teacher coded T-2, who mentioned realizing semi-structured and unstructured activities, delivered her thoughts as follows:

"I do not give photocopy activities to children. I try to find unstructured activities as much as possible. Children are already trying to produce their own products there using her/his own imagination and creativity. I choose our materials, materials change…Children act again with their own choices and preferences…I want them to improve themselves with available materials and to produce an original product somehow. In the old system there were photocopies. You cannot do art with templates. Art is a product produced as a result of a person's own dreams…" T-2

Teacher coded T-4 mentioned implementing art activities as both semi-structured and unstructured with the following sentences:

"Actually, I do not do planned activities for children. I just vary the things, materials in the art center. Honestly I try to put a different thing every day and I have not done a structured activity so far…The child works there with the material she/he wants in a way she/he wants….Sometimes I vary paper types. As the occasion arises I give children straw paper or glossy paper. I give the colorful papers. Other than that I give thick cardboards with for instance a shape on it, the child cuts and glue it and produce something else. I mean other than that, there is not anything I make them do simultaneously one-to-one. They work on art activities as long as they focus and want." T-4

Teacher coded T-9, who stated to be doing both semi-structured and unstructured practices, expressed her thoughts as follows:

"Content of art activities is usually like this, often unstructured activities in which they can use original and different materials. Sometimes we give the instructions a little more specific, though. …For instance, we made children do still life painting with crayons. We asked them to draw not the one they see but the one they imagine …" T-9

Findings regarding the techniques used by preschool teachers within the context of art activities and practices they implement are displayed in Table 5.

Table 5. The practices of preschool teachers within the context of art activities

Theme	Sub-themes	Codes	N
Art practices	Technique-oriented activities	Painting	5 (T-1, T-6, T-9, T-11, T-14)
		Cutting and sticking	4 (T-1, T-6, T-10, T-14)
		Activities based on artists and artworks	4 (T-3, T-6, T-9, T-11)
		Kneading practices	4 (T-2, T-6, T-11, T-12)
		Free style drawing and painting	2 (T-2, T-3)
		Completion practices	2 (T-5, T-11)
		Three dimensional activities	2 (T-6, T-8)
		Pattern practices	1 (T-11)
		Paper folding techniques	1 (T-5)
		Spraying techniques	1 (T-2)
	Skill-oriented activities	Activities in which children can use their imagination and creativity	8 (T-2, T-5, T-8, T-9, T-10, T-12, T-13, T-14)
		Activities to support development of fine motor skills	4 (T-1, T-10, T-12, T-15)
		Activities that will contribute to sense development	3 (T-7, T-12, T-15)
	Environmental arrangements	Art center usage	5 (T-2, T-4, T-5, T-8, T-10)
		School garden usage	3 (T-2, T-5, T-10)
		Sensory table usage	1 (T-7)

When Table 5 is examined, it is seen that sub-themes of "Technique-oriented activities", "Skill-oriented activities" and "Environmental arrangements" have emerged.

Teacher coded T-6, who stated that she does painting, cutting and sticking, kneading, 3-D practices and activities based on artists and artworks within the context of art practices as "Technique-oriented activities", expressed the practices she does as follows:

"You see, cutting and sticking, coloring, kneading with play dough, 3-D practices in the classroom…Other than these, I mean recently we studied three artists as part of art activity. We started with Miro. Miro had figures, we started with those figures with children. Afterwards, there is an artist named Alexander Calder, he also uses geometrical shapes. From that we transferred to Picasso. You see, cubic paintings, he draws even the human face geometrically. And we did such practices with children…" T-6

Teacher coded T-1 delivered the art practices she realizes "Technique-oriented activities" and "Skill-oriented activities" as follows:

"While having art activities in class, I mostly do activities I believe will have more effect on children. For instance, I take activities, which will contribute their fine motor skills, such as coloring, cutting and sticking…" T-1

Teacher coded T-12 indicated realizing art practices "Skill-oriented activities", which will support fine motor and sense development and in which children can use imagination and creativity:

"I pay attention to making different studies at levels that will support creativity and develop fine motor skills of children. I try to provide opportunities to children such as interpreting objects they use in their daily lives with a different perspective other than their main usage purpose, kneading practices, producing new things by kneading or touching, supporting the development of all senses…" T-12

Teacher coded T-7 stated she did activities "Skill-oriented activities" that will contribute to the sense development of children and used sensory table "Environmental arrangements" as follows:

"Activities in which they mostly touch and feel. I pay attention to activities which children do by touching and feeling. We have a sensory table for instance, we use it in activities. These are what come to my mind for now." T-7

Teacher coded T-10 was determined to realize practices in all sub-themes. This teacher conveyed her experience and thoughts below:

"I prepare more of learning centers. Children go to art centers based on their preferences. For this, I locate materials such as watercolor paints, finger paint and dough with which they can work on individually. They get experience with these, but original studies are the ones that definitely improve their creativity. I do cutting studies occasionally for fine motor skill development…Cutting practices are really important in terms of fine motor skill development. Any child who is interested in it goes to that table. We use the garden as well. For instance, we go out to the garden, in the meantime I want them to choose one object in the garden that attracts their attention. We can use that object, which the child brings to class, bird feather, leaves or whatever; we can use it in the art activity." T-10

The findings of the materials used by preschool teachers in art activities are shown in Table 6.

Table 6. Materials used by preschool teachers in art activities

Theme	Sub-themes	Codes	N
Materials	Artistic materials	Various paints (watercolor, finger paint, crayon, colored pencil)	7 (T-1, T-2, T-4, T-6, T-9, T-10, T-14)
		Paper types	6 (T-1, T-2, T-4, T-5, T-6, T-9)
		Moldable materials (clay, salted ceramic dough, play dough)	5 (T-2, T-6, T-10, T-11, T-12)
		Droppers	1 (T-2)
		Brushes	1 (T-4)
	Natural materials	Branches, leaves, flowers	5 (T-2, T-4, T-8, T-10, T-11)
		Mod/soil	2 (T-5, T-8)
		Bird feathers	1 (T-10)
	Waste materials	Package (bottle, box, packet)	4 (T-3, T-11, T-13, T-14)
		Used papers	1 (T-11)
	Manipulative materials	Kinetic sand	2 (T-6, T-7)
		Insert-remove toys	1 (T-8)
		Shaving foam	1 (T-7)
	Other	Daily objects	1 (T-12)
		Presentation and slides	1 (T-15)

When the findings in Table 6 related to the materials used by preschool teachers as part of art activities are investigated; it is seen that concepts of "Artistic materials", "Natural materials", "Waste materials", "Manipulative materials" and "Other" sub-themes have emerged.

Teacher coded T-2, who stated to give place to artistic materials and natural materials within the scope of art practices, reflected her thoughts and experiences as follows:

"…Some days I give them finger paints. Our materials vary. For instance, they can study in the ways they imagine by using watercolor paint or diluted finger paint put in a dropper. Another day we use natural materials. Of course art is not something solely based on paints. We use paper, but as little as possible. …We obtain paint from the natural materials. For instance, they crush flowers, leaves, all of them and obtain colors on a paper from nature. They are both surprised and enjoy the situation, and a permanent learning occurs. They can of course use play dough. Sometimes we dry some of their products…" T-2

Teacher coded T-6 mentions about using artistic materials and manipulative materials in art activities as below:

"I use play dough and kinetic sand for 3-D studies more of course. But for other activities we do with paper, we often use finger paints, crayons and colored pencils…" T-6

Teacher coded T-11 stated using artistic, natural and waste materials in art activities the following sentences:

"We use materials such as clay and leaves. We do original studies using salted ceramic dough and used papers. There are also waste materials such as bottles in our activities." T-11

Teacher coded T-15, who expressed using presentation and slides from the "Other" sub-theme in art activities, delivered her experiences about her practices as follows:

"I use presentation and slides. Not like showing and making them do it, but for giving them an idea. For instance, if they are going to draw an animal, I prefer to show children its characteristics and real photographs as well…" T-15

DISCUSSION

As a result of the study, it was found that only one-third of the teachers took a course on art education in the early childhood period during their undergraduate education. Similar to this result, in another study by Çelik and Tuğluk (2020), while 80% of the preschool teachers stated that they had taken courses on art education during their undergraduate education, it was seen that some of those were different undergraduate courses like Museum Education, Creativity and its Development that are in the curriculum. Although art education is a compulsory course within the undergraduate program offered by the Council of Higher Education, previous studies revealed that some teachers had not taken any course on art education in early childhood (Erkut, 2016; Şahin, 2020). It is thought that this could be a result of the fact that the Art Education in Early Childhood course differs as an elective or a compulsory course in the undergraduate programs of universities. Supporting this thought, a teacher who participated in this study stated that she did not take the art education course because it was an elective together with a music course in her undergraduate program. She had decided to take music instead. The Council of Higher Education updated the art education course as a compulsory course in the fifth semester of the Early Childhood Education Undergraduate Program in 2018. Thus, it is thought that all preschool teacher candidates have taken the "Early Childhood Art Education" course starting from the 2018-2019 academic year. However, the quality of the course and the competency of the instructor teaching it are matters of concern to reach the course's goals (Yıldız & Esen Çoban, 2019). As a matter of fact, in the previous studies, teachers reported that art education courses did not meet their expectations because the courses were more theoretical than practical, the instructors were not experts in their fields, and the content of the course was not suitable for the preschool education level (Büyükyıldırım, 2018; Özkan & Girgin, 2014; Şahin, 2020).

Similarly, a teacher who participated in the present study stated that she had taken the art education course in an undergraduate program. However, the instructor teaching it was appointed outside the education faculty and did not present the course in line with early education. Compared to the other areas in early childhood education, there are fewer experts in the field of art education. Experts from other faculties such as fine arts could present the course from a more theoretical perspective rather than practical and appropriate for preschool education. Considering such cases, with an update by the Council of Higher Education in 2018, it was mentioned that the field courses for teaching the subject should be taught by instructors who have studied at a postgraduate level in the teaching program or who are associate professors (The Council of Higher Education, 2018b). For teachers to be equipped in early childhood art education, they must be field experts who teach this course. The course should have theoretical knowledge and practical examples for preschool education.

The present study shows that only one-third of the teachers consider themselves competent, and the rest consider themselves partially competent. Similar to these findings, a study by Bulut (2020) shows that almost half of the teachers define themselves as partially competent in art and creativity. The ones that stated they considered themselves as partially competent explained this with the lack of current knowledge and education on art education in early childhood, lack of know-how on materials, problems experienced in planning activities, lack of interest, the need to focus on school readiness skills and lack of time. The fact that the

teachers who took part in the study have problems with activity planning and their lack of education can be considered a result of not taking a qualified early childhood arts education course during their undergraduate years; because one of the reasons teachers are experiencing problems in activity planning, and implementation may be their lack of knowledge on the subject (Ulutaş & Ersoy, 2004). Teachers' lack of knowledge about the materials may also cause undesirable outcomes in practice. Materials used in artworks in early education can be definitive in terms of the art process and the quality of work. The compatibility of the materials with each other can affect the children's pleasure from the process and the permanence of the product. For instance, if a sticking material is not chosen correctly, the desired outcome may not be achieved. Therefore, the tools and materials should be chosen well (Ayaydın & Mercin, 2013). When teachers are not competent with materials, the planned art experiences may not go as desired, and children may not enjoy the process.

One of the study's striking findings is that teachers consider themselves not fully competent in art because they are not interested in art, focus on school readiness skills, and struggle to find the time. Artworks can be integrated with all types of activities (math, reading and writing readiness, movement, science etc.) in the curriculum. The Ministry of National Education Preschool Education Program emphasizes various integrated activities that are put together with suitable transitions (MoNE, 2013). Teachers can integrate art, which is not in their interest, with the disciplines they are interested in through integrated activities. Thus, problems in spending time on art can be eliminated. Also, studies show that art experiences support children's school readiness skills and literacy development (Phillips et al., 2010). Thus, teachers can support children's school readiness skills through independent or integrated art experiences.

When structuring types of art activities teachers use are examined, it is seen that all teachers use semi-structured activities while almost one-third of the teachers use unstructured activities. Teachers indicated that they choose the materials or/and instructions to be used in the semi-structured activities. Teachers who also shared that they use unstructured activities also mentioned leaving the material choice and the activation process to the children. Instead of structured and product-oriented activities, focusing on semi-structured and open-ended experiences meet children's learning and discovery needs and may increase children's active participation in the learning process (Çelik & Tuğluk, 2020). Another study supports this view by showing that the level of participation in art experiences in classrooms where an unstructured approach is used is higher than the level of participation in classrooms where a product-oriented approach is used (Avcı & Sağsöz, 2018). Teachers' letting children free in their choices through unstructured activities and deciding on instructions and materials through semi-structured activities are valuable. Determining some elements of the learning process by adults in art education is beneficial and necessary for the artistic development of children (Bea, 2004). Allowing children freedom in choices at all times may cause a routine and repetitiveness in art studies (Sharp, 2004). Teachers have a significant role in creating a balance between structuring and freedom for children to express themselves freely (Bilir Seyhan & Ocak Karabay, 2018). Setting up a rich art environment with some limitations (material, instruction etc.) may help create an extensive and appealing learning environment to help children develop their artistic skills and creativity (Cutcher & Boyd, 2018). Some teachers in the study emphasized that they do not include structured activities because they would prefer to give children the opportunity to make choices, they value children's creativity in art, and the structured activities are outdated. The teachers' opinions, who stated that they carried out semi-structured and unstructured activities by emphasizing creativity, may show that these teachers' understanding of structured art activities started to change.

Findings obtained from the art techniques and practices that early childhood teachers use were evaluated in terms of techniques used, skills and environmental arrangement. It was noticed that teachers mostly prefer colouring followed by cutting and sticking, activities based on artists and their work and kneading practices. In parallel with the present study's findings, literature shows teachers often choose coloring, tearing/cutting – sticking activities (Aydoğdu & Ayanoğlu, 2020; Büyükyıldırım, 2018; Çelik & Yazar, 2009; Özkan & Girgin, 2014; Ünal, 2018). While colouring, tearing/cutting – sticking activities are essential in developing fine motor skills and hand-eye coordination, they may discourage children artistically when offered (Şahin, 2020). Zupancic and colleagues (2015) stated that colouring activities are frequently used in preschool education institutions due to the ease of use of materials such as coloured pencils and crayons and the children's need and desire to express themselves with colours. That being said, teachers' choosing activities such as tearing/cutting – sticking activities is thought to result from the fact that materials used in these types of activities are easily accessible and economical as well as the preparation time is less, and they can be used in various settings. Another reason for widely using these activities by teachers may be supporting motor skills and practising skills such as holding a pencil and using scissors, thus increasing children's readiness for primary school. Teachers' statement that they also prefer art activities based on artists and artworks as well as kneading along with tearing/cutting –sticking activities has been considered a significant finding in art education. Yolcu (2009) mentioned that while planning art activities, both two-dimensional and three-dimensional work should be included considering children's perception skills can vary. According to Buyurgan and Buyurgan (2012), children should be offered not only drawing experiences, three-dimensional work or work with various materials but also an environment where they can express their opinions and hear about their friends' opinions by being introduced to artists and the work that would gain them an artistic point of view. It is thought that the teachers who stated that they are including these types of activities have more awareness about how art activities should be in the preschool period.

It was revealed from the teachers' statements that they also practised art activities to develop children's skills. When these statements were examined, it was found that teachers implement activities to support children's imagination and creativity, fine motor skills and sensory development. Similarly, in the studies, early childhood educators stated that art experiences foster children's motor skills as well as creativities (Bulut, 2020; Gökdemir, 2019; Özkan & Girgin, 2014; Özyürek & Aydoğan, 2011).

However, all development areas of children can be supported with art activities in the preschool period (Fox & Schirrmacher, 2014). Through quality art activities planned according to the age and development levels of children, early literacy, communication, mathematics, cooperation, and scientific process skills can be supported, as well as fine motor, creativity and sensory development (Cutcher & Boyd, 2018; Fox & Schirrmacher, 2014; Novaković, 2015; Phillips et al., 2010). In addition, children's self-care skills can be supported by the careful use of materials during art activities. It can be said that teachers should consider the benefits of art activities to children's developmental areas with a more holistic perspective and not limit them to directly related developmental areas such as creativity, fine motor skills and sensory development.

When art activities are examined in terms of environmental arrangements, it is seen that one-third of the teachers use the art centre, one-fifth use the school garden and one teacher uses the sensory table. While all teachers in the study have an art centre in their classroom, only one-third of them stated that they use the centre for art activities is another remarkable outcome of the study. Similar to this finding, in another study by Aysu and Aral (2016) with 16 teachers, only 4 of them were found to use the art centre in their classroom. The art centre is one of the learning centres mentioned in the MoNE 2013 Preschool Education Program. While all of the teachers in the study have an art centre in their classroom, most did not mention the centre. This could be explained as the art centre being set up as an area with shelves and cabinets for art materials (paint, paper etc.) instead of a space where children can spend time.

Similarly, a study by Ramazan and colleagues (2018) shows that all classrooms had art centres with materials related to art, but these areas were not designed for children's use. This finding of the present study and other studies demonstrate that art centres and materials are not of the desired quality or quantity (Aysu & Aral, 2016; Ramazan et al., 2018). The finding that three of the teachers participating in the study mentioned they use the school garden and another one mentioned the sensory table for art experiences show that these four teachers do not limit their art experiences to traditional tabletop activities. Outdoor experiences support children's cognitive, social-emotional and motor development and increase attention, creativity and imagination (Yıldırım & Özyılmaz Akamca, 2017). Teachers need to move art experiences beyond classroom walls more often to increase the quality of the experiences and benefit from the outdoor opportunities.

It is found that teachers in the study mostly use art materials for art experiences. Following art materials, it is found that natural, waste and manipulative materials are also used. Similar to the findings of this study, other studies show that teachers mostly use art materials like paint and paper (Avcı & Sağsöz, 2018) but also include natural materials (Çelik & Tuğluk, 2020). Materials used in art experiences in early childhood are pretty necessary. The variety of materials supports children's concept development and allows them to use different senses. Thus, the learning process can become more interesting for the children while what they have learnt may be more permanent. Natural and art materials enable children to interact with nature (Zembat et al., 2020). Waste materials may activate creativity by allowing children to choose materials themselves (Buyurgan & Buyurgan, 2012; Çetin & Koyuncuoğlu, 2013). In Reggio Emilia's approach, which stands out as one of the early childhood approaches with an art focus, art, natural and waste materials are often used together (Thornton & Brunton, 2009). Teachers' use of natural, manipulative and waste materials and art materials is a positive finding; however, these materials should be included more to support children's conceptual and sensory development and make learning permanent.

CONCLUSION AND RECOMMENDATIONS

As a result of the study, it is concluded that art education courses offered within the scope of early childhood education undergraduate programs are not conducted sufficiently and functionally in previous years. The course names Art Education in Early Childhood, which was updated as the compulsory course in the early childhood education undergraduate curriculum in the 2018-2019 academic year, should be instructed by experts in the field. Additionally, the content of the course should include not only art theory and concepts but also artistic developmental aspects of children in early childhood ages and the contribution of art activities to young children's development. The properties of high-quality art activities, techniques, the use of material and the creation of active art centres should also be addressed in the course. In addition, it may be suggested to include subjects such as planning, implementing and evaluating qualified art activities and integrating them with other activities.

It was found that teachers do not consider themselves competent in art education due to a lack of knowledge in art practices. Preschool teachers and experts working on early childhood arts education can be brought together with online or face-to-face training. Teachers' knowledge of the subject can be strengthened in theory and practice. Also, it has been determined that in-service training for art education in the preschool period is quite limited. It may be suggested that teachers should be supported more with in-service training.

Some teachers stated that they did not find themselves fully qualified in art activities because they were not interested in arts; they thought they should give importance to school readiness skills. They had problems allocating time to art activities. It is recommended that teachers implement art activities by integrating them with other types of activities.

It is suggested that art centres in early childhood classrooms should be designed as spaces with tables and chairs and a sufficient amount of quality materials where children can have full access to materials and choose to work independently rather than spaces where art materials are only exhibited and kept. Also, teachers can often use outdoor spaces for art activities and combine art and outdoor learning opportunities.

In this study, the art practices of preschool teachers were investigated according to the teachers' opinions. In future studies, research examining the art practices of teachers can be conducted through observations in the learning environments.

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We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

Researchers' contribution rate

First author conceived of the presented idea. Second author developed the theory and first author collected data. All authors reviewed and analyzed the data. Second author supervised the findings of this work. Both authors discussed the results and contributed to the final manuscript

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| Research Article / Araştırma Makalesi |

Analysis of Mind and Intelligence Games for Primary School Mathematics Curriculum Learning Outcomes

Akıl ve Zekâ Oyunlarının İlköğretim Matematik Öğretim Programı Kazanımlarına Göre Analizi

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Keywords

1. Primary school
2. Mind games
3. Intelligence games
4. Mathematics curriculum
5. Mathematics education

Anahtar Kelimeler

1.İlkokul
2.Akıl oyunları
3.Zeka oyunları
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Abstract

Purpose: In this study, the Turkish Federation of Mind and Intelligence Games used in Intelligence Games Education in Teacher Educators are analyzed for primary school mathematics curriculum learning outcomes.

Design/Methodology/Approach: This study uses a document analysis model among qualitative research methods. The descriptive analysis method among qualitative data analysis techniques was applied for data analysis.

Findings: As a result of the research, it was determined that the most outcomes and game matches were in the 1st grade; mind and intelligence games mostly matched with outcomes in learning areas of numbers and operations and geometry; It is seen that the outcomes under the sub-learning domains Spatial Relations, Geometric Objects and Shapes, Natural Numbers match more with the game contents.

Highlights: The study results show that mind and intelligence games were included in the Ministry of National Education (MoNE) curriculum in 2013. In the following years, the subject received interest in investigating its contributions to the education field. This study might recommend that skills aimed for the mathematics class might be offered based on intelligence games when the curriculum is considered based on activities.

Öz

Çalışmanın amacı: Bu çalışmada Türkiye Akıl ve Zekâ Oyunları Federasyonunun Zekâ Oyunları Eğitici Eğitiminde kullanılan akıl ve zekâ oyunlarının ilköğretim matematik dersi kazanımları açısından analizi yapılmıştır.

Materyal ve Yöntem: Araştırmada nitel araştırma yöntemlerinden doküman incelemesi kullanılmıştır. Verilerin analizinde nitel analiz tekniklerinden betimsel analiz kullanılmıştır.

Bulgular: Araştırma sonucunda en çok kazanım ve oyun eşleşmesinin 1. Sınıfta olduğu; akıl ve zeka oyunların en çok sayı ve işlemler ile geomteri öğrenme alanlarında kazanımlar ile eşleştiği; Uzamsal İlişkiler, Geometrik Cisimler ve Şekiller, Doğal Sayılar alt öğrenme alanları altında bulunan kazanımların oyun içerikleriyle daha fazla eşleştiği görülmektedir.

Önemli Vurgular: Araştırma sonuçlarına göre akıl ve zekâ oyunlarının Milli Eğitim Bakanlığı (MEB) müfredatındaki çalışmaları 2013 yılında programda yerini almıştır. Sonraki yıllarda bu konu eğitim alanındaki katkıları incelenmek üzere daha çok ilgi görmüştür. Çalışmanın, oluşturulacak programlarda etkinlik bazında dikkate alındığında matematik dersinde kazandırılmak istenen becerilerin verilmesinde olumlu etkisinin olacağından bahsedilmiştir.

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INTRODUCTION

Humans have played games since babyhood. A baby does not need to learn how to play a game because the game is an instinct for humankind (Berber, 2018). Playing games contribute to children's physical, mental, emotional and social development. While games are a need for children, they act as an education tool that impacts the children's development processes. Each game addresses the different developmental properties of the children. Therefore, a child in the developmental period must play different games (Halmatov, 2019).

Teaching with games, one of the modern education methods, can be seen as essential in terms of learners' success, motivation for class and positive effects on the students. When the studies regarding the effects of games on development are investigated, it can be seen that the games impact various developmental fields. The relationship between mathematics and games shows that mathematics and intelligence games are intertwined (Ugurel & Morali, 2008). Mental processes such as creating hypotheses, induction, deduction, applying strategies, relational thinking, classification, looking for different solutions methods for the problem and creating models while playing games form the mathematics class's core.

Games played for centuries are also crucial for sustaining cultural values. However, the games diversified as the conditions of today's world changed. For example, games today are more played indoors, and the opportunities to benefit from the educational properties increased. Therefore, this change in the games that changed and enriched over time reflected the used materials. Today, educational games are used to improve learning with fun, concept teaching, problem-solving skills, strategy development, focusing on the target, and participation in individual or group work. Since educational games can be concretized with visual materials, using these games in mathematics class with abstract statements can increase the interest in the class and contribute to learning the subject (Oz Pektas, 2017).

Until today, game categorization has been undertaken around the world. Accordingly, intelligence games were not categorized with absolute results. It is seen that various researchers adopted different categorizations. Intelligence games include various verbal or non-verbal games as well as games with or without visual materials. In the end, the general assumptions about the various intelligence games have problem-solving, reasoning, and alternative solution creating discourses. Oldfield called intelligence games mathematics games and explained these games under 12 titles. Hack and Duhl explained the classification of strategic games such as chess and the go-on probability concept. In mathematics teaching, Offenholley investigated intelligence games as the games that could be used in mathematics classes. Compared to other verbal lessons, mathematics is based on the skill of analyzing by understanding rather than memorizing (cited in Erdogan et al., 2017). Concretization of this class with abstract concepts ensures permanent learning at the primary school level. Active use of intelligence games should be emphasized in gamification. It is believed that students' reasoning activities during the intelligence game-playing process increase their success and flexibility in calculation and numerical operations, which are among the mathematics class subjects (Aksakal, 2020). All this theoretical knowledge shows that intelligence games should be related to mathematics class due to the strategic aspects of these games. It is believed that individuals successful in intelligence games have high mathematics success today. The opposite is also valid today.

According to the constructivist education approach, reasoning skills enable forming relationships between concepts. The activities that develop reasoning skills should be included in the educational setting. Reasoning skill that is included among the core skills of the primary school mathematics class increases the learners' academic success in the learning environment and creates a positive perspective about the mathematics class. It is believed that using intelligence games in the game and learning methods adopted in the mathematics class will play an influential role in learning these skills and attitudes (Yilmaz, 2019).

Intelligence games are the entire activities that enable individuals to create different solutions to problems and to reveal their potential. In this sense, these games help individuals improve their number, operation, strategy, logic, reasoning and creativity skills, increasing their mathematical success (Seb & Bulut Serin, 2017).

As a result of the studies in Turkey, intelligence games were first included in the Ministry of National Education (MoNE) curriculum in 2013 as an elective course. The primary purpose of the intelligence games class expressed as "intelligence games class aims students' to recognize and develop their intellectual potential, create different and unique strategies against problems, make fast and correct decisions, develop a systematic thought structure, develop individual, team and competitive working skills within intelligence games context and develop a positive attitude towards problem-solving" and the core elements of MoNE Intelligence Games Class Curriculum are explained as "the focus of the program is to develop students' problem-solving, communication and reasoning, self-regulation and psychomotor skills and affective characteristics(MoNE, 2013).

The same curriculum divided intelligence games into 6 units: Reasoning, Operation Games, Geometric-Mechanical Games, Strategy Games, Memory Games, Verbal Games and Intelligence Questions. Each unit was explained with tables with game examples and related skills (MoNE, 2013).

The factors that need to be considered in mathematics curriculum application are

· The students' differences must not be disregarded. Therefore, mathematics teaching activities should highlight activities that emphasize students' learning styles and strategies.

· Students' previous learning should be identified, opportunities to build new mathematical concepts over the old ones should be provided with activities that support effective learning, and students should be encouraged in this process.

· Tangible materials should be used in new concept teaching and assessment as much as possible. Materials such as number cards, decimal blocks, fraction teams, and various models obtained from basic daily materials could be given as examples.

· In the mathematics learning-teaching process, students' verbal expression of their thoughts and internalizing, understanding and structuring mathematical concepts play an essential role. Students should exhibit how they structured the concepts in the learning process and are encouraged to communicate at the individual and inter-individual levels.

· In the mathematical concept learning process, it is essential for the teacher to guide the students to express their thoughts.

· Accordingly, questions such as "Have you ever seen a problem similar to this problem? If yes, do you remember your method? Do you know the method that will work to solve this problem?" should be asked to permit the students to reveal and consolidate their thinking processes. The effect of developing a positive attitude towards mathematics on mathematical success is undeniable. Mathematical games should be included in the appropriate sections related to the unit content (MoNE, 2018).

The Intelligence Games training program consists of 3 steps;

Level 1 (Beginner): It includes learning the rules of the games, gaining essential knowledge and skills, playing beginner-level games and solving puzzles.

Level 2 (Intermediate): It includes making logical inferences, starting from the right place in puzzles, applying basic strategies in strategy games, playing intermediate games and solving puzzles.

Level 3 (Advanced Level): It includes high-level knowledge and skills such as creative thinking, analysis, original strategies, evaluating and generalizing. Playing advanced games, solving puzzles and benefiting from the experiences of others are included in this step (MoNE, 2013).

The cognitive skills such as problem-solving, reasoning and forming a cause-effect relationship in intelligence games match the general targets of the mathematical class learning outcomes. At the same time, it is believed that the attitude towards mathematical class will change positively by using intelligence games (Alkas Ulusoy et al., 2017). Individuals' thinking and reasoning skills are linked with the mathematical education they receive from school-age to adulthood. The learning outcomes of the mathematics class emerge in various aspects of life to facilitate our lives. At this point, the traditional mathematics teaching methods are replaced by modern education approaches appropriate for today's education understanding. Intelligence games education as the sub-subject of game methods that help to gain problem-solving skills is included among these methods that should be highly used in mathematics (Tural Sonmez & Dinc Artut, 2012). The reason for the brain games course to be taught as an elective course in secondary schools in the 2012-2013 academic year is based on these basic assumptions (Dokumaci Sutcu, 2021b).

In this study, the content of intelligence games in Primary School Mathematics Curriculum and Turkish Federation of Mind and Intelligence Games, Intelligence Games Education of Teacher Educators. It is believed that the study results will be beneficial in providing information about using games to help students gain the skills included in the primary school mathematics class general targets. Additionally, it is predicted that the curriculum-makers can benefit from this study by including intelligence games in more in-class activities.

According to the intelligence games class curriculum and information in the mathematics curriculum, it is seen that the relationship between intelligence games-mathematics will serve similar purposes. When the expected points are considered, subject learning outcome-game skill should be matched for the teachers' use and expanding intelligence games education in primary school mathematics class. It is hoped that this study will benefit teachers t find which intelligence game can be used for which learning outcome. When the research studies about Intelligence Games Lesson Program at the secondary level are examined, it is seen that they focus on teachers' opinions about the Intelligence Games Lesson Curriculum and the intelligence games lesson, the effects of intelligence games on primary and secondary school students, and pre-service teachers, primary school students' attention level, values education and special education, in-service teachers' views on the process and studies on intelligence games, and literature reviews(Adalar, 2017; Altun, 2019; Bas et al., 2020; Bottino et al., 2013; Cagir & Oruc, 2020); Can, 2020; Cilingir Altiner, 2018; Dagli, 2020; Demirkaya & Masal, 2017; Devecioglu & Karadag, 2014.; Dokumaci Sutcu, 2021a; Ekici et al., 2017; Ergun & Gozler, 2020; Gencay et al., 2019; Kula, 2020; Kuzu & Durna, 2020; Sadikoglu, 2017; Sahin, 2019; Sargin & Tasdemir, 2020; Saygi & Alkas Ulusoy, 2019; Yilmaz & Yildiz Ikikardes, 2020). However, to the best of the researcher's knowledge, no studies are analyzing the relationship between mind and intelligence games and Primary School Mathematics Curriculum learning outcomes. Therefore, the current study fills a gap in the literature.

Problem

Which learning outcomes do the intelligence games recommended by Turkish Federation of Mind and Intelligence Games include in the primary school curriculum?

Sub-Problems

1. Which learning outcomes do intelligence games include for different class levels?
2. Which learning outcomes do these games include based on learning fields in the primary school curriculum?
3. Which learning outcomes do these games include based on sub-learning fields in the primary school curriculum?

METHOD/MATERIALS

This study that investigated mind and intelligence games are investigated for primary school mathematics curriculum learning outcomes were conducted with qualitative research methods. With the case study, each context is evaluated with an in-depth, detailed and holistic perspective, the differences that occur according to each context and the underlying reasons are explained, and the reader or interested persons are described(Akar, 2017). This study used a document analysis pattern. Document analysis that is one of the scientific methods that analyze the data collected systematically about the research topic in the shortest time helps to infer and to interpret the data. This is a scientific method that involves collecting, questioning and interpreting various documents for the research(Ozkan, 2019).

The research data was collected with Learning Outcome Identification Form and the control list was created based on expert view. The properties of mind and intelligence games were matched with Primary School Mathematics Curriculum learning outcomes.

The descriptive analysis method among qualitative analysis method was applied. Descriptive analysis that aims to transfer the obtained data in organized and interpreted format includes creating a frame, data processing, finding identification and interpretation stages. The results are found from cause-effect relationships formed based on interpretations. It is possible to make predictions by considering these results (Simsek & Yildirim, 2018). The differences in opinions and differences were identified and the fitness values between the coders were investigate(Miles & Huberman, 1994). The analysis results showed that the fitness between the researchers was at an acceptable level (87.36 %). The acceptable fitness between the coders must be at least 70%.In this study, the purpose is to analyze the obtained data under scientific rules and objectively interpret the findings.

Research Unit

Primary School Mathematics Curriculum learning outcomes were analysed for equilibrio, tangramino, perspecto, architecto, metaforms, kulami, match madness, whatzizz, zigzag, cumulo, pomela, rondo vario, dizios 6+, mind- qwirkle 6+, mind-qbitz8+, pattern play 3+ , skippity, blockbuddies, patternplay3d, look look, pentago, triangle game, skilled structures 200, tangram set, pentomino, mangala, reversi, colours, shapy, candy, six, numbers mind and intelligence games properties used in Turkish Federation of Mind and Intelligence Games Education of Teacher Educator.

FINDINGS

The findings of this study were obtained by analysing the primary school mathematics curriculum and intelligence games content in the Turkish Federation of Mind and Intelligence Games Intelligence Games Education of Teacher Educators. The obtained findings were investigated for sub-problems. The data obtained from the findings are given in the tables below.

Sub-Problem 1: Which learning outcomes do intelligence games include for different class levels?

Table 1 analysed the distribution of 32 games according to primary school mathematics curriculum learning outcomes. It is predicted that each game can be used for multiple learning outcomes for different class levels. While different class levels can benefit from the same game, multiple games can be used for one learning outcome.

Table 1. Analysis of mind and intelligence games for primary school mathematics curriculum learning outcomes

Game Name	1. Grade	2. Grade	3. Grade	4. Grade
Equilibrio	1.2.1.1./1.3.4.1.	2.2.1.1./2.2.1.2./2.2.1.3.	3.2.1.1.	4.2.1.1.
Tangramino	1.2.1.1./1.3.4.1.	2.2.1.1./2.2.1.2./2.2.1.3.	3.2.1.1.	
Perspecto	1.2.1.1./1.3.4.1.	2.2.1.1./2.2.1.2./2.2.1.3.	3.2.1.1.	
Architecto	1.2.1.1./1.3.4.1.	2.2.1.1./2.2.1.2./2.2.1.3.	3.2.1.1.	
Meta-Forms	1.2.1.1./1.2.1.2./1.2.2.1.	2.2.1.1./2.2.1.2./2.2.2.1.	3.2.1.4.	4.2.1.2.
Kulami		2.2.2.1.	3.2.4.2.	
Game Name	**1. Grade**	**2. Grade**	**3. Grade**	**4. Grade**
Match Madness	1.2.1.2./1.2.2.1./1.2.2.2./1.2.3.2.	2.2.1.2./2.2.1.4./2.2.2.1./2.2.3.2.		
Whatzizz		2.2.2.2.	3.2.2.1./3.2.2.2.	4.2.2.1./4.2.2.2.
Zigzag	1.2.2.1.	2.2.2.1.		
Cumulo	1.2.2.2.			
Pomela	1.2.2.1./1.2.2.2.	2.2.2.1.		
Rondo Vario	1.2.1.1./1.2.2.1./1.2.2.2./ 1.3.1.1.	2.2.1.1.		4.2.1.1./4.2.1.2.
Dizios 6+	1.2.2.1./1.2.2.2./1.2.3.1. 1.2.3.2.	2.2.2.1./2.2.3.1./2.2.3.2.		
Mind- Qwirkle 6+	1.2.2.1./1.2.2.2./1.2.3.1. 1.2.3.2.	2.2.2.1./2.2.3.1./2.2.3.2.		
Mind-Q Bitz 8+	1.2.1.1./ 1.2.2.1.	2.2.2.1./2.2.2.2.	3.2.2.2./3.2.3.1.	

Game Name	1. Grade	2. Grade	3. Grade	4. Grade
Pattern Play 3+	1.1.1.8./1.1.4.1./1.2.2.1./ 1.2.2.2.	2.1.1.7./2.1.6.1./2.2.1.2.		
Skippity	1.1.1.3./1.1.1.4.	2.1.1.1.		
Block Buddies	1.2.2.1./1.2.2.2./1.2.3.1.	2.2.1.1./2.2.1.2./2.2.1.4. 2.2.2.1./2.2.2.2./2.2.3.1. 2.2.3.2.	3.2.1.4.	4.2.1.5.
Pattern Play 3d	1.1.1.8./1.1.4.1./1.2.2.1. 1.2.2.2.	2.1.1.7./2.1.6.1./2.2.1.2.		
Look Look	1.1.2.1./1.1.2.2./1.1.2.5. 1.1.3.1./1.1.3.2./1.1.3.3.			
Pentago		2.2.2.1.	3.2.4.2./3.2.4.3.	
Triangle Game	1.2.1.2.	2.2.1.2.		
Skilled Structures-200	1.2.2.1./1.2.1.2.	2.2.1.2./2.2.2.1.		
Tangram Set	1.2.1.1./1.3.4.1.	2.2.1.1./2.2.1.2./2.2.1.3.	3.2.1.1.	
Pentomino	1.2.1.1./1.3.4.1.	2.2.1.1./2.2.1.2./2.2.1.3.	3.2.1.1.	
Mangala	1.1.1.3./1.1.2.2./1.1.2.5.	2.1.2.4./2.1.1.3.	3.1.2.4.	
Reversi	1.2.2.1.	2.2.2.1.	3.2.4.3.	
Colours	1.2.1.1./1.2.1.2./1.2.2.1.	2.2.1.1./2.2.1.2./2.2.2.1.	3.2.1.4.	4.2.1.2.
Shapy	1.2.1.1.	2.2.1.1.		4.2.1.1./4.2.1.2.
Candy	1.2.1.1.	2.2.1.1.		
Six	1.2.2.1./1.2.3.1./1.2.3.2.	2.2.2.1./2.2.3.1./2.2.3.2.	3.2.4.3.	
Numbers	1.1.2.1./1.1.2.2./1.1.2.5. 1.1.2.6./1.1.3.1./1.1.3.3. 1.1.3.4.	2.1.2.4./2.1.2.5./2.1.3.6./2.1.4.1./ 2.1.4.2./2.1.4.3. 2.1.5.1.	3.1.2.4./3.1.2.6. /3.1.3.4.	4.1.2.4./4.1.3.4. 4.1.4.6./4.1.5.6.
Total	**80**	**76**	**22**	**14**

According to Table 1 is examined, it is seen that the most outcomes and game pairing is in the 1st grade; it can be seen that "Understands the meaning of addition operation.", "Classifies and names geometric shapes based on the number of corners and edges." and "Uses mathematical language to signify location, direction and movement" learning outcomes were similar to the skills aimed with the games. Accordingly, the games that have learning outcomes for mathematics teaching could be selected and used in the class. For example, it is shown on the table that "Classifies and names geometric shapes based on the number of corners and edges." learning outcome can be gained by playing Equilibrio, Perspecto, Tangram Set, Tangramino, Architecto games. The connection between materials in the content of these games and learning the shapes was formed.

Sub-Problem 2: Which learning outcomes do these games include based on learning fields in the primary school curriculum?

Table 2 shows the analysis of intelligence games for primary school mathematics curriculum learning areas. 4 learning areas in the primary school mathematics curriculum are Numbers and Operations, Geometry, Measurement and Data Processing. When the table is analysed, it can be seen that mind and intelligence games can contribute to learning outcomes if these games are used in the education-training field as these games serve to the learning outcomes in Geometry, Numbers and Operations learning field. It can be seen that mind and intelligence games can be effective in Measurement and Data Processing learning areas.

Table 2: Analysis of intelligence games for primary school mathematics curriculum learning areas

Game Name	Number And Operations	Geometry	Measurement	Data Processing
Equilibrio		1.2.1.1./2.2.1.1./2.2.1.2. 2.2.1.3./3.2.1.1.	1.3.4.1.	
Tangramino		1.2.1.1./2.2.1.1./2.2.1.2. 2.2.1.3./3.2.1.1.	1.3.4.1.	
Perspecto		1.2.1.1./2.2.1.1./2.2.1.2. 2.2.1.3./3.2.1.1.	1.3.4.1	
Architecto		1.2.1.1./2.2.1.1. /2.2.1.2. 2.2.1.3. /3.2.1.1.	1.3.4.1.	
Meta-Forms		1.2.1.1. /1.2.1.2. /1.2.2.1. 2.2.1.1. /2.2.1.2. /2.2.2.1. 3.2.1.4. /4.2.1.2.		
Kulami		2.2.2.1./3.2.4.2.		
Match Madness		1.2.1.2. /1.2.2.1. /1.2.2.2. 1.2.3.2. /2.2.1.2. /2.2.1.4.		

Game Name	Number And Operations	Geometry	Measurement	Data Processing
		2.2.2.1. /2.2.3.2.		
Whatzizz		2.2.2.2. /3.2.2.1. /3.2.2.2. 4.2.2.1. /4.2.2.2.		
Zigzag		1.2.2.1./2.2.2.1.		
Cumulo		1.2.2.2.		
Pomela		1.2.2.1./1.2.2.2./2.2.2.1.		
Rondo Vario		1.2.1.1./1.2.2.1./1.2.2.2. 2.2.1.1.	1.3.1.1.	
Dizios 6+		1.2.2.1. /1.2.2.2. /1.2.3.1. 1.2.3.2. /2.2.2.1. /2.2.3.1. 2.2.3.2.		
Mind- Qwirkle 6+		1.2.2.1. /1.2.2.2. /1.2.3.1. 1.2.3.2. /2.2.2.1. /2.2.3.1. 2.2.3.2.		
Mind-Q Bitz 8+		1.2.1.1. /1.2.2.1./ 2.2.2.1. 2.2.2.2. /3.2.2.2. /3.2.3.1.		
Pattern Play 3+	1.1.1.8. /1.1.4.1. 2.1.1.7. /2.1.6.1.	1.2.2.1. /1.2.2.2. /2.2.1.2.		
Skippity	1.1.1.3./1.1.1.4./2.1.1.1.			
Block Buddies		1.2.2.1. /1.2.2.2. /1.2.3.1. 2.2.1.1. /2.2.1.2. /2.2.1.4. 2.2.2.1. /2.2.2.2. /2.2.3.1. 2.2.3.2. /3.2.1.4. /4.2.1.5.		
Pattern Play 3d	1.1.1.8. /1.1.4.1. /2.1.1.7. 2.1.6.1.	1.2.2.1. /1.2.2.2. /2.2.1.2.		
Look Look	1.1.2.1. /1.1.2.2. /1.1.2.5. 1.1.3.1. /1.1.3.2. /1.1.3.3.			
Pentago		2.2.2.1./3.2.4.2.		
Triangle Game		1.2.1.2. /2.2.1.2.		
Skilled Structures-200		1.2.2.1. /1.2.1.2. /2.2.1.2. 2.2.2.1.		
Tangram Set		1.2.1.1./2.2.1.1. /2.2.1.2. 2.2.1.3. /3.2.1.1.	1.3.4.1.	
Pentomino		1.2.1.1./2.2.1.1. /2.2.1.2. 2.2.1.3. /3.2.1.1.	1.3.4.1.	
Mangala	1.1.1.3./1.1.2.2./1.1.2.5. 2.1.2.4./2.1.1.3./3.1.2.4.			
Reversi		1.2.2.1. /2.2.2.1. /3.2.4.3.		
Colours		1.2.1.1. /1.2.1.2. /1.2.2.1. 2.2.1.1. /2.2.1.2. /2.2.2.1. 3.2.1.4. /4.2.1.2.		
Shapy		1.2.1.1./2.2.1.1./4.2.1.1. 4.2.1.2.		
Candy		1.2.1.1. /2.2.1.1.		
Six	1.2.2.1. /1.2.3.1. /1.2.3.2. 2.2.2.1. /2.2.3.1. /2.2.3.2. 3.2.4.3.			
Numbers	1.1.2.1. /1.1.2.2. /1.1.2.5. 1.1.2.6. /1.1.3.1. /1.1.3.3. 1.1.3.4. /2.1.2.4. /2.1.2.5. 2.1.3.6. /2.1.4.1. /2.1.4.2. 2.1.4.3. /2.1.5.1. /3.1.2.4. 3.1.2.6. /3.1.3.4. /4.1.2.4. 4.1.3.4. /4.1.4.6. /4.1.5.6.			
TOTAL	**44**	**134**	**7**	

Table 2, it is determined that game content and the learning outcomes in Numbers and Operations, Geometry learning areas matched at a high level. It can be seen that the related games should be used especially for the 1st and 2nd-grade learning outcomes. For example, the table shows that the Numbers game can benefit learning outcomes in the Numbers and Operations learning area. Numbers game aim the child to find the results for operations that become harder in higher levels by using visual tips. The children need to use story problem skills to find the results in the higher levels.

Sub-Problem 3: Which learning outcomes do these games include based on sub-learning fields in the primary school curriculum?

Table 3 shows the analysis of intelligence games for primary school mathematics curriculum sub-learning areas. Table 2 stated that mind and intelligence games will have the best benefit for the learning outcomes in Geometry and Numbers and Operations learning areas. It is listed that the same games were beneficial for learning outcomes in Natural Numbers, Addition with Natural Numbers, Subtraction with Natural Numbers, Multiplication with Natural Numbers, Division with Natural Numbers, and Fractions sub-learning areas in the Numbers and Operations learning area. In the Geometry learning area, it is seen that the mind and intelligence games developed the Basic Concepts in Geometry, Geometric Objects and Shapes, Spatial Relations and Geometric Patterns sub-learning areas the most. There were games to improve the skills for Weighting sub-learning area learning outcomes in the Measurement learning area.

Table 3: Analysis of intelligence games for primary school mathematics curriculum sub-learning areas

Game Name	Numbers and Operations	Geometry	Measurement	Data Processing
Equilibrio		Geometric objects and shapes	Weighting	
Tangramino		Geometric objects and shapes	Weighting	
Perspecto		Geometric objects and shapes	Weighting	
Architecto		Geometric objects and shapes	Weighting	
Meta-Forms		Geometric objects and shapes Spatial relations		
Match Madness		Geometric objects and shapes Spatial relations Geometric patterns		
Whatzizz		Spatial relations		
Zigzag		Spatial relations		
Cumulo		Spatial relations		
Pomela		Spatial relations		
Rondo Vario		Geometric objects and shapes/Spatial relations/Length measurement		

Game Name	Numbers and Operations	Geometry	Measurement	Data Processing
Dizios 6+		Geometric objects and shapes/Spatial relations/Geometric patterns		
Mind- Qwirkle 6+		Spatial relations/Geometric patterns		
Mind-Q Bitz 8+		Geometric objects and shapes/Spatial relations		
Pattern Play 3+	Natural numbers Fractions	Spatial relations/Geometric patterns		
Skippity	Natural numbers			
Block Buddies		Spatial relations/Geometric patterns/Geometric objects and shapes		
Pattern Play 3d	Natural numbers/Fractions	Spatial relations/Geometric patterns		
Look Look	Addition with natural numbers/Subtraction with natural numbers			
Pentago		Spatial relations/Basic concepts in geometry		
Triangle Game		Geometric objects and shapes		

Game Name	Numbers and Operations	Geometry	Measurement	Data Processing
Skilled Structures-200		Spatial relations/Geometric objects and shapes		
Tangram Set		Geometric objects and shapes	Weighting	
Pentomino		Geometric objects and shapes	Weighting	
Mangala	Natural numbers/Addition with natural numbers			
Game Name	**Numbers and Operations**	**Geometry**	**Measurement**	**Data Processing**
Reversi		Spatial relations/Basic concepts in geometry		
Colours		Geometric objects and shapes/Spatial relations		
Shapy		Geometric objects and shapes		
Candy		Geometric objects and shapes		
Game Name	**Numbers and Operations**	**Geometry**	**Measurement**	**Data Processing**
Six		Spatial relations/Geometric patterns/Basic concepts in geometry		
Numbers	Addition with natural numbers/Subtraction with natural numbers/Multiplication with natural numbers/Division with natural numbers			

Table 3 shows that the learning outcomes in Spatial Relations, Geometric Objects and Shapes and Natural Numbers sub-learning areas matched the most with game contents. By looking at the table, it is seen that the Zigzag game is related to spatial relations sub-learning area. The Zigzag game aims to sew a button on a shirt by following the instructions for the tip of the scissors on a wood. The instructions are given below, top, side or crosswise compared to the previous button. Therefore, the Zigzag game might be effective to improve the child's location-direction knowledge. It would be beneficial to use the games that match the learning outcomes as activities.

DISCUSSION

In today's education approach, the main aim is to raise individuals who think, create ideas, criticize, continuously develop and quickly adapt to new conditions. Different methods and techniques must be used to learn these thinking skills in the education environment. It is necessary to have active reasoning in mathematics class, where problem-solving, analyzing, generalizing and high-level cognitive skills are used. While it is expected to have reasoning, problem-solving, and critical thinking individuals in the education environment, where these individuals can show these characteristics should be created (Dogan Tas & Yondemli, 2018). Mathematics as a class that can show these characteristics requires various methods in the education environment. One of the methods and techniques activating the students in this process is games. When it is considered that the classical school and class environment has become incredibly dull for the children of the digital age, the studies clearly showed that the intelligence games that enable learning with fun are more attractive.

The magazines published at the beginning of the 1920s included intelligence games to develop children's multiple intelligence. These games ensure children learn cognitive skills such as reasoning, creative thinking and evoking interest (Sarikaya, 2018). The aim was to improve the analysis skill of the children for the same game when the children worked on solving the games in the magazines (Sarici Bulut & Sarikaya, 2018). It is stated that the children who face the problem and find opportunities to solve it at a very young age learn these skills better. For this purpose, games as main applications and intelligence games as sub-applications should be utilized to ensure the children gain problem-solving skills in the education environment. While the teachers argue that intelligence games positively affect mathematical thinking skills, students reported that the games especially developed reasoning, relating and problem-solving skills (Alkas Ulusoy et al., 2017). When the students' views were asked in addition to the teacher, the students expressed positive effects of the games on them. Unlike the teachers, the students reported that their academic success

increased and they socialized with intelligence game activities (Demirel & Yilmaz, 2019). They reported that the mind and intelligence games would contribute to relating, reasoning, mathematical communication and problem-solving skills (Cetin & Ozbugutu, 2020). Teachers expressed their desire to use games in the class because they made the mathematics class more fun and understandable (Usta et al., 2017). Prospective teachers reported that they would include intelligence games during education in the following processes (Savas, 2019). In addition to the cognitive and affected skills that the intelligence games contribute, these games also have a contribution to values education(Sadikoglu, 2017). It is possible to state that such activities both strengthen the social relationships in the family and ensure the gaining of cognitive skills (Alkan & Mertol, 2017). Teachers including geometric intelligence games in this class would develop students' mechanical intelligence (Dokumaci Sutcu, 2018). As a result of Aslan's research, when the findings of the question "What are the problems you have in the Intelligence Games lesson to the teachers participating in the research," the problem of "material deficiency" was determined in the first place(Aslan, 2019). When the existing studies on this topic are considered, the positive effects of mind and intelligence games on the education process can be seen. The effects of intelligence games on some variables are generally investigated. For example, intelligence games can affect attitudes towards geometry, helping and problem-solving beliefs, strategy and reasoning skills, spatial ability, logic and reasoning skills, cognitive skills, motivation, attention and concentration, spatial reasoning skills, mathematics achievement and spatial sense development and mind turning. It has been revealed that the effect on their tasks has been examined (Dokumaci Sutcu, 2021b). Based on the research on mind games, compared with the control group, students in the experimental group who played mind games showed the development of their perception problem-solving ability and performance (Demirel & Yilmaz, 2019).

Organizing the learning environment with criteria that enable intelligence games will benefit the students. In line with the desired targets, the results reveal teachers' necessity to receive education about the intelligence games curriculum (Demir, 2016). With games, it is possible to teach concepts such as shape, colour, size, volume, counting, distance, time and intellectual processes such as classification, ranking, problem-solving, analysis, matching and assessment with fun. Although positive views regarding the contribution of intelligence games to intellectual skills such as problem-solving were reported, the number of research studies on intelligence games must be increased to support this claim.

CONCLUSION AND RECOMMENDATIONS

In this study, the relationships of 32 box games which were showed in Turkish Federation of Mind and Intelligence Games, Intelligence Games Education of Teacher Educator were analyzed in terms of learning outcome, learning and sub-learning area in different grade levels. It is expected that these tables will be helpful for teachers who know the game content to choose the suitable game for the desired skill and learning outcome. It can be seen that most of the learning outcomes for the mathematics class were connected to the game content in the investigated mind and intelligence games. When our desire is to enrich the learning environment with different activities, using intelligence games in the mathematics class will help students to reinforce the subjects. This study might recommend that skills aimed for the mathematics class might be offered based on intelligence games when the curriculum is considered based on activities.

Teachers' efforts to transfer theoretical knowledge to the application are insufficient (Yilmaz, 2019). Therefore, it is believed that teachers receiving necessary applied education to apply intelligence games activities in the learning environment will increase the effect of intelligence games on the students.

Education at the undergraduate level and in-service education will be effective for teachers to gain new generation skills about intelligence games. The most distinct result in the studies is the need to add mind and intelligence games as an elective course to all education levels (Zengin, 2018). In terms of students' thinking skill development, it could be recommended to include intelligence game activities more in the curriculum.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Statements of publication ethics

We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

Researchers' contribution rate

The study was conducted and reported with equal collaboration of the researchers. 1. Author: Finding the research topic, theoretical framework, consulting the research process, data analysis, writing the discussion part, reporting the research (%50), 2. Author: Related researches, data analysis, report the research (%30), 3. Author: Descriptive analysis and checking tables, reporting the research, language translation (%20). All authors discussed the results and contributed to the final manuscript.

Ethics Committee Approval Information

Research does not require ethics committee approval.

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| Research Article / Araştırma Makalesi |

Examining Online Learning Motivations of University Students Studying Via Distance Education In The Covid-19 Pandemic By Digital Literacy Variable

Covid-19 Pandemisinde Uzaktan Eğitim Aracılığıyla Öğrenim Gören Üniversite Öğrencilerinin Çevrimiçi Öğrenme Motivasyonlarının Dijital Okuryazarlık Değişkenince İncelenmesi

Özlem KARAKIŞ[1]

Keywords

1. COVID-19 pandemic
2. Digital literacy
3. Distance education
4. Online learning motivation
5. University students

Anahtar Kelimeler

1. COVID-19 pandemisi
2. Dijital okuryazarlık
3. Uzaktan eğitim
4. Çevrimiçi öğrenme motivasyonu
5. Üniversite öğrencileri

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Abstract

Purpose: 422 university students participate in this study where the digital literacy of university students studying via distance education during the Covid-19 pandemic by online learning motivation variable is examined.

Methodology: The study used the Personal Information Form, Digital Literacy Scale (DLS) and Online Learning Motivation Scale (OLMS). The research is structured in descriptive and relational scanning models.

Findings: According to the data obtained, it is stated that the digital literacy and online learning motivation of the students within the scope of the research are at a medium level; digital literacy levels do not differ by gender and grade level; there is a statistically significant difference in online learning motivation level of students in favour of female students; moreover, in the score of the whole online learning motivation scale, there is a significant difference between 2nd and 4th-grade students in favour of 2nd-grade students and between 3rd and 4th-grade students in favour of 3rd-grade students; there is a moderately positive and statistically significant relationship between students' digital literacy and online learning motivation levels and their online learning motivation and digital literacy predict each other by 21.8 %.

Highlights: Given that 21.8 % of students' online learning motivation is interpreted by their digital literacy or vice versa, increasing the development of students' digital literacy and online learning motivation levels with in-school and out-of-school training is suggested.

Öz

Çalışmanın amacı: COVID-19 pandemisinde uzaktan eğitim aracılığıyla öğrenim gören üniversite öğrencilerinin dijital okuryazarlıklarının çevrimiçi öğrenme motivasyonu değişkenince incelendiği bu çalışmaya toplam 422 üniversite öğrencisi katılmıştır.

Yöntem: Araştırmada, Kişisel Bilgi Formu, Dijital Okur-yazarlık Ölçeği (DOÖ) ve Çevrimiçi Öğrenme Motivasyonu Ölçeği (ÇÖMÖ) kullanılmıştır. Mevcut araştırma betimsel ve ilişkisel tarama modellerinde yürütülmüştür.

Bulgular: Elde edilen verilere göre, araştırma kapsamındaki öğrencilerinin, dijital okuryazarlık ve çevrimiçi öğrenme motivasyonlarının orta düzeyde olduğu; dijital okuryazarlık düzeylerinin cinsiyete ve sınıf düzeyine göre farklılaşmadığı; öğrencilerin çevrimiçi öğrenme motivasyon düzeylerinde cinsiyet değişkenine göre kadın öğrencilerin lehine istatistiksel olarak anlamlı farklılık olduğu; çevrimiçi öğrenme motivasyonu ölçeğinin bütününe ilişkin puanda 2. ve 4. sınıf düzeyleri arasında 2. sınıf öğrencileri lehine ve 3. ve 4. sınıf düzeyleri arasında 3. sınıf öğrencilerinin lehine manidar farklılık olduğu; öğrencilerinin dijital okuryazarlık ve çevrimiçi öğrenme motivasyon düzeyleri arasında orta düzeyde pozitif ve istatistiksel olarak manidar bir ilişki olduğu ve öğrencilerin çevrimiçi öğrenme motivasyonları ve dijital okuryazarlıklarının birbirlerini % 21,8 oranında yordadığı belirlenmiştir.

Önemli Vurgular: Öğrencilerin çevrimiçi öğrenme motivasyonlarının %21,8'inin dijital okuryazarlıkları ile yorumlandığı ya da tam tersi olduğu göz önüne alındığında, okul içi ve okul dışı eğitimlerle öğrencilerin hem dijital okuryazarlık hem de çevrimiçi öğrenme motivasyon düzeylerinin geliştirilmesi önerilmektedir.

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INTRODUCTION

Technologies concerning information and communication, an inseparable part of life by the transition to the information society in the 21st century, consist of digital technologies. These digital technologies are increasingly used daily, referring to non-analogue phones, computers, media players, the internet, and related software. According to the 2017 Digital Report, revealing how technologies concerning digital life, a part of daily life, change individuals' lives, 50 % of the world's population uses the internet, 37 % of the world's population uses social media, 34 % of the world's population uses mobile social media and 22 % of the world's population uses e-commerce (We Are Social & Hootsuite, 2017). In Turkey, 59.6 % of the population used a computer in 2018, and the rate of internet use was 79 % in 2020 (Turkish Statistical Institute [TÜİK], 2020). In 2018, the rate of computer use between the ages of 16-24 was 75.1 % for males and 60.1 % for females, and the rate of internet use was 94.7 % for males and 86.5 % for females (TÜİK, 2018). This rate change reveals the increased interaction between technology and people in the digital age. Information pollution has also risen incredibly with the increase of information, and individuals need "digital literacy skills" to get the correct information (Ng, 2012). According to Hamutoğlu et al. (2017a, p.410), digital literacy skills are essential to make information and communication technologies a safer platform by using these new and different technologies, examining the accuracy or validity of the information obtained, and solving the problems encountered at the same time. That is why digital literacy, the skill that makes up the talents of the digital generation (Spires, Paul & Kerkhoff, 2018), has become even more important than literacy these days (Çubukçu & Bayzan, 2013). The COVID-19 pandemic, which spread to the world from Wuhan, China, in December 2019 (WHO, 2020a; 2020b), was an intermediary to use digital devices, online resources, social media technology and e-learning activities more effectively that mediate the digital literacy skills (Mulenga & Marbán, 2020). The need for digital literacy skills in education has been reinforced due to the COVID-19 pandemic and emphasized in the study carried out by Onyema et al. (2020). This rapid development of digital technologies has also exposed individuals to situations that require them to benefit from technical, cognitive, and sociological skills (Eshet-Alkalai & Amichai-Hamburger, 2004: 421). One of these technical skills needed is "online learning", which has been widely and intensely used due to the precautions taken during the COVID-19 pandemic (Bozkurt, 2020). Some studies point out that dropouts will increase, students will have difficulty re-interacting in the COVID-19 pandemic (Buckler et al., 2020) and students are determined to be less motivated for learning-teaching activities after the pandemic (Aguilera-Hermida, 2020). Ramírez-Correa et al. (2015) and Xu and Jaggars (2013) state that students drop education in online learning due to a lack of motivation; therefore, "motivation" emerges as an essential factor in online learning.

Online Learning Motivation

With the COVID-19 pandemic, a factor that significantly affects human life, our perspective on education and how we interpret education has changed (Bozkurt & Sharma, 2020). Educational institutions were temporarily closed due to the COVID-19 pandemic, and about 1.6 billion students in 191 countries were severely affected by that (UNESCO, 2020); immediately afterwards, countries started to implement distance education in schools at all levels to provide that students do not fall behind in their education. Distance education, which started with mailing, has evolved into "online learning", influenced by the developments in the internet and technology. Online learning, which is defined by Christensen et al. (2008) as a disruptive innovation, is an approach that offers well-designed and interactive learning environments by using different digital technology features and resources and learning materials suitable for open and flexible learning environments without time and space limitations (Khan, 2005). Online learning, a student-centred approach (Aoki, 2010), is one of the most dynamic forms of current learning opportunities (Miltiadou & Yu, 2000). In addition to its advantages, various factors are essential for online learning (McIsaac & Gunawardena, 1996). During the pandemic, motivation is thought to emerge as one of the most significant determinants in online learning, according to the declarations of Buckler et al. (2020) and Aguilera-Hermida (2020).

In educational settings, motivation, one of the most important psychological concepts, explains the degree to which learners devote attention and energy to various learning requirements. Motivation is a feature that persuades students to learn and do learning activities (Green & Sulbaran, 2006) and is a significant factor in students' choices and the degree of their participation, effort, and persistence in learning processes (Dörnyei, 2001; Dörnyei & Ushioda, 2011). It is separated into two intrinsic and extrinsic motivations; In contrast, extrinsic motivation consists of appreciation and praise for good work; intrinsic motivation is an internal desire to learn about a particular subject (Knowles & Kirkman, 2007). In other words, motivation is the psychological power that energizes individuals to realize certain situations, activates them and enables the action to continue (Karakış, 2014). Motivation, a significant factor for maintaining students' satisfaction in the online learning environment (Chen & Jang, 2010), stems from the fact that online learning environments have a more autonomous nature than traditional classroom contexts (Artino Jr., & Stephens, 2009). Motivation enables the learner to cope with various difficulties and achieve learning goals (Bekele, 2010; Hoskins & van Hooff, 2005; Jones & Issroff, 2007; Muilenburg & Berge, 2005; Song et al., 2004; Ucar & Kumtepe, 2019). Studies also show that the relation between motivation and online learning satisfaction is positive (Biner et al., 1994; Chute et al., 1999; Lim, 2004). Research indicates that low motivation levels contribute to low retention rates (Artino, 2008; Keller, 2008), and high motivation is related to distance learner retention in distance education (Levy, 2007). In the relevant literature, some studies determine that high motivation explains class participation and academic achievement (de Barba, Kennedy & Ainley, 2016; Giesbers et al., 2013; Guay et al., 2008; Lopéz-Pérez et al., 2011; Rovai & Wighting, 2005; Yi & Hwang, 2003). The study by Albelbisi and Yasop (2019) determined that a lack of motivation in online learning can cause individuals to spend extra time completing

their homework, submit homework late, or do poor-quality work. It is clear, then, that motivation is a vital consideration for distance education.

Since online learning evokes human-computer interaction, unlike face-to-face education (McIsaac & Gunawardena, 1996), an effectively designed website is an essential factor affecting the motivation of online students (Arnone & Small, 1999; Small, 1997). Level of interaction with learning materials (Gao & Lehman, 2003), the general climate of the instructional environment (Kim & Frick, 2011), social presence (Visser, Plomp & Kuiper, 1999), getting education to use the required technology (Schramm et al., 2000) is also important factors affecting the motivation of online students. Moreover, students sometimes experience technical difficulties and communication interruptions in online classes (Essex & Çağiltay, 2001; Hara & Kling, 2000). These discouraging technical difficulties prevent the student from accessing resources, activities and tasks, instructor, and classmates. Since technology is the only link students have in online learning, any technical problem experienced increases the likelihood of students being unwilling to learn or even quitting the course (Kim & Frick, 2011). In online learning environments, students have high motivation when they do not experience a technological problem (Kim & Frick, 2011). Therefore, at least a little technological competence is needed for online learning. This competence is also essential to reducing cognitive load, as the excessive cognitive load can cause a student's attention to shift from subject to technological problem and decrease motivation (Hartley, 1999; Kim & Frick, 2011; Pintrich & Schunk, 2002). Moreover, studies have determined that computer or internet self-efficacy are important factors affecting students' online learning satisfaction and class participation (Hill & Hannafin, 1997; Joo et al., 2000; Lim, 2001). Also, Hudson et al. (1998) state that student support is vital to overcoming technical difficulties. Perceived difficulty in learning can also adversely affect learning motivation in online environments, as it may increase student anxiety (Reinhart, 1999). Fostering the motivation of learners engaged in distance education, therefore, requires attention to a range of factors, including the design of learning activities and digital technologies used etc. (Hartnett, 2016).

Digital Literacy

Gilster, who popularized the concept, described digital literacy as the ability to use and understand the information provided by computers from several sources in different ways (Gilster, 1997:15); Eshet-Alkalai (2002) defined it as a process that includes thinking skills, obtaining data from the internet and using technology correctly by establishing relationships; Bawden (2001:23) associated the concept with how technological devices work and awareness of technology; Ng (2012: 1066-1067) defined it as the intersection of technique, cognitive and social-emotional dimensions and Belshaw (2011) defined it as applications that support effective learning in this digital age and left the types of applications open because of the changes in applications with developing technologies. The reason why digital literacy is divided into sub-disciplines such as computer, communication, and visual literacy with the development of digital technologies is its dynamic and comprehensive structure. In short, digital literacy can be defined as the ability to develop a positive attitude towards new technologies, understand information using digital technologies, create and share new information, evaluate existing information effectively and critically, and obtain digital information within the framework of ethical rules and solve problems encountered. Digital literacy is not an alternative to literacy but an extension that contributes to it and is essential for working, learning, and socializing in the contemporary world (Churchill et al., 2008). Knobel and Lankshear (2006) stated that digital literacy is increasingly being defined as an official goal of education; therefore, it is essential for today's students to get this knowledge and skills (Martin, 2005); therefore, educational institutions should accelerate the practices that will increase students' digital literacy (Donohue, 2014; Gillen et al., 2018; Ihmeideh & Alkhawaldeh, 2017; Karabacak & Sezgin, 2019).

In the related literature, there are some study results in which the digital literacy levels of university students are found to be 'high' (Can et al., 2020; İşioğlu & Kocakuşak, 2012; Khalid et al., 2015; Kozan, 2018; Kozan & Özek, 2019; Üstündağ et al., 2017; Ocak & Karakuş, 2019; Özoğlu, 2019; Öztürk & Budak, 2019; Svensson & Baelo, 2015); 'low' (Campbell, 2016; Coşkun et al., 2013; Cote & Milliner, 2016; Kuru, 2019; Rambousek et al., 2016) and 'moderate' (Çetin, 2016; Çukurbaşı & İşman, 2014; Tyger, 2011). There are many studies in which there is a significant difference between the digital literacy levels of students in terms of the gender variable (Çam & Kyici, 2017; Çetin, 2016; Deryakulu, 2007; Gökçearslan & Bayır, 2011; Göldağ & Kanat, 2018; Gui & Argentin, 2011; Gürtekin, 2019; Hamutoğlu et al., 2017a; Horne, 2007; Korkut & Akkoyunlu, 2008; Kozan, 2018; Markauskaite, 2005; Nasah et al., 2010; Ocak & Karakuş, 2019 ; Özden, 2018; Özerbaş & Kuralbayeva, 2018; Özoğlu, 2019; Öztürk & Budak, 2019; Sakal, 2019,2020; Sarıkaya, 2019; Sulak, 2019; Tsai et al., 2001; Yaman, 2019; Yontar , 2019). In the related literature, few studies have been found in which there is no important difference between digital literacy levels of students in terms of gender (Can et al., 2020; Ertaş et al., 2019; Korkmaz & Mahiroğlu, 2009; Kozan, 2018; Polat, 2018; Sarıkaya, 2019; Yaman, 2019; Yılmaz et al., 2019). In studies examining the level of digital literacy according to grade level, there are very few studies in which there is no significant difference between the level of digital literacy in terms of class level (Çukurbaşı & İşman, 2014; Sarıkaya, 2019) and there are more studies in which students' digital literacy levels differ significantly in terms of grade level (Can et al., 2020; Carrington & Robinson, 2009; Göldağ & Kanat, 2018; Hamutoğlu et al., 2017b; Kozan, 2018; Marsh et al., 2017; Öztürk & Budak, 2019; Pew Research Center, 2005; Techataweewan & Prasertsin, 2017; Witten et al., 2018; Yaman, 2019).

Importance of the Research

Life has come to a standstill from time to time. Information and communication technologies have been mainly used to adapt to the uncertainties and follow the agenda because of the Covid-19 pandemic (Junio, 2020). The quarantine practices carried out during this process have led to the intensification of the use of digital technology to mediate people's business and education needs. According to Mulenga and Marban (2020), the Covid-19 pandemic has been a mediator for busier utilization of digital devices and online learning. Thus, students having online education during the pandemic have been in dire need of knowledge and skills such as using necessary computer programs in online learning environments and having an awareness of technological devices, obtaining data from the internet within the framework of ethical rules to do their homework, understanding that the data is up-to-date and reliable, and communicating correctly with teachers and friends on the internet. Since familiarity with technology is substantial in online learning (Agarwal et al., 2000; Marrakas & Johnson, 1998), these needs, knowledge, skills, services, and technologies require students to be digital literate at a certain level. As some degree of technical competence is required for online learning, this competence is also essential to reduce cognitive load, as the excessive cognitive load can cause a student's attention to shift from subject to technological problem and decrease motivation (Hartley, 1999; Kim & Frick, 2011; Pintrich & Schunk, 2002). Students exposed to online learning intensely in the COVID-19 pandemic also need the motivation to cope with the challenges they face in digital environments and achieve their learning goals. Motivation, an essential factor in online learning, is the driving force that enables students to act and energize to access and evaluate information in lessons, use different software applications and hardware, and produce digital content. Computer or internet self-efficacy (Hill & Hannafin, 1997; Joo et al., 2000; Lim, 2001) and technical and communication difficulties (Essex & Çağiltay, 2001; Hara & Kling, 2000; Kim & Frick, 2011) are decided to be some of the problems that decrease motivation in online learning. Effectively designed website (Arnone & Small, 1999; Small, 1997), level of interaction with learning materials (Gao & Lehman, 2003), the general climate of the instructional environment (Kim & Frick, 2011), social presence (Visser, Plomp & Kuiper, 1999) and training to use the required technology (Schramm et al., 2000) increase the motivation in online learning environments as well. Since technology is the only link students have in online learning, any technical problem experienced increases the likelihood of students being unwilling to learn or even quitting the course (Kim & Frick, 2011). Fostering the motivation of learners engaged in distance education, therefore, requires attention to a range of factors, including the design of learning activities and digital technologies used etc. (Hartnett, 2016). Therefore, the current research is central in stating the relation between digital literacy and online learning motivation levels and how much digital literacy predicts online learning motivation or vice versa in the context of university students studying via distance education in the COVID-19 pandemic.

Purpose of the Research

This research aims to examine the digital literacy levels of university students studying via distance education in the Covid-19 pandemic by the variable of online learning motivation. With this aim, answers to the following questions were examined:

1-What is the digital literacy and online learning motivation levels of university students studying via distance education during the COVID-19 pandemic?

2- Do the digital literacy and online learning motivation levels of university students studying via distance education during the COVID-19 pandemic differ by gender and grade levels?

3-Is there a significant relationship between the digital literacy and online learning motivation levels of university students studying via distance education during the COVID-19 pandemic?

METHOD

Research Model

The research was structured in descriptive scanning model as it aimed to reveal the digital literacy and online learning motivation levels of university students studying via distance education in the COVID-19 pandemic. According to Gay and Airasian (2000), descriptive scanning models aim to reveal a current situation. In addition, the research was structured in relational scanning model since it examined how digital literacy of students effect their online learning motivation levels. According to Karasar (2012), relational scanning models aim to determine the co-change between two and / or more variables. The dependent variables of the study are digital literacy and online learning motivation levels of university students; its independent variables are gender and grade level.

Participants

The participants of the study are students studying at a university (approximately 31000) in Turkey's Black Sea region in the 2020-2021 academic year. The frequency and percentage values for independent variables are given in Table 1.

Table 1. Percentage and Frequency Values Regarding the Variables

Variables		F	%
Gender	Female	292	69,2
	Male	130	30,8
Grade level	1	109	25,8
	2	183	43,4
	3	51	12,1
	4	79	18,7

When Table 1 is examined, of the study group consisting of 422 students, 292 (69.2%) are female, 130 (30.8%) are male; 109 (25.8%) 1st year, 183 (43.4%) 2 nd year, 51 (12.1%) 3rd year and 79 (18.7%) 4th year students.

Data Collection Tools and Its Process

In the study, "Digital Literacy Scale" (DLS) and "Online Learning Motivation Scale" (OLMS) were used. In the study, "Personal Information Questionnaire" prepared by the researcher was also used for demographic data about students' gender and grade levels.

Online Learning Motivation Scale (OLMS)

Data on the online learning motivation levels of students were gathered by Online Learning Motivation Scale (OLMS) developed by Chen and Jang (2010) which was adapted to Turkish by Özbaşı et.al. (2018). OLMS consists of a total of 28 items and seven sub-dimensions called as intrinsic motivation to know (IMTK), intrinsic motivation to succeed (IMTS), intrinsic motivation to experience stimulation (IMTES), determined regulation (DR), introjected regulation (IR), extrinsic regulation (ER) and lack of motivation (LOM). The scale is a 7-point Likert type and the 5th, 12th, 19th and 26th items of it are reverse coded as in the original scale. The lowest score that can be acquired from the scale is 28 and the highest score is 196. In the present study, points between 28-83 were evaluated as low, points between 84-140 as medium, and points between 141-196 as high for the whole scale; and points between 4-11 were evaluated as low, points between 12-20 as medium, and points between 21-28 as high for all sub-dimensions.

Digital Literacy Scale (DLS)

Data on students' digital literacy levels were collected by Digital Literacy Scale (DLS) developed by Ng in 2012 which was adapted to Turkish by Hamutoğlu et al. (2017a). DLS consists of four sub-dimensions: attitude, technique, cognitive and social, and a total of 17 items. There are no items scored in reverse in the scale where 5-point Likert type rating is used. There are seven items in the attitude sub-dimension, six items in the technique sub-dimension, and two items in each of the cognitive and social sub-dimensions. The lowest score that can be obtained from the scale is 17 and the highest score is 85. In the present study, for the whole scale, points between 17-39 were considered low, points between 40-62 were considered medium, points between 63-85 were considered high; for the attitude sub-dimension points between 7-16 were considered low, points between 17-26 were considered medium and points between 27-35 were considered high; for the technique sub-dimension points between 6-13 were considered low, points between 14-22 were considered medium and points between 23-30 points were considered high; for the cognitive and social sub-dimensions points between 2-4 were considered low, points between 5-7 were considered medium and points between 8-10 were considered high.

Confirmatory factor analysis (CFA) was performed with the LISREL 8.80 program to determine the construct validity. While the survey model was created for OLMS without modification, the survey model was created by defining the error covariance of the 8th and 9th items for the DLS. Model data fit indices calculated for both scales are given in Table 2.

Table 2. Model Data Fit Indices Obtained for OLMS and DLS

	RMSEA	χ^2_{sd}	GFI	AGFI	NNFI	CFI	Λ	ε	$r_{(interfactorial)}$
OLMS	0,080	$700{,}93_{112}$	0,91	0,90	0,94	0,95	0,40-0,85	0,28-0,80	No
DLS	0,070	$1002{,}99_{329}$	0,92	0,90	0,98	0,98	0,38-0,92	0,15-0,86	No

In Table 2, the models were examined with the Robust Maximum Likelihood estimation, considering the case of not meeting the multiple normality distribution assumption of the data in the research. RMSEA value, being examined as a strong statistic in model fit indices, was 0.080 and below, which was an indicator of good fit (Hu & Bentler, 1999). In the context of this criterion, it was seen that OLMS and DLS fitted well for the model data fit RMSEA value. Chi-square statistics were affected by the sample size

and known as poor fit. Since the chi-square value increases as the sample size increases, the fact that the χ2 / df index obtained in CFA is less than three states that the model has good fit values (Kline, 2005). The chi-square value for OLMS was found to be greater than three when divided by degrees of freedom, and less than three when divided by degrees of freedom. It was understood that the model data fit for the chi-square fitted index in the DLS data, while the fit was not achieved in the OLMS data. The 'good fit' criterion for GFI, AGFI, NNFI and CFI fit indices is 0,90 and above (Hu & Bentler, 1999). When the CFA result obtained in the context of these indexes was examined, it was seen that the model fit was ensured for OLMS and DLS. According to Tabachnick and Fidell (2001), to be a good indicator of a dimension, the factor load should be at least 0.32. When the factor loads were examined, it was greater than 0.32 without discarding the items. Error values were less than 0.90. These findings could be shown as evidence that the items were good representatives for the specified dimensions. When the model data fit indices were evaluated as a holistic one, it was found that the model data fit was achieved for both scale data. Structure validity was ensured with the result of CFA.

After providing validity proof, the Cronbach's alpha reliability coefficient was calculated for the sub-dimensions of the scale and the whole scale, and the results were given in Table 3. Tukey additivity test results (Tukey Nonadditivity p> .05) showed that the sub-dimensions of the scale were summable.

Table 3. Reliability Coefficients Calculated for OLMS and DLS

Scale	Dimensions	Reliability Coefficient (α)
OLMS	Intrinsic motivation to know (IMTK)	0,868
	Intrinsic motivation to succeed (IMTS)	0,828
	Intrinsic motivation to experience stimulation (IMTES)	0,835
	Determined regulation (DR)	0,787
	Introjected regulation (IR)	0,831
	Extrinsic regulation (ER)	0,752
	Lack of motivation (LOM)	0,866
	The whole scale	0,912
DLS	Attitude	0,883
	Technique	0,879
	Cognitive	0,767
	Social	0,725
	The whole scale	0,933

The alpha coefficients examined in Table 3 were found to be above 0.70 (α IMTK = 0.868; IMTS = 0.828; α IMTES = 0.835; α DR =0.787; α IR = 0.831; α ER = 0.752; α M = 0.866; α0.912 WholeScale; αAttitude = 0.833; Technique = 0.879; α Cognitive = 0.767; αSocial = 0.725; α WholeScale= 0.933). In this case, it can be said that scales measure with few errors and their reliability is high.

Analysis of Data

CFA was applied for construct validity to determine whether the scales measured the desired level in the study group. Model fit was achieved by modifying the four-factor DLS. Error covariance was defined between item 8 and item 9 for the modification. After proving that the desired structure could be measured with survey scales, the reliability of the sub-dimensions of the scale and the total scale was calculated. It was proved by Tukey additivity test that the sub-dimensions of the scales could be summed up. It was determined whether the independent variables in the sub-problem sentences of the research had a normal distribution according to the sub-dimensions and total scores of the scales by comparing the Kolmogorv-Shapiro Wilk's test, kurtosis-skewness values and the 1.96 critical value of the coefficient calculated when these values were divided by their standard error values. In the context of the total scores obtained from the scales used in the study, the distribution of the participants at the low-medium-high levels in the context of the previously determined cut-off scores was reported. According to the gender variable, the total score of DLS, the attitude, social sub-dimension scores and the total score of OLMS and IMTK, IMTES, DR, IR and LOM sub-dimension scores were examined with the unrelated sample t-test; the technique and cognitive sub-dimension scores of DLS and IMTS and ER sub-dimension scores of OLMS were examined with the Mann Whitney U test. According to the grade variable, total score of DLS, technique sub-dimension score and total score of OLMS, IMTK, IMTES, IR sub-dimension scores with the ANOVA test; the attitude, cognitive, social sub-dimension scores of DLS and the scores of the IMTK, DR, ER and LOM sub-dimensions of OLMS were examined with the Kruscal Wallis H test. In addition to the test statistics used, the effect sizes were reported. Since the scores for both scales had normal distribution, the values obtained using the Pearson correlation coefficient were reported.

FINDINGS

This section presents the findings of each research question, respectively.

Findings Regarding the First Research Question

The answer to the first research question "What is the digital literacy and online learning motivation levels of university students studying through distance education during the COVID-19 pandemic?" is given in Table 4 and Table 5.

Table 4. Distribution of DLS by Levels

	Attitude		Technique		Cognitive		Social		The whole scale	
	f	%	f	%	f	%	f	%	f	%
Low	93	21,8	34	8	75	17,6	56	13,1	44	10,3
Medium	198	46,4	187	43,8	161	37,7	232	54,3	218	51,1
High	136	31,9	206	48,2	191	44,7	139	32,6	165	38,6

In Table 4, the distribution of the scores of the sub-dimensions and the whole scale according to the levels determined in the standard score range is given. In the attitude sub-dimension, it was found that 93 students (21.8%) were at low level, 198 students (46.4%) were at medium level and 136 students (31.9%) were at high level; for this sub-dimension, those with a medium level were in the majority. In the technique sub-dimension, it was found that 34 students (8%) were at low level, 187 students (43.8%) were at medium level and 206 students (48.2%) were at high level; for this sub-dimension, those with a high level are in the majority. In the cognitive sub-dimension, it was found that 75 students (17.6%) were at low level, 161 students (37.7%) were at medium level and 191 students (44.7%) were at high level; for this sub-dimension, those with a high level were in the majority. In the social sub-dimension, it was found that 56 students (13.1%) were at low level, 232 students (54.3%) were at medium level and 139 students (32.9%) were at high level; for this sub-dimension, those with a medium level were in the majority. The combination of the scores obtained from the sub-dimensions was provided by Tukey's additivity analysis and the total score was obtained for the scale. When the scores acquired from the whole scale were examined, 44 students (10.3%) were at low level, 218 students (51.1%) were at medium level and 165 students (38.6%) were at high level. It can be denoted that digital literacy level of the students within the scope of the research is medium.

Table 5. Distribution of OLMS by Levels

	IMTK		IMTS		IMTES		DR		IR		ER		LOM		Whole scale	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
Low	23	5,5	47	11,1	32	7,6	43	10,2	65	15,4	23	5,5	144	34,1	23	5,5
Medium	399	94,5	235	55,7	181	42,9	181	42,9	202	47,9	136	32,2	189	44,8	223	52,8
High	0	0	140	33,2	209	49,5	198	46,9	155	36,7	263	62,3	89	21,1	176	41,7

In Table 5, the distribution of the scores of the sub-dimensions and the whole scale according to the levels determined in the standard score range is given. In IMTK, 23 students (5.5%) were at low level, 399 students (%) were at medium level; for this sub-dimension, those with a medium level were in the majority. In IMTS, 47 students (11.1%) were at low level, 235 students (55.7%) were at medium level and 140 students (33.2%) were at high level; for this sub-dimension, those with a medium level were in the majority. In IMTES, 32 students (7.6%) were at low level, 181 students (42.9%) were at medium level and 209 students (49.5%) were at high level; for this sub-dimension, those who have a high level were in the majority. In DR, 43 students (10.2%) were at low level, 181 students (42.9%) were at medium level and 198 students (46.9%) were at high level; for this sub-dimension, those with a high level were in the majority. 65 students (15.4%) were at low level, 202 students (47.9%) were at medium level and 155 students (36.7%) were at high level in the IR; for this sub-dimension, those with a medium level were in the majority. In ER, 23 students (5.5%) were at low level, 136 students (32.2%) were at medium level and 236 students (62.3%) were at high level; for this sub-dimension, those with a high level were in the majority. In LOM, 144 students (34.1%) were at low level, 189 students (44.8%) were at middle level and 89 students (21.1%) were at high level; for this sub-dimension, those with a medium level were in the majority. The combination of the scores obtained from the sub-dimensions was provided by Tukey's additivity analysis and the total score was obtained for the scale. When the scores obtained from the whole scale were examined, it was seen that 23 students (5.5%) were at low level, 223 students (52.8%) were at medium level and 176 students (41.8%) were at high level. It can be pointed out that the online learning motivation level of the students is medium.

Findings Regarding the Second Research Question

The answer to the second research question "Do the digital literacy and online learning motivation levels of university students studying through distance education during the COVID-19 pandemic differ by gender and grade levels?" is given in Table 6, Table 7, Table 8, Table 9, Table 10, Table 11, Table 12 and Table 13.

For the second research question of the study, a significant difference in DLS scores by gender was examined. In this process, if the data had a normal distribution or not was interpreted in a holistic manner by comparing it with the desired limit value compared with the 1.96 criterion for Kolmogorov-Shapiro-Wilk's test, kurtosis-skewness and standard error values of these indices. It was observed that there was a normal distribution by gender variable for the attitude and social sub-dimensions for DLS and for the whole scale. Significant differences according to the gender variable were examined with unrelated samples t-test and given in Table 6.

Table 6. Unrelated Samples T-Test Result of DLS according to the Gender Variable

Sub-dimension	Gender	N	$\bar{\chi}$	Sx	df	t	p
Attitude	Female	292	22,63	6,920	420	0,944	0,346
	Male	130	21,93	7,253			
Social	Female	292	6,48	1,934	420	-1,501	0,134
	Male	130	6,79	2,071			
Whole scale	Female	292	57,42	14,597	420	-0,266	0,79
	Male	130	57,84	15,496			

p> 0.05

In Table 6, it was examined if the scores related to the attitude and social sub-dimensions and the whole scale had a significant difference according to gender or not. A significant difference was not found according to the gender variable, t (420) Attitude = 0.944; t (420) Social = -1,501; t (420) Whole Scale = -0.266. With this finding, it can be asserted that male and female students' total score, attitude, and social sub-dimension scores of the DLS scale are at equal levels.

Mann Whitney U test was applied to determine whether the technique and cognitive sub-dimension scores that did not provide a normal distribution differ according to gender and are given in Table 7.

Table 7. Mann Whitney U Test Result of DLS according to Gender Variable

Sub-dimension	Gender	N	Mean Rank	U	p	r
Technique	Female	292	202,04	16219	0,017*	0,00567
	Male	130	232,74			
Cognitive	Female	292	217,73	17160,5	0,112	
	Male	130	197,5			

p> 0.05

In Table 7, the Mann Whitney U test was applied to examine if there was a significant difference according to the scores of technique and cognitive sub-dimensions or not. It was determined that there was a significant difference in the scores of the technique sub-dimension according to gender; U = 16219, r = 0.00567. When the mean rank of the technique sub-dimension was examined, it was seen that the mean ($\bar{\chi}$ = 232) of male students was higher than that of female students ($\bar{\chi}$ = 202.04). In line with the reported effect size data, the gender variable explained 0.5% of the technique sub-dimension; this effect was low. When the cognitive subscale scores differed significantly according to gender, it was seen that there was no significant difference, U = 17160.5; it can be said that the cognitive literacy of male and female students is at the same level.

It was investigated if there was a significant difference in OLMS scores according to gender or not. In this process, Kolmogorov-Shapiro-Wilk's test, in which the data did not have a normal distribution, was interpreted in a holistic manner by comparing it with the desired limit value when compared with the 1.96 criterion for kurtosis-skewness and standard error values and ratios of these indices. It was observed that there was a normal distribution according to the gender variable for the sub-dimensions of IMTK, IMTS, IMTES, DR, IR, ER and M and the whole scale for OLMS. Significant differences by gender variable were examined with unrelated samples t-test and given in Table 8.

Table 8. Independent Samples T-Test Result of OLMS according to the Gender Variable

Sub-dimension	Gender	N	$\bar{\chi}$	S_x	df	t	p	η^2
IMTK	Female	292	18,4589	5,37862	420	2,948	0,003*	0,020273
	Male	130	16,7846	5,40454				
IMTES	Female	292	20,7808	5,21034	420	4,523	0,00*	0,046446
	Male	130	18,2923	5,2362				
DR	Female	292	20,0068	5,41666	420	3,794	0,00*	0,033137
	Male	130	17,8462	5,36781				
IR	Female	292	18,6267	5,78192	420	3,705	0,00*	0,031649
	Male	130	16,3385	6,02264				
LOM	Female	292	13,9041	6,84068	420	-4,038	0,00*	0,037372
	Male	130	16,7462	6,28683				
Whole scale	Female	292	135,5993	26,34871	420	3,579	0,00*	0,029596
	Male		125,7154	25,83467				

p <0.05

In Table 8, it was examined if the scores related to the sub-dimensions of IMTK, IMTES, DR, IR ve LOM and the whole scale had a significant difference by gender or not. A significant difference was found according to the gender variable, t (420) IMTK = 2.948; t (420) IMTES = 4.523; t (420) DR = 3.794; t (420) IR = 3.705; t (420) LOM = 4.038; t (420) the whole scale = -3.579. When the effect sizes calculated with the result of significant difference were examined, the gender variable had 2.02% of IMTK sub-dimension scores, 4.64% of IMTES sub-dimension scores, 3.31% of DR sub-dimension scores, 3% of IR sub-dimension scores, 3,17 and 2.96% of the scores calculated from the whole scale. Reported effect sizes were medium. For the LOM sub-dimension, the scores of the male students ($\bar{\chi}$LOM = 16.75) were higher than the scores of the female students ($\bar{\chi}$LOM = 13.90). When the effect sizes calculated with the result of significant difference were examined, the gender variable explained 3.73% of the LOM sub-dimension scores and this effect was at a medium level.

Table 9. Mann Whitney U Test Result of OLMS according to Gender Variable

Sub-dimension	Gender	N	Mean Rank	U	p	η^2
IMTK	Female	292	228,63	66759	0,00*	-0,01027
	Male	130	173,03			
ER	Female	292	225,37	65807	0,00*	-0,00832
	Male	130	180,35			

p <0.05

In Table 9, if there was a significant difference according to gender in the IMTK and ER sub-dimension scores or not was examined with Mann Whitney U test and it was found that there was a significant difference; IMTK = 66759, r = -0.01027; U-ER = 65807, r = -0.00832. When the mean rank of the IMTK sub-dimension was examined, it was seen that the female students ($\bar{\chi}$ = 228.63) were higher than the male students' scores ($\bar{\chi}$ = 173.03). In line with the reported effect size data, the gender variable explained 0.1% of the IMTK sub-dimension; this effect was low. When the mean rank of ER sub-dimension was examined, it was identified that female students ($\bar{\chi}$ = 225,37) were higher than male students' scores ($\bar{\chi}$ = 180,35). In line with the reported effect size data, the gender variable explained 0.08% of the IMTK sub-dimension; this effect was low. A statistically significant difference was found in favor of female students in the IMTK and ER sub-dimensions.

In the context of the second research question of the study, it was examined if there was a significant difference in DLS scores according to grade level or not. In this process, if the data had a normal distribution or not was interpreted in a holistic manner by comparing it with the desired limit value compared with the 1.96 criterion for Kolmogorov-Shapiro-Wilk's test, kurtosis-skewness, and standard error values of these indices. It was observed that the attitude, technique, cognitive and social sub-dimensions for DLS and the whole scale provided a normal distribution by class level variable. Significant differences by class level variable were examined with unrelated samples t-test and given in Table 10.

Table 10. One-way Analysis of Variance (ANOVA) of DLS according to Grade Level

	Grade level	$\bar{\chi}$	S_x	N	Variance Source	Sum of Squares	df	Mean Square	F	p
Technique	1	20,97	4,93	109	Intergroup	135,259	3	45,086	1,57	0,197
	2	22,23	5,691	183	In-group	12029,8	418	28,779		
	3	22,51	5,045	51	Total	12165,06	421			
	4	21,66	5,356	79						
Whole	1	55,18	13,648	109	Intergroup	1061,646	3	353,882	1,69	0,187
scale	2	58,49	15,707	183	In-group	91936,81	418	219,945		
	3	59,88	13,698	51	Total	92998,46	421			
	4	57,14	14,994	79						

p> 0.05

When the analysis result presented in Table 10 was examined, it was seen that there was no significant difference in terms of the class levels of the students' DLS total score and technique sub-dimension scores F (3,418) = 1,567.

Table 11. DLS's Kruskal Wallis H Test Result According to Grade Level

Sub-dimensions	Grade level	N	Mean Rank	df	x^2	p	Significant Difference
Attitude	1	109	187,4	3	7,069	0,07	No
	2	183	223,63				
	3	51	227,2				
	4	79	206,52				
Cognitive	1	109	190,45	3	4,946	0,176	No
	2	183	219,17				
	3	51	227,43				
	4	79	212,48				
Social	1	109	193,58	3	4,864	0,182	No
	2	183	217,56				
	3	51	234,68				
	4	79	207,22				

p> 0.05

In Table 11, whether the differentiation of DLS scores according to grade levels was significant was examined with the Kruscal Wallis H test and no significant difference was found, H3 (attitude) = 7,069; H3 (cognitive) = 4.946; H3 (social) = 4.864; it can be stated that the digital literacy levels of the participants at different grade levels are the same.

While investigating whether there was a significant difference in OLMS scores by class level, whether the data had a normal distribution or not was interpreted in a holistic way by comparing the Kolmogorov-Shapiro-Wilk's test with the desired limit value compared with the 1.96 criterion for kurtosis-skewness and standard error values of these indices. It was observed that the whole of OLMS and the sub-dimensions of IMTK, IMTS, IMTES, DR, IR, ER, LOM provide normal distribution by class level variable. Significant differences by class level variable were examined with unrelated samples t-test and given in Table 12.

Table 12. One-way Analysis of Variance (ANOVA) Result of OLMS according to Grade Level

Sub-dimensions	Grade level	$\bar{X}$	S_x	N	Variance Source	Sum of Squares	df	Mean Squares	F	p	Significant Difference	n
IMTK	1	17,69	5,33	109	Intergroup	381,039	3	127,013	4,403	0,005*		0,030634
	2	18,48	5,56	183	In-group	12057,6	418	28,846			2nd and 4th	
	3	19,24	5,43	51	Total	12438,64	421				3rd and 4th	
	4	16,22	4,91	79							2nd and 3rd	
IMTES	1	20,01	4,97	109	Intergroup	141,274	3	47,091	1,661	0,175		
	2	20,34	5,56	183	In-group	11852,64	418	28,356				
	3	20,63	5,30	51	Total	11993,92	421					
	4	18,87	5,25	79								
IR	1	18,25	5,66	109	Intergroup	308,068	3	102,689	2,946	0,033*		0,020706
	2	18,09	6,17	183	In-group	14570,35	418	34,857				
	3	19,16	5,78	51	Total	14878,42	421				4th grade	
	4	16,28	5,68	79							3rd grade	
Whole scale	1	132,18	24,01	109	Intergroup	7625,634	3	2541,878	3,673	0,012*		0,025683
	2	134,28	27,03	183	In-group	289288,6	418	692,078			2nd and 4th	
	3	139,22	28,36	51	Total	296914,2	421				3rd and 4th	
	4	124,76	26,26	79							2nd and 3rd	

When the analysis result presented in Table 12 is examined, it is observed that there is not a significant difference in terms of the class levels of the IMTES sub-dimension scores of the students, F (3,418) = 1,661, p> 0.05. In other words, the scores of IMTES of students at 1st, 2nd, 3rd, and 4th grades are similar. A significant difference was observed in the IMTS sub-dimension score according to the grade levels, F (3,418) = 4,403, p <0.05. The Tukey test was used to determine the grade level of the significant difference, since it provided the assumption that the variances were equal. There was a significant difference between the 2nd

and 4th grade levels in favor of the 2nd grade students ($\bar{\chi}$ 2nd Grade = 18.48). In the IMTS sub-dimension score, there was a significant difference between the 3rd and 4th grade levels in favor of the 3rd grade students ($\bar{\chi}$ 3rd Grade = 19,24). When the size of the calculated effect was examined, the class level variable explained 3.06% of the IMTS scores and this effect was at a low level. On the other hand, a significant difference was observed in the scores of the IR sub-dimension by grade level, F (3,418) = 2,946, p <0,05. Tukey test was used to determine which grade level the significant difference was in favor of it, since it provided the assumption that the variances were equal. There was a significant difference in favor of the 3rd grade students between the IR sub-dimension levels of 3rd and 4th grade students ($\bar{\chi}$ 3rd grade = 19,16). When the size of the calculated effect was examined, the grade level variable explained 2.07% of the intrinsic motivation scores for success and this effect was at a low level. A significant difference was observed in the score of the whole scale according to the grade level F (3,418) = 4.403, p <0.05. Tukey test was used to determine which grade level the significant difference was in favor of it, since it provided the assumption that the variances were equal. There was a significant difference between the levels of the 2nd and 4th grade students in favor of the 2nd grade students ($\bar{\chi}$ 2nd grade = 134.28) and there was a significant difference between the levels of 3rd and 4th grade students in favor of 3rd grade students ($\bar{\chi}$ 3rd grade = 139,22). When the calculated effect size was examined, the class level variable explained 2.56% of the total scores of the scale and this effect was at a low level.

Table 13. Kruskal Wallis H Test Result of OLMS according to Grade Level

Dimensions	Grade Level	N	Mean Rank	df	x^2	p	Significant Difference	r
IMTK	1	109	211,1927	3	9,751944	0,02	4th grade	0,101594
	2	183	225,5328				4th grade	
	3	51	218,4804				4th grade	
	4	79	174,9114				1st.-2nd.3rd. grade	
DR	1	109	219,0963	3	15,75581	0,00	4th grade	0,139904
	2	183	223,2322				4^{th} grade	
	3	51	228,549				4^{th} grade	
	4	79	162,8354				1^{st} 2^{nd} 3^{rd}grade	
ER	1	109	209,8073	3	7,6946	0,05	No	
	2	183	214,2923					
	3	51	245,4118					
	4	79	185,4747					
LOM	1	109	190,2798	3	7,7293	0,05	No	
	2	183	208,4754					
	3	51	236,5					
	4	79	231,6456					

In Table 13, it was examined with the Kruscal Wallis H test whether the differentiation of OLMS scores according to class levels was significant or not. When the digital literacy levels of the participants for ER and LOM sub-dimensions were compared according to their class levels, no significant difference was found. H3 (ER) = 7.6946; H3 (LOM) = 7.7293, p> 0.05. Significant difference was observed in the sub-dimensions of IMTK and DR according to the class level, H3 (IMTK) = 9,751944; H3 (DR) = 15.75581, p <0.05. The Mann Whitney U test was used as a post hoc test to determine the differences in the grade levels in IMTK and DR sub-dimension scores. As a result of the analysis, it was seen that there was a significant difference between 1.st, 2nd., 3rd and 4th grade students in favor of 1st, 2nd and 3rd grades separately for the IMTK and DR sub-dimensions; the effect size of the class level variable affecting the IMTK and DR sub-dimensions was low.

Findings Regarding the Third Research Question

The answer to the third research question “Is there a significant relationship between the digital literacy and online learning motivation levels of university students studying through distance education during the COVID-19 pandemic?” is given in Table 14.

Table 14. Correlation Results Regarding OLMS and DLS

		IMTK	IMTS	IMTES	DR	IR	ER	LOM	OLMS
Attitude	r	0,451**	0,445**	0,442**	0,457**	0,406**	0,299**	-0,287	0,436**
	p	0	0	0	0	0	0	0	0
	N	422	422	422	422	422	422	422	422
Technique	r	0,415**	0,395**	0,410**	0,374**	0,279**	0,249**	-0,184	0,384**
	p	0	0	0	0	0	0	0	0
	N	422	422	422	422	422	422	422	422
Cognitive	r	0,453**	0,479**	0,467**	0,496**	0,453**	0,388**	-,248**	0,494**
	p	0	0	0	0	0	0	0	0
	N	422	422	422	422	422	422	422	422
Social	r	0,357**	0,374**	0,375**	0,347**	0,302**	0,272**	-,134**	0,378**
	p	0	0	0	0	0	0	0,006	0
	N	422	422	422	422	422	422	422	422
DLS	r	0,479**	0,474**	0,477**	0,470**	0,398**	0,327**	0,264**	0,467**
	p	0	0	0	0	0	0	0	0
	N	422	422	422	422	422	422	422	422

In Table 14, the results of the correlation calculated by using the sub-dimension scores of the scales used and the total score results for the whole were reported. It was seen that the attitude sub-dimension score of DLS had a low-level significant relationship with the ER and LOM sub-dimension scores of OLMS. While a positive correlation was calculated between the attitude and technique sub-dimension scores and the DD sub-dimension score, a negative correlation was calculated between the attitude and technique sub-dimension and the LOM sub-dimension score. A low level of significant relationship was observed between the technique subscale score and the IR, ER and LOM sub-dimensions. The relationship between LOM and the technique sub-dimension was negative. There was a low and negative significant relationship between the cognitive sub-dimension score and the LOM sub-dimension score. A low level and significant relation was found between the social subscale and ER and LOM subscale scores. The relationship between social and LOM scores was negative. A low, positive, and significant relationship was observed between the total DLS score and the LOM subscale scores. All the correlations examined between other sub-dimensions and total scores of DLS, and OLMS showed that there was a moderately positive and significant relationship between DLS and OLMS. The correlation value calculated between the two variables considered in the study was significant ($r_{CDM-RLS}=0.467$, $p<0.05$). The variance value explained for the two variables was calculated as 0.218. With this finding, we can say that 21.8 % of online learning motivation level of students is interpreted by their digital literacy level or vice versa.

DISCUSSION and CONCLUSION

It was determined that there is a moderately positive and statistically significant relationship between the digital literacy and online learning motivation levels of the students within the scope of the study. The correlations between the digital literacy and online learning motivation levels obtained according to the gender and grade levels of the students were also found as equal. Moreover, 21.8 % of students' digital literacy is interpreted by their online learning motivation. Based on these findings, it can be said that there is a moderately positive and statistically significant relationship between students' digital literacy levels which refers to understanding and using the information provided through computers, obtaining data from the internet within the framework of ethical rules and using this data in the right place and at the right time, establishing relationships through the internet, obtaining the necessary information and solving the problem when they encounter any technical and technological problem, being aware of technologies, paying attention to these technologies and having a positive attitude towards them and online learning motivation, which is a characteristic convincing student to learn and fulfil the learning activities and the force that encourages students to fulfil their choices and participation. Since familiarity with technology is essential in online learning environments (Agarwal et al., 2000; Marrakas & Johnson, 1998), these needs, knowledge, skills, services, and technologies require students to be digital literate at a certain level.

Moreover, as some degree of technological competence is required for online learning, this competence is also vital to reducing cognitive load, as the excessive cognitive load can cause a student's attention to shift from subject to technological problem and decrease motivation (Hartley, 1999; Kim & Frick, 2011; Pintrich & Schunk, 2002). Motivation, an essential factor in online learning, is the driving force that enables students to act and energize to access and evaluate information in lessons, use different software applications and hardware, and produce digital content. Ramírez-Correa et al. (2015) and Xu and Jaggars (2013) state that one of the leading reasons for dropping education in online learning is motivation; therefore, motivation emerges as an essential factor in online learning and thus in digital literacy. Training to use the required technology is also an essential factor affecting the motivation of online students (Schramm et al., 2000). Studies have determined that computer self-efficacy is essential to students'

online learning satisfaction and class participation (Hill & Hannafin, 1997; Joo et al., 2000; Lim, 2001). Technology in online learning, needed within the scope of distance education and used by the precautions taken in the COVID-19 pandemic, is the only connection that students have, so any technical problem experienced increases the possibility of students being unwilling to learn and even quitting the course (Essex & Çağıltay, 2001; Hara & Kling, 2000; Kim & Frick, 2011); therefore, students need to adopt technology and develop their digital skills in line with the emerging global trends and realities in education. In online learning environments, students have higher motivation when they do not have a technical problem (Kim & Frick, 2011) because these technical difficulties can be very discouraging if they prevent the student from accessing course resources, activities and tasks, the instructor, and other students. University students who are exposed to online learning intensely during the COVID-19 pandemic within the scope of the present research are digitally literate individuals at a moderate level; so we can say that they have some technical and operational skills, can follow technologies, use digital products and perform essential computer-based works in order to continue their education by learning the developing communication and information technologies and need to have motivation, which is a psychological feature that encourages them to learn and do learning activities in online learning environments at a moderate level and these variables affect each other moderately.

It has been determined that the digital literacy levels of the students within the scope of the research are at a medium level. Based on this finding obtained in the study, it can be said that the students within the scope of the study have a medium level of basic technical and operational skills in obtaining the information they need from digital sources, evaluating the timeliness and reliability of the information obtained, socializing on the internet, obtaining, and using information without violating the ethical rules and knowing what to do when personal security is harmed. In addition, it can be said that the students' skills within the scope of the study have a medium level of skills in following the developing technologies, generating new information and distinguishing the correct information. As Martin (2005) emphasized, recognizing digital resources and tools, reaching them, managing, evaluating, analyzing, synthesizing, generating new information from what they have acquired and being aware of them are among the skills that today's students should acquire. Therefore, we can say that university students within the scope of this research have those skills at a moderate level. Knobel and Lankshear (2006) stated that digital literacy was increasingly defined as an official goal of education. So, that university students within the scope of this research have a moderate level of digital literacy means they have that official education goal indicated by Knobel and Lankshear. Studies conducted by Çetin (2016), Çukurbaşı and İşman (2014) and Tyger (2011) in which university students have moderate digital literacy in the relevant literature also support this finding of the current research.

There is no difference in terms of the cognitive, attitude and social sub-dimension scores of the digital literacy scale of male and female students within the scope of the research; it is seen that there is a significant difference in favour of male students in the technique sub-dimension. The fact that the male students within the scope of the study have higher scores in the technique sub-dimension of the digital literacy scale may be due to higher knowledge and skills than female students of having technical and operational skills to learn communication and information technologies and use them in daily activities, performing essential computer-based works, accessing different software applications and hardware devices, and using them, choosing and using the most appropriate technological tools to complete the task. According to the study done by the Turkish Statistical Institute in Turkey, the rate of people between the ages of 16-24 using computers was 75.1% for males and 60.1% for females in 2018; the internet usage rate for the same year was 94.7% for males, and 86.5% for males between January and March 2018 was found (TÜİK, 2018). This data, which can be considered proof that males are more concerned with computers and the internet in Turkey, also supports the fact that male students within the scope of the study got more points in the technique sub-dimension of the scale. This finding of the study is also supported by some research findings in the relevant literature (Deryakulu, 2007; Gui & Argentin, 2011; Korkmaz et al., 2015; Korkut & Akkoyunlu, 2008; Ocak & Karakuş, 2019; Sulak, 2019; Tsai et al., 2001). That there is no difference in terms of the cognitive, attitude, and social sub-dimension scores of the digital literacy scale of male and female students within the scope of the research means both male and females students can think critically, evaluate and use digital information in online search and use the internet for communication, keep personal information, protect personal security, know what to do in danger and against this danger based on internet ethics at the same level.

Moreover, all students within the scope of the present research have the same level of digital literacy attitude, a tendency that affects both social perception and behaviour, which is attributed to an individual and regularly forms her thoughts, feelings, and behaviours about a psychological object; therefore, those students are found to have the same level of thoughts, feelings, and behaviours about the process of thinking skills, obtaining data from the internet and using technology correctly by establishing relationships. Moreover, it was determined that the digital literacy levels of the students within the scope of the study did not differ according to gender. The finding that there is no difference in terms of the total score of the digital literacy scale of female and male students within the scope of the research is also supported by some research findings in the literature (Can et al., 2020; Ertaş et al., 2019; Korkmaz & Mahiroğlu, 2009; Kozan, 2018; Polat, 2018; Sarıkaya, 2019; Yaman, 2019; Yılmaz et al., 2019).

It was determined that DLS total score and technique, cognitive, affective, and social sub-dimension scores did not differ according to grade levels; in other words, the total score and sub-dimension scores of the DLS of all students studying at 1st, 2nd, 3rd and 4th grade are similar. Based on this data obtained from the research, it can be said that students of all grade levels equally have the skills of using communication and information technologies in their daily lives, distinguishing accurate and current information in online search, researching and protecting their personal information without ignoring internet ethics, using essential technological resources and digital technologies, having a positive attitude towards digital technologies and establishing

healthy communication with people on the internet. When the relevant literature was examined, it was determined in the studies conducted by Çukurbaşı and İşman (2014) and Sarıkaya (2019) that the digital literacy of university students did not differ in terms of grade level; the findings of these studies support the current research findings. However, there are also studies in the literature in which the level of digital literacy differs according to the level of students' grade levels (Baker et al., 2003; Can et al., 2020; Carrington & Robinson, 2009; Göldağ & Kanat, 2018; Hamutoğlu et al., 2017b; Kozan, 2018; Marsh et al., 2017; Öztürk & Budak, 2019; Pew Research Center, 2005; Techataweewan & Prasertsin, 2017; Witten et al., 2018; Yaman, 2019). The fact that the current research finding does not coincide with some research findings in the literature may probably be since all of the students within the scope of the research are very intensely and suddenly exposed to the digital environment, especially as a necessity of online learning, due to the COVID-19 pandemic.

It has been determined that the online learning motivation of the students within the scope of the research is at a medium level. Based on this finding, it can be said that both female and male students within the scope of the study have moderate motivation levels for online learning, an innovative approach that offers well-designed and interactive learning environments, using different digital technological features and resources, and learning materials suitable for open and flexible learning environments, without time and space limitations. In addition, it can be said that the student's motivation to concentrate on, participate in and complete learning activities and their level of interaction with learning materials, expectations of appreciation and praise for their learning, their inner desire to learn about their lessons, and their mental and psychological energy to perform online courses are moderate. Since human-computer interaction evoked by online learning (McIsaac & Gunawardena, 1996) and effort to use the required technology (Schramm et al., 2000) are essential factors affecting the motivation of online students and those skills are needed for distance education during the COVID-19 period, that the university students within the scope of the current research have moderate online learning motivation is inevitable.

In the study, a statistically significant difference was found in favour of male students only in the lack of motivation sub-dimension; a statistically significant difference was found in favour of female students in the total scale score. These findings mean that the online learning motivation levels of male students within the scope of the study are lower than that of female students. This is an indication that the psychological conditions that persuaded the female students within the scope of the study to learn and complete the learning activities were higher than that of the male students; it can be said that the degree of participation, effort and persistence of female students in learning processes, their inner desire to acquire information about a subject, the psychological powers that enable them to realize their educational situation and the continuation of this action, and their concentration towards teaching are higher. We can say that lack of motivation, the state of not feeling the competence to do activity according to Ryan and Deci (2000), is felt more intensely by male students. Moreover, the current research finding that indicates a statistically significant difference in favour of female students in the total score of the scale is supported by the findings of some studies in the related literature (Fredericksen et al., 2000; Swan et al., 2000).

In the study, it was found that "external regulation", "lack of motivation", and "intrinsic motivation to experience stimulation" sub-dimension scores of the online learning motivation scale did not differ according to students' grade levels; there is a significant difference between the 2nd and 4th grades in favour of 2nd-grade students and between 3rd and 4th grades in favour of 3rd-grade students in the "intrinsic motivation to succeed" sub-dimension score and the score regarding the whole scale; there is a significant difference between 3rd and 4th grades in favour of 3rd-grade students in the "introjected regulation" sub-dimension; there are significant differences in favour of the 1st, 2nd and 3rd-grade students separately between 1st, 2nd, 3rd and 4th-grade students according to the grade level in terms of "intrinsic motivation to know" and "determined regulation" sub-dimensions. In the whole online learning motivation scale score, a significant difference was found between the 2nd and 4th-grade levels in favour of the 2nd-grade students and between the 3rd and 4th-grade levels in favour of the 3rd-grade students. Based on these study findings, it can be said that the online learning motivation of the students studying in lower grades is higher than those studying in upper grades. This may be since the younger the students are, the more they are competent in online environments.

Suggestions

In the study, it was determined that the digital literacy and online learning motivation of university students were at a medium level, and 21.8 % of online learning motivation of students within the scope of the study is explained by their digital literacy or vice versa. Based on this finding, the reasons for students' medium level of digital literacy and online learning motivation can be determined by instructors. These levels can be increased with in-school and out-of-school training. The rise of one factor will trigger the rise of the other factor anyway.

The study determined that as the students' grade levels increased, their digital literacy and online learning motivation levels decreased. The reasons underlying the decrease in students' digital literacy and online motivation, e.g. learning content and level of interaction, should be investigated, and instructors should plan training on this subject.

It was also determined that female students within the scope of the research scored less than male students in the technique sub-dimension of DLS; to eliminate the technical literacy gap between the genders, training for female students can be organized by instructors.

In the study, a statistically significant difference was found in favour of male students only in the lack of motivation sub-dimension of the online learning motivation scale and in favour of female students in the total score of the scale. For this reason, training and seminars should be organized to increase male students' motivation to learn from online instructors.

It is thought that it would be beneficial to conduct a similar study by new researchers with faculty members who interact the most with university students. In addition, awareness of digital literacy can be created in parents through joint training organized with legal and non-governmental organizations.

Longitudinal and experimental studies can be conducted by new researchers on digital literacy and online learning motivation. By curriculum development experts, goals related to digital literacy and online learning motivation can be included in the curriculum.

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Statements of publication ethics

I hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

Ethics Committee Approval Information

This study was conducted under the permission of "Bolu Abant İzzet Baysal University Human Research Ethics Committee in Social Sciences" met on 24.12.2021 with the number 2012/12.

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| Research Article / Araştırma Makalesi |

Knowledge Production About Educational Management in Türkiye: Lecturer Perspectives

Türkiye'de Eğitim Yönetimine İlişkin Bilgi Üretimi: Öğretim Elemanlarının Görüşleri[1]

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Keywords

1.Epistemological Beliefs in Educational Management,
2.Knowledge in Educational Management,
3.Knowledge Base of Educational Management,
4.Epistemology of Educational Management,
5.Scholarly Thinking in Educational Management

Anahtar Kelimeler

1.Eğitim Yönetiminde Epistemolojik İnançlar,
2.Eğitim Yönetiminde Bilgi,
3.Eğitim Yönetiminin Bilgi Tabanı,
4.Eğitim Yönetiminin Epistemolojisi,
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Abstract

Purpose: The study analyzes epistemic beliefs of field members qualitatively as to the knowledge base of Educational Management.

Design/Methodology/Approach: The research design is descriptive phenomenology, and the data collection tool has semi-structured questions facilitating epistemological reasoning and thinking in Educational Management. The questions were posed through one-on-one, face to face interviews. The participants are 29 lecturers in departments of Educational Management in 3 state universities in Turkey. The interviews were hold during the first term of 2018-19 Academic Year.

Findings: The results indicate the participants hold unique epistemic beliefs in their evaluations of possibility of knowledge, truth of knowledge, justifying knowledge and boundaries of knowledge in the knowledge base. It is observed participants' personal epistemic beliefs also bear certain commonalities.

Highlights: There is neither a priori knowledge nor absolute truth in the knowledge base implying the knowledge of Educational Management calls for hermeneutic explanations; it continues to be a struggle to study the highly dynamic epistemologies-both those of individual researchers and communities-emerging and 'filtered' and hence 'refined' in the knowledge of the field. Preserving the core of the field knowledge whilst expanding it can be realized through working in a collaborative fashion within the field and 'beyond'.

Öz

Çalışmanın amacı: Bu çalışmada alan üyelerinin eğitim yönetimi bilgi tabanına ilişkin epistemik inançlarının nitel olarak incelenmesi amaçlanmıştır.

Materyal ve Yöntem: Araştırma tasarımı betimsel fenomenoloji olup veri toplama aracı olarak "Eğitim yönetiminde epistemolojik akıl yürütmeyi ve düşünmeyi kolaylaştıran yarı yapılandırılmış sorular" kullanılmıştır. Sorular bire bir, yüz yüze görüşme yoluyla sorulmuştur. Katılımcılar, Türkiye'deki 3 devlet üniversitesinde Eğitim Yönetimi bölümlerinde görev yapan 29 öğretim elemanıdır. Görüşmeler, 2018-2019 akademik yılının ilk döneminde gerçekleştirilmiştir.

Bulgular: Araştırma bulguları, katılımcıların bilginin olasılığı, bilginin doğruluğu, bilginin gerekçelendirilmesi ve bilgi tabanındaki bilginin sınırları ile ilgili değerlendirmelerinde özgün epistemik inançlara sahip olduklarını göstermektedir. Katılımcıların kişisel epistemik inançlarının bazı ortak yönleri bulunduğu da izlenmektedir.

Önemli Vurgular: Eğitim Yönetimi bilgisinin hermenötik açıklamalar gerektirdiğini ima edecek biçimde, alanın bilgi tabanında ne a priori bilgi ne de mutlak gerçek vardır; hem bireysel araştırmacılara hem topluluklara ait olarak ortaya çıkan son derece dinamik ve "filtrelenip" "damıtılmış" epistemolojileri inceleme işi bir uğraşı olmaya devam etmektedir. Alan bilgisinin özünü genişletirken korumak, alanın içinde ve 'ötesinde' iş birlikçi bir şekilde çalışarak gerçekleştirilebilir.

> "Knowledge is a social construct, a consensus among the members of a community of knowledgeable peers."
>
> — Kenneth A. Bruffee

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INTRODUCTION

The onset of the latest millennium brought more questions of disorienting nature-if not novel crises-into the field of Educational Management. Such periods, provided they precede conflicting views, lead to 'cracks' in the epistemological sphere of scholarly work resulting in issues with recognition and legitimacy of any area (Wallerstein, 2004). Oplatka (2007) pinpointed a conflict of paradigms in the field whilst other prominent names; Fitz, (1999), Heck & Hallinger (2005), Maxcy (2001) emphasized the area suffers from unified scientific-academic understanding(s). Today, the horizon yet to preserve its rather hazy scene.

Conceptual Framework

Ensuring epistemological unity has been difficult for Educational Management, which does not date back to early years unlike the other 'autochthonous' social sciences. Being a relatively newly born area amongst the neighboring others makes things a bit more complicated. To date, the history of Educational Management has gone hand-in-hand with the epistemological developments in the field and there exists the tendency to frame it under the umbrella term of management sciences (Özdemir, 2011). Moreover, the dominance of Western philosophies in the research paradigms has been noted (Bush, 2020). All these realms have certain effects on the directions in the field. Yet, changes take place too; "there has been a significant growth in manuscripts about Asian education, accepted for publication in EMAL", (Bush, 2015: 3) *Educational Management Administration & Leadership*, one of the top journals of the area where "the articles may also be seen as a barometer for the changing emphases." (Bush & Crawford, 2012: 537).

Turkey has been a center, beginning from archaic times, where knowledge is created and disseminated. Howbeit, in the contemporary world, arguably whispers, not-yet-voices are heard about Educational Management from Turkey though it has a lot to say. There are a few studies of Turkish origin reflecting epistemological thinking behind the research in Turkey. Some relatively more recent ones are as follows: Bozdoğan (2018), Bozkurt & Bozkurt (2018), Demirhan, et al. (2018), Özdemir (2018a, 2018b), Şahin & Cemaloğlu (2019), Yıldırım (2018). On the other hand, no studies have been documented from the bulk of domestic and international research which solely analyses the epistemic beliefs of field members. Having said that Buske & Zlatkin-Troitschanskaia (2019) have relatively lately investigated principals' epistemological beliefs. As once was shared by Willower (1975), today merely a number of studies analyze the epistemological essence of the area. This seemingly adds to the depression in the field that was declared by several field members. An allegory might help visualize the specific case in Turkey here in that sense, where the enclosing crisis of the whole field takes the shape of an 'adolescent crisis' for Turkey bearing in mind the emerging expertise and the cognition that is still in progress. This problem of neglecting the epistemological stances doubles with the innate characteristics of the area; its being highly context-dependent that interrupt emergence of shared perspectives (Ertürk, 2012). It is not surprising for a branch of social science to experience ontological, epistemological, and methodological predicaments (Şentürk & Turan, 2012) which endeavors to encompass both theoretical perspectives and the practical/empirical sides of knowledge (Hart, 1999) though. The turmoil of assumptions and beliefs together with what is associated with the relevant practicum i.e., managing the educational institutions along with the management of sources like people, finance and other elements that are of more abstract being such as intellect cause issues in this regard.

Aristotle, an early ancient philosopher of Anatolia pinpointed all our scientific understanding (ἐπιστήμη) pertaining to a specific area could be understood by analyzing the rationale behind the things we comprehend about that very field is to hold (Gasser-Wingate, 2016: 1). Hundreds of years later on the same land viz. Turkey a somewhat similar attempt to understand can take place for Educational Management by asking several epistemological questions: "What is the possibility of knowledge? How can truth of knowledge be declared? What are the ways (if any) of justifying knowledge?" and "Are there any boundaries of knowledge?". It is not extraordinary that such a struggle would not only be a scientific but also a humanistic one (Berger & Luckmann, 1966) for the field bringing about further discussions. For instance, whether the knowledge of Educational Management is fact or value-bond when attempting to deal with morality, rights, life, and humanity (Gunter & Ribbins, 2002: 387) is worth being searched.

Looking at the chronicle of the field enrooting in Turkey certain institutions seem influential in the epistemic development. First off, the opening of The Institute of Public Administration for Turkey and the Middle East in 1953 paved the way for the intersection of Educational Management and Public Administration reflecting the overall approach of those years. The foundation of academic divisions in two universities of the capital: Ankara University and Hacettepe University in 1965 and 1966 respectively contributed to the generating and dispersing of the knowledge in the field. While reaching almost the end of the first quarter of the new century, it is witnessed that 45 universities involve Educational Management departments in Turkey. There are other bodies and publications like *Educational Administration: Theory and Practice*, which is a quarterly published journal that accepts work on educational management, planning, economics, policy, and supervision. There is *EYUDER* (Association of Educational Administrators and Experts), a non-governmental organization established with a view to organizing national and international projects. This association regularly hosts a field-specific forum entitled *EYFOR* that enables academic work as well as opinions of teachers, school managers and academicians to be exchanged. Educational Administration Research and Development Association is another society, which embodies a journal of the area called *Research in Educational Administration and Leadership* (REAL) and organizes congress series of the field regularly.

Purpose

In light of what has been covered so far it might be appropriate "to ask questions as to what field members know and need to know, what is worth knowing, how they know and practice that knowing" (Gunter, 2005: 166) with a view to better analyzing the knowledge in the area, in a field taking a critical role being the producer of research itself and as a fundamental conduit for the optimal implementation of evidence-based practicum in education (Gorard, 2005: 161). This study hence intends to contribute to the efforts worldwide vis-à-vis scrutinizing the knowledge of the field through listening to real people (Patton, 2002) via giving ear to their not-yet-(well)-heard voices (Berg, 2001).

The main question of the study is: "How are epistemic beliefs of faculty members of the departments of Educational Management in the 3 state universities of the capital of Turkey?". The research questions oriented toward the said question are as follows; "How are epistemic beliefs of the participants as to:

1. Possibility,
2. Truth,
3. Justification,
4. Boundaries of knowledge of the field of Educational Management?

Research Design

Considering the potential of qualitative studies regarding obtaining data in a detailed way (Strauss & Corbin, 1997) the study aims and hopes to say 'something new' through eschewing traditional paths of research (Ludwig, 2007), anticipating the possibility of even paradigm shifts within and beyond the field (Özdemir, 2010).

METHOD

The preferred method of inquiry is Phenomenology; an approach towards understanding knowledge, knowing through intellectual engagements of meaning making, eventually arriving at rich data (Creswell & Creswell, 2017; Merriam, 1998). Embracing the philosophical pathway of Phenomenology assists the researcher in discovering authentic beliefs. The design that seeks to shed light to epistemic beliefs of the participants is Descriptive Phenomenology. When it is recalled that the researcher bears witness to the participant's, who is conscious of their being, account of subjective experience carrying epistemological ramifications (Willis et al., 2016: 1188), the employment of such design can be evaluated as one that helps discover personal epistemologies of the participants. Husserl's Philosophical Phenomenological Method is also referred to since propositional statements of hypothetical nature were provided as part of the data collection instrument. These helped speculate on various epistemological dimensions of knowledge through "a philosophical type of analysis that seeks to understand consciousness as such before it is interspersed with empirical reality" (Giorgi et al., 2017: 178).

Participants and Procedures

In Descriptive Phenomenology, participants are expected to share their unique thoughts about the specified phenomenon (Kline, 2008). The participants were selected through purposeful sampling by ensuring a balanced distribution as regards gender, academic title, and affiliated university to reflect this originality. They are faculty members of the departments of Educational Management in 3 state universities in Ankara, Turkey. They were on duty during the fall term of 2018- 19 Academic Year. These universities, to wit Hacettepe University, Ankara University and Gazi University are believed to be amongst the leading ones discerning their history, capacity, transfer of *scientia* and also their being "Research Universities[4]"

The table below represents the enprint of the members of the Educational Management of the pertinent universities in the first academic term of 2018- 19 Academic Year. Of these academics contacted via email or phone, all the volunteering ones (29 individuals, 58% of the whole) are invited to the study as they reflect the parameters of purposeful sampling. These faculty agreed to sign the consent letter and permitted to have their voices recorded. They were interviewed in their offices on a one-on-basis with the help of the semi- structured interview questions.

Table 1. Potential Participants

Academic Title	Gender		University		
	Female	Male	Hacettepe	Ankara	Gazi
Full Professor	8	10	3	5	10
Associate Professor	3	8	5	2	4
Assistant Professor	2	1	1	1	1
Research Assistant	13	5	6	9	3
Total	26	24	15	17	18
Grand Total: 50					

Data Collection Tool

In-depth interviews were carried out using a form comprised of questions which were confirmed previously by 12 experts (field members, lecturers of Philosophy departments) in line with the interdisciplinary approach of the study. The questions reflect Traditional Normative Epistemology which is based on justification. Again, to acquiesce to the structure of the research and refrain from any confusions, the statements given to the participants with the questions contain elements of both Epistemology and Educational Management. It is believed that the participants then were able to conceptualize what was asked, which might otherwise be (more) difficult.

The researcher with the title of a Turkish-English/English-Turkish translator and interpreter, herself translated the interview questions and direct quotes from Turkish-the mother tongue of the researcher and the participants. Both the translated versions and the original (Turkish) phrases were checked by one bilingual colleague to see if they convey the right messages and reflect the participant's tone. In total 11 hours 17 minutes of recording was noted and this was later transcribed that makes up 887 KB of encrypted data.

Analysis Processes

Keeping in mind Husserl's *epoché,* in this Descriptive Phenomenological study, the researcher; a field member, tried to put aside and/or bracket her own experiences with the phenomenon to eliminate any prejudgments. An educational scientist (not a field member) supported the analysis process of transcription, phenomenological reduction, decision making on the themes. 10 themes out of 11 themes (90.9%) covering epistemic beliefs were agreed upon by the researcher and her colleague. The interview questions allegedly form sub-themes. To satisfy trustworthiness, authenticity criteria (Guba & Lincoln, 1989) were allowed for. All the transcribed data were checked by the participants and changes made to the transcriptions of 5 participants upon request.

Ethical Considerations

The study catered to ethical issues with design, data gathering, analysis, reporting (Edwards & Mauthner, 2012: 18). All the legal permissions were also obtained.

Assumptions

The following are the assumptions; the participants are capable of representing their own epistemic beliefs bringing on diversity, the data collection instrument makes it possible for Epistemology and Educational Management to meet as two entities.

Limitations

The epistemic beliefs are limited to the participants and what they disclose.

RESULTS

1.Possibility of Knowledge in the Field

The first question was: *Can we talk about the originality of the knowledge base of the field?* The purpose was to get participant responses in respect of the possibility of the originality of knowledge (re)produced in theoretical and practical domains in the field. The views of the participants do not cluster under a single perspective i.e., "yes" or "no", conversely, there is a balanced share under two categories.

15 participants who affirmed the non-existence of an original knowledge base justified their epistemic beliefs through these reasons: Educational Management innately owns an eclectic/multi-disciplinary territory of knowledge; there is *sine qua non* of the close, intertwined and Venn diagrams-like constructions of Educational Management and the other fields; Educational Management is like a 'hyponym' of the 'hypernym', namely, Educational Sciences, where there are 'co-hyponyms' such as Curriculum and Instruction and Measurement and Evaluation in Education; the field is inevitably located within Management, Public Administration and Business Administration especially in countries like Turkey. It was asserted by 11 that being concerned with an original knowledge base in the field is 'futile' and 8 pronounced that to dig for empirical knowledge would be more sensible. The participants had the tendency to refer to the cognitive schemas in their minds that enable metaphorical/analogical descriptions when sharing their opinions.

One participant (U2P8-hereinafter "U" represents one of the universities in the study and "P" represents one of the participants) vocalized their remarks in the following way:

> *Trying to have a defined knowledge base is a result of*
> *feeling insecure…and why to see the lack of originality as a threat?*
> *The field cannot be protected by keeping it in a 'fishbowl'.*
> *How can a field member produce educational*
> *policies without the knowledge of Economics?*
> *We have to cooperate.*

3 participants who denied the existence of original knowledge talked about the disadvantages that may even result in a loss of the field's 'scientific being'; its *raison d'être*. A participant (U1P8) eminently shared: *To me one of the most 'hapless' of all the other sub-divisions of Educational Sciences is Educational Management. It is not even recognized as a scientific discipline since we are under the 'reign of' Management, a powerful field.*

14 participants who posited the originality of the knowledge base of Educational Management underlined the knowledge is still being constructed and used these expressions: Educational institutions and their stakeholders are placed in the heart of the research which makes studies prototypical, the field knowledge remains original on the condition that it relates itself to real life, despite the interconnected/overlapping sections of the knowledge base in the form of Venn-diagrams with other sciences, the field bestows original knowledge. One quote of a participant

(U3P2) is as follows: *I do believe in that there is originality in the knowledge base of the field. I do not think in this way only as a field member or a researcher, I do so by recalling my past experiences with the field as a teacher, a practitioner.*

Both groups referred to Venn-diagrams to clarify their epistemic beliefs participants and alluded the importance of the pragmatic side of the knowledge base.

2.Epistemological Truth in the Knowledge of the Field

The second question was: *Can we talk about absolute truth in the knowledge base of Educational Management? Why/not?* and an exigent result is identified. None agreed on a form of knowledge that points to absolute truth as they all said in different ways that Educational Management is directly linked to humans.

Putting aside the paradoxical situation that such proclamations themselves may be 'sheer', it might be meaningful to elaborate on what this standpoint recites for the field. The participants talked about "multiple truths" which converge Epistemological Relativity in the knowledge base, and they shared social sciences cannot embrace absolute truth; practical truths could/should be of concern. The below representation displays what is envisaged:

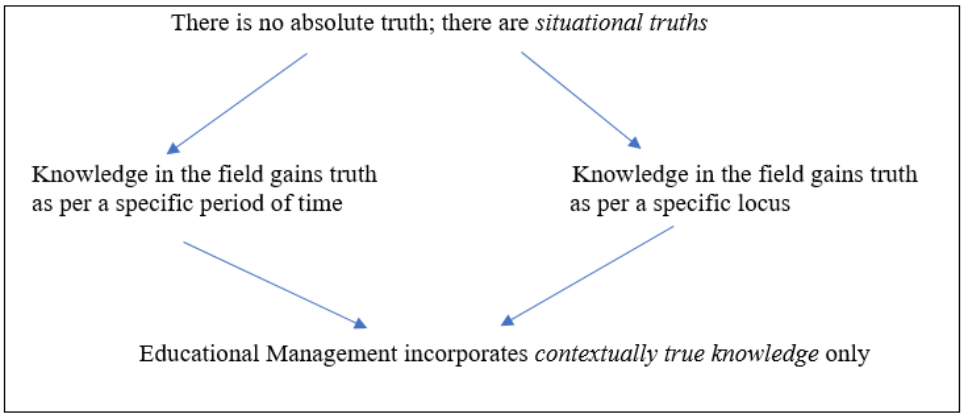

Figure 1. Truth in the Field of Education Management

3.Justification of Knowledge in the Field

The first question at this stage was: *How can you determine the truth of the knowledge circulating in the field?* The "you" herein should be deemed as "you, a researcher and field member" that puts the participant in the position of the 'agent' who makes the necessary decisions about doing research. Inarguably, the statement shared: *This school is a learning organization* accompanying the question above allowed to clear the way for epistemological thinking at the same time facilitating field knowledge. Specific criteria were provided for the participants to reach a conclusion as to the reliability, correctness and eventually regarding the truth of the statement. Epistemologically speaking these criteria were: *Coherence Theory of Truth, Consistency, Appeal to Authority, Correspondence* and *Pragmatic Theory of Truth.* The question then turns out to be a one that reads: *This school is a learning organization. Which criterion or criteria would you use to (cross)check if this statement is true?*

The results unearth that 6 participants chose to refer to Pragmatic Theory of Truth, 23 chose to refer to all the criteria. Apart from Pragmatic Theory of Truth no single criterion was selected.

6 participants who referred to Pragmatic Theory of Truth, interlineated the functionality 'maxim' of the truth of the knowledge. A participant (U2P2) said: *Providing this educational institution in the statement contributes to the development of all the shareholders, then, I could say, yes; it indeed is a learning organization. After all, isn't this the purpose of such schools?*

Majority of the participants picked up all the criteria to check the truth of the statement. A participant (U1P2) said: *Bearing in mind all my experiences in the field in years, both as a field researcher and an administrator, I would say all the criteria came in handy.* In a similar way another participant (U1P8) voiced: *It would be necessary to check all the criteria as a whole and also one-by-one because education is there with people and their realities.* Lastly the participants emphasized socio-cultural contexts (U1P4): *We have to 'stretch' the criteria. To exemplify, things would be different for each country. Even in Turkey there are regional or district-wise variations and cases that come into play amidst such issues.*

The second set of questions also came with a statement: *An efficient school manager is always good at managing crises.* The participants justified the truth of this statement in relation to the question and the given criteria: *Which criterion/criteria would you refer to so as to justify the truth in the statement? a) Visiting schools to carry out observations and interviews; b) using induction-deduction for logical reasoning, and not feeling the need for onsite visits; c) both visiting schools and evaluating the data obtained there through epistemological thinking; d) evaluating the statement with your own intuition and foresight; e) evaluating the statement with your unique and personal justifications believing this is what each researcher would do; f) doing a concept analysis of the key terms i.e., efficient school manager* and *crisis management.*

25 participants shared they would use all the criteria to justify the truth. They said they would follow this way as it would be more scientific by triangulating data, and this would be compatible with the eclectic feature of the field. Albeit, there is also the mentioning of the 'over-concern' of being scientific (U1P4): *We can always talk about the subjectivity and non-generalizability of the data here*. *Also, the data can be too contextual for the researchers abroad since our practices do not match with their theories. Thereupon, being completely scientific like natural sciences is vital.*

4 participants declared they would refer to criterion "c" as they find it beneficial to visit schools and evaluate the data obtained there with the help of epistemological thinking/reasoning. One participant (U1P3) implied onsite observations would be 'theory laden': *I would look for onsite evidence to support whether this school leader adhered to the expected behavior of the theories and also to what I know about being an efficient school manager.* Another participant (U2P8) from the same group stated that as a criterion, the "c" above would adequately fit in the general criteria of conducting scientific work: *I think one of the main functions of science is not only to report but also to explain giving cause-effect relationships.*

4.Epistemological Boundaries of Educational Management

The last two questions were about the epistemological boundaries anent the domains of the knowledge base and the scientific quintessence of the field.

The first of question was: *Do you think there are boundary lines of the knowledge base of the field? If yes, what would you say about the starting and ending points of these? How can Educational Management be situated among disciplines and areas such as Public Administration, Educational Sciences, Management?*

7 participants agreed there are boundary lines circumscribing the knowledge base whereas 22 believed there are no boundaries.

The ones who believed there exist boundary lines alleged: There is expanding contextual knowledge of the field; the research topics and their dimensions differentiate the knowledge; the knowledge base of Public Administration naturally sets the boundaries; and boundaries are rather artificial and required for academic work.

One participant (U3P2) extrapolated their beliefs through a homology:

We do not conduct research within an indefinite
area. Nevertheless, I avoid reductive remarks
here now that it is quite a work-in-progress.
It is like an ore bed, as we dig it gets larger so we
enter into novel passages.

1 participant (U2P12) sounds as if they were not contented:

There must be clear boundary lines…
Concepts of Psychology are infinite, cynicism, organizational silence,
and alike…take one and carry out a study in
Educational Management with teachers, principals,
there is no end…Nonetheless, for the field to gain legitimacy, the knowledge
base needs to have its original knowledge…
As Turkish field members, we have to chew over that very issue.

Other participants put across their beliefs in these ways: The fact that the knowledge base of the field is not confined is normal and even constituted a desired consequence for interdisciplinary human sciences. Some declared the knowledge is growing like a 'living being'.

The last cluster of questions entailed the boundaries of the field knowledge to gain a scientific outlook. This question was asked accordingly: *How can the circulating knowledge in the knowledge base be looked upon on the fact-value issue?* The participants were again given a statement: *Instructional leaders should be visionary* and were asked: *Do you think what this statement conveys can be investigated within the field of Educational Management?*

The statement is normative and furthermore the concept "visionary" seems to be abstract and perhaps too *ad hoc*. As a result, such a statement apparently fostered deeper epistemological reasoning on the part of the participants.

9 participants propounded the statement is not suitable to be studied as the use of "should" is not scientific at all; it would be better for the field to stay away from strong and imposing statements to be more realistic and humanistic.

8 believed the statement can be studied on certain conditions and opined their beliefs in the following ways: What such kinds of statements mean could determine the appropriateness of the use of "should" or obscure terms like "visionary" and this necessitates meticulous reasoning of researchers in the field.

12 participants agreed the statement can be a starting point of research and expounded their beliefs in these ways: In all sciences including Educational Management there needs to be 'cornerstones', accepted truths like the one in the statement about leaders and these truths indeed illuminate research routes.

One participant (U2P3) believed such normative statements pointing at values, not only do form starting points but also 'ending remarks' in studies:

> *We aim at the training of good individuals, citizens.*
> *There are values and gains in what we do.*
> *Humans are central to our work. At the end of the day, we are engaged in public services. These services make use of scientific data and thusly the optimal decisions are taken and recommendations are made accordingly.*

DISCUSSIONS

The first question was on the subject of the originality of knowledge and the emergent issues appeared to have relevancy to Epistemology and epistemological thinking in the area. It endorsed the comprehension of the scientific knowledge of the field by reviewing the first array of the rationale behind the creation and broadening of that knowledge (Gasser-Wingate, 2016; Kuçuradi, 1995) or as in Kuhn's and Popper's manifests, behind "the shifting intellectual stances" along with "conjectures and refutations" in the area, where the reasons to conduct research and results of research alter in an incredibly fast fashion (Levin, 1999).

The results connoted the 'ever-hot topic' of the knowledge domain showing the epistemological dilemma (Şentürk & Turan, 2012) at a small(er)-scale. Thinking about the equal share of who denied the existence and who believed in the existence of original knowledge literally represented the dispute in the area constituting an 'archetypical' pattern. Oplatka's (2007, 2010) mentions of a conflict of paradigms in the knowledge base and the related discussions of Fitz (1999), Heck & Hallinger (2005) and Maxcy (2001) are evident among this conspicuous distribution of the participants. The answers also provide insights into the meta-epistemology of the area: the knowledge of the knowledge of Educational Management. Here the answer to Rorty's (1979) and Goldman's (1986) question about the possibility of knowledge seems like a 'Schrodinger's Cat' coming out of this micro-representation of the bigger area of Educational Management since the chances of the originality of the knowledge's being possible (*alive*) are 'equivalent' according to the participant views.

The participants who warranted there is no originality of the knowledge also accentuated that the other disciplines and areas often interfere with the knowledge produced and circulate in the field. This situation reminds what Özdemir (2011) once adduced in the context of the knowledge of Management science(s) and the knowledge base of Educational Management. Some were not satisfied with this situation as they had worries about the potential threats to the academic/scientific legitimacy of the area of Educational Management. This resembles Wallerstein's (2004) arguments about the possible undesired issues with the recognition of a scientific field. Some participants seemed to attach more importance to studies with empirical outcomes, not to philosophical debates. This re-validates Willower (1975) who stated almost half a century ago that research in Educational Management most often examines topics outside the epistemological essence of the area; however, contradicts what Hallinger & Kovačević (2019) have recently said germane to the increasing interest in epistemological issues.

The other group of participants shared that one can confidently talk about the originality of the knowledge. From an epistemological point-of-view this has links to the scale that Musgrave (1993) presented; it is possible to reach a form or (one of the) forms of knowledge in which the latter has connections to the shared beliefs of the participants of the knowledge of multiple truths in Educational Management. This further reminds Developing a Communications Epistemology (Thody, 2008) through common epistemic positions of field members (Ertürk, 2012; Greco, 2007) and through the possibility of the existence of some multiple but unique domains of knowledge within both the theoretical and practical layers of the area (Charlot, 2001), in other words, a form of knowledge that touches on inquiry and practice equally (Hart, 1999).

The second of the questions was linked to famous Gettier Problem (1963): "Is justified true belief knowledge?" and the participants expressed their epistemological beliefs about absolute truth in Educational Management. All believed there is not any form of absolute truth in the knowledge base. Instead, they pointed to multiple truths that are contingent claiming that the field is wholly human-dependent. This 'absolute' and perhaps at the same time ironic standpoint of the participants that completely rejects the existence of absolute truth emphasizes diverse truths, which are products and creations of human beings (Steiner, 1963). This may also explain the socially constructed epistemological truth claims in the research community (Harris & Wihak, 2017). The participants seemed as if they 'pulled' the field knowledge away from "the conventional wisdom and orthodoxy of administration" (Hodgkinson, 1991). As a matter of fact, particularly since the end of the last century the field has actually experienced a sharp turn and new directions have come off for multiple yet-still-"true" conceptualizations of central terms like manager, management, administration and leadership as a result of scholarly endeavors (e.g., Eacott & Evers, 2014; Hoy, 1994; Gunter, 2005; Gümüş et al., 2018; Sapre, 2002; Tirado, 2006).

The third question intended to seek the beliefs pertinent to justification(s) of true knowledge in Educational Management, a fundamental issue in Epistemology (Pollock, 1974) by trying to attain their personal epistemological reasoning unique to their thinking (Lane, 1995; Plantinga, 1986; Swain, 1979). The participants are asked to give the reason(s) behind their epistemological beliefs by talking about the related evidence (Clifford, 1886) and by referring to the cognitive schemes constituting the representative(s) of truth in their minds (Garrison, 1988).

For the first set of questions of this third phase, the participants were provided some criteria of Theory of Knowledge to check the truth of the given statement which are Coherence Theory of Truth, Consistency, Appeal to Authority, Correspondence and Pragmatic Theory of Truth.

Some punctuated that they would justify the truth of the statement using only Pragmatic Theory of Truth. Their opinions appear to be in line again with the socially constructed 'realities' idea of Bates (1980) and Greenfield and Ribbins (1993) as they acknowledged the statement could become true only if that very school served the relevant community well. This thinking finds its place in different corridors of education too: instruction, learning, teaching, training alongside philosophies/approaches such as critical pedagogy and a handful of other social theories. Similarly, Evers & Lakomski (1991: 222) promulgated the pragmatic function of education in the following manner: "What counts as valid inquiry, as epistemologically progressive, is limited to what the surrounding epistemology counts as promoting well-being".

Most participants referred to all the criteria given. Amongst some claiming to have both the theoretical and day-to-day/onsite experiences in the field also uttered that they would do so for the sake of addressing the dichotomy of the theory and practice (Anderson & Jones, 2000) as sticking to one criterion could neglect either theoretical or practical aspect of the area (Leithwood & Duke, 1999; Maxcy, 2001; Ogawa et al., 2000; Slater et al., 2002). Others in the same group declared using all the criteria would be more reliable enabling the triangulation of data as it is the case with natural sciences. This discourse can be associated with the logical empiricism of the midst twentieth century that even mirrors the doctrine of Vienna Circle reminding numerous names like Griffths (1959a, 1959b) and Halpin (1966).

The others expressed they would have onsite visits and later check the data collected through their self-epistemic justifications, which directs their own reasoning in relation to the criterion: *both visiting schools and evaluating the data obtained there with the help of epistemological thinking*. Their decisions about the ways to conduct (their) research in a way indicate the multidimensional character of the knowledge base in the area (Riehl et al., 2000).

The last questions revealed epistemic beliefs regarding epistemological boundaries in the knowledge of the field.

The first question touched upon whether there are (in)visible boundary lines around the knowledge base of the area and if there are any list-like checkpoints for the field members to determine a/the basis (Resnik, 2000) and to differentiate the field knowledge from that of the others.

Several participants agreed there are boundary lines in this respect. Some phrased 'drawing' man-made boundary lines can be deemed critical to sustain the scientific quality. This hints at the fear of producing non-scientific knowledge or a delusion of producing scientific knowledge (Mahner, 2007). Others enumerated that there is flourishing knowledge within the 'boundaries' developing out of discoveries (Lakatos & Musgrave, 1968).

Others gave voice to an alternative look. They believed there are no lines in the area as expected. This school of thought is actually similar to what Bryant (1985) underlined for the field as well as to those of the other thinkers (e.g., Van Baalen & Karsten, 2012) who imparted that even Management as a broader discipline does not/cannot own any boundaries.

A participant in this group reflected their worries about a possible axial dislocation to occur in research orientations on account of the lack of boundary lines. This thesis brings to minds the importance of determining a number of epistemological standpoints (Greene et al., 2008) that embody all the aspects of the area in a coherent manner (Bush, 1999; Erickson, 1979; Labaree, 1998) at the same time emphasizing and preserving the 'nucleus of the knowledge'.

The last question series aimed to concentrate upon the fact-value dilemma in the field of Educational Management.

A group of participants advocated the statement provided: *Instructional leaders should be visionary* cannot be acceptable nor can it be a remark of the field members as it is not scientific and it is too much value focused. These field members believed there is the implicit absoluteness of the statement with the use of "should" and an abstract concept like "visionary" further pushes the statement out of the 'boundaries' of the field. This in a way refutes the belief that there are imminent domains of value found in the knowledge base of the field (Begley, 1999) and that Educational Management is an area that stresses how issues 'should be' (Willower, 1997).

Some participants happened to believe the statement in question can circulate in the knowledge base only when justified with refined thinking alongside embracing a humanistic perspective (Berger & Luckmann, 1966; Evers & Lakomski, 1996, 2001, 2012; Gunter & Ribbins, 2002).

The last group put forth that the aforementioned statement can be produced/circulated as the starting point of future research. This is related to the understanding that the field has systems of values, power relations (Simkins, 1999) with subjective models philosophized (Bush, 1995) and to be philosophized.

CONCLUSIONS

The study uncovered the epistemic beliefs of the participants, field members from Turkey.

Educational Management is a field (game) where the 'rules' (of the game) have already been set; nevertheless, there are members and even 'game changers' from around the world who continue to join in and whose contributions have come into 'play' in recent years (Bush, 2015)- a case which is also evident in a significant journal of the field; *EMAL* (Bush & Crawford, 2012).

There are several different domains of knowledge which are melting points of philosophies together with the related practicum (Greenfield & Ribbins, 1993) in the field. One prominent result was the rather incongruous agreement on *a priori* knowledge and absolute truth, which was itself *a priori*: There is neither *a priori* knowledge nor absolute truth in the knowledge base implying Educational Management calls for hermeneutic explanations.

It continues to be a struggle to study the highly dynamic epistemologies-both those of individual researchers and communities-emerging and 'filtered' and hence 'refined' in the knowledge of the field. This can be realized through working in a collaborative fashion within the field and 'beyond' while also attempting to preserve the kernel of the field. This is actually of utmost importance for the future of Educational Management which can ease the maturation of the knowledge bases, in particular for locations who have taken part in the 'gameplay' mentioned earlier relatively later like Turkey.

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Statements of Publication Ethics

We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

Researchers' Contribution Rate

The first author played an active role in the writing of the conceptual framework, data collection and analysis processes as well as the writing of the discussion and conclusion of the research, and the second author played an active role in the overall design process and acted as the inspirational agent all throughout.

Ethics Committee Approval Information

Hacettepe University Rectorate, Educational Sciences Ethics Committee, Number: 35853172-300.

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| Research Article / Araştırma Makalesi |

Leadership Styles and Power Bases Preferences of Primary School Administrators from the Perspective of Preservice Science Teachers

Fen Bilimleri Öğretmen Adaylarının Bakışıyla İlköğretim Okul Yöneticilerinin Tercih Ettikleri Liderlik Tarzları ve Güç Kaynakları

Selçuk Şahingöz[1]

Keywords
1.Leadership styles
2.Power bases
3.Preservice science teachers
4.Primary education
5.School administrators

Anahtar Kelimeler
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Abstract

Purpose: The aim of this study is to examine the types of leadership that primary school administrators exhibit and the power bases they utilize from the perspective of preservice science teachers.

Design/Methodology/Approach: Qualitative research design was applied in the study. The data were collected through the observations through 72 preservice science teachers during the Fall and Spring semesters and the assessment of the self-reports they prepared based on the semi-structured interviews with 18 school administrators.

Findings: According to the obtained data from the preservice science teachers, leadership style preferences of school principals are more in favor of instructional and moral leadership styles. The result is similar for school vice principals, but shared leadership style is also added to the mentioned leadership styles. The findings also show that the school administrators use legitimate and expert power bases more than the other power bases in educational administration process.

Highlights: The preservice science teachers additionally emphasized the school principals are greatly benefit from their charisma power on the contrary the school vice principals. On the other hand, they pointed out the school vice principals exhibit shared leadership more than the school principals. Last, the preservice teachers argued leadership preferences of the school administrators that aspect of science education related practices.

Öz

Çalışmanın amacı: Bu çalışmanın amacı, ilköğretim okul yöneticilerinin sergilediği liderlik tarzlarını ve kullandıkları güç kaynaklarını fen bilgisi öğretmen adaylarının bakış açısıyla incelemektir.

Materyal ve Yöntem: Çalışmada nitel araştırma yöntemi kullanılmıştır. Veriler, 72 fen bilgisi öğretmen adayının Güz ve Bahar dönemleri boyunca gerçekleştirdikleri gözlemleri ve 18 okul yöneticisiyle yaptıkları yarı yapılandırılmış görüşmelerden yola çıkarak hazırladıkları bireysel raporlarının değerlendirilmesi yoluyla toplanmıştır.

Bulgular: Fen bilgisi öğretmen adaylarının elde ettikleri verilere göre okul müdürlerinin liderlik tarzı tercihlerinin daha çok öğretimsel ve etik liderlik tarzları lehine olduğunu göstermektedir. Sonuç okul müdür yardımcıları için de benzer olmakla birlikte, bahsedilen liderlik tiplerine paylaşılmış liderlik tarzı da eklenmiştir. Ayrıca bulgular okul yöneticilerinin eğitim yönetimi sürecinde yasal ve uzman güç kaynaklarını diğer güç kaynaklarına göre daha fazla kullandıklarını göstermektedir.

Önemli Vurgular: Fen bilgisi öğretmen adayları, ek olarak okul müdürlerinin karizma güçlerinden okul müdür yardımcılarının aksine büyük ölçüde yararlandıklarını vurgulamaktadır. Diğer yandan okul müdür yardımcılarının ise okul müdürlerinden daha fazla paylaşılmış liderlik sergilediklerini belirtmişlerdir. Son olarak, öğretmen adayları okul yöneticilerinin fen eğitimi ile ilgili uygulamalarını eleştirmişlerdir.

"You show me a school with a principal behind the desk, and I'll show you a school without principal leadership."
- Baruti Kafele -

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INTRODUCTION

The needs of people have been changing with developing and changing society. Accordingly, the education system is also affected by this wind of change all around the world. Based on the contemporary education system, the goals and objectives of education has been revised. Thus, the mission and vision of education is redefined.

Although the education policies of the countries are determined by the governments, the implementers in schools are still school administrators. School administrators have important responsibilities for carrying out education in line with the determined educational goals. They should effectively contribute to the organization to enrich school environment and to arrive desired target (Aslanargun, 2011). School administrators demonstrate their skills in different ways in order to manage this process successfully. Therefore, they should exhibit leadership characteristics rather than administrators the purpose of achieving their schools' goals (Okutan, 2012). Many studies in the literature show the styles of leadership that school administrators exhibit and the power bases they prefer to use have an essential role in achieving the desired goals in school management (Diş & Ayık, 2016; Düru, 2015). According to Leithwood, Harris and Hopkins (2008), leadership of school administrator promote to enhance student academic achievement, to apply proper leadership style depends on the circumstance, to motivate teachers through indirect ways such as increasing their commitment and improving their working conditions.

In order to create a strong and dynamic school culture, a prudent leader should be aware that each individual case requires a different approach. Therefore, school administrators should use appropriate and useful leadership styles that can respond to the requirements of the situations encountered (Walters, 1992). The leadership competencies of school administrators directly affect the quality of education in the school (Cemaloğlu, 2007). Their power base preferences also shape what leadership style they successfully implement. For this reason, identifying leadership styles and power bases of school administrators are an important criterion for evaluating and improving their effectiveness in the management process.

The conducted studies in the literature often handle identifying leadership styles or power bases separately by the view of school principals or teachers. However, the characteristics of leadership extends a large range. Each of the leadership styles has some crucial features in order to reach succeed leadership. The more leadership styles are accomplishedly exhibited, the more effective the school administrator will be. In this study, leadership styles in general and power bases were investigated together and considered from the perspective of pre-service science teachers. Thus, it is determined how effectively school administrators implement leadership features and how power bases related with their leadership preferences. Differently, the styles of leadership exhibited by school administrators and the power bases they apply were evaluated by considering field-oriented attitudes and focused on science education for this.

It should be considered the concepts of school administrator, leader, leadership, instructional leadership and power bases. If examining the related terminology, it provides a better understanding of the research. School administrator is the person who is obliged to bring the school to its goals are consistent with the expectations of the relevant laws, education policies and modern education understanding (Özdemir, 2018). Leader is the person who influences individuals to achieve the goals (Bateman & Snell, 2004). Leadership is defined as influencing, motivating and giving opportunities to individuals to contribute to the effectiveness and success of their organization (McShane & VonGlinow, 2005). Instructional leadership is described as teaching at school and focuses on learning-teaching processes (İlter, 2018). Power bases indicate what resources a person uses to influence others (Şimşek, 2005). There is a strong relationship between leadership and power resource because the power refers to the leader's ability to influence organizational actions and decisions.

Theoretical Framework

Leadership styles and power bases in education construct the theoretical framework of the study to figure out how primary school administrators perform their administrative abilities. Styles of the leadership were formed based on the leadership styles lists of Sezgin (2012) and Gedikoğlu (2015). A new simplified list was generated depending on both lists (see Figure 1). The leadership styles that had similar meanings were gathered under a topic. Accordingly, seven styles of leadership the school administrators could be exhibit were defined. These are; moral leadership, instructional leadership, charismatic (visionary) leadership, transformational (transactional) leadership, authentic (spiritual, creative) leadership, shared (distributed) leadership, servant leadership. The definition of each style of leadership is given below.

Moral Leadership: Moral leader considers ethical behaviors of the employees. Therefore; moral school administrator should exhibit ethical behaviors and be a role model in order to create a school culture (Sezgin, 2012). For instance, it is not an ethical behavior for a school principal expecting teachers to come to school on time and reside in the school only a few hours.

Instructional Leadership*:* Instructional leader aims to increase academic achievement of the students and provide effectiveness in their learning process (Şişman, 2002). Accordingly, the school administrator has four instructional leadership roles. These are; resource provider, instructional resource, communication provider, and visibility at the school.

Resource provider: The school administrator organizes the school staff and resources to achieve the mission and goals of the school. The most important resource of the school is the human, the teacher.

Instructional resource: The school administrator assists teachers in their professional development. Thus, teachers are encouraged to apply new and different teaching and learning methods to increase student achievement.

Communication provider: A school administrator should purpose to provide effective communication with all communities. It is necessary to be an expert in effective listening, understanding in-group relations, and empathy by the school administrator.

Visibility at the school: The school administrator participates in the daily activities of the school as an effective instructional leader and exhibits behaviors consistent with vision of the school (Sezgin, 2012).

Charismatic (Visionary) Leadership: Charismatic leaders gain faith, trust, acceptance, emotional commitment, admiration and high performance in their followers (Sezgin, 2012). Characteristics of charismatic leadership include vision, effective communication, building trust, helping people feel sufficient, being energetic, action oriented, and inspirator (DuBrin, 2006).

Transformational Leadership: Burns (1978) and Bass (1990) claim transformational leaders, as a potential motivator, enhance needs and interests of their employees and also consider the aim and mission of the working community. According to Bass (1990) and Griffith (2004), transformational leaders reach this purpose through three ways. These are; charisma, individualized consideration, and intellectual stimulation. Transformational leadership is able to be seen as a leadership style that directs the rapid change process in the social structure and contributes to the change (Çelik, 1998).

Authentic (Spiritual, Creative) Leadership: Authentic leadership is a visionary, creative, flexible and optimistic form of leadership (Leithwood and Montgomery, 1986). The main behaviors of the authentic leader are transparency, self-sacrifice and consistency (Michie and Goothy, 2005).

Shared (Distributed) Leadership: Shared leadership results from distributing the responsibility among the interdependent employees and relating them with social interaction (Printy & Marks, 2006). Therefore, shared leaders maximize all human resource capacity in an organization by empowering people and giving them the opportunity to lead in their professions (Özmusul, 2018). In other words, shared leadership is expressed as mutual interaction in which members are involved in the management process (Pearce and Manz, 2005). As a result, successful shared leadership provides improving shared understanding and more effective action in the community.

Servant Leadership: Servant leaders transform their colleagues and organizations and built growing communities (Crippen, 2010; Crippen, 2012; Spears, 2004; Sultan & van de Bunt-Kokhuis, 2014). Therefore, servant leader communicates well with employees and tries to be instructive by encouraging them (Sezgin, 2002).

Transactional leadership is a style of leadership when employees comply with the leader's demands in return for praise, rewards, or avoidance of disciplinary action (Burns, 1978; Gedik, 2020). The basic principle of transactional leadership is exchanging one thing to desired thing for employee (Stewart, 2006). In this study, transactional leadership is associated with power bases because the power of authority includes legitimate, coercive, and reward power bases. These power bases involved in the stated characteristics of transactional leadership. Transactional leadership is not considered as a leadership style.

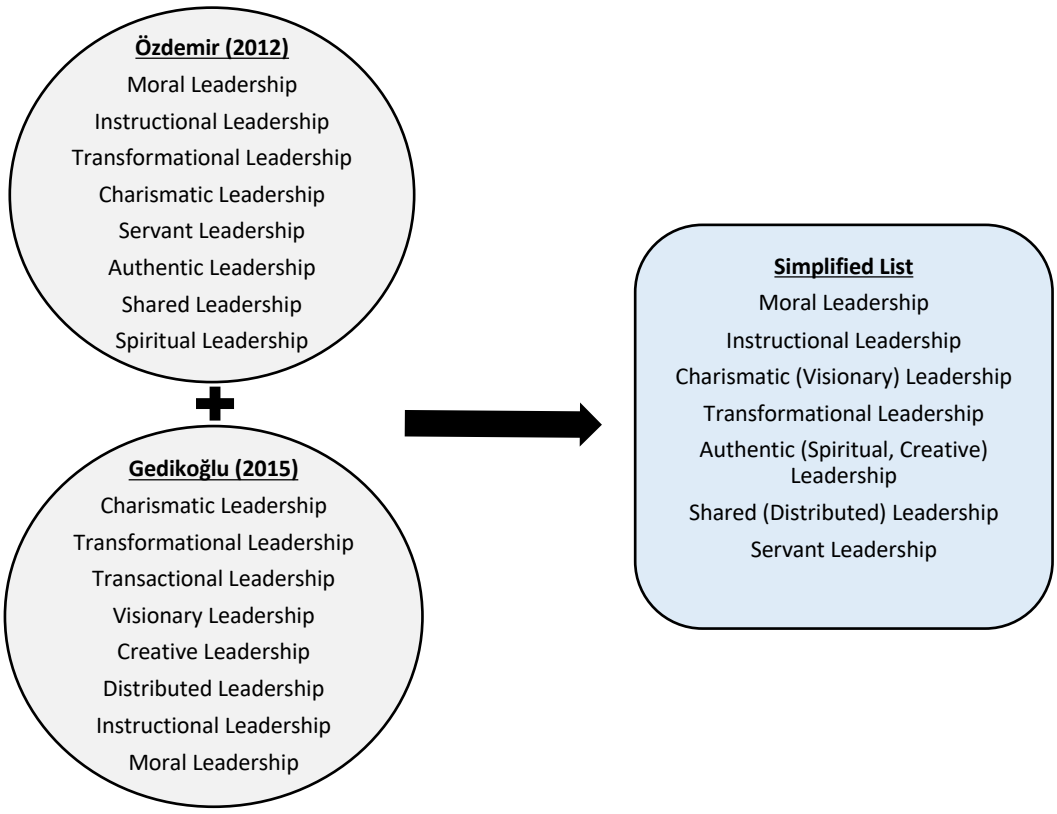

Figure 1. The list of leadership styles in education

Administrators in organizations have power bases arising from their positions and personal characteristics (Karaman, 1999). According to the categorization of French and Raven (1959), the power bases were entitled under two main topics as the power of authority and the power of personality (see Table 1).

The power of authority results from position or status of the administrators and it is given to them by superiors (Sezgin, 2002). This power base includes legitimate power, coercive power, and reward power.

Legitimate Power: This power is called official authority. Legitimate power is given to the administrator by appointment and employees are expected to comply with it (Hitt, Black & Porver, 2005).

Coercive Power: This power based on the extent to which an administrator deprives employees of the rewards desired by them or uses punishment to control employees (Schermerhorn, Hunt & Osborn, 2000). The effect of this power is based on the habits of the administrator and includes compliance through fear and punishment (Sezgin, 2002). Punishment could be applied as pay cuts, demoting, stopping get a promotion, or dismissal (Hellriegel, Jackson & Slocum, 2002).

Reward Power: This power is based on the ability to give rewards by the administrator (French & Raven, 1959). For instance, giving salary bonus, getting promotion or praising employee verbally/giving plaque etc.

The power of personality result from the individual character of the administrator (Hitt, Black & Porver, 2005). This power base includes charisma power and expert power.

Charisma Power: Charisma power leads to the attitude regarding referent power (Kudisch et al., 1995; Koşar, 2012). For this reason, unlike the French and Raven (1959) categorization, charisma power is included instead of referent power. An administrator with charisma has a stance that exhibits comfort, self-confidence, an energy and vitality that can affect the employees (Sezgin, 2002).

Expert Power: This power is arising from the knowledge, skills and experience of the administrator. When employees believe in the expert power of the administrators, their attitudes and behaviors towards them are more positive and inclined to obey (Sezgin, 2002).

Table 1. Types of the power bases

The Power of Authority	The Power of Personality
Legitimate Power	Charisma Power
Coercive Power	Expert Power
Reward Power	

The Purpose of the Study

The purpose of the study is to determine in which leadership style(s) and power base(s) that school administrators handle the most in primary education based on the perspectives of preservice science teachers. In light of the mentioned literature, the following research questions are addressed:

1. What are the styles of leadership preferred by primary school administrators from the perspective of preservice science teachers?
2. What are the types of power bases preferred by primary school administrators from the perspective of preservice science teachers?

METHOD

Research Design

I utilized a qualitative research approach in order to make a detailed and in-depth assessment of a specific situation in this study (Yıldırım & Şimşek, 2011). Individual profiles in different cases should be identified considering mentioned leadership styles and power bases definitions. For this reason, I applied the qualitative research design involving both direct observations and semi-structured interview techniques as primary data collection methods (Marshall & Rossman, 2011). The study specifically focuses on what preservice science teachers determine about leadership styles and power bases of the school administrators. Therefore, observations and interview result predictions of the preservice teachers play an important role when properly organizing and applying the research design.

Research Design

I determined to use easily accessible sampling, one of the purposeful sampling methods for the sample of the research (Yıldırım & Şimşek, 2011). Therefore, I constituted the participants among 72 senior preservice science teachers from a university where take places Black Sea region of Turkey. I preferred a large sampling in order to reduce inappropriate effects coming from subjective perspective of the observers and tried to provide more than one evaluation for same school administrator. During the study, these preservice teachers observed and interviewed with 18 school administrators, 9 of which are principals and 9 are vice principals, working in 11 different primary schools located in the center of Kastamonu. In the formation of the study group, I considered the

criteria of willingness and volunteering to participate, and being a school administrator in any primary school in the city center of Kastamonu.

Data Collection Tools

I applied a semi-structured interview form with open-ended questions, which is a frequently preferred data collection form in qualitative research (Creswell & Poth, 2018; Bogdan & Biklen, 2012). I split the interview form two parts taking account of the school administrators. The first part includes open-ended questions to be addressed to school principals, and the second part includes open-ended questions to be addressed to vice principals. I asked the same questions to school principals and vice principals throughout the interview process except for the second and third questions depend on their school administrator positions (see Appendix 1). I took the opinions of three field and education experts from the division of educational administration for the validity and reliability during the preparation process of the interview form. I reached agreement by consensus on the interview questions with the field experts. I applied the form after the necessary arrangements were made in this direction. In addition, the preservice science teachers benefited their individual observations to infer leadership styles and power bases of the school administrators.

Data Collection Procedure

I carried out the study with preservice science teachers who were enrolled in teaching practice courses in the Fall 2019 and Spring 2020 semesters. Thus, I purposefully constituted these preservice teachers because they had the opportunity to make sufficient observations about the school administrators during the fall and spring semesters in school environment. They were also taking the school management course. In this way, they had the necessary theoretical knowledge about the styles of leadership preferred and the power bases used by school administrators.

Data collection for the study took place fall and spring semesters, totally spread out across 28 weeks. The preservice science teachers were able to find out leadership styles and power base tendencies of the school administrators while they were on duty. They drew on their experiences to identify what leadership styles and power bases had been exhibited by school administrators.

Data Analysis

The preservice science teachers initially transcribed the interviews. Then, they interpreted leadership styles and power base preferences of the school administrators according to their responses. At this point, I generated the categories depends on the leadership styles and power bases at the part of theoretical framework above. Based on the definition of each leadership styles and power bases, the preservice teachers coded and offered interpretations through qualitative memos regarding the data. They also considered their individual observations about the school administrator when identifying their leadership styles and power bases preferences. Last, the preservice teachers submitted reports regarding their evaluations to the corresponding researcher.

I used pseudonyms for the name of the school and thus name of the school administrators who participated in the study as *Secondary School (State) #1, Secondary School (Imam Hatip) #1* and so on to protect their identities. By the way, *# of evaluation* refers how many preservice teachers evaluated same school administrator when examining the tables. I listed leadership styles and power bases of each school administrator aspect of the view frequencies of the pre service teachers.

FINDINGS

I separately sought out leadership styles and power bases of the school administrators as school principals and school vice principals for answering the both research questions.

Table 2 shows the leadership styles and power bases distributions of the school principals. With respect to the preservice teacher views, three leadership styles which are moral leadership (6 of 9), instructional leadership (4 of 9), charismatic leadership (3 of 9), spiritual, and authentic leaderships (1 of 9) come into prominence. One other hand, power base preferences of the school principals are favor of legitimate (5 of 9), expert (3 of 9), charisma (2 of 9), and reward (1 of 9) power bases.

Table 2. Leadership styles and power bases of the school principals

School	# of evaluation	Leadership Style (f)	Power Base (f)
Secondary School (State) #1	1	Moral (1) Charismatic (1)	Legitimate (1)
Secondary School (State) #2	4	Instructional (3) Moral (3) Spiritual (3) Charismatic (2) Shared (1) Servant (1) Transformational (1)	Expert (4) Reward (3) Legitimate (2) Charisma (1)
Secondary School (State) #3	3	Moral (3)	Expert (2) Reward (2)

School	# of evaluation	Leadership Style (f)	Power Base (f)
		Transformational (2) Shared (2) Authentic (2) Instructional (1) Charismatic (1) Servant (1)	Legitimate (2) Charisma (1)
Secondary School (State) #5	3	Charismatic (3) Instructional (2) Moral (2) Servant (2) Authentic (2) Transformational (1)	Charisma (3) Legitimate (2) Expert (2) Reward (2)
Secondary School (State) #6	8	Instructional (8) Moral (3) Authentic (3) Transformational (3) Charismatic (2) Shared (2) Servant (1)	Expert (7) Coercive (3) Legitimate (3) Reward (2) Charisma (1)
Secondary School (State) #7	1	Moral (1) Instructional (1)	Legitimate (1)
Secondary School (State) #8	5	Charismatic (3) Instructional (2) Transformational (2) Shared (2) Moral (1)	Legitimate (4) Charisma (2) Expert (1) Coercive (1)
Secondary School (Imam Hatip) #1	8	Moral (7) Instructional (5) Transformational (4) Charismatic (3) Servant (2) Shared (1) Authentic (1)	Legitimate: 5 Expert (3) Charisma (2)
Secondary School (Imam Hatip) #2	8	Instructional (3) Moral (3) Authentic (3) Shared (2) Transformational (1) Charismatic (1)	Charisma (6) Legitimate (5) Expert (1) Reward (1)

Table 3 reveals that the school principals cumulatively display instructional and moral leadership styles rather than the other leadership styles when considering nine different schools. This means almost half of the preservice teacher views indicate one of these leadership styles.

Table 3. Leadership styles distribution of the school principals

Leadership Style	f (frequency) (n=107)	~% (percentage)
Instructional	25	23,36
Moral	24	22,43
Charismatic	16	14,95
Transformational	14	13,08
Authentic	11	10,28
Shared	10	9,35
Servant	7	6,54

When looking at Table 4, the obtaining data is in favor of legitimate, expert, and charisma power bases as preferences of the school principals. These three power bases reflect majority of the preservice teacher views (near 81%) relevant to power base preferences of the school principals.

Table 3. Leadership styles distribution of the school principals

Power Base	f (frequency) (n=75)	~% (percentage)
Legitimate	25	33,33

Power Base	f (frequency) (n=75)	~% (percentage)
Expert	20	26,67
Charisma	16	21,33
Reward	10	13,33
Coercive	4	5,33

According to Table 5, the data suggests that more than the half of the school vice principals (5 of 9) primarily prefer instructional leadership. The school vice principals exhibit the most shared leadership (3 of 9) after instructional leadership. Besides, only one school vice principal more specifically demonstrates moral leadership, but still same level as shared leadership. The preservice teachers highlighted legitimate (5 of 9), reward (4 of 9), expert (3 of 9), coercive (1 of 9), and charisma (1 of 9) power bases as the most used power bases by the school vice principals.

Table 5. Leadership styles and power bases of the school vice principals

School	# of evaluation	Leadership Style (f)	Power Base (f)
Secondary School (State) #1	4	Instructional (3) Moral (2) Servant (2) Transformational (1)	Legitimate (4) Reward (4) Charisma (3) Expert (3)
Secondary School (State) #2	6	Instructional (6) Shared (6) Moral (4) Authentic (4) Servant (3) Charismatic (2) Transformational (1)	Expert (6) Legitimate (5) Charisma (1)
Secondary School (State) #4	12	Instructional (8) Moral (7) Shared (5) Authentic (4) Transformational (3) Charismatic (3) Servant (1)	Legitimate (8) Expert (5) Coercive (4) Reward (2) Charisma (2)
Secondary School (State) #6	2	Shared (2) Instructional (1) Moral (1) Transformational (1)	Reward (2) Charisma (1) Coercive (1)
Secondary School (State) #7	1	Shared (1) Transformational (1)	Reward (1)
Secondary School (State) #8	1	Instructional (1) Transformational (1) Charismatic (1) Servant (1) Moral (1)	Legitimate (1) Expert (1) Reward (1) Coercive (1) Charisma (1)
Secondary School (Imam Hatip) #1	1	Shared (1)	Expert (1)
Secondary School (Imam Hatip) #2	2	Moral (2) Shared (2) Instructional (1) Authentic (1)	Legitimate (2) Charisma (1) Expert (1)
Secondary School (Imam Hatip) #3	2	Instructional (2) Servant (1) Charismatic (1)	Legitimate (2) Charisma (1)

Table 6 indicates that the school vice principals cumulatively have instructional, shared and moral leadership styles rather than the other leadership styles. Even, these three leadership styles generate two-thirds of the total leadership styles exhibited. Depends on the preservice science teacher views, instructional leadership (25%) came into forward little more than the other leadership styles.

Table 6. Leadership styles distribution of the school vice principal

Leadership Style	f (frequency) (n=88)	~% (percentage)
Instructional	22	25,00
Shared	17	19,32
Moral	17	19,32

Leadership Style	f (frequency) (n=88)	~% (percentage)
Authentic	9	10,23
Transformational	8	9,10
Servant	8	9,10
Charismatic	7	7,95

Considering Table 7, the preservice science teacher views emphasized that legitimate (~34%) and expert (25%) power bases as strongly preferred by the school vice principals. In fact, these two power bases (~59%) constitute more than half of the total power bases used. By the way, the preservice teachers indicated that charisma (~16%) and reward (~16%) power bases are similarly preferred by the school vice principals. They also stated coercive power base (~9%) as at the least used power base.

Table 7. Power bases distribution of the school vice principal

Power Base	f (frequency) (n=64)	~% (percentage)
Legitimate	22	34,38
Expert	16	25,00
Charisma	10	15,63
Reward	10	15,63
Coercive	6	9,38

The school principal composite profile was compared with the school vice principal profile as an indicator of similarity and dissimilarity with respect to leadership style and power base distributions. Obtaining data refer that the school vice principals handle shared leadership more than the school principals when separately examined the school administrators. In addition, the school vice principals benefit from reward power base more frequently than the school principals.

Overall, Table 8 and 9 present that leadership style and power base of both school principals and school vice principals, in other words the school administrators, are apparently in favor of instructional leadership (~24%) and legitimate power base (~34%).

Table 8. Leadership style distribution of the school administrators

Leadership Style	f (frequency) (n=195)	~% (percentage)
Instructional	47	24,09
Moral	41	21,03
Shared	27	13,85
Charismatic	23	11,80
Transformational	22	11,28
Authentic	20	10,26
Servant	15	7,69

Table 9. Power base distribution of the school administrators

Power Base	f (frequency) (n=139)	~% (percentage)
Legitimate	47	33,81
Expert	36	25,89
Charisma	26	18,72
Reward	20	14,39
Coercive	10	7,19

DISCUSSION

The findings are formed individual observations and interview reports regarding leadership style and power base of the school administrators. I addressed the first research question through the qualitative data gathered from the preservice science teachers what leadership styles the primary school administrators prefer. The preservice science teachers indicate that the school administrators who they evaluate bring instructional leadership (~24%) characteristics into the forefront. Half of the school administrators (4 school principal and 5 school vice principal) prominently reflect this leadership. It is the natural result of the expected academic achievement from school administrators and is supported in the literature. For instance, Reames (2010) emphasizes the main role of instructional leadership features to provide successful educational administration by school administrators.

Moral leadership (~21%) is second-most exhibited leadership style among the school administrators. At this point, the findings infer that the type of school could be as a factor to preferred moral leadership. Half of the school administrators (3 of 6) working in secondary school (Imam Hatip) primarily benefit from moral leadership. Unlike the secondary state schools, the curriculum is

applied based mainly on religion and moral knowledge in Imam Hatip secondary schools. It is possible that the administrators in these schools give more importance to ethical behaviors and try to be a role model. For instance, a preservice science teacher mentions from an Imam Hatip secondary school administrator as a moral leader. The preservice teacher remarks the administrator acts to the foreign students as same as the other students.

Leithwood, Harris and Hopkins (2008) declare seven claims regarding with successful school leadership. One of these claims emphasize that it contributes to the development of the school and positively effect on increasing student achievement when school administrators exhibit shared leadership characteristic. The results of this research also confirmed the same result presenting shared leadership as second-most preferred leadership together with moral leadership after instructional leadership by the school vice principals. In parallel, Bush and Glover (2014) emphasize that the most effective leadership in increasing academic achievement of the school is instructional leadership. They also indicate the application of instructional leadership together with shared leadership can produce much more successful results in school management.

I addressed the second research question relevant to what power bases the primary school administrators prefer. According to the data, power base preferences of the school administrators are in favor of legitimate and expert power. The preservice science teachers stress that the school administrators the most use legitimate power base (~34%) and second-most use expert power base (~26%). Supporting this research, many studies also claim school principals priorly prefer legitimate and expert power bases (Altınkurt and Yılmaz, 2012; Deniz and Çolak, 2008; Meydan and Polat, 2010; Memduhoğlu and Turhan, 2016). The fact that legal power comes to the forefront in the use of authority and authority indicates that school administrators should always have a command of legal texts and legislation in successfully managing education and training for certain purposes. It is an expected school administrators well known legislation related education and significantly apply legal rules in school. As a reflection of this circumstance, the school administrators are able to priority use legitimate power base. The school vice principals generally have legal power and shared leadership characteristics more than the school administrator profile. For the main reason underlying this, it can be said that the vice principal has a management style and field in a hierarchical order dependent on the principal.

Expert power results from the knowledge, skills and experience of the school administrator. For instance, a preservice science teacher who observed the school administrator successfully benefit from expert power defines the application of this power base as a skill to easily figure out whatever conflict or trouble face with in school environment. In addition, the preservice teacher states that to enhance this feature depends on professional experience and self-improvement in the field of school management. Considering the interview report, the preservice teacher indicates that the school administrator has over 25 years teaching and administration experiences and also been several certificates related school management from the different in-service training programs. At this point, many studies linked transformational leadership to expert power (Atwater and Yammarino, 1996; Yahaya et al., 2011). Although the most preferred power base after legal power is expert power, it is seen that school administrators insufficiently exhibit the transformational leadership feature in this research.

The school administrators prefer charisma power (~19%) as third-most used power base. The data shows that school administrators (~21%) benefit from charisma power more than school vice principals (~16%) in educational administration. Bayrak, Altinkurt and Yilmaz (2014) similarly claim that school climate is positively enhanced in case of school principals choose to apply charisma, reward, and expert power bases instead of legitimate and coercive power bases. This situation could be interpreted as school administrators should get the base of the power from their personal characteristics rather than their authority in order to use their power resources effectively.

As indicated above, the preservice science teachers point out the school administrators limitedly demonstration transformational leadership characteristics. Just a few preservice teachers are able to give specific example how school principals benefit from transformational leadership. A transformational leader should have the skills of entrepreneurship and innovation. A pre-service science teacher defined how a school vice principal uses transformational leadership in a specific activity. The school vice principal organized support training room for special education students.

The preservice science teachers also critique leadership preferences of the school administrators that aspect of science education related tasks. They expect that the school administrators act transformational leader considering the declaration of 2023 Education Vision Document. Within the scope of the 2023 Education Vision Document, the Ministry of National Education (MoNE) in Turkey aims to establish Design and Skills Labs (DSLs) in primary and secondary school levels. However, the preservice teachers claim that there is inadequate preparation this educational change process in general by the school administrators. For instance, public school teachers probably have competency-based needs in DSLs (Demirata & Sadik, 2021). The school administrators rarely recognize this need and support teachers with activities. According to the preservice science teachers, some school administrators organize this kind of activities. For instance, a school principal encourages teaching and learning robotic coding in his school. Another school principal leads organization of TÜBİTAK (the Scientific and Technological Research of Turkey) science festivals regularly in his school.

CONCLUSION AND RECOMMENDATIONS

It is expected that school administrators exhibit leadership features; therefore, they should have almost equal distribution in different styles of leadership. However, it is seen that there is an accumulation in some leadership preferences in light of the

findings. My first suggestion is school administrators should improve their leadership repertoire because each style of leadership has its own advantages and school administrators should have more or less need to practice all of them.

The duty definition of the school vice principals is another issue that we should think over it. Their position of the school vice principal could push them to more focus on educational tasks and share the responsibility with school principal and the other school vice principal. As a natural consequence of this circumstance, the school vice principals (8 of 9) weightily reflect instructional and shared leadership characteristics. This limits the potential of the school vice principals and hinders authentic leadership features of them. My second suggestion draws to redetermine expectations and responsibility from the school vice principals.

At this point, we could merge second and third suggestions under the title of blended leadership. It is argued that how blended education plays an important role in recent education system and the need of blended leadership skills increases. Blended leadership is related with shared (distributed) leadership and administrative management (Jones et al., 2014). Effective application of blended leadership facilitates providing and leading the educational change with participation of each member of the professional team. Both school administrators and also teachers should be informed regarding blended education and leadership with varies events such as in-service training programs.

Last, I would like to underline the need for practice schools in order to enable preservice teachers in the school environment to better comprehension what school administrators apply leadership styles and power bases. The preparation about school management is fundamental for preservice teachers of the present as potential school administrators of the future. Until the last semester, they shouldn't wait for teaching practice course to figure out school management.

Limitation

The research is limited to school administrators working in Kastamonu city center, who were selected according to the appropriate sampling method in the 2019-2020 academic year. The data obtained in the study are also limited to the observations of the preservice science teachers and the declarations of the school administrators participated in the interviews.

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Statements of publication ethics

I hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

Researchers' contribution rate

There is only one author and responsible for all of the research.

Ethics Committee Approval Information

This research was conducted in accordance with all ethical rules. It has the Ethics Committee Certificate with the Decision of Kastamonu University Social and Human Sciences Publication Ethics Committee dated 12.10.2020 and 3 numbered 3-34.

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| Research Article / Araştırma Makalesi |

Classroom Teachers' In-Class Ecological Footprint Awareness Raising Practices

Sınıf Öğretmenlerinin Sınıf İçi Ekolojik Ayak İzi Farkindalığı Arttırma Uygulamaları[1]

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Keywords

1. Environmental education
2. Ecological footprint
3. Classroom teacher
4. Classroom practices

Anahtar Kelimeler

1. Çevre eğitimi
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Abstract

Purpose: This research aims to determine the practices of classroom teachers to increase awareness of ecological footprint in the classroom.

Design/Methodology/Approach: The study group of this research, shaped by the basic qualitative research model among the qualitative research methods, consists of 28 classroom teachers who work in Diyarbakır city centre in the 2019-2020 academic year and are determined by the purposeful-criterion sampling method. During the data collection process of the research, interviews were done with classroom teachers. In the interviews, questions prepared with semi-structured interview techniques were used, and content analysis was used in the analysis process of the data obtained with these questions.

Findings: As a result of the interviews with the classroom teachers, It was stated to teachers that ecological footprint practices should be given from primary school. It has been concluded that the practices of classroom teachers to reduce the ecological footprint include components of the ecological footprint. These activities provide children with the development of environmental awareness, a sense of responsibility and cooperation, a love of nature and animals, and a sense of protection and ownership. It was determined that classroom teachers faced difficulties such as limited school facilities, lack of sufficient support from parents and administrators, insufficient curriculum and crowded class sizes during ecological footprint practices and activities to develop sustainable living opportunities.

Highlights: The field was discussed in the light of the literature. Suggestions were made about ecological footprint practices in the classroom.

Öz

Çalışmanın amacı: Bu araştırma ile sınıf öğretmenlerinin sınıf içi ekolojik ayak izi farkındalığı arttırmaya yönelik yaptıkları uygulamaları belirlemek amaçlanmaktadır.

Materyal ve Yöntem: Nitel araştırma yöntemlerinden temel nitel araştırma modeli ile şekillenen bu araştırmanın çalışma grubunu 2019-2020 eğitim öğretim yılı Diyarbakır il merkezinde görev yapmakta olan ve amaçlı-ölçüt örneklem yöntemi ile belirelen 28 sınıf öğretmeni oluşturmaktadır. Araştırmanın veri toplama sürecinde sınıf öğretmenleri ile görüşmeler yapılmıştır. Yapılan görüşmelerde yarı yapılandırılmış görüşme tekniği ile hazırlanmış sorular kullanılmış ve bu sorular ile elde edilen verilerin analiz sürecinde içerik analizinden yararlanılmıştır.

Bulgular Sınıf öğretmenleri ile yapılan görüşmeler sonucunda; Ekolojik ayak izi uygulamalarının ilkokuldan itibaren verilmesi gerektiği, öğretmenler tarafından ifade edilmiştir. Sınıf öğretmenlerinin ekolojik ayak izini azaltmaya yönelik yapmış oldukları uygulamaların ekolojik ayak izi bileşenlerini kapsadığı ve bu etkinliklerin çocuklarda çevre bilincinin, sorumluluk ve yardımlaşma duygusunun, doğa ve hayvan sevgisinin, koruma ve sahiplenme duygusunun gelişmesini sağladığı sonuçlarına ulaşılmıştır. Sınıf öğretmenlerin, ekolojik ayak izi uygulamaları ile sürdürülebilir yaşam fırsatları geliştirmeye yönelik yaptıkları etkinlikler sürecinde, okul imkanlarının kısıtlı olması, veli ve yöneticilerden yeterli desteğinin olmaması, öğretim programının yetersiz ve sınıf mevcutlarının kalabalık olması gibi zorluklarla karşılaştıkları tespit edilmiştir.

Önemli vurgular: Alan yazın ışığında tartışılmıştır. Sınıf içi ekolojik ayak izi uygulamaları hakkında önerilerde bulunulmuştur.

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INTRODUCTION

Being a living thing in need of nature, human beings have been struggling to exist by using the resources in nature like other living things since ancient times. Initially given to survive for generations, this struggle has turned into human domination over nature over time (Gül, 2013). Although this dominance may seem like an advantage for people who are fond of living comfortably, it has turned into a disadvantage for humanity, which constantly wants more, takes itself at the centre of nature, and ruthlessly destroys nature for its interests (Kırıktaş, 2019). It is stated that the first steps of the process of man's domination of nature started with the transition of human beings into the agricultural society (Chachra, 1992). Although it aimed to meet the basic needs by cultivating the soil initially, the increase in the food and energy needed due to the increase in the population over time necessitated acceleration in the production process (Sulak, 2018). This acceleration gained momentum with the industrial revolution, and humans, unlike other living things, went so far as to interfere with the functioning of nature and this situation caused irreversible destruction (Birel, 2019).

According to the Living Planet report, Only 25% of the land in the world has not been exposed to human activities, and it is estimated that this rate will decrease to 10% by 2050. (WWF, 2018). It is known that forests protect the soil and climate, regulate water flow, and contribute significantly to nature with the large and small creatures they contain. A study conducted on forests located in the tropical and subtropical zone between 2000 and 2010 stated that 40% of forest areas were destroyed, and the main reason for this extinction was human activities (FAO, 2016). It is stated that due to the melting of the glaciers in the poles with global warming, the sea level rose by 12-25 cm in the 20th century and continued to rise by 2 mm every year (Aksay, Ketenoğlu, & Kurt, 2005). This rise brought along dangers such as flooding coastal countries such as the Netherlands and Bangladesh, mixing seawater with freshwater resources, and destroying fertile agricultural lands (Neubert, 2001; cited in Kılıç, 2008). This destruction of natural life causes global climate change, which increases threats to soil, air and water. It was stated in various international meetings that the solution to all these problems could be possible by changing the human behaviours that cause these problems in the desired direction and that education should be used as an essential tool at this point (Bülbül, 2007). In its 2001 report, the European Union commission said, "The Education System has a vital role in ensuring a better understanding of the purpose of sustainable development. The education system encourages behavioural changes by improving individual and collective sense of responsibility. "(European Council, 2001). The solution to the problems faced by humanity in the present age will be possible with practical educational approaches in early childhood. Non-governmental organizations such as UNESCO and UNICEF also state that education is essential in increasing the quality of life in social, economic and environmental issues and ensuring sustainability (Toran, 2017). In this context, the environmental awareness of teachers, which is an essential element of education, is critical.

Considering the environmental education programs in the world, it is seen that the global goals and values of environmental education are given in the first level of primary education, especially in all European Union countries (Stokes, Edge, & West, 2001). For example, in Finland, local programs are developed based on the decisions of the national education board. Accordingly, all schools must act according to the aim of promoting sustainable development and ensuring the improvement and protection of the environment. Developing a positive attitude towards the place where people live in Bulgaria since 2003 from 5th grade to 8th grade; Achievements such as assuming roles against society, nature and the protection of nature have been emphasized. It is stated that environmental literacy is given under six headings [environmental knowledge, socio-political knowledge, knowledge of environmental issues, affective characteristics, determination of environmental responsibilities, mental skills and environmental responsibility behaviours] (Erdoğan, Kostova, & Marcinkowski, 2009). In the Bavaria region of Germany, environmental education is compulsory for all children at the first level of primary education. According to the educational program, environmental education begins with the children's environment (school, family, home, etc.) and daily experiences (walking tours, educational trips, etc.). It was emphasized that, especially in primary school, children should be based on the knowledge they have acquired before the age of starting school, have positive experiences about nature and should be offered the opportunity to increase their environmental awareness. The environmental education program in England, another European country; undertakes the responsibility to provide a sustainable environment for future generations, to understand the existence of humans in nature, to understand our responsibilities for other species, to justify development, to maintain balance and diversity in nature wherever possible; It is based on values such as protecting beauty and interests for future generations. As in Turkey, environmental education in Spain is carried out by integrating it into all levels (Stokes, Edge, & West, 2001).

When the primary education programs in Turkey were examined, the subject of environmental education was started to be taught in 4th and 5th grades of primary schools alternately for one hour a week with the decision number 274 of the Board of Education and Discipline in 1992. However, this lesson was taken from the program because the desired results were not achieved. In the Regulation on Primary Education Institutions prepared in 1997, It has been determined that one of the primary education institutions aims to provide students with the awareness and habits of protecting themselves, their family and society, and the environment. Although the acquisitions related to environmental education are tried to be taught in different units in Life Science, Chemistry Geography, Science / Science and Technology, Biology, Health Science and Social Studies courses, the importance and broad scope of environmental education make it compulsory to teach environmental education as a separate course (Tanrıverdi), 2009). With the change made by the Board of Education and Discipline in the Weekly Course Schedule of Primary Education Institutions (Primary and Secondary Schools) in 2012, 'Environment and Science' course was allowed to be taught as an elective course in the 7th and 8th grades of secondary schools (MEB, 2012). In 2015, the Environmental Education course started as an elective in secondary schools. Elective Environmental Education course; The balance of nature, Matter cycle and natural balance,

limitation of resources and ecological footprint, Global environmental problems, environmental-friendly solutions and technologies consist of five units and 38 gains (MEB, 2015). From the 2016/2017 academic year until the 2020/2021 academic year, the Environmental Education course is presented to the selection of the students as an elective course every year with the writings of the Board of Education regarding the compulsory and elective courses. However, in the study conducted by Tuncer and Özüt (2017) with teachers and administrators working in Bingöl and Elazığ provincial centres and schools in some districts of these two provinces, it was seen that the name of the Environmental Education course did not even exist in the table they gave regarding the selection rates of elective courses. Again, according to the same study, it was observed that the most important factor considered in determining the elective courses was school facilities, and most of the teachers took elective courses outside their branches.

It can be said that environmental education is included in the teaching-learning area of an elective or a compulsory course in education programs in Turkey. It is seen that it is aimed at sustainable development. For example, the third particular purpose of the science teaching program applied in primary education (to realize the mutual interaction between the individual, the environment and the society; to develop an awareness of sustainable development regarding society, economy and natural resources) and some of the achievements in the Life Studies program (Be sensitive to nature and the environment, It develops the ability to use resources efficiently.) (MEB, 2018).

In order for future generations to continue their lives in a healthy world, it can be said that it is of great importance to be a suitable role model for children from an early age and to organize educational environments where sustainability elements are taken into account for them, and to implement well-prepared environmental education programs that will ensure more interaction of children with nature. Practices carried out within this framework in schools are essential elements that raise awareness about social sustainability, especially for children, school staff and families (Güngör, 2019). Considering this situation, this study aimed to determine what practices classroom teachers used in the classroom to increase awareness of ecological footprint.

METHOD

Research Model

In this research, basic qualitative research model was used. The basic qualitative research model is the participants' interpretation of a phenomenon or event from their own perspective and the researcher tries to make sense of the fact or event from the interpretations. In basic qualitative research, data are collected through interview, observation or document analysis. The researcher decides on the questions to ask within the scope of the theoretical framework, the situation he will observe or the documents he finds relevant (Merriam, 2013).

Working group

The working group of this research consists of classroom teachers working in primary schools affiliated to Diyarbakır city center in the 2019-2020 academic year. The classroom teachers in the study group were determined by criterion sampling method and random sampling method, which are among purposeful sampling methods. The basic understanding in the criteria sampling method is to study all situations that meet a predetermined set of criteria. The criteria can be determined by the researcher or a previously prepared criteria list can be used (Yıldırım & Şimşek, 2013). In this study, making classroom practices to increase ecological footprint awareness is used as the sampling criterion. 28 classroom teachers were determined using the criterion sampling method. The demographic information of the classroom teachers interviewed is given in Table 1 below.

Table1. Demographic characteristics of classroom teachers participating in the interview

Interviewee	Gender	Age	Seniority	Education status	Faculty	Region where the school is located	Class size	Seminar Receiving Status
I1	F	30	8	License	Faculty of Education.	Countryside	25	No
I2	M	46	22	License	Faculty of Education.	Countryside	40	No
I3	M	34	12	License	Faculty of Education.	Town center	22	No
I4	M	35	10	License	Faculty of Education	Countryside	22	No
I5	F	30	3	License	Faculty of Education.	Countryside	18	No
I6	F	34	9	License	Faculty of Education.	Town center	32	No
I7	M	34	10	License	Faculty of Education.	Countryside	14	No
I8	M	35	11	License	Faculty of Education.	Town center	30	No
I9	M	30	7	License	Faculty of Education.	Town center	28	No
I10	M	28	5	License	Faculty of Education.	Town center	29	No
I11	M	27	4	License	Faculty of Education.	Countryside	12	No

I12	M	32	8	License	Faculty of Education.	Town center	29	No
I13	F	38	15	License	Faculty of Education.	Town center	22	No
I14	M	25	1	License	Faculty of Education.	Town center	27	No
I15	M	36	10	License	Faculty of Education.	Countryside	28	No
I16	M	33	7	License	Faculty of Education.	Countryside	19	No
I17	M	34	9	Master's degree	Faculty of Education.	Town center	40	No
I18	M	38	15	License	Faculty of Education.	Countryside	40	No
I19	F	30	8	License	Faculty of Education.	Countryside	22	Yes
I20	F	28	3	License	Faculty of Education.	Town center	40	No
I21	F	33	11	License	Faculty of Education.	Town center	28	No
I22	F	34	12	License	Faculty of Education.	Town center	37	No
I23	F	24	1	License	Faculty of Education.	Countryside	20	No
I24	M	30	4	License	Other	Countryside	19	No
I25	F	29	5	License	Faculty of Education.	Town center	10	No
I26	F	32	5	Master's degree	Faculty of Education.	Town center	16	No
I27	F	25	2	Master's degree	Faculty of Education.	Countryside	21	No
I28	F	32	5	Master's degree	Faculty of Education.	Town center	16	No

Table 1 shows the distribution of teachers participating in the interview according to gender, seniority, educational status, the region where the school is located, the type of education, the status of receiving seminars, the faculty they graduated from and the class sizes. According to the table, 13 of the participants were women and 15 were men; Ten teachers' seniority is 0-5 years, 10 teachers' seniority is 6-10 years, 6 teachers' seniority is 11-15 years, 1 teacher's seniority is 16-20 years and 1 teacher's service period is 21 years or more; 22 of the teachers were undergraduate and 6 of them graduate; 13 of the teachers were working in the rural area and 15 were working in the city center; all teachers participating in the interview teach an independent classroom; Only 1 of the teachers who participated in the interview took a course to improve the awareness of ecological footprint, 27 of them did not take a course in this direction; It was determined that 27 of the teachers were graduates of education faculties and 1 of them graduated from other departments. It was determined that the class size of 14 of the teachers participating in the interview was between 10-22, 9 of the class size was between 25-35 and 5 of the class size was between 36-48.

During the data collection process of this research, interviews were made with classroom teachers. Interview is a data collection tool that helps individuals reveal what, why and how they think, what their feelings, attitudes and thoughts are towards an event or phenomenon, and the situations that direct their behavior (Ekiz, 2009). The questions prepared during the interview process were prepared with the semi-structured interview technique. In the semi-structured interview, the questions are open-ended. Important data are collected from each participant. Participants answer the questions based on their own thoughts (Turan, 2013).

In this study, in order to ensure the content validity of the questions prepared with the semi-structured interview technique, the opinions of two experts who had a doctorate in the field of Education Programs and Instruction and the other in the field of Classroom Education were taken. In line with expert opinions, necessary corrections were made on the interview questions and the questions were made ready for implementation. In addition, in order to check the suitability of the interview questions to the purpose of the research before the application, two volunteer classroom teachers working in Diyarbakır city center were interviewed before the application. After the interview, the consistency between the answers received from the classroom teachers and the questions was confirmed by taking expert opinion. With the final form of the interview questions, firstly, the opinions of the teachers about whether they deem it appropriate to implement the activities for ecological footprint practices in primary schools were taken. Subsequently, it was asked what activities the teachers did in the classroom. After the in-class activities, teachers were asked what changes they observed in students. The problems faced by the teachers before, during and after the activities were asked and their opinions were taken. Finally, teachers were asked to make suggestions for in-class ecological footprint practices.

Interviews with classroom teachers were carried out face-to-face and by taking audio recordings, following the rules of social distance and wearing masks due to the Corona Virus (Covid-19) Outbreak that appeared in our country in 2020. The audio recordings obtained after the interview were put into writing and then put into the analysis process.

Data Analysis

Content analysis was used in the analysis process of the data obtained as a result of interviews with teachers. Yıldırım and Şimşek (2013) define content analysis as the job of gathering similar data under certain codes and themes and organizing and interpreting them in a way that the reader can understand. Kumar (2011) mentions that while analyzing the content, firstly, it is necessary to create broad themes that reflect the meanings of the answers, then assign the codes to the main themes and classify

the responses under the main themes, and finally, the themes and report texts should be integrated. The same way was followed when analyzing the data in this study.

In order to determine the reliability of the data obtained through qualitative research, the reliability between the coders was examined. In order to ensure the reliability of the study, expert opinion was sought to confirm whether the opinions obtained in the study represented the determined themes or not. The number of "consensus" and "disagreement" was determined by comparing the researcher's and the expert's evaluations regarding the opinions that should be included in the themes. Then, the reliability formula [Reliability = Agreement / (agreement + disagreement)] of Miles and Huberman (1994) was used. In this study, the reliability rate, which shows the consistency between the encodings made by the two coders, was determined as 92%.

FINDINGS

In this section, findings obtained from teachers' opinions on the appropriateness of footprint practices in primary schools are included. The findings obtained are shown in Table 2.

Table 2. Opinions on the appropriateness of EAI applications to be delivered in primary schools

		f
Appropriate	**To create environmental awareness**	
	• Environmental awareness	11
	• An individual in harmony with her/his environment	10
	• Nature love	3
	Suitability for the teaching process	
	• Permanent learning can take place	12
	• Adequate level of readiness of the child	8
	• Easier acquisition can occur	7
	• Preparation for the next level	4
	• Suitable for all ages	2
Not Appropriate	**Developmental dissonance**	
	• Concrete period	1
	• Unreadiness	1

When the opinions of the teachers about the appropriateness of the implementation of ecological footprint practices from primary schools are examined; It is observed that they have the idea that ecological footprint practices should be taught in primary schools. The teachers; To create environmental awareness, to raise individuals who are compatible with their environment, to gain a love of nature, gain can be achieved more easily at a young age, there is no specific age, it can be given at any age, their perception is clear at a young age, it is necessary for preparation for the next level. Two teachers stated that the students were in the concrete period and their level of readiness was insufficient. The sample opinions of teachers about giving ecological footprint practices starting from primary school are as follows.

In our changing world, bringing ecological footprint practices to primary school students accelerates the adaptation of the individual to his / her environment. These practices should be gained to individuals at the earliest ages. I do not think that there is a certain age to teach these applications. As a result, the individual can learn ecological footprint practices at a young age, since he is intertwined with the environment he / she lives in. (Participant- 3)

The primary school process is a breaking point for people to acquire certain behaviors. Experiences gained at this age can turn into habits that can be used lifelong. And if we can grasp the importance of this situation to students in primary school, both the society will become increasingly conscious and the students will be trained from the core (Participant-15).

Ecological footprint practices should take place in primary schools. Of course, here should be taken into consideration the age characteristics of the children. It should be conveyed with basic lines without over-comprehending and detailing the children (Participant 16).

Participant 1, 2, 5, 7, 13, 24, 25, 26, 27 and 28 stated that ecological footprint practices should be given starting from primary school in order to create environmental awareness and increase the level of awareness, while participant 4, 9,10, 14, 15, 20 and 21 stated that since permanent and easy learning can take place in primary school, ecological footprint practices should be given from primary schools. Participants 2, 3, 6, 8, 11, 18, 19 and 23 stated that ecological footprint practices should be given from primary schools in order to raise individuals who are compatible with their environment. Participant 22 stated that it is not appropriate to give ecological footprint practices in primary schools because children are in a concrete period, and participants 5, 16 and 17 stated that the developmental characteristics of my children should be taken into account in planning the activities. When the teachers' opinions are examined, the majority of the participants find it necessary to implement ecological footprint practices in the primary school age, which is the age when easier and permanent learning takes place, in order to create environmental awareness, sensitivity and love of nature in students. Two participants stated that such activities are not appropriate due to the developmental characteristics of the students.

Findings Regarding In-Class Ecological Footprint Practices

In this section, findings about the activities that teachers have done to develop sustainable living opportunities with ecological footprint practices are included. The findings obtained are shown in Table 3.

Table 3. Teachers' opinions about their EFP activities

		f
In-class activities	**Activities to protect and develop natural elements**	
	• Garden activities	7
	• Planting	6
	• Growing flowers	4
	• Feeding animals	4
	• Building bird nest	3
	• Cleaning school garden and classroom	3
	• Making taps with sensory	1
	Recycling activities	
	• Recycle bins	12
	• Collection of waste batteries	3
	• Designing from waste material	2
	Information studies	
	• Trip observation	5
	• Giving seminars, lecturing, watching a documentary	4
	• Exhibition	2
	• Drama	2
	• Poster works	1

When the answers given by the teachers to the 2nd question are examined; It was determined that teachers carried out various activities such as encouraging recycling, developing environmental awareness in practice gardens, planting saplings, empathizing by feeding animals, drama, exhibitions and posters to develop sustainable living opportunities through ecological footprint practices. Sample opinions of teachers about the activities they have done are as follows.

In our school, we organize various activities in order to raise environmental awareness and to give children a love of nature. First of all, children plant saplings themselves in the designated areas in the schoolyard every year. We give the children the responsibility to take care of the saplings they planted (Participant 2).

We met with environmental associations and provided recycling bins for our school. And we introduced this to all classes. In addition, he cleaned the school garden and its surroundings several times with teachers and students, and materials that could harm the nature were bought and recycled, and other household wastes were thrown into the municipality's garbage container (Participant 7).

We had the opportunity to watch nature more closely by organizing a trip to the forest area around our school. During the trip, we felt by touching, seeing and hearing that trees, birds, ants and squirrels were alive with broad expressions, like us, plants and animals, and that they need clean water, air and living spaces (Participant 10).

We organized an exhibition of newspaper, TV and internet news at the school about the disasters that may arise as a result of the destruction of forest areas and the unconscious deforestation, water and air pollution. The documents obtained as a result of the researches carried out by the students for a semester were displayed in the school corridor. The students exhibited their works in groups of two (Participant 11).

To reduce energy consumption; We tried to raise awareness by preparing small notes such as "Don't drain the water, put it out if unnecessary" and stick it to suitable places in our classroom, school and students' homes (Participant 23).

Participant 1, 2, 3, 4, 6, 8, 12, 13, 14, 17 and 20 carried out activities of planting saplings and growing plants in order to develop sustainable living opportunities with ecological footprint practices in the education process; participants 2, 3, 7, 9, 13, 15, 18, 20, 21 and 23 organized activities to disseminate recycling and to utilize waste materials; Participant 2, 4, 8, 18, 20 and 23 animals made their nesting activities and left water and food in suitable places for feeding; The participants 2, 3, 4, 8 and 10 organized nature trips to help students understand the importance of nature; 6, 7, 15 and 23 participants stated that they organized activities to save energy; 9, 11, 13, 16 and 26 of the participants stated that they did information (posters, exhibitions, etc.).

When the activities are examined, it is seen that teachers carry out various activities on the protection and development of natural life, providing energy saving and popularizing recycling.

Findings Regarding the Changes Observed in Students as a Result of Ecological Footprint Activities.

In this section, the findings about the changes observed in students as a result of the activities that teachers have done to develop sustainable living opportunities with ecological footprint practices are included. The findings obtained are shown in Table 4.

Table 4. Changes observed in students as a result of EFP activities

		f
Observed changes in student behavior	Environmental awareness	
	• The importance of living things and nature	25
	• Animal love	6
	• What recycling is and its importance	5
	• Sense of protecting and owning natural elements	5
	• Using resources efficiently	3
	• Environmental	2
	Social, affective development	
	• Sense of responsibility	12
	• Cooperation	4
	• Self-confidence	3
	• Friendship ties	3
	• Being able to empathize	2
	• Socializing	2
	Academic achievements	
	• • Learning can be adapted outside of school	4
	• • Active participation in the lesson	2
	• • Increasing awareness of environmental education	1

When the answer given by teachers to the question of how students 'behaviors changed as a result of their practices aimed at developing sustainable living opportunities with in-class ecological footprint practices, it was observed that changes such as the students' environmental awareness, love of animals and sense of responsibility developed, and the importance of living things and nature was understood. In addition to these, it was also stated that there were changes such as cooperation developed, academic success increased, self-confidence improved, sense of protection and ownership developed. Teachers' views on these changes are as follows.

> *As a result of these activities we have done; children became more sensitive to the environment, animals and plants. The children developed a sense of empathy. We have seen that children develop a sense of friendship. Owning a sapling, growing it, giving it water gave children a sense of responsibility (Participant 2).*

> *I think that the activities we do contribute to the social, emotional and academic development and ecological awareness of children (Participant 19).*

> *With the activities, I got effective results for students to become more conscious individuals in daily life. Environmental awareness developed. They became more sensitive individuals. In addition, their sense of taking responsibility developed by realizing that they are a part of the society they live in. First of all, this sensitivity started in the classroom, and continued with the changes in the school and home environment, and we got visible results (Participant 27).*

Participant; 1, 2, 4, 5, 6, 10, 11, 12, 14, 18, 21, 26 and 27 stated that environmental awareness developed in students as a result of the activities and that students understood why nature and living things are important. Participants 7, 9, 12, 13, 17 and 23 stated that the sense of responsibility developed in the students; Participants 2, 10, 23 and 26 stated that students' love for animals developed; 2, 3, 8, 9, 10, 15, 16, 19, 20, 24 and 25 stated that students were more social, more helpful and their academic success increased.

When the teachers' views were examined, it was observed that students were more conscious of the environment, gained love of nature and animals, students developed a sense of responsibility, empathy, solidarity and their academic success increased as a result of the activities performed.

Findings Concerning the Problems Encountered in the Process of Ecological Footprint Practices

In this section, findings related to the difficulties faced by teachers during the activities they have done to develop sustainable living opportunities with ecological footprint practices are included. The findings obtained are shown in Table 5.

Table 5. Difficulties encountered in the EAI implementation process

		f
Problems Encountered	Problems with the school environment	
	• Insufficient school facilities (economic, physical, equipment)	14
	• Parents' indifference	11
	• Not enough environmental issues in the curriculum	7
	• Lack of knowledge in teachers	6
	• School administrations not providing sufficient support	5
	• Excessive class sizes	3
	• Readiness level of students	2
	• Slow progress of bureaucracy	2
	• Teaching does not turn into life	1
	• Schools do not have environmental policies	1
	Social Problems	
	• Peer bullying	5
	• Language problems	1
	Geographic problems	
	• Geographical inadequacies	2
	• Limited transportation possibilities	1

When the opinions of the teachers about the difficulties they face in the process of making activities aimed at developing sustainable living opportunities with ecological footprint practices at school are examined; In general, school facilities are insufficient, parents and school administrations are indifferent to such activities. Besides these; They stated that they faced difficulties such as high class size, bureaucratic obstacles, social environment, insufficient education program on this issue and lack of knowledge on these issues. The views of the teachers about the difficulties they faced are as follows.

> *Geography itself was more of a challenge for us. Because the region we are in is also called the Karacadağ region and is almost all covered with stones, when you want to dig, the soil is very likely to encounter a stone without hitting the shovel or the Pickaxe. The vicinity of Karacadağ is the incarnation of the word "geography is destiny" (Participant 7).*
>
> *The insufficient level of readiness of children is one of the problems we face. The language problems we experience in our region and the limited opportunities in the institution are the most difficult issues. The reasons for these difficulties can be counted as economic problems, the inability to fully establish the education system, and the inability to provide an equitable education system (Participant 18).*
>
> *Since the insensitivity and indifference of the parents, being aware of this situation and exhibiting wrong example behaviors to the students prevented my activities from becoming concrete, I had a hard time in terms of the permanence of the process. In addition, the fact that the school is not organized accordingly, the indifference of other teachers, the inconsistent behavior of the administration (one day supports the activity and not another day) causes me to have difficulties (Participant 21).*
>
> *School facilities for such activities were very limited. It was difficult to find someone we could do with technically skilled work to even make containers for animals. We couldn't find anyone who could take the garbage we separated and recycle it. Our activity became meaningless. The little notes we prepared to save electricity and water lasted for a week. Students in other classes removed these notes from their places (Participant 23).*

Participant 1, 3, 6, 8, 9, 11, 12, 14, 17, 20 and 21 stated that the basis of the difficulties they face in the process of developing sustainable living opportunities with ecological footprint activities in schools is the attitudes of the parents. Participant 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 19, 23 and 25 stated that the facilities of schools are limited. Participants 1, 3, 4, 9 and 20 stated that school administrators' approaches were a challenge they faced. According to the participants 1, 2, 3, 10, 11, 18, 19 and 20, the education programs are insufficient. Participants 4, 13, 20 and 21 stated that the gains were negated by the social environment. Participants 5 and 15 stated that the lack of information is the most important difficulty. Participants 7 and 24 stated that they faced geographical difficulties. And participants 26 stated that not having an overall activity on these issues as a training policy as a difficulty they faced.

Findings Regarding Suggestions for Ecological Footprint Activities

In this section, findings related to the suggestions of teachers for developing sustainable living opportunities with ecological footprint activities are included. The findings obtained are shown in Table 6.

Table 6. Teachers' suggestions for EFP activities

		f
Suggestions	**Suggestions for the teaching process**	
	• Education programs should be enriched	9
	• Environmental education should be given as a lesson	8
	• Regional differences should be taken into account in activities	1
	• Activities should be done in nature	3

Suggestions for school stakeholders	
• Environmental education should be given to teachers	7
• Environmental education should be given to parents	5
Suggestions for the school administration	
• Opportunities for schools should be increased	6
• Activities should be school-based	5
• Removal of bureaucratic obstacles	1
• Teachers should be supported in classroom activities.	1
Recommendations for researchers	
• The number of researches on ecological footprint should be increased	2

When the suggestions of teachers for developing sustainable living opportunities with ecological footprint activities in school are examined, in general; Suggestions such as enriching the curriculum, teaching environmental education as a lesson, providing teachers with in-service training on ecological footprint practices, raising awareness of parents on environmental issues, improving school facilities, and making school-centered practices come to the fore. In addition, teachers expressed their suggestions such as providing students with the opportunity to learn by doing and living, alleviating bureaucracy, supporting teachers' activities to increase environmental awareness, and conducting more research on environmental issues. The various suggestions of the teachers are as follows.

It may be suggested that every school has a practice garden or even a lesson related to the environment to be added to the program. More than ever, we must turn our face to Nature (Participant 6).

In order to realize activities that will encourage students to take responsibility, both the education program and school administrations should be supportive (Participant 11).

I suggest giving priority to family education before schools. Since the first teachers are mothers and fathers and households, it will be more effective and sustainable for adults to receive education first and to be good examples for children (Participant 13).

This subject should be covered more in the training program. If possible, it will be useful to teach it as a separate course (Participant 20).

First of all, teachers should clear their misconceptions on this issue and make it a way of life and then pass it on to their students.

Participant 1, 2, 3, 10, 11, 18, 20, 23 and 27 suggested that the curriculum should be enriched to develop sustainable living opportunities with ecological footprint activities in schools. 2, 3, 6, 7, 8, 12 and 20 of the participants suggested that environmental education should be taught as a separate course. Participants 2, 3, 4, 6, 10 and 23 suggested improving school facilities. Participants 1, 5, 8, 13, 15, 22, 23, 26 and 27 recommended training for parents and teachers. 19, 20, 23 and 26 participants suggested that inclusive studies on the environment should be carried out. 24 and 26 participants suggested further research on environmental issues.

CONCLUSION AND DISCUSSION

Earth is the only planet known to have living life on it. The fact that it provides suitable living conditions for living things has enabled the diversity of living things on Earth. Problems such as the rapid depletion of natural resources, the adverse effects of global warming on the ecological balance, and the rapid rise of the sea level cause a rapid decrease in the diversity of living things and threaten the lives of the people who are the source of these problems. It is widely accepted today that suitable living conditions have been destroyed due to various human activities. This situation has been expressed a lot in national and international meetings. (Çamur and Vaizoğlu, 2007). In these meetings, the aim of ensuring more sustainable living conditions by reviewing human activities, minimizing the destruction of nature and living life, and providing more sustainable living conditions were prioritized, and decisions were taken in this direction. The opinion that it is vital to educate individuals from an early age was included in the concluding statements of these meetings. In this section, the opinions of teachers about the implementation of these practices in primary school, the practices they have made to develop ecological footprint practices and sustainable living opportunities, the changes they observed in the students as a result of the practices, and their views about the problems they encountered during the implementation process and various suggestions will be discussed.

It is also stated in some studies that providing environmental education in primary school, which is the period when children's basic attitudes and values are formed, is necessary for effective and permanent learning (Hirst, 2019). In parallel with these studies, it is deemed appropriate by classroom teachers to teach ecological footprint practices in primary schools, and the idea that these practices should be given starting from the preschool period is expressed. Teachers justified their thoughts that EFP practices should be given from primary school with statements such as that permanent and more accessible learning will take place, that children take role models early, and that their perceptions are more open at younger ages. Onur, Çağlar, and Salman (2016) concluded that due to their studies aiming to raise awareness of waste paper utilization in preschool children, positive changes occur in children toward waste disposal. Güngör (2017) stated that he observed positive behavioural changes in preschool students due to his study. These results justify the views of the teachers. The idea that a course called "Environmental Education" should be taught was also widely expressed by teachers. In parallel with teachers' views, Can and Serençelik (2014) concluded in

their study that crucial importance is not given to environmental education and that environmental education should be included in the program as a class.

The activities that teachers have done to increase the awareness of students' ecological footprint and to develop sustainable living opportunities are generally; disseminating recycling, growing plants, enabling children to empathize with animals, organizing nature trips, and using resources efficiently and informative (posters, dramas, exhibitions, etc.) can be classified as activities. It is possible to correlate the activities performed with EFP components directly. Sapling planting activities are an activity aimed at reducing our forest area footprint, activities such as recycling or reusing waste materials for another purpose, collecting waste batteries are aimed at reducing our carbon footprint, activities for agricultural activities in the unused areas of the schoolyard It can be said that it is an activity aimed at reducing our footprint. Activities aimed at saving water and energy and protecting animals are activities aimed at reducing our structured area footprint. Considering that the share of the mentioned footprint components in total footprint components is 95% (WWF, 2012), it can be said that teachers are doing suitable activities to reduce the ecological footprint.

Regarding student changes due to their activities, classroom teachers stated that children developed environmental awareness, a sense of responsibility and cooperation, a love of nature and animals, and a sense of protection and ownership. It is seen that these achievements of students are among the achievements of Science and Life Sciences courses (MEB, 2018). In line with teachers' views, Onur (2016) and Bakar (2019), in their studies with preschool children, concluded that environmental education has a positive effect on children's cognitive structures about the concept of environment and that environmental awareness has developed in their students as a result of activities carried out within the scope of environmental education. In parallel with the opinions of the classroom teachers who participated in the study; Jaus (1982), in his study with 5th graders and Jaus (1984) with 3rd graders, concluded that children who received environmental education had more positive environmental attitudes than children in the control group who did not receive an education.

Teachers pointed to the negative attitudes of parents, social environment and administrators regarding the difficulties they face in implementing ecological footprint practices and practices for developing sustainable living opportunities. It was determined that most participants who stated they had problems due to inadequate school facilities and geographical reasons were teachers working in rural areas. The reasons for this may be the inadequacy of school facilities in the village schools compared to the schools in the city centre, or the difficulties in transportation and accommodation. Fidan (2008) also stated that there is a shortage of equipment in village schools. It was determined that most of the participants who stated the source of the most common problems as parents were teachers working in city centres. Teachers stated that it was a problem because parents were indifferent, and parents thought that EFP activities were unnecessary because they would not contribute to the student's academic success. In parallel with the teachers' opinions in our research, Babaoğlan, Çelik, and Nalbant (2018) stated in their research that teachers ask parents to take care of their children, support them, meet the needs of the child, support their homework, and fulfil their responsibilities. Özpınar and Sarpkaya (2010) stated that their parents always respect teachers working in village schools. This situation can be shown as why the teachers working in the village did not express their parent's attitudes as a difficulty they encountered. The positive environmental attitudes of the parents, upper-class students and teachers, whom the children take as role models, shape how children view the environment. The fact that the adults, whom they see as role models, are concerned with nature and exhibit a protective and beautifying attitude will cause their children to develop environmental awareness in this direction (Atasoy, 2005). Otherwise, it can be said that children will resist activities aimed at developing environmental awareness, making it difficult for teachers. The classroom teachers whose opinions we received expressed the adverse effects of parent and the social environment approaches on students' environmental awareness development process as the difficulties they encountered. Inadequacy of school facilities, insufficient curriculum and large class sizes were expressed as difficulties. The education that started in the family continues in a planned way in school. In this respect, the school plays a vital role in improving the family's misbehaviour and attitudes and gaining new knowledge and skills. Factors such as the small number of classrooms, the school garden's ability to give positive environmental messages, and the ability to conduct environmental education activities at school are very effective in helping children gain positive behaviours towards the environment (Atasoy, 2005).

As suggestions on ecological footprint practices and developing sustainable living opportunities at school, teachers stated that it is necessary to improve school facilities, raise the awareness of parents and teachers, enrich the curriculum, and include a lesson named "environmental education" in the curriculum. These suggestions are consistent with the factors that teachers have identified as difficulties. Elimination of these difficulties constitutes the most recommended issue. Educating teachers about environmental awareness, enriching the curriculum in units related to environment and nature, and increasing school opportunities should be seen as steps to make environmental education successful. In addition to the development of environmental awareness of students, students' acquisition of scientific process skills, freeing them from memorization and information burden, and raising students as individuals who are aware of their responsibilities can only be achieved through teachers who are knowledgeable about environmental issues, sensitive and conscious about ecological problems (Atasoy, 2005).

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Statements of publication ethics

We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

Researchers' contribution rate

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| Research Article / Araştırma Makalesi |

Effects of Question Prompts in Web-Based Video Analysis System on Pre-service Teachers' Reflective Thinking

Web Tabanlı Video Analiz Sisteminde Kullanılan Soru İpuçlarının Öğretmen Adaylarının Yansıtıcı Düşünme Becerileri Üzerindeki Etkileri

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Keywords
1. Scaffold
2. Reflective thinking
3. Microteaching

Anahtar Kelimeler
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Abstract

In this study, in order to facilitate pre-service teachers'(PSTs) peer-interaction and reflective thinking during their microteaching process, a web-based video analysis environment was designed. The purpose of this study is to examine the effects of generic and directed scaffolds embedded within this environment on PSTs' reflective thinking while they are making the reflection on peers' microteaching video. For this purpose, a true experimental study was designed and applied. 55 PSTs were enrolled in this study. Finding of this study revealed that the use of directed question prompts embedded in a web-based video analysis system has a positive significant effect on PSTs' reflective thinking level.

Öz

Bu çalışmada, öğretmen adaylarının mikro öğretim süreçlerinde akran etkileşimini ve yansıtıcı düşünmeyi kolaylaştırmak için web tabanlı bir video analiz ortamı tasarlanmıştır. Bu çalışmanın amacı, ortama yerleştirilmiş genel ve yönlendirilmiş öğrenme desteklerinin, öğretmen adaylarının akranlarının mikro öğretim videolarına geri dönüt sürecinin yansıtıcı düşünme üzerindeki etkilerini incelemektir. Bu amaçla, gerçek bir deneysel çalışma tasarlanmış ve uygulanmıştır. Bu çalışmaya 55 öğretmen adayı katılmıştır. Bu çalışmanın bulguları, web tabanlı bir video analiz sistemine gömülü soru ipuçlarının kullanımının, öğretmen adaylarının yansıtıcı düşünme düzeyi üzerinde olumlu ve anlamlı bir etkiye sahip olduğunu ortaya koymuştur.

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INTRODUCTION

In almost all of the educational training programs, pre-service teachers (PSTs) engage in field experiences. Especially they have a chance of teaching experiences once or twice. As stated by Greene (2003), for a variety of reasons, it is often difficult to find placements for teacher candidates in local schools for experiences (Greene, 2003, p. 22). For the teacher candidates both observation and to be observed play an important role in professional development (Richards & Farrell, 2011) and also PSTs cannot see the teaching styles of different teachers and gain experience (Paker, 2000).

In teacher education programs, microteaching technique as a way of providing real life experience and it has been in use for many years (Remesh, 2013). All over the world it is widely in use for different ELT Masters, in teaching assistant training, and FLE teacher education settings. Microteaching technique plays an important role in determining the inadequate and absent sides of the pre-service teaching related with their teaching profession (Kuran, 2009). This technique was used for training of the PSTs in the controlled classroom in a simplified way. The first aim of this technique was to train the PST in a rapid way in order to close the gap between practice and theory (Tochon, 2008). The intended aim is to prepare the PSTs for professional working life.

In teacher training programs, PSTs can take a limited feedback from the supervisor teacher (Rorrison, 2005). However, it is known that divergent and multiple perspective feedbacks are really beneficial for PSTs' professional development (Huang, 2001). Peer feedback, shows a number of learning benefits for the feedback recipient, on the other hand it is also beneficial for the feedback provider (Cao, Yu, & Huang, 2019). In recent years the importance of the reflective practice (McDermott el al., 2012; Schön, 1983; 1987) has taken attention in preparing the individuals for the professional environment. Dealing with the difficulties has positive effects of the critical thinking in classroom setting (Dewey, 1933; Schön, 1987; Hulfish&Smith,

1961; Van Manen, 1977). The importance of reflective thinking in teacher education programs have been emphasized by significant educational researchers (Dewey, 1933; Schön, 1987; Shulman, 1986). Thinking about the teaching and learning in a deep way helps them to improve their teaching professional skills. Reflection during the PSTs' professional development gives chances to teachers to think about their work, and understanding the view of what the students and they do and by the way, they can improve the teaching and learning quality (A'Dhahab & Region, 2009; Akbari, 2007). So, in microteaching sessions, students by sharing experiences, collaborating with each other and group discussions may improve their critical thinking attitudes (Arsal, 2015). The feedback quality plays an important role. Huang (2001) was conducted a study in order to explore the PSTs' reflective practice during the microteaching peer feedback session. The findings of the study showed that reflective level of the participants was at the reporting level, and explained what had been done instead analyzing the related issues and in the conclusion author discovered that reflection contents and the reflective thinking issues needed to be an improvement (Huang, 2001).

In order to improve the microteaching technique and consequently, enhance the teaching experience of PSTs, some new approaches can be adopted into these environments. By promoting the reflective thinking level of the PSTs, they can make more reflective peer feedbacks. In addition, it is aimed to refine reflection quality and quantity of peer evaluation. Through the scaffolding and strategic interventions reflection can be learned (Coulson & Harvey, 2013). In order to improve the reflective thinking levels of the peer, a Web-based Peer Evaluation System (WBPES) developed specifically for this study. This supporting tool was designed in order to make peer evaluation of the microteaching sessions facilitate the peer feedback process and management workload. In addition to technical support, PSTs are needed to be trained in order to be critical and reflective thinking teachers. In this environment PSTs were forced to be more reflective by using different techniques, so, in the WBPES, question prompts as a scaffold has been used in order to enhance the reflective thinking level of the PSTs and guided them while observing the peers. As a scaffold, generic and directed question prompts were used to enhance the reflection. Davis (2003) claims that generic scaffolds yields deeper reflection, on the other hand, the context-specific scaffolds are effective during writing scientific arguments (McNeill & Krajcik, 2009). By different question prompts may affect the PSTs reflective thinking and by the way, the quality of the peer review might increase. So this paper explores the effects of the generic and the directed scaffolds on PSTs reflective thinking level.

LITERATURE REVIEW

Reflective Thinking and PSTs

Reflective thinking plays a critical role in individuals' learning (Bloom, 1956; Dewey, 1933). There are many claims in the literature on the importance of the reflection while the individual's learning (Bloom, 1956; Dewey, 1933). Dewey (1933) defined the reflective thinking as a kind of better way of thinking that consists of turning a subject over in the mind by giving it serious and consecutive consideration. Shön (1983), explained a connection between reflection and action. He defined this issue in two types of reflection as reflection-in-action and reflection-on- action. According to Schön(1983), reflection in action occurs during the event while evaluating and making changes consciously. On the other hand, reflection-on-action occurs before or after the action take place (Freese, 1999).

During the performance some of the most interesting examples of reflection in action occurs (Shön, 1983, p.54). From this approach, it can be assumed that while teaching process thinking on the existing action and reaction may result in teaching (Freese, 1999). Zeichner and Liston (1996) argued that while bringing the understanding to the complex situations in the classroom, reflection plays an important role, in addition, Munby and Russell (1990) think that, by reflective practice, teachers can

find the chance of reframing and reinterpreting their experiences from a different looking side. Like this, in most of the studies, researchers claimed the crucial role of the reflection while teaching and learning processes.

Reflection is important for PSTs' professional development. It gives chances to teachers to think about their work, and understanding the view of what the students and they do and by the way, they can improve the teaching and learning quality. (A'Dhahab & Region, 2009; Akbari, 2007). By asking questions, making critics, evaluating learners construct their own knowledge in the situation of reflective thinking help them to construct a bridge between the belief and relatives of teaching (Lee, 2008). By linking the theory and practice reflective thinking helps to make mental activities on the educational issues. (Taggart, & Wilson, 2005).

Although it is known the reflective thinking in learning is very important, but how it can lead to learning is very little known (Resnik, 1987). Also how it can be best promoted in the classroom needs to be investigated (Davis, 2003). Reflection orient can depend on the learners' own thinking and reflection helps learners set goals and improve the understanding (Davis, 2003) and it is a very crucial component for teachers' professional development (Dewey, 1933; Schon, 1987; Shulman, 1986).

Microteaching and Reflective Thinking

Microteaching developed and firstly used at Standford University in 1963 in order to find out a new and effective training method for PSTs (Allen & Cooper, 1970). This process serves a very convenient environment to PSTs in order to gain experiences on teaching skills in the controlled classroom atmosphere. In this environment the real classroom difficulties are reduced for the practitioners and the teacher candidates receives a great deal of feedbacks (Allen, and Ryan,1969).

Microteaching environment allows the PST to gain experience on the teaching skills and to cultivate the reflective thinking (Huang, 2001). In microteaching sessions PSTs can learn many useful new skills; especially they can learn the application of the teaching skills in the classroom environment. For instance fluency in asking questions, probing questions, higher order questions, divergent questions, reinforcement, recognizing attention behavior, silence and nonverbal cues, closure, lecturing, use of examples, planned repetition, completeness of communication (Allen and Cooper, 1970).

In order to increase the understanding of teaching and learning PSTs are expected to give careful and thoughtful deliberation to microteaching environments (Huang, 2001). Especially the feedback part is important in microteaching process, because in the feedback part microteaching performers could find the chance of how their performance qualified in the evaluators' side. Evaluators give feedback by making reflection while watching the performers' video. Reflection is used for PSTs both consider their own learning and encountered problems; in addition, reflection is considered the main component of peer evaluation (Roberts, 2006). While peer is watching the microteaching video s/he can model the successful sides of the performer's act and they can take the positive and useful vicarious experiences and refuse the useless ones (Bandura, 1977). While describing the experience critical reflection is the helper of the learner in order to analysis the experience and make judgments for future (Brookfield, 1995).

The reflection of the PSTs' focus on the following eight points: teacher characteristics (82%), delivery of instruction (78%), classroom interaction (40%), subject content knowledge (25%), questioning techniques (23%), instructional aids (15%), students (9%), and general education issues (4%) (Huang, 2001). Feedback step comes after the teaching part and the PSTs give this feedback by answering different questions which are attached to the related parts of the microteaching (Baird, Belt,Webb, 1967). Zink (2010), claims that reflection is a key part of the teaching process because making reflection, students talk about which experience is meaningful and how this learning can be applied in the future, but in a study, Huang (2001) revealed that for the feedback session of the microteaching process, the reflective level of the participants are at the reporting level, and they explain what had been done instead analyzing the related issues and also author discovered that reflection contents and the reflective thinking issues were needful to improvement.

Scaffolding and Reflection

The concept of the scaffolding was rooted by the Vygotsky with the idea of Zone of Proximal Development (ZPD). Dennen (2004), defined the scaffolding as a metaphor for a structure which is put in a place in order to help learners reach their goals in an educational environment and removed time by time until no need to its existence. In the educational setting, structures can be constructed by achieving the required learning tasks. According to Sharma and Hannafin (2007), while selecting the learning tasks for individuals the ZPD provides a conceptual framework, in addition, to support the specific learning scaffolding provides a strategic framework while selecting and implementing the strategies. For these strategies depend on the specifications, different scaffolds can be used related to their functions.

Scaffolds have been used for different purposes including reflection and inquiring. Selecting the appropriate scaffold for the requirement of the circumstance might be difficult for the designers and researchers (Belland, 2017). The key question here is what to scaffold. This question is used in order to focus the leaner on the topic or domain or in the learning process which is the metacognitive processes like problem-solving and self-regulatory processes (Azevedo & Jacobson, 2008). In literature, scaffolding can be used for different aims depend on their functions and mechanisms. Technology-based tools have been used to help the learners to understand a task, decompose problems, and gain strategies by displaying disciplinary strategies (Edelson et al., 1999, Quintana et al., 2004). Technology is a general concept and this concept includes especially computer supported learning environments. Jonassen (1999) called these computer-based learning environments as Mindtools and claims that Mindtools are used in order to engage the leaner in constructive, higher-order thinking and critical thinking on the studying subjects. Mindtools

for scaffolding are used to assist the students while they are interpreting and organizing their personal knowledge within a complex content (Hwang, Shi and Chu, 2011).

Technology-Based Scaffolds

In the literature technology-based tools have been used to enhance the learners during the cognitive and metacognitive processes. Metacognitive scaffolds guide the learners while learning in terms of how to think by modeling cognitive strategies and self-regulatory processes.

Technology based scaffolds are used in various educational settings and different studies conducted on this issue. As Sharma and Hannafin (2007) claimed that in order to direct and enhance the learning via the use of the computers the technology-based scaffolds can be used. Different types of scaffolds have been adFyıopted in technology enhanced learning environments (TELEs). TELEs are differentiate from the traditional learning environments in terms of usage of computers to direct and enhance learning (Sharma and Hannafin, 2007). In a computer-mediated learning environment, Ping and Swe (2004) made a categorization on the existing scaffolding strategies as orienting strategies, peer interaction, prompts, and modeling. Technology based scaffolds have been used to prepare the learners for the learning environment by giving guidance and making connections to existing ones and personal experiences. For instance Edelson et al. (1999) designed "staging activities" used for sequences of structured investigations and used the "bridging activities" which is a type of visualization method used to articulate the learners' initial conceptions. Kolodner et al. (2003) used a tool named "messing about" which enables the learners to design and build an initial model depend on their prior knowledge.

Embedded computer-based scaffolds have been used to enhance the PSTs' reflective practice. In order to support the PSTs reflection, Lin at al. (1999) declared four types of computer based scaffolding strategies. First one is the process prompts which were used to help the PSTs to track and understand their process by revealing appropriate questions. The second one is the process displays which were used to make the tacit learning process explicit and overt. The third one is the process modeling which is used to focus the leaner on the process that an expert would use in order to think about or solve the specific problem. The last and the fourth one is the reflective social discourse which is used for creating community-based discourse in order to provide multiple perspective and feedback for making the reflection.

Prompt Scaffolds

Prompt scaffolds have been used in the different environment for different purposes. For instance used in software to let the learner track and understand their learning process. In specific, prompts are important for the learners in the situation of problem-solving task (Lin at al., 1999). In literature, prompts have been used in the forms of hints, reminders, sentence starters and questions. To support the scientific explanation and argumentation, prompts have been used (Bell and Davis, 2000). Sandoval provided the prompts in the BGuILE environment by using Explanation Constructor software (1998; 2003). The researcher gave hints to learners about what they could include in their explanations.

Question prompts are used to trigger the learner's response by using different question types for different cognitive levels. (Wandberg & Rohwer, 2010) These cognitive levels as defined by Bloom's taxonomic levels (1956) could be supported by using different question prompts. In promoting the higher levels of reflection, prompts and questioning as scaffolding strategy has been most widely in use (Lai, 2008). The question prompts, make it easier for students to understand the steps behind their actions and the steps they are taking and the decisions they make (Linn el al., 1995).

Generic and Directed Prompts

(generic directed tanım) Prompts can be used in different ways. Prompts are the hints or questions given to the learner (Renkl, Skuballa, Schwonke, Harr, & Leber, 2015). Generic prompts were used by stopping the student and asking a question, on the other hand directed prompts were used by providing hints addition to the question (Davis, 2003).

Davis (2003) conducted a study in order to investigate the way of prompting students for reflection. She investigated the research question of "Do students merely need to be prompted to reflect, or do they need guidance in reflecting productively?" In the study, two types of scaffolds, generic and directed, were contrasted. The results of the study show that the directed group students reflected unproductively responded to the prompts than the generic group. Also, the generic prompted students developed more coherent understandings than the directed group students.

In another study, Wu and Looi (2011) worked on the agents prompts as a scaffold. In this study, they used two types of scaffolds, generic and specific prompts. In this study, as a learning partner, the inquisitive agent tutee in learning-by-teaching activities was explored. In result, they found that while generic prompts yielded to deeper contemplative reflection, the specific prompts resulted into more reactive reflection.

In one study, King (1991) compared the 3 groups of guided, unguided and control group of 5th grade students. While guiding the group, peer questioning strategy was used. The guided group students were asked more strategic questions, and they performed better than the unguided questioners and control group students on problem solving and novel computer test. Using guided questioning, prompts the students to create their own questions in higher order level. By asking and receiving these types of questions helped the students to construct the knowledge in long term memory.

In their study, NcNeill and Krajcik (2006) contrasted the effects of domain-specific and domain-generic scaffolds and they found that domain-specific scaffolds are more effective than the domain generic scaffolds in terms of understanding the content. Also

in another study it was found that domain specific scaffolds can achieve to start the knowledge integration process but they are not capable in knowledge fostering alone (Bell & Davis, 2000; Kyza & Edelson, 2003).

In a study university students were given generic and context-specific prompts in order to make reflection on their answers about human immune system and a concept map, so the generic prompted students gained significantly more from the context-specific prompted and the control group students (Ifenthaler, 2012).

Purpose of the study

In literature there different studies and some of them resulted in in a positive effect of the generic scaffolds (Davis, 2003; Ifenthaler, 2012), on the other hand some others supports the valuable effects of the directed scaffolds (King, 1991; NcNeill and Krajcik, 2006)). Purpose of this study is to improve the reflective thinking level of the PSTs during the feedback process. For this aim, a web-based peer evaluation system (WBPES) was designed and in this environment, generic and directed scaffolds were used in order to improve the reflective thinking levels of the PSTs.

In this study, question prompts(QPs) were embedded in this WBPES in order to support the PSTs during the peer evaluation process. So, in this environment, two types of question prompts were contrasted. One of them is the generic questions. These questions were given to the one part of the PSTs. It is used to collect peer feedbacks of the PSTs without the guidance of specific questions in WBPES. In this process PSTs reflected on three parts, labeled as the introduction, main activities, and closure-evaluation. They wrote down reflections into the text boxes which were only captioned by the name of the part as introduction part, main activities part, closure- evaluation part. This form was used inside the WBPES. On this system, PSTs made reflections by watching the microteaching performer's video. The system also gives the chance to evaluators to check out the materials used during the microteaching performance like lesson plan, presentation and evaluation documents The other type of the question prompt was the directed questions. It is used to collect peer feedbacks of the PSTs under the directed QPs in WBPES. QPs were used as a scaffold to direct the learner on the specific point about to reach the appropriate leaning goals (Azevedo & Hadwin, 2005). In order to guidance the treatment group, domain-specific QPs were asked. QPs were prepared based on the aspects of a lesson plan. For three main parts as main activities and closure-evaluation parts on the WBPES, PSTs made reflections by watching the microteaching performer's video. For three parts 12 question prompts were asked. Also, the microteaching video was divided into three parts as named introduction, main activities, and closure-evaluation. By dividing the video slices, it was aimed to make easier finding the answers for QPs. Like on the other group, the system gives the chance to evaluators to check out the materials used during the microteaching performance by the microteaching performer.

Although literature suggests that use of video can be effective to facilitate reflection for teacher education, new tools and supporting evidence are beginning to emerge (Rich & Hannafin, 2009). Therefore, the purpose of this study is to examine the effectiveness of question prompts as scaffolding tool embedded within web-based peer evaluation system for supporting PSTs' reflective thinking while they are making a reflection on the peers' microteaching video. The study was designed to examine the following question:

- Does the use of generic and directed question prompts embedded in a web-based video analysis system have an effect on PSTs' reflective thinking level over the peer assessment sessions?

METHOD

Participants

Participants included the third year PSTs enrolled in the Computer Education Teaching Methods II Course at Department of Computer Education and Instructional Technology at Middle East Technical University in Turkey. A total of 55 PSTs participated in the study with 45 male and 10 female, aged between 21 and 27 years old. PSTs had an experience on instructional planning in the courses that they took previously at the department.

Web-based peer evaluation system

Web-based peer evaluation system (WBPES) was developed to provide video analysis environment for the PSTs enrolled in Computer Education Teaching Methods II course. This is a must course and specifically, focuses on both micro strategies of teaching and learning. PSTs are required to develop the lesson plan and present it as microteaching performance.

Peer evaluation screen in the WBPES consisted of three parts including, microteaching video, lesson plan and materials, and microteaching video evaluation report. In the microteaching video part, PSTs could be able to watch the microteaching performer's video. Microteaching videos were stored on the video server of VIMEO ®, they were protected with a password. This password was given to all participants. In the material part, PSTs can check out the materials, including a lesson plan, activity sheets, and handouts etc., used during the microteaching performance. Microteaching video evaluation report part consist of three areas, including introduction, main activities, and closure. Each part included text entry boxes for PSTs to write down their reflections about the microteaching performance.

Treatment conditions

Two versions of the WBPES were designed with the modification on the video and reflection parts assisted with generic and directed scaffolds. While in generic WBPES, peer evaluation screen includes the microteaching video as a whole, in directed WBPES, microteaching video was divided into three parts introduction, main activities, and closure. Moreover, while in generic

WBPES, instate of directed question prompts, generic scaffolds provided in the peer evaluation screen microteaching video evaluation report part; in directed WBPES, directed question prompts were used as a scaffold for each part, introduction, main activities, and closure. Domain-specific question prompts were designed in order to help them reflect on the different parts of the lessons. All the question prompts were reviewed by experts.

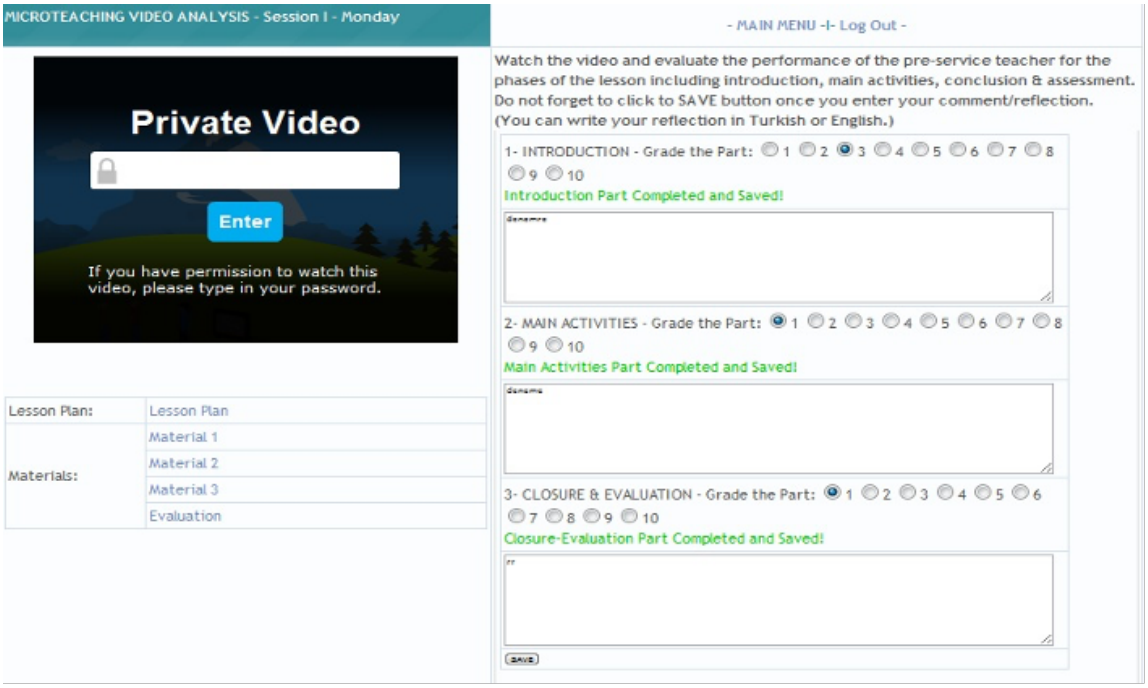

Figure 1. Generic Group Screen

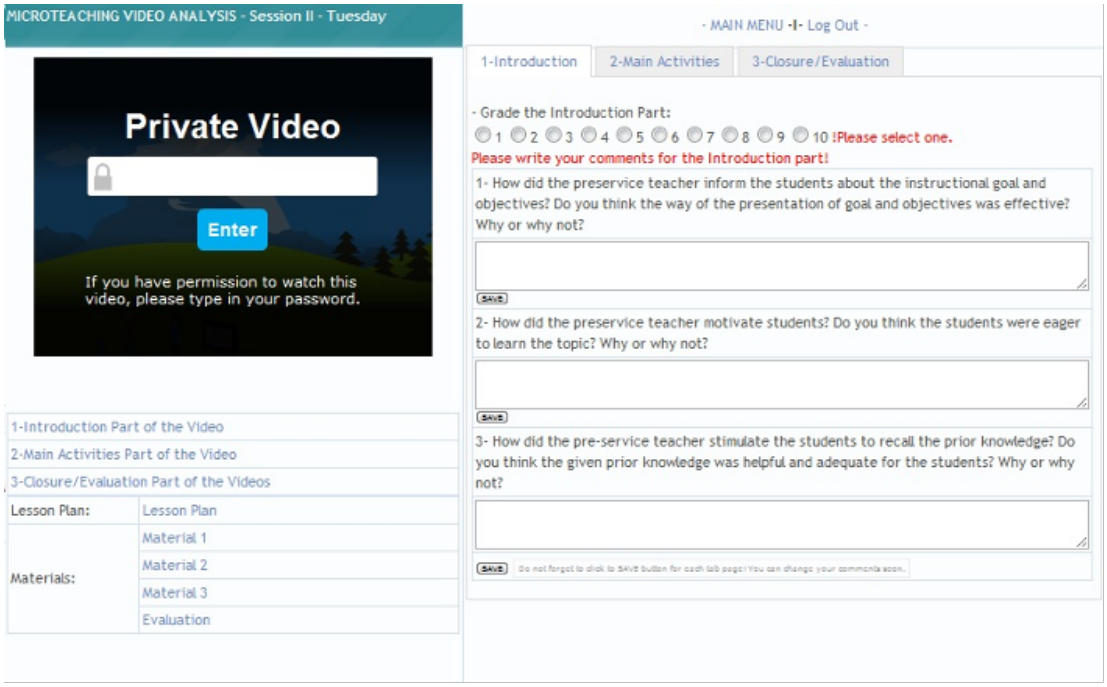

Figure 2. Directed Group Screen

Research Design

In order to examine the effectiveness of scaffolds within web-based peer evaluation system, a true experimental study that included control and experimental group with pre and post-test was designed (Fraenkel & Wallen, 2006). Participants were randomly assigned to each group. For the effects of generic and directed scaffolds in peer evaluation system on the reflective thinking skills of PSTs, both groups' reflective thinking levels as the dependent variable were measured before and after the study.

Procedure

At the beginning of the semester, PSTs were assigned to either control (n=27) and experimental group (n=28). First, all PSTs provided with a pre microteaching video, which was selected from the previous year's performances by the researchers, in a generic scaffolded peer evaluation system. They were required to watch the microteaching video and write their reflections about

the introduction, main activities, and closure part of the lesson. Then, all PSTs worked individually on the preparation of a twenty-minute lesson plan to be implemented in the microteaching performance for two weeks. Afterward, every week, three pre-service teachers performed microteaching at each section over nine weeks. Depending on the control and experimental group assigned, each section provided access with either generic and directed WBPES, respectively. PSTs at both groups evaluated each week's microteaching performances in WBPES. At the end of the study, PSTs were provided with the post microteaching performance video in a generic peer evaluation system identical to the one provided at the beginning. They again wrote their reflections about the parts of the lesson.

Data sources

Evaluation reports of Microteaching videos

In order to evaluate the reflective level of participants, responses to the pre and post microteaching video evaluation reports in the peer evaluation system were analyzed. A rubric, named "Criteria for the Recognition of Evidence for Different Types of Reflective Writing", developed by Hattan and Smith's (1994, 1995) was modified and used to score reflective level of participants. The rubric consisted of four levels, including descriptive writing, descriptive reflection, dialogic reflection, and critical reflection. Each of these levels was categorized according to characteristics of the reflector's writing.

The first level, descriptive writing is not considered as a reflection, but just reporting or describing events occurred. In this level individual does not have any attempt to provide reasons or justifications. The second level, the descriptive reflection, individual not only make a description of events but also makes some attempt to provide the reason for events or actions but still in a report or descriptive way. As a third level, dialogic **reflection**, individual thinks on the events and makes qualities of judgment and possible alternatives for explaining and hypothesizing by exploring the experience, events, and actions. The forth and the last level is the critical reflection. In this level, individual demonstrates an awareness of events and actions and can look from the multiple perspectives. Using the rubric, reflections of the PSTs were scored from 1, the lowest thinking reflective level, to 4, highest reflective thinking level. Microteaching video evaluation reports were graded by two raters, who were blind to groups. Before grading, the raters go through each level in the rubric and they reached a consensus on the rubric by scoring 20 of the reports together. Then, both raters scored the forms using the rubric. At the end, an inter-rater reliability analysis was conducted (alpha=.89).

Data Analysis

In order to examine the effects of the question prompts embedded within WBPES on PSTs' reflective thinking level, one-way analysis of variance (ANOVA) was conducted. The independent variable was the group and the dependent variable was the mean difference of pre and the post reflective thinking level scores. Scores of 48 PSTs, 22 in experimental and 26 in the control group, who were completed both pre and post reflection were included to analysis. In order to control the data whether it is ready for running one-way ANOVA, the required assumptions of independent observation, normality, and homogeneity of variance were checked.

RESULTS

Table 1 summarizes the descriptive statistics for pre and post-reflective thinking levels for control and experimental group. Descriptive statistics indicated that for the pretest the mean scores of PSTs' reflective thinking levels for the control group (M = 2.48) and experimental (M = 2.19) group are approximate to each other. When the post-test scores investigated, the experimental group's mean score (M = 3.12) is a bit greater than the control group's one (M = 2.80). The ANOVA results at Table 2 revealed that mean difference in the control and experimental group was significant, F (1, 46) =12.40, p = .001, partial η^2 = 0.21. Namely, mean difference for the experimental group (d = 0.93) was significantly higher than control group (d = 0.32).

Table 1. Descriptive statistics for reflective thinking levels of PSTs

	Group	n	M	SD	Min	Max
Pretest	Control Group	22	2.48	.60	1.67	3.67
	Exp. Group	26	2.19	.69	1.00	3.67
Pretest	Control Group	22	2.80	.73	1.00	4.00
	Exp. Group	26	3.12	.60	1.67	4.00

Table 2. ANOVA results for reflective thinking levels of PSTs

	Sum of Squares	*df*	Mean Square	*F*	Sign
Between Groups	Control Group	1	4.360	12.401	.001
Within Groups	Exp. Group	46	.352		
Total	Control Group	47			

DISCUSSION

In literature, different studies were conducted on the guidance of the learner while thinking cognitively and meta-cognitively. Some studies resulted that guidance improves the reflective thinking level and learning, on the other hand, some other studies advocated that minimal or lack of guidance of learner result in more reflective thinking level.

This study investigated the effects of question prompts as scaffolding tool embedded within web-based peer evaluation system on PSTs' reflective thinking. Overall findings of this study indicated that at the end of the research the use of directed question prompts embedded in a web-based video analysis system make a positive significant effect on PSTs' reflective thinking level, also it is revealed that both experimental and the control group PSTs' reflective thinking levels have increased.

Most of the studies in the literature are on the effects of scaffolds on the problem-solving skills and science learning but there were not enough studies focus at how question prompts can be used to foster reflective thinking while PSTs are giving feedback to their peers. King (2002) argues that for promoting the different kinds of cognitive processing, it is necessary to ask different sort of questions. Therefore, engaging in these cognitive processes strengthens the understanding (King, 2002). In the literature there were some studies, claimed that "People can sometimes learn very well through unguided exploration, and can also learn by listening passively to lectures or stories or by being directly instructed" (Mercer, 1995). But in this context directed PST performed more reflective results than the generic group.

Reflective thinking is important for professional development (Schön, 1987). With the help of the cognitive scaffolds, learners could reach to levels that they could not achieve without it (Holton and Clarke, 2002). After the learner reach to intended point then it is expected learner may represent the specifications gained with the help of scaffolds (Holton and Clarke, 2002). In this study, PSTs were trained with question prompts as generic and directed scaffolds. It was revealed that making reflection with question prompts change the PSTs reflective thinking process in a positive way for both groups. Both groups were asked to make the reflection on a sample microteaching video under the generic questions prompts at pre and post-test. The experimental group, trained with the directed question prompts, gave more reflective feedbacks from pre to post test.

At the end of the study, it is revealed that the reflective thinking level of the PSTs has increased. Both groups PSTs forced to give reflection to the microteaching videos. By the time, the progress of the reflective thinking level is an expected result, because in literature most of the studies claimed that the both generic and the directed question prompts have positive effects on reflective thinking (Lai, 2008; Davis, 2003, Wu and Looi, 2011).

Improvement the affordance of preparing qualified teacher candidates with highly critical thinking capacity is an active debate (Lai, 2008). Early field experiences act an important role in teacher education (Gutton & McIntyre, 1990). In these field experiences, teacher education programs have been widely using the microteaching technique in order to prepare the PSTs for the real classroom setting. Microteaching environments serve very convenient opportunities to PSTs in order to gain experiences on teaching skills in the classroom environment. Studies in which the PSTs involve in reflective inquiry, point out significant effect on the cognitive development of the PSTs (Dunkin et al., 1994). For teaching actions, the initial role of the evaluation criteria is to supply evidence and determining which evidence is relevant to the evaluation criteria is the evaluator's skill (Danielson & McGreal, 2000). During the peer evaluation process of the microteaching sessions, it is expected from the evaluator to make a meaningful and evidence-based evaluation, by the way that the microteaching performer could take the optimum benefit from the feedbacks. So, these microteaching sessions may explain the progress of the reflective thinking level for both groups.

In this study, with regard to scaffolded PSTs, peer feedbacks showed that they were more successful at explaining the actions and events. Some of them could achieve to look action and events from multiple perspectives and they were more successful than the generic scaffolded PSTs on providing reasons and making justification about the events or actions. But it is possible to say that some of the generic scaffolded PSTs were represented high reflective thinking level, but in this group most of the PSTs are at the descriptive writing or descriptive reflection level which are the first and the second level of the "Criteria for the Recognition of Evidence for Different Types of Reflective Writing" rubric.

As findings revealed that reflection level of PSTs in the control group was between descriptive and dialogical (M=2.48) at the beginning of the study. Moreover, at the end of the study, it was more close to the dialogical (M=2.80) but not significantly. On the other hand, findings showed that while reflection level of pre-service in the experimental group was near to descriptive (M=2.19) at the beginning of the study, it was over dialogical (M=3.12) at the end of the study. Despite the overall learning gain, the results suggested that use of directed question prompts embedded in a web-based peer evaluation system facilitated reflective thinking of PSTs better than generic scaffolds embedded web-based peer evaluation system, so by the time directed scaffolded group members learned to give more reflective feedbacks.

Findings of this study also suggest that providing PSTs with domain-specific prompts in the directed system might help them focus on each part of the peer evaluation process like instructional planning, introduction, main activities, and conclusion. This might have helped the PSTs give more critical and reflective feedbacks. Findings of this study about the effects of the QPs on reflective thinking were supported by different studies in literature (NcNeill and Krajcik, 2006; Bell & Davis, 2000; Kyza & Edelson, 2003). By scaffold the experimental group with directed question prompts could force them to find out an answer to question prompts from the video parts and the related materials, on the other hand, in control group because the PSTs were asked to answer generic questions without any stress of finding specific answers, they wrote down what they saw in the video. So this feeling could make unwillingness for making the reflection.

For the novice learners, guided instructional approaches are more effective than the unguided or minimal guided ones (Kirschner et. al., 2006). All the participants of the study were the novice PSTs. Also, the results of the study showed that novice PSTs needed to be guided by instructional approaches. But after they learned how to deal with the obstacles they automatically remove the guidance, in other words, they unintentionally faded the scaffolds. Until the student independently completes the task successfully than the students start to trust themselves and they slowly fades the scaffolds (Puntambekar & Hubscher, 2005; Sharma & Hannafin, 2007).

CONCLUSION AND RECOMMENDATIONS

Evaluating teacher candidates with limited practical knowledge can be challenging, so in this situation it is required to scaffold the peers in order to help to think higher order thinking level and by the way they can make valuable and evidence based critical thinking while evaluating the peers. The reflection process could give chance of to monitor their own knowledge construction and make a connection with new ideas to the existing ones and generates new ones for self-reflection and evaluation.

Scaffolds have been an important argument for reflective thinking process. There are different views about the scaffolds' effect to reflective thinking level. This study might make valuable contributions to this debate. In this study, to support the learners' reflective skills on the process of planning, monitoring, and evaluation technology based tools have been used. These tools have been used to help the leaner to see their thinking and learning process explicitly (Lin, Hmelo, Kinzer, and Secules, 1999). Two types of scaffolds as generic and directed was used and their effects on reflective thinking level were investigated. As a result, directed group members were more reflective than the generic ones.

The result of this study gives clues to the instructional designers, educators, and teachers about effects of scaffolds in order to facilitate the peer evaluation and improve the reflective thinking process. However scaffolds can be used in different learning environments, the result of this study is concentrate on the reflective thinking process. The result of the study shows that the guiding the learner with QP as a scaffold enhances the reflective thinking and results in greater knowledge acquisition. Prompting is a time consuming process for the teacher and in the classroom environment it may not be feasible with a single teacher for each student (Cuevas et al., 2002). In this study by the help of the computer supported scaffolding environment, it became possible to manage the prompting process for each student individually.It can be recommended that rather than the static scaffolds, dynamic scaffolds can be used in order to facilitate the peer feedback process by using adoptive systems. By the way PST do not guess which type of QP will be assessed and thus they can concentrate to the different points in their every peer evaluation. Much research is needed about the effect of video analysis tools on PSTs' reflective thinking during microteaching.

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Statements of publication ethics

We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

Examples of author contribution statements

A.B. and B.C. conceived of the presented idea. A.B. developed the theory and performed the computations. C.D. and D.E. verified the analytical methods. B.C. encouraged A.B. to investigate [a specific aspect] and supervised the findings of this work. All authors discussed the results and contributed to the final manuscript.

Researchers' contribution rate

The study was conducted and reported with equal collaboration of the researchers.

Ethics Committee Approval Information

This study was conducted before 2020.

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| Research Article / Araştırma Makalesi |

Training Primary School Science Teachers to be Conscious of Scientific Creativity

İlköğretim Fen ve Teknoloji Dersi Öğretmenlerinin Bilimsel Yaratıcılık Bilincinin Geliştirilmesi

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Keywords

1. Scientific creativity
2. Creativity consciousness
3. Science education
4. Creativity
5. In-service teacher education

Anahtar Kelimeler

1. Bilimsel yaratıcılık
2. Yaratıcılık bilinci
3. Fen eğitimi
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Abstract

Purpose: This qualitative case study explores whether and to what extent a scientific creativity training improved primary school science teachers' consciousness of scientific creativity, and how these changes in the teachers' scientific creativity consciousness were transferred into their classroom practices following the intervention.

Design/Methodology/Approach: A Scientific Creativity Training Program (SCTP) was developed by the researchers. Data were collected from seven primary school science teachers using semi-structured interviews, in-class observations, and document analysis. Data were analyzed using an inductive content analysis.

Findings: The results indicated that the SCTP (Scientific Creativity Training Program) seemed to improve the teachers' consciousness of scientific creativity. The results also indicated that all teachers integrated scientific creativity into their classroom practice as a result of the SCTP. The SCTP was found to enable teachers to reflect on the extent to which they employed creativity in their personal and professional lives and question the extent to which they taught creativity and/or used creative methods in the classroom. Furthermore, the analysis indicated that the SCTP improved the teachers' creativity consciousness and enhanced their pedagogical content knowledge. This was in turn found to affect the teachers' classroom practices, as it led them to believe that creativity is malleable and increased their motivation and self-efficacy to foster their students' creative consciousness and creative attitudes. The teachers seemed to use more creative activities and materials in their science classrooms following the intervention, despite the presence of hindrances that negatively impacted their practices.

Highlights: Our results indicated that creativity education can lead teachers to make significant changes to their classroom practice by gradually integrating scientific creativity. The present study also reveals that each teacher has a unique trajectory of change regarding creativity and creative teaching, which needs to be taken into consideration for more sustainable creativity education.

Öz

Çalışmanın Amacı: Bu nitel durum çalışması, bir bilimsel yaratıcılık eğitiminin, ilköğretim fen ve teknoloji dersi öğretmenlerinin bilimsel yaratıcılık bilincini ne ölçüde geliştirdiğini ve eğitim sonrasında öğretmenlerin bilimsel yaratıcılık bilincindeki değişikliklerin öğretmenlerin sınıf uygulamalarına ne şekilde aktarıldığını incelemektedir.

Materyal ve Yöntem: Çalışmada, araştırmacılar tarafından Bilimsel Yaratıcılık Eğitim Programı (BYEP) geliştirilmiştir. İlköğretim düzeyinde görev yapan yedi fen ve teknoloji dersi öğretmeninden yarı-yapılandırılmış görüşme formu, sınıf-içi gözlem ve doküman analizi yolu ile veri toplanmıştır. Elde edilen veriler içerik analizi kullanarak incelenmiştir.

Bulgular: Araştırma sonuçları, BYEP'nin (Bilimsel Yaratıcılık Eğitim Programı) öğretmenlerin bilimsel yaratıcılık bilincini artırdığını göstermiştir. Araştırma sonuçları, ayrıca, tüm öğretmenlerin BYEP'nin bir sonucu olarak, bilimsel yaratıcılığı sınıf uygulamalarına aktardığını ortaya koymuştur. BYEP'nin, öğretmenlerin yaratıcılığı kendi kişisel ve mesleki hayatlarında ne ölçüde kullandıkları üzerine düşünmelerini, sınıfta ne ölçüde yaratıcılığı öğrettiklerini ve yaratıcı metodları kullandıklarını sorgulamalarını teşvik ettiği görülmüştür. Bunun yanı sıra, araştırma sonuçları BYEP'nin öğretmenlerin yaratıcılık bilincini ve pedagojik alan bilgilerini artırdığını ortaya koymuştur. Bunun da öğretmenlerin, yaratıcılığın şekillendirilebilir olduğuna inanmalarını sağladığı ve öğretmenlerin, öğrencilerinin yaratıcılık bilincini ve yaratıcı tutumlarını geliştirme konusundaki motivasyonlarını ve öz-yeterliliklerini artırdığı ve dolayısı ile öğretmenlerin sınıf-içi uygulamalarını etkilediği ortaya çıkmıştır. Öğretmenlerin eğitim sonrasında, uygulamalarını olumsuz yönde etkileyen engellere rağmen fen derslerinde daha çok yaratıcı etkinlik ve materyal kullandıkları görülmüştür.

Önemli Vurgular: Araştırma sonuçları, yaratıcılık eğitiminin, öğretmenlerin kademeli olarak bilimsel yaratıcılığı sınıf-içi uygulamalarına aktarmalarına katkı sağladığını ortaya koymaktadır. Bu çalışma ayrıca, her öğretmenin yaratıcılık ve yaratıcı öğretim konusunda özgün bir değişim yörüngesi izlediğini ve bunun sürdürülebilir yaratıcılık eğitimi için dikkate alınması gerektiğini ortaya koymaktadır.

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INTRODUCTION

In today's competitive world, with high-stakes exams like PISA and TIMMS and a focus on new educational directions like STEM or STEAM education, incorporating creativity and scientific creativity into teacher education and teacher practices stand out as an ascendant theme in curriculum development, particularly in OECD countries. However, although creative thinking is increasingly becoming a goal of educational reforms around the world, science curricula in most countries, including Australia, the UK, USA (Yang, Lin, Hong, & Lin, 2016) and Turkey, do not include the term "scientific creativity". While Turkish curricula do include some creative elements, integrating creativity and scientific creativity into classroom practice remains a challenge. There is still a need for policies promoting creativity and scientific creativity in education.

There is a growing body of literature highlighting the following major benefits of fostering creativity in education: "improved motivation, achievement, creativity, self-confidence, school attitudes" (Davis, Rimm, & Siegle, 2014, p.243); positive attitudes towards creative ideas, awareness of one's own creativity and creative situations, and encouragement of imagination, questioning, and humor (Colangelo & Davis, 2003); multiple forms of thinking, which in turn facilitates the development of unique ideas (O'Connor, 2012); and self-competencies such as self-esteem and self-efficacy (Sternberg, 2006).

Science class is one area where incorporating creativity into classroom applications ought to make a difference in teaching and learning processes. In light of the aforementioned potential benefits of creativity in education, there is a clear need for primary school science teachers to enhance students' creative growth in their classes, beginning when students are young (Craft, 1999; O'Connor, 2012; Prentice, 2000; Yates & Twigg, 2017). Given that creative teachers can serve as models for their students' creativity development (Sternberg, 2006), it is important to develop science teachers' consciousness of creativity and scientific creativity. According to Davis (2003), by means of creativity consciousness, individuals "can grasp the importance of creativity for their own personal growth and development-self-actualization" (p.319). Davis et al. (2014) argue that most creative characteristics can be developed by a creativity-conscious teacher. They claim that "attitudes and personality traits can be changed to produce a more flexible, creative, and self-actualized person" (p. 211). If teachers develop creativity consciousness and integrate creativity into their classroom practice, this is expected to foster creativity growth among students as well.

With this in mind, this study was designed primarily to explore whether and to what extent science teachers' consciousness of scientific creativity could be increased through a scientific creativity training program (the SCTP), and how the changes in the teachers' scientific creativity consciousness were transferred into their classroom practices following the intervention.

BACKGROUND

A Brief Look at Creativity and Scientific Creativity

Researchers agree that there is substantial confusion and a lack of consensus on the definition of creativity as a construct (Kind & Kind, 2007; Parkhurst, 1999). However, contemporary scholars argue that creativity can be defined (Beghetto & Kaufman, 2007; Runco, 2004; Sawyer et al., 2003; Sternberg, 2018). Torrance, the developer of the Torrance Tests of Creative Thinking (TTCT), defines creativity as follows:

> "I defined creativity as the process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on; identifying the difficulty, searching for solutions, making guesses, or formulating hypotheses about the deficiencies; testing and retesting these hypotheses and possibly modifying and retesting them; and finally communicating the results" (1965, p. 663-664).

In Torrance's view, people who embrace this definition should endorse creative behavior, thinking and potential in both test and non-test procedures. Sternberg (2018) asserts that "creativity is viewed basically as an attitude toward life and one's work, but also has cognitive, affective, motivational, and environmental components" (p.50). Amabile (2011) believes that creativity is influenced by four factors: domain-relevant skills (expertise), creativity-relevant processes (personal approach to a given problem), task motivation (willingness to engage), and the social environment (outside the person).

Craft (2001) proposes a different classification based on the distinction between "little c" and "big C" creativity, which is similar to Boden's (2009) distinction between "historically creative" (H-creative) and "personally creative" (P-creative) persons. Little c or P-creative people are those who build moderate products. In contrast, big C or H-creative people tend to produce unique, revolutionary ideas, such as Picasso or Einstein. Taking a different perspective, Harris and de Bruin (2019) highlight the interdisciplinary side of creativity with a "whole-school creative ecology approach" combining science, technology, the arts, culture, and industry. In this approach, the arts and environmental subjects (STEAM) are also promoted alongside STEM subjects.

There are different types of creativity, including the major domains of scientific, artistic, and everyday creativity (Batey & Furnham, 2006). One can be creative in any given domain. That is why scientific creativity can be studied on its own. In the long history of science, certain individuals – including Stephen Hawking, Einstein, Tesla, Pastor, and Avicenna – have become legendary, towering figures known for their impressive scientific creativity. Scientific creativity is a domain that has gained more attention in recent years (Mukhopadhyay & Sen, 2013), and is of substantial importance for science education (Kind & Kind, 2007; Meyer & Lederman, 2013). However, early traces of the scientific creativity construct can be found in Feist's (1998) definition: "the capacity to have novel-original and useful-adaptive ideas in the domain of natural and social sciences" (p. 290). Based upon Guilford's (1956) "structure of intellect", Hu and Adey (2002) proposed the scientific creativity structure model (SCSM), which encompasses

three dimensions: process (cognitive processes), trait (fluency, flexibility and originality), and product (science knowledge, science problems, etc.). Hu and Adey (2002) themselves defined scientific creativity as "a kind of intellectual trait or ability producing or potentially producing a certain product that is original and has social or personal value, designed with a certain purpose in mind, using given information" (p. 392). Lastly, for Ayas and Sak (2014), scientific creativity—as a domain-specific form of creativity— is "the ability to generate novel ideas or products that are relevant to context and have scientific usefulness or importance" (p. 195). Drawing upon all these definitions of creativity in general and scientific creativity in particular, we propose the following definition of scientific creativity, which integrates elements of science into the creativity process: Scientific creativity can be defined as the ability to find novel solutions to problems in the discipline of science and/or to develop original, useful and/or meaningful scientific ideas, designs or products rooted in scientific knowledge and methods.

Can Teachers' Creativity Consciousness Be Developed?

Creativity consciousness has a pivotal role in creativity education. A multitude of research suggests that effective creative teaching leads to development of creativity consciousness (Davis et al., 2014) and creative learning (e.g. Davis et al., 2014; Sternberg, 2006). "Creativity consciousness and creative attitudes include an awareness of creativity, valuing creativity, a predisposition to think creatively, a willingness to make mistakes, and others" (Davis et al., 2014, p.242). Promoting consciousness of scientific creativity necessitates a systematic approach incorporating many different facets, including teacher education.

Davis et al. (2014) recommend that the following objectives be addressed in creativity training. They further emphasize that "increasing creativity consciousness and creative attitudes is the single most important component of teaching for creative growth" (p. 225).

."Raising creativity consciousness, teaching creative attitudes, and strengthening creative personality traits

. Improving students' understanding of creativity;

. Strengthening creative abilities through exercise;

. Teaching creative thinking techniques;

. Involving students in creative activities; and

. Fostering academic creativity" (p. 224)

Similar to Davis et al. (2014), de Souza Fleith (2000) lists ways to foster students' creativity: through teaching strategies (discovery learning, open-ended questions, student-centered views, engaging students in a variety of activities); teachers' attitudes (recognizing students, encouraging different responses, humor, questions and risk-taking, and providing students with different options) and classroom climate (a psychologically safe environment). Davis (2003) interprets Fleith's list as ways to foster creativity consciousness.

Creativity-based teaching-learning processes may include fun, interactive activities, games, and similar classroom practices. Specific examples of such practices include student-centered activities like brainstorming, creative problem solving, and creative thinking activities such as painting and writing (Colangelo & Davis, 2003); as well as open-ended, student-oriented, exploratory and group-based learning strategies (Kind & Kind, 2007). For science, the list might also include 'hands-on' activities in the laboratory or outdoors. "These settings are regarded as inviting openness and freedom" (Kind & Kind, 2007, pp. 4-5).

When planning creativity training programs for teachers, it is important to keep in mind that effective professional development practices increase the sustainability of learning experiences. Effective staff development practices that could lead to positive changes in teachers' attitudes, beliefs, and teaching practices might include the use of active learning (Wei, Darling-Hammond, Andree, Richardson, & Orphanos, 2009), experiential learning (Guskey, 1986), the development of a learner-oriented approach (Sahin & Yildirim, 2015), and follow-up (Waters, 2006). Specifically with respect to in-service teacher training programs, Trnova and Trna (2014) recommend using inquiry-based learning to foster science teachers' creativity.

Numerous studies of creativity in educational settings have been conducted in several countries (e.g. Bolden, Harries, & Newton, 2010; Gajda, 2016; Yoon, Woo, Treagust & Chandrasegaran, 2015). Specifically, there has been a growing interest in domain-specific creativity. One domain that has attracted the attention of researchers is science. There has been an increasing number of studies in scientific creativity in recent years (e.g. Li & Lin, 2014; Mukhopadhyay & Sen, 2013). A great number of these studies focus on science teachers' perceptions about creativity and scientific creativity. For example, in their study, Akcanca and Cerrah-Ozsevgec (2016) investigated pre-service science education teachers' beliefs about creativity. The researchers concluded that creativity might be developed but school curriculum was a hindrance as teachers thought the curriculum was ineffective to develop creativity.

In another study, Liu and Lin (2014) investigated science teachers' views on scientific creativity and scientific creativity instruction in the classroom. The results indicated that the teachers were aware of many core features of creativity, and tended to emphasize divergent thinking, autonomy, and curiosity and interests. In contrast, they overlooked aspects such as convergent thinking, problem-finding, and linking the arts and science.

In an older study, Bore (2007) studied creativity development among five primary and three secondary school teachers using a grounded theory approach. The study underlined the importance of the "bottom-up" method for promoting creative science

teaching, and four phases were identified from the teacher interviews: uncertainty, visioning, realization and readiness. Uncertainty referred to planning future creative learning experiences for students. Visioning was related to idea generation and collaboration within and between individuals. Realization was the phase in which the ideas acquired structure, while during the readiness phase, teachers were eager to practice their ideas with students.

Experimental studies that focus on the development of science teachers' scientific creativity and creativity have also attracted the attention of the researchers. An increasing number of the intervention studies focus on the effect of constructivist and innovative approaches in teaching science on science teachers' creativity and creativity consciousness. However, to the best of our knowledge, development of science teachers' creativity consciousness through scientific creativity trainings has only been marginally addressed in these studies. To illustrate, in an experimental study, Trnova and Trna (2014) applied inquiry-based science education to support students' and teachers' creativity development. The results showed that participants improved their "abilities (all participants created new materials), individual approach (teachers changed worksheets etc.) and process (teachers worked very hard, improvised, etc)" (pp. 58-59).

As seen, although there has been an increasing interest in scientific creativity studies in science education, most of these studies focus on perceptions of prospective science teachers, in-service science teachers and students about creativity and scientific creativity (e.g., Akcanca & Cerrah-Ozsevgec, 2016; Aktamis & Ergin, 2008). Therefore, there is a need to explore how science teachers' creativity consciousness can be developed through specifically designed scientific training programs which aim to raise science teachers' creativity consciousness through creativity and scientific creativity content and instructional activities. With this in mind, in this study, we aimed to explore whether and to what extent science teachers' consciousness of scientific creativity could be increased through a scientific creativity training program (the SCTP), and how the changes in the teachers' scientific creativity consciousness were transferred into their classroom practices following the intervention. In order to do so, we employed the SCTP, which was developed specifically for this purpose. While developing the SCTP, we applied the goals and objectives for effective creativity trainings identified by Davis et al. (2014). Our research questions are as follows:

1. How does the SCTP affect science teachers' consciousness of scientific creativity?

   1.1. What elements of the SCTP increased the science teachers' creativity consciousness in science?

2. What are the impacts of higher creativity consciousness on teaching?

   2.1. What elements of the SCTP facilitated the science teachers' integration of higher creativity consciousness in science into their teaching?

METHOD

Design

A qualitative case study was used to answer the research questions. A case study design was used to "explore a real-life, contemporary bounded system (a case) (…) through detailed, in-depth data collection involving multiple sources of information ... and report a case description and case themes" (Creswell, 2013, p. 97).

Participants

Data was collected from seven science teachers (five female; two male) working in public primary schools in Northern Cyprus. In order to recruit participants, a text describing the purpose of the study and providing brief information about the creativity training program was sent to schools and shared with teachers through social media (Facebook) and local newspapers. Primary school science teachers were asked to contact the researchers and apply for the training program via a Google form on a voluntary basis. A purposeful sampling strategy was used to recruit the teachers, the criteria being teaching science classes at the primary school level and years of teaching experience. As Table 1 shows, the participants' teaching experience ranged between 6 and 17 years. Four teachers were teaching at village schools, while three teachers were teaching at inner-city schools.

Table 1. Demographic Profiles for the Participants (n=7)

Pseudonyms	Gender	Teaching Experience	School Type	Grade Level
T1	Female	17	Inner-city	4
T2	Female	7	Inner-city	2
T3	Male	6	Village	5
T4	Female	8	Village	4
T5	Male	14	Village	5
T6	Female	13	Village	5
T7	Female	9	Inner-city	1

Data Collection Instruments

Qualitative data was collected in the form of semi-structured interviews, in-class observations, and document analysis. The qualitative data enabled us to track changes in the teachers' instructional practices in terms of how and to what extent they transferred their new knowledge and skills into classroom practice. This data triangulation increased the internal validity of the study. Detailed information on data collection tools were explained below.

Semi-structured Interviews

Three interview schedules were developed: one to be administered prior to the training program, one to be administered one to two weeks after the training program, and one to be administered one term after the training program. Although the three interview schedules were similar to one another, the post-seminar schedules also included questions about the effects of the training on participants and how the teachers were applying the training content in class. Two faculty members, one from the Department of Curriculum and Instruction and the other from the Department of Assessment and Evaluation, provided expert opinions on the appropriateness and clarity of the draft interview schedules and suggested adding further questions and/or removing unnecessary questions in some cases. The interview schedules were then revised and finalized on the basis of these expert opinions.

In-Class Observations

A classroom observation schedule was developed to be used after the training program to determine whether and to what extent teachers transferred the knowledge and skills they acquired in the training program to their actual classroom practice. We obtained expert opinions on the observation schedule from the same experts who provided expert opinions on the interview schedules, and revised the observation schedule accordingly.

Document Analysis

As part of the document analysis, instructional materials the teachers used as part of their classroom practices after the training program were collected and analyzed to supplement the data from interviews and classroom observations. Among these classroom documents were electronic and printed materials (e.g., PowerPoint presentations, handouts).

Procedure

The study consisted of three phases, as defined below:

Phase 1: Developing Data Collection Instruments and Participant Selection

In the first phase of the study, the data collection instruments were developed. Specifically, the researchers designed a novel in-service training program on scientific creativity, three semi-structured interview guides, and a classroom observation schedule. Then, necessary ethics permissions were obtained. After obtaining these permissions, participants were recruited and selected based on the criteria described before.

Phase 2. Scientific Creativity Training Program (SCTP) and Data Collection

The second phase of the study comprised the implementation of the SCTP and the associated data collection process. The SCTP was designed as a four-week training program and was held on the campus of an international university in Northern Cyprus. The program took place over three Saturdays in November 2017. It lasted eight hours per session. In the SCTP, we focused on scientific creativity-based activities that reflected the objectives of creativity education proposed by Davis et al. (2014) , namely developing creativity consciousness and positive attitudes towards creativity, improving understanding of creativity and creative individuals, experiencing creative skills, teaching effective creative thinking techniques, and involvement in creative activities. The sessions incorporated hands-on activities and active learning environments to promote creativity, providing teachers with the opportunity to learn by doing. During the training sessions, the researchers collected observational data through semi-structured observation forms. Information about each week's session is presented below.

Week I. Prior to the first training, pre-interviews were conducted with the participating teachers in which they were asked about their understanding of creativity and scientific creativity as well as their in-class practices related to scientific creativity. The interviews lasted about 20 minutes each and were audio-recorded. After this data collection, the first training module of the SCTP began, which aimed to enhance the participants' creativity consciousness and attitudes as well as understanding of creativity, as recommended by Davis et al. (2014), through the use of various inquiry- and learner-based creativity activities. The instructional activities were conducted using easily found materials (e.g., toilet paper, wire coat hangers), video clips focusing on creativity (e.g., Mona Lisa Smile), stories about creative people, the experiences of inspirational teachers who had made creative changes to their instruction, and examples from daily life. We tried to enhance the participants' creative thinking by involving them in creative

active learning environments in which they were encouraged to practice and exercise creative thinking skills (e.g., fluency, originality, elaboration) through related activities, as recommended by Davis et al. (2014) (e.g., 'what would happen if…?' activities, 'thinking of unusual uses for common objects', and 'thinking of product improvements') (p. 229).

Week II. The second training was held on the following weekend. This training module focused on scientific creativity and the link between scientific creativity and science education. Similar to the first week, this session also took the form of active learning environments that provided teachers with the opportunity to learn by doing. During Week II, similar to the first module, we aimed to enhance the participants' scientific creativity consciousness and attitudes, and enabled them to experiment with scientific creativity-based activities in creative environments, as suggested by Davis et al. (2014). The teachers participated in 10 creative science activities with links to the science curriculum (e.g. DNA extraction, draining a buckle, building a motorboat, egg in the box, etc.). The researchers conducted semi-structured observations during the session. At the end of the session, the participants were given an interesting and challenging science problem to discuss in the last training module and were asked to complete mini-projects involving scientific creativity-oriented activities in groups of 2-3 to present during the final week of the training. With these activities, we aimed to allow the participants to put their new knowledge and skills into practice.

Week III. The third week of the SCTP was the preparation week for the mini-projects. The participating teachers came together in groups of 2-3 to design mini-projects that would be presented in the final week of the SCTP.

Week IV. In the last week of the training program, the mini-projects were presented in creative and interactive learning environments. After each group presentation, a full group discussion was conducted concerning the use of the suggested activities in the classroom.

Phase 3: Follow up

The researchers conducted the second interviews with participants one to two weeks after the SCTP ended. The participants reflected on the SCTP and discussed how they were integrating creativity into their classroom practice following the SCTP. After the interviews, in-class observations were conducted in the teachers' classrooms to supplement the interview data. In addition to interviews and observation, instructional materials the teachers used as part of their classroom practices after the training program (e.g., handouts, PowerPoint presentations) were collected. Each teacher's class was observed for 2 to 4 hours, depending on the teacher's availability using the observation schedule developed by the researchers. Finally, one semester after the SCTP, the third interviews with the teachers were conducted in order to track long-term changes in the teachers' classroom practices.

Data Analysis

Inductive content analysis of the data collected from the teachers through semi-structured interviews, in-class observations, and document analysis was conducted. The content analysis was conducted simultaneously with the data collection. The researchers prepared a preliminary code list by taking the related literature and research questions into consideration, in accordance with Miles and Huberman's (1994) strategy. As the researchers coded the data, they added newly emergent codes to the preliminary code list. After the completion of the first round of coding, double coding was conducted as suggested by Creswell (2011) to "reduce overlap and redundancy of codes" and "collapse codes into themes" (p.244). Five major themes emerged from the data analysis.

RESULTS

Five interrelated themes regarding the SCTP's contribution to the teachers' consciousness of scientific creativity and how and to what extent the teachers transferred their new knowledge and skills into practice emerged from the data analysis of the interviews, in-class observation, and document analysis. These themes are: (1) self-reflection, (2) development of creativity consciousness, (3) changes in teachers' pedagogical content knowledge, (4) increased teaching motivation and teaching self-efficacy to encourage students' creative growth, and (5) changes in classroom practice.

Self-Reflection

The results indicated that self-reflection may be the initial stage of change in teachers' consciousness of creativity and transfer of creativity consciousness into their teaching. Teachers' engagement in inquiry-, creativity- and scientific creativity-based activities using easily found materials (e.g., toilet paper, a wire coat hanger, an orange, flowers, eggs) during the SCTP encouraged them to reflect on the extent to which they employed creativity in their everyday personal and professional lives and question the extent to which they taught creativity and/or used creative methods in the classroom. To illustrate, T6 stated when reflecting on the impact of the SCTP:

> The seminar (SCTP) helped me to see even a very simple thing differently. Well ... I told myself "Were we wearing blinders (before)? Why can't we see these details? Why can't we be happy with small things?". I started to look very differently. (Interview 2)

Likewise, the interview with T6 conducted at the end of the term showed that she had continued to self-reflect on her classroom practice:

I felt that I had to use more activities (as part of my instruction) after the seminar (SCTP). Because if I, as a 36-year-old individual, a teacher, have enjoyed these (activities in the SCTP), it is my responsibility to have my students experience the same feelings.

Development of Creativity Consciousness

The results indicated that teachers may develop creativity consciousness following the SCTP as a consequence of the self-reflection process. The self-reflection process helped teachers identify the importance of creative thinking skills in their personal and professional lives. The teachers developed an awareness that they could improve their own creativity as well as the creativity of their students in the classroom. For example, reflecting on how the SCTP increased her creativity consciousness, T1 stated: "Well...originality is important for creativity. I have started to see creativity as an element that has to be present at every moment and everywhere. While getting dressed, watching TV, sitting…" (2nd interview). Likewise, T6 stated in her last interview: "I developed awareness that I did not notice anything when travelling in a car. We now see different things when we look out the (car) window". Similarly, reflecting on how the SCTP helped her develop creativity consciousness, and thus change her behavior in the classroom, T4 stated:

Previously (before the SCTP), I used to ask questions in line with my aims to elicit student ideas...such as brainstorming; however, I somehow tried to get the answers I desired. It might not have been deliberately, but I used to direct the students to what I would plan to discuss/do (in the classroom). Somehow I noticed that (after the SCTP). I mean in terms of enabling them to express their ideas freely, to produce ideas...It (the SCTP) increased my awareness of this. (Interview 2)

The results of the interview conducted with T4 one term after the SCTP seemed to indicate that she had transformed her classroom practice as a result of the change in her creativity consciousness, as seen in the following quote:

Well, most importantly, it (the SCTP) helped me to gain (creativity) consciousness. I have started to ask myself how I can ask more creative questions (in the classroom) or how I can encourage student creativity. Well, kids can be more creative than us. For example, even before I asked them what the shape we designed in the classroom looked like, they said that "Here is a spaceship, let's get in", and they entered the shapes (on the floor). If I hadn't attended the training program, I would not have allowed them to do so. I would have only said "No, we will be only calculating the shapes on the floor". But I allowed them to imagine that it was a spaceship and do something inside it.

Changes in Teachers' Pedagogical Content Knowledge (PCK)

The next theme that emerged from the data analysis concerned changes in the teachers' PCK (pedagogical content knowledge). The results indicated that in parallel to the self-reflection process and the development of creativity consciousness, the SCTP may increase the teachers' PCK regarding integrating creative thinking into classroom practice. Several of the training methods utilized in the SCTP might facilitate an increase in the teachers' PCK with respect to creative thinking, namely the learner-centered approach; the use of simple, easily found materials; the enjoyable, curiosity-triggering, creative thinking-based science activities; asking thought-provoking questions; watching videos related to creativity; the researchers sharing the experiences of inspirational teachers who had made creative changes to their instruction; book and movie recommendations by the researchers on the topic of creativity; the use of icebreakers; high trainer competencies; the effective delivery of theoretical knowledge on creativity and creative thinking; the participants' development of creativity projects with their colleagues and presenting them in the last session of the SCTP; the use of examples from daily life; and the effective use of PowerPoint presentations. By way of example, reflecting on the use of learner-based training in the SCTP, T6 stated: "You involved us (in the SCTP). We noticed that we could see the things we could not in reality by being involved and sharing our ideas. It was great" (Interview 2). Similarly, reflecting on the use of materials, T6 stated in her last interview that: "I learned how to use materials while being involved in the activities there (in the SCTP). I created things I would never think about with the materials you gave".

Increased Teaching Motivation and Teaching Self-Efficacy to Encourage Students' Creative Growth

The results indicated that the self-reflection process, development of creativity consciousness and attitudes, and changes in teachers' PCK seemed to in turn increase their teaching motivation and teaching self-efficacy with respect to encouraging students' creative growth. The data indicated that most of the teachers wanted to make changes to their instruction by employing more creative tasks and thinking-outside-the-box activities in order to teach topics in a novel way. To illustrate, in her second interview, T1 stated:

Well, now I have started to think about how I could use creativity or contribute to a child (a student's creativity) for every single topic. How can I help the child to demonstrate his/her own creativity? And it has been really effective.

Similarly, T3 stated: "I sometimes think: 'What kind of (creative) activities can I do about this topic? What kind of experiments can I conduct?' Well, there are activities in the textbook, but it (STCP) enabled me to think about different activities (Interview 2)". Similarly, reflecting on the program's impact on her PCK, T4 stated:

Well, I've started to ask different questions to myself. There has been a change in the things I read and watch. I've started to watch TedX talks you (researchers))showed/recommended. There are updates from YouTube. I follow a classroom teacher you mentioned to be inspired to improve myself. I've started to think about how I could develop myself and my instruction. (Interview 2)

Another noteworthy comment is as follows:

> Well, our self-confidence increased. We have started to apply most of the activities we conducted in the seminar in our classrooms. We also created more activities for classroom use. We have seen its benefits. (T2, Interview 2)

Changes in Classroom Practice

The results of the second interviews, observational data and document analysis indicated that all teachers seemed to immediately begin to put their new knowledge and skills into practice in the classroom. They primarily tried out or adapted the activities and/or materials used in the SCTP to improve their students' scientific creativity. To illustrate, T6 said: "I have started to use the activities you used in the (SCTP) by adapting them to my own context" (Interview 2). Similarly, T1 explained how she conducted an activity used in the SCTP:

> For example, I had a mandarin with me in class. There was an orange experiment we tried there (in the SCTP). Two participants (in the SCTP) used that activity. They first threw the orange into the water unpeeled, then peeled. When I used it in the classroom, the students shouted "wow" as if they had invented something. It is very easy but I believe students will no longer forget it. (Interview 2)

The data from the third interviews, classroom observations and document analysis indicated that the teachers' use of creativity in the classroom also increased in the long run. At this point, in addition to employing the activities and materials they had experimented with in the SCTP, the teachers had started to create new activities in line with their instructional goals (e.g., T3 made groundwater using a jar, gravel, sand, and empty toilet paper rolls in Grade 5). For example, T4 stated: "Well … I have started to reflect on the activities that I use and to think about how I can modify them" (Interview 3). Similarly, T2 stated: "We have used a lot of activities that students like including yours. In addition, we created more activities" (Interview 3).

The teachers reported that the changes in their classroom practice had a positive impact on their students' interest in science class, independently of grade level. In addition, the changes in classroom practice reportedly enhanced the students' knowledge retention and motivation to complete creative science tasks outside of school. For instance, reflecting on an experiment she had conducted with a toy car in the classroom, T1 pointed out the changes in students' attitudes as follows: "When I used activities, I noticed how effective it could be, how disinterested students enjoyed it, and those students participated in the lesson more" (Interview 3). Similarly, T1 described the impact of scientific creativity activities on their students' interest as follows:

> Students have started trying out something new at home. I made a magnet. I gave them a list to show what a magnet could and could not attract. They (the students) were not limited to the list. They started to try out everything at home. At the end of the day, there were very interesting things. One student said that the magnet was attracted to the fork and knife. Another said "mine can't" insistently. Thus, they researched that and found that in some forks, the amount of iron was low, in others, it (the amount of iron) was higher. They were even able to reach this conclusion by themselves.

The interview data showed that these changes in the students' interest in science class, motivation to carry out creative science projects outside of school, and knowledge retention seemed to in turn further increase the teachers' motivation to continue to use creative methods in the classroom. To illustrate, reflecting on the impact of the SCTP on her classroom practice, T1 noted:

> Well, it (the SCTP) helped me to overcome my pessimistic point of view. I mean there are children that you cannot reach whatever you do. They stay behind their friends. I mean we couldn't get their attention (before the SCTP). However, I now notice that when I use these activities, they (these children) have started to participate. Well, it is great to see that.

The results from qualitative interviews and observational data showed that the extent to which the teachers use creativity in class might depend on grade level. Teachers of lower grades seemed to use more creative activities, as they mentioned having fewer concerns related to high-stakes exams and curricular expectations. To illustrate, T3 stated:

> I have had a chance to put some activities (that I learned in the SCTP) into practice. But there is a lot of content and college preparation. As I am behind schedule, I have not been able to use (creativity-based) experiments in all classes or topics. (Interview 3)

The results of the interviews indicated that alongside high-stakes exams and curricular expectations, inadequate parental support, students not bringing materials with them to class and a lack of knowledge of how to manage classroom discussions when students came up with lots of creative ideas were among the barriers to teachers fostering scientific creativity in the classroom. For example, T4 stated:

> There are students who are not aware of their responsibilities … or due to their parents' background - even though I ask for simple materials, they forget to bring a balloon or a bottle ... This limits me, I have to bring extra materials, the materials they have to bring (Interview 2).

With respect to experiencing problems managing classroom discussions, T4 stated:

> Well, children have a lot of ideas … I allow them (to share their ideas) so that I can get their creative ideas but then they might experience problems about focusing. Because they enjoy it. They think of other ideas too … I might have problems directing their attention to the topic again (Interview 3).

Nevertheless, the results indicated that the teachers continued to use creative methods in the classroom despite the obstacles they encountered. When discussing the chaos that creative tasks generated in the classroom, T1 stated: "I have started to enjoy (the activities) too. I used to regard this (noise) as a problem … There would be noise, chaos … But it is okay as our classes are crowded". Hence, the results indicated that although high-stakes exams and curricular expectations had a negative impact on teachers' creative practices, especially during the last two weeks of the term, most teachers seemed to continue to incorporate creativity into science instruction. For example, reflecting on his practices after the SCTP, T5 stated:

> In the fifth grade, we do not have sufficient time (for creativity-based activities). Well, we have to create time. Because there is an overloaded curriculum and a deadline ... But as I've mentioned before, I used to apply creativity-based activities with a percentage of 20, now I do my best to apply 50-60 percent. I have definitely seen its positive impact. (Interview 3)

The results further indicated that the teachers planned to continue to use scientific creativity in the classroom in upcoming years despite the roadblocks they encountered. To illustrate, T2 stated:

> Well, next year I will be teaching the first grade. From the very beginning, I plan to use similar activities every week ... I will say "Today is our Creativity Day", "Scientific Day", "Experiment Day". I plan to integrate this into my instruction. (Interview 2)

In line with their interest and motivation to continue to integrate creativity into instruction, the interviews showed that the teachers hoped to participate in similar in-service training programs in the future to update their knowledge and skills and further improve their teaching motivation and self-efficacy. One notable quote is as follows:

> Well, conducting these kinds of studies occasionally will motivate us, increase its (creativity's) importance and we won't forget ... It will be more permanent. I think this should be done from time to time to make a difference, like giving fresh blood. (T1, Interview 3)

DISCUSSION AND CONCLUSION

This study set out to explore whether and to what extent science teachers' consciousness of scientific creativity could be increased through a scientific creativity training program (the SCTP), and how the changes in the teachers' scientific creativity consciousness were transferred into their classroom practices following the intervention. The results indicated that all teachers put the new knowledge and skills they had acquired during the SCTP into practice in their classroom instruction. Self-reflection seemed to be the initial stage of this process of transferring professional learning into practice. The results revealed that the teachers' engagement in inquiry- and creativity-based activities using easily found materials in active learning environments during the SCTP may have encouraged them to reflect on their use of creativity in their personal and professional lives as well as in their classroom practice. Alongside this self-reflection, teachers may develop creativity consciousness. The results indicated that this may have increased their awareness of scientific creativity and its importance and motivated them to further improve their own and their students' creativity. This finding is consistent with that of Sahin and Yildirim (2015), who found that the transfer of professional learning into classroom practice starts with self-reflection, which in turn leads to a change in teachers' pedagogical beliefs. It is also encouraging to compare these findings to those of Cheng (2016), who found in his study on personal transfer of creative learning from a toy course that the students who completed the course "used to relate creativity with something unusual, great, inborn and rather difficult to gain, but after the toy course they were aware that creativity could always be found in daily life (if one was sensitive enough) and that creative thinking could also be improved by learning" (p.63).

Our results further revealed that the SCTP may facilitate the development of teachers' PCK concerning how to deploy scientific creativity in the science classroom. The results indicated that certain practices employed in the SCTP may effectively promote the development of teachers' PCK concerning scientific creativity, confirming the results of previous studies. These effective practices included the use of an inquiry-based, learner-centered training (e.g., Colangelo & Davis, 2003; Kind & Kind, 2007; Sahin & Yildirim, 2015), active learning strategies (e.g., Sahin & Yildirim, 2015; Wei et al., 2009), and enjoyable, curiosity-triggering creative thinking-based science activities. These findings support the results of previous experimental studies revealing that inquiry- and learner-based professional development trainings in the field of science education positively affect participants' teaching practices (e.g., Trnova & Trna, 2014).

Another important finding was that the self-reflection process, development of creativity consciousness, and changes in teachers' PCK seemed to increase the teachers' teaching motivation and teaching self-efficacy with respect to encouraging students' creative growth. The results showed that most teachers were motivated to deploy creativity-based tasks in their science classes and immediately integrated the training content into their classroom practice following the SCTP. They seemed to initially replicate the activities and/or materials used in the SCTP to enhance their students' scientific creativity, either with adaptations or exactly as they were introduced in the training. As time went on, however, the teachers continued to focus on scientific creativity in the classroom and even started to design new activities and/or materials in accordance with their instructional goals. It is encouraging to compare our results with Davis' (2003) theoretical suggestion that "At the very least, we all can make better use of the creative abilities with which we were born" (p. 318). The results of this study lend further confirmation to previous studies' findings that creativity interventions can have a meaningful impact on creative thinking skills (e.g., Davis, 2003; Davis et al., 2014) and a variety of learner-based instructional techniques (Colangelo & Davis, 2003; Kind & Kind, 2007).

Although we did not collect data from students of the teachers who were involved in the study, the data from teacher interviews and classroom observations suggested that the changes in teachers' classroom practices may have positively affected

their students' interest in science class, knowledge retention and motivation to conduct creative science tasks outside the school environment. This was in turn found to reciprocally enhance the teachers' motivation to continue to incorporate scientific creativity into the classroom. Hence, this study adds to the evidence from previous studies suggesting that there is a reciprocal relationship between teachers' beliefs and practices (e.g., Clarke & Hollingswoth, 2002; Cobb, Wood, & Yackel, 1990; Gelmez-Burakgazi & Can, 2020; Sahin & Yildirim, 2015). Furthermore, our findings on teacher motivation also support Amabile's (1983) Intrinsic Motivation Hypothesis by Creativity: "a primarily intrinsic motivation to engage in an activity will enhance creativity, and a primarily extrinsic motivation will undermine it" (p. 366).

However, the teachers experienced some barriers to integrating scientific creativity into their science classrooms, namely high-stakes testing, curricular expectations and related time management concerns. These posed a particular hindrance for fifth-grade teachers. Other obstacles the teachers encountered were students not bringing the requested materials to class, a lack of parental support, and a lack of know-how among the teachers on how to manage classroom discussions when students came up with lots of creative ideas. Nevertheless, the results showed that the teachers continued to incorporate creativity into the classroom despite these challenges and planned to continue to foster scientific creativity in upcoming years. Hence, this finding provides support for the premise that changes in teachers' creativity consciousness, PCK and teaching motivation and teaching self-efficacy to integrate creativity into their classroom instruction may lead them to sustainably foster scientific creativity in the classroom in the long run, despite the associated challenges.

FINAL REMARKS

The findings reported in this study may be able to contribute to teachers' creativity consciousness. Our results indicated that creativity education can lead teachers to make significant changes to their classroom practice by gradually integrating scientific creativity. Although our data reveals a common pattern of teacher change, it should be noted that, consistent with Cheng's (2016) study, which found that "The personal transfers of learning were found to be spontaneous, far, diverse, multidirectional, highly individual and, sometimes, quite unexpected" (p.58), the present study also reveals that each teacher has a unique trajectory of change regarding creativity and creative teaching, which needs to be taken into consideration for more sustainable creativity education.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Statements of publication ethics

We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

Researchers' contribution rate

The study was conducted and reported with equal collaboration of the researchers.

Ethics Committee Approval Information

This study has been ethically approved by Hacettepe University Ethics Committee on 16/11/2016 with document number 76942594-900/3988.

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| Research Article / Araştırma Makalesi |

Determining Education Faculty Students' Motivations Which Are Effective in the Choice of Profession and Field

Eğitim Fakültesi Öğrencilerinin Meslek ve Alan Seçiminde Etkili Olan Motivasyonların Belirlenmesi

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Keywords

1. Profession choice
2. Field choice
3. Teacher candidate
4. Intrinsic motivation
   Extrinsic motivation

Anahtar Kelimeler

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Abstract

Purpose: This study aimed to determine the motivations that are effective in teachers' candidates' choosing the teaching profession and the field they study. In addition, it aimed to examine the intrinsic and extrinsic motivations that are effective in profession and field choices regarding gender, year of study and the field of education.

Design/Methodology/Approach: The research was conducted with the relational screening model. The research population comprised students studying at Inonu University, Faculty of Education. The sample was composed of students studying in Preschool Teaching, Turkish Language Teaching, Mathematics Teaching and Classroom Teaching departments at Inonu University Faculty of Education. Non-parametric tests were used because the data did not show normal distribution.

Findings: It was determined that the motivation sources effective in teacher candidates' choice of profession and field of education were at the level of "Agree" in the intrinsic field, intrinsic profession, outside profession dimensions and throughout the scale while they were at the level of "Partially Agree" in the outside field dimension. Differences were found in gender in the intrinsic and extrinsic professions and the extrinsic field subdimensions. No difference was found in motivations that are effective in choosing a profession and field according to a year of study. Differences were found in terms of the department of study.

Highlights: The motivation of teacher candidates to choose their profession and the field of education is primarily intrinsic. However, it was observed that besides intrinsic motivation sources, a certain level of extrinsic motivation sources was also practical. This situation is promising for the future of education and the teaching profession in Turkey.

Öz

Çalışmanın amacı: Bu araştırmanın amacı, öğretmen adaylarının öğretmenlik mesleğini ve öğrenim gördükleri alanı tercih etmelerinde etkili olan motivasyonları tespit etmektir. Bunun yanında meslek ve alan tercihlerinde etkili olan içsel ve dışsal motivasyonların cinsiyet, sınıf düzeyi ve öğrenim görülen alan bakımından incelenmesi amaçlanmıştır.

Materyal ve Yöntem: Araştırma, ilişkisel tarama modeli ile yürütülmüştür. Araştırmanın evrenini İnönü Üniversitesi Eğitim Fakültesi öğrencileri oluşturmaktadır. Örneklem ise İnönü Üniversitesi Eğitim Fakültesi Okul Öncesi Öğretmenliği, Türkçe öğretmenliği, Matematik Öğretmenliği ve Sınıf Öğretmenliği bölümlerinde öğrenim gören öğrenciler oluşturmaktadır. Veriler normal dağılım göstermediğinden parametrik olmayan testler kullanılmıştır.

Bulgular: Öğretmen adaylarının meslek ve öğrenim gördükleri alanı tercih etmelerinde etkili olan motivasyon kaynakları; içsel alan, içsel meslek, dışsal meslek boyutlarında ve ölçek genelinde katılıyorum düzeyinde iken dışsal alan boyutunda ise kısmen katılıyorum düzeyinde olduğu görülmüştür. İçsel ve dışsal meslek, dışsal alan alt boyutlarında cinsiyet açısından farklılaşmalar bulunmuştur. Sınıf düzeyine göre meslek ve alan seçiminde etkili olan motivasyonlar açısından farklılaşma bulunmamıştır. Öğrenim görülen bölüm açısından farklılaşmalar bulunmuştur.

Önemli Vurgular: Öğretmen adaylarının mesleklerini ve öğrenim gördükleri alanı tercih etme motivasyonları daha çok içsel kaynaklıdır. Bu durum Türkiye'nin eğitim geleceği ve öğretmenlik mesleği bakımından umut vericidir. Ancak içsel motivasyon kaynaklarının yanında belirli düzeyde dışsal motivasyon kaynakları da etkili olduğu görülmüştür.

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INTRODUCTION

As a result of people's struggle with nature and each other, cooperation and professions emerged (Sarpkaya, 2008,p. 55). The profession is defined as "a job with defined rules, based on systematic knowledge and skills, acquired through a certain education, and done in order to produce useful goods, provide services and earn money in return" (Turkish Language Association [TDK]). Countries use education systems to raise a qualified workforce to increase their level of development (Çevik & Yiğit, 2009, p. 89). Teachers, who are the essential elements of the education system (Küçükahmet, 2012, p. 180), are at the centre of education systems in raising the qualified workforce that the country needs (Organization for Economic Co-operation and Development [OECD], 2005, p. 1). In this sense, it can be said that teaching is one of the professions that are considered fundamental for the development and welfare of a country (Watt et al., 2014, p. 1).

Individuals who will perform in the teaching profession that requires excellent sacrifice should have personality traits compatible with their professions, be satisfied in their professions, love learning and teaching, and be happy to do their profession (Dağ, 2010, p. 1). Choice of the profession is a process whose education and development continue throughout life (Yazıcı, 2009, p. 35), and which will make the individual happy for a lifetime and provide job satisfaction when it is chosen in line with the interests and skills of the individual (Karakuş-Kaçmaz, 2015, p. 19). Many positive and negative factors affect young people's career choices (Yüce, Şahin, Koçer & Kana, 2013, p. 295). In this context, it is seen that many studies have been conducted on the reasons why teacher candidates choose their profession. In the studies conducted, it was determined that teacher candidates choose teaching professions for reasons such as liking to teach, the desire to work with children and young people, being effective in the future of children and young people, contributing to the development and welfare of the society, teaching being suitable for their own abilities, the desire to make a difference, having job security, enjoying teaching, its compatibility with family life, being able to spare time for the family, contributing to increasing social equality, previous teaching and learning experiences, vacation time, additional job opportunities, salary, graduate education and career opportunities, gender eligibility, not having enough points for another field, lack of other options, convenience of working hours, ease of finding a job , being close to their residence, the teaching profession being valuable and respected in society, the influence of family, friend and a teacher, and the high social aspect of teaching (Anılan & Anılan, 2014; Aydın, 2011; Bastick, 2000; Boz & Boz, 2008; Bursal & Buldur, 2013; Çermik H., Doğan & Şahin, 2010; Dağ, 2010; Eş, 2010; Karadağ, 2012; Kılcan, Keçe, Çepni & Kılınç, 2014; Övet, 2006; Özbek, 2007; Özsoy, Özsoy, Özkara & Memiş, 2010; Papanastasiou & Papanastasiou, 1997; Sarıkaya & Khorshid, 2009; Şeker & Çapri, 2020; Tataroğlu, Özgen & Alkan, 2011; Ubuz & Sarı, 2008; Watt & Richardson, 2007; Young, 1995). However, it is seen that the number of studies based on the motivation of teacher candidates in their choice of profession is somewhat limited (Çelik et al., 2018; Ekinci, 2017; Hellsten & Prytula, 2011; König & Rothland, 2012; Öztürk-Akar, 2012; Watt & Richardson, 2007; Yüce, Şahin, Koçer & Kana, 2013; Yu & Bieger; 2013; Yong, 1995), and that in many countries, there are very few systematically collected and analyzed data about people's motivation to choose teaching as a profession (Watt et al., 2014, p. 2).

Motivation is the most crucial power that guides an individual's behaviour and ensures the behaviour's intensity, speed and continuity (Akbaba, 2006, p. 343). While sources of motivation are influential in choosing the teaching profession (Yazıcı, 2009, p. 33), they are also essential for the development of teacher candidates (Çelik et al., 2018, p. 40). While extrinsic motivation emerges with external effects such as reward and punishment, intrinsic motivation is internal reactions such as love, curiosity, knowing, being sufficient, and the desire to develop (Akbaba, 2006, pp. 343-345). While activities that are intrinsically motivated provide the basic psychological needs to be met (Ryan & Deci, 2017, p. 113), individuals who are motivated in this way enjoy realizing their goals rather than seeing their activities as a tool for another purpose (Hilker, 1993, p. 8).

The motivation for teacher candidates to choose a profession is considered an essential factor in admission, progression, and graduation from a teacher education program, as well as a fundamental premise for motivation and enthusiasm in the teaching profession (König & Rothland, 2012, p. 289). It is known that teacher candidates with high intrinsic motivation generally perform better than those with less intrinsic motivation (Baker, 2004, p. 190). Teacher candidates' choice of a profession cannot be considered separately from the social context. Studies have shown that while extrinsic motivation sources such as salary, job security and career in underdeveloped and developing countries are determinants in teacher candidates' choice of profession, altruistic and intrinsic motivation sources are determinant factors in developed countries in this respect (Bastick, 2000; Yong, 1995). Considering the effects of economic development on motivation, these results show that the differences between underdeveloped or developing countries and developed countries are consistent with Maslow's motivation theory (Bastick, 2000). The individual's consideration of his/her interests, desires and personality traits in the choice of the profession rather than attributing material meanings to the profession s/he chooses will ensure that many psychological and sociological problems that the individual may face in the future can be prevented at the very beginning (Dağ, 2010, p. 5). Considering that intrinsic motivation contributes positively to the learning process and the quality of learning (Baker, 2004, p. 190), the quality and nature of education in a country are directly proportional to the quality of teachers in the country (Celep, 2004, p. 25), and that the teaching profession requires loving children and the profession above all (Kıroğlu, 2014, p. 345), determining the motivations of teachers in choosing their professions and their fields, and arranging the teacher selection, training and appointment systems accordingly are essential in terms of meeting the expectations of countries from education.

Countries achieve their goals of raising new generations by age requirements, ensuring the transfer of culture, and meeting their future labour force needs through education systems. Teachers are at the centre of the effectiveness and efficiency of this system, and they directly affect the quality and efficiency of education systems. The motivation of teacher candidates to choose their profession will affect their training during their education, future teaching life, attitudes towards their professions and students' success. In this context, it is crucial to determine the motivations of teacher candidates in choosing their profession and field. It is seen that there are limited studies on the motivations that are effective in teacher candidates' choice of their profession and the field of education. This study is vital in that it will determine teacher candidates' intrinsic and extrinsic motivations that are effective in their choice of profession and field and thus contribute to the literature. It will provide insight for the researchers and the policies to be followed in selecting, training and employing teachers.

Purpose of the Study

The purpose of this study was to determine the motivations that are effective in teachers candidates' choosing the teaching profession and their field of study. In addition, it was aimed to examine the intrinsic and extrinsic motivations that are effective in profession and field choices in terms of gender, year of study and the field of study. In line with this purpose, answers to the following questions were sought:

1. What are the intrinsic and extrinsic motivations of the teacher candidates that affect their preference of the teaching profession and the field they study?
2. Do the intrinsic and extrinsic motivations that affect teachers candidates' choosing the teaching profession and the field they study differ by gender?
3. Do the intrinsic and extrinsic motivations that affect teacher candidates' choosing the teaching profession and the field they study differ according to the year of study?
4. Do the intrinsic and extrinsic motivations that affect teacher candidates' choosing the teaching profession and the field they study differ according to the departments they study in?

METHOD/MATERIALS

The research has the relational screening model. Relational screening studies are studies conducted to determine the relationships between two or more variables. It is tried to find out to what extent the relationship type or types exist (Büyüköztürk, Çakmak, Akgün, Karadeniz & Demirel, 2013, p. 15).

Papulation and Sample

The research population consisted of students studying at Inonu University, Faculty of Education. The sample was composed of students studying in Preschool Teaching, Turkish Language Teaching, Mathematics Teaching and Classroom Teaching departments at Inonu University Faculty of Education. Information on the distribution of demographic characteristics of teacher candidates according to independent variables is given in Table 1 as frequency and percentage.

Table 1. Frequency and Percentage Distribution of the Number of Students by Demographic Characteristics

		f	%
Gender	Female	283	65.7
	Male	148	34.3
	Total	**431**	**100.0**
Department	Preschool Teaching	104	24.1
	Turkish Language Teaching	102	23.7
	Mathematics Teaching	122	28.3
	Classroom Teaching	103	23.9
	Total	**431**	**100.0**
Year of Study	1st Year	112	26.0
	2nd Year	102	23.7
	3rd Year	103	23.8
	4th Year	114	26.5
	Total	**431**	**100.0**

Looking at Table 1, it is seen that 65.7% of the teacher candidates included in the sample were female, 34.3% were male, 24.1% were studying in preschool teaching, 23.7% in the Turkish language teaching, 28.3% in mathematics teaching departments, and that 26% of them were first year students, 23.7% were second year students, 23.9% were third year students, and 26.5% were in their fourth year of study.

Data Collection Tool

The research data were collected via the "Motivation in Profession and Field Selection Scale" developed by Mayr (1998) and adapted to Turkish by Atav and Altunoğlu (2013). The scale consists of 4 subdimensions as intrinsic field, extrinsic field, intrinsic profession, extrinsic profession, and 21 items.

Data Analysis

The data obtained were analyzed using the SPSS program. Kolmogorov-Smirnov test was used to determine whether the data were distributed normally or not.

Table 2. Normality Test Analysis Results

	Kolmogorov-Smirnov		
	Statistic	df	Sig.
Intrinsic Field	.181	431	**.00**
Extrinsic Field	.071	431	**.00**
Intrinsic Profession	.128	431	**.00**
Extrinsic Profession	.121	431	**.00**
General Average	.077	431	**.00**

In Table 2, it is seen that the data do not show a normal distribution due to the Kolmogrow-Smirnov values were found to be (0.00; p> 0.05) in all subdimensions and throughout the scale. While analyzing the data obtained in the research, descriptive statistics calculations were made first. The Mann-Whitney U test was used to determine whether the intrinsic and extrinsic motivation levels, which are effective in teacher candidates' choosing the teaching profession and the field they study, differed according to gender variables, and the Kruskal-Wallis test was employed to determine whether they differed according to the variables of the department and year of study levels. In cases where a significant difference was determined as a result of the Kruskal-Wallis test, multiple comparisons were made to determine which group or groups the difference originated from.

The score ranges given in Table 3 were used in the evaluation and interpretation of the intrinsic and extrinsic motivation levels that affect the teacher candidates' preferences of the teaching profession and the field they study. The ranges were assumed to be equal, and the score range for the arithmetic averages was calculated as 0.80 (Score Range = (Highest Value - Lowest Value)/5 = (5 - 1)/5 = 4/5 = 0.80). According to this calculation, the evaluation range of the arithmetic means is given in Table 3.

Table 3. Score Ranges of Teacher Candidates' Motivation Levels

Score Ranges	Level Of Agreeing	Quality
1.00–1.79	Strongly Disagree	Very Little Effective
1.80–2.59	Disagree	Little Effective
2.60–3.39	Partially Agree	Moderately Effective
3.40–4.19	Agree	Effective
4.20–5.00	Totally Agree	Very effective

The arithmetic mean values of the items related to the motivation sources that are effective in teacher candidates' choosing their profession and the field of study were determined to be ranging from 1.00 to 1.79 as “very little effective” at the level of strongly disagree, from 1.80 to 2.59 as "little effective" at the level of disagree, from 2.60 t0 3.39 as “moderately effective” at the level of partially agree, from 3.40 to 4.19 as "Effective" at the level of agree, and from 4.20 to 5.00 as "very effective" at the level of totally agree.

FINDINGS

Findings regarding the intrinsic and extrinsic motivation levels of teacher candidates, which are effective in their profession and field preferences, are given in Table 4.

Table 4. Arithmetic Averages and Standard Deviation Values of the Motivation Levels Effective in the Teacher Candidates' Selection of Profession and Field

Subdimension	$\overline{X}$	s
Intrinsic Field	4.0928	.70
Extrinsic Field	3.3577	.62
Intrinsic Profession	4.1433	.57
Extrinsic Profession	3.8300	.74
General Average	3.8560	.40

Looking at Table 4, when the arithmetic averages of the sources of motivation that affect the teacher candidates' choice of profession and the field of study are examined, it is seen that while it is at the “agree” level and effective in the intrinsic field, intrinsic profession, extrinsic profession dimensions and throughout the scale, it is at the “partially agree” level and moderately effective in the extrinsic field dimension.

Finding with Regard to the Second Sub-Problem

The results of the Mann-Whitney U test conducted to determine whether there was a difference according to the gender variable in the intrinsic and extrinsic motivation levels that are effective in the teacher candidates' choosing the teaching profession and the field they study are shown in Table 5.

Table 5. Analysis of the Teacher Candidates' Motivation Levels Effective in Choosing Profession and Field According to the Gender Variable

Dimension	Gender	n	Mean Rank	Sum of Ranks	U	p
Intrinsic Field	Female	283	223.26	63181.50	18888.500	.09
	Male	148	202.13	29914.50		
Extrinsic Field	Female	283	227.24	64310.00	17760.000	**.00***
	Male	148	194.50	28786.00		
Intrinsic Profession	Female	283	232.41	65771.00	16299.000	**.00***
	Male	148	184.63	27325.00		
Extrinsic Profession	Female	283	234.60	66391.00	15679.000	**.00***
	Male	148	180.44	26705.00		

When Table 5 is examined, it is seen that the motivation levels of teacher candidates in choosing their profession and the field they study in did not differ in the intrinsic field subdimension according to the gender variable ($p = .09$; $p > 0.05$), but they differed in the extrinsic field ($p = .00$; $p < 0.05$), intrinsic profession ($p = .00$; $p < 0.05$), and extrinsic profession ($p = .00$; $p < 0.05$). Considering the mean rank, it is seen that the significant differences in the subdimensions are in favor of the female teacher candidates.

Finding with Regard to the Third Sub-Problem

In order to determine whether the intrinsic and extrinsic motivation levels of teacher candidates', which are effective in their choice of the teaching profession and the field they study, differed according to their year of study, Kruskal-Wallis test was performed. Analysis results are given in Table 6.

Table 6. Analysis of the Teacher Candidates' Motivation Levels Effective in Choosing Profession and Field According to Their Year of Study Variable

Dimension	Year of Study	n	Mean Rank	df	p
Intrinsic Field	1st Year	112	202.53	3	.08
	2nd Year	102	241.45		
	3rd Year	103	204.46		
	4th Year	114	216.89		
Extrinsic Field	1st Year	112	222.67	3	.09
	2nd Year	102	200.26		
	3rd Year	103	238.37		
	4th Year	114	203.31		
Intrinsic Profession	1st Year	112	204.86	3	.23
	2nd Year	102	216.32		
	3rd Year	103	206.59		
	4th Year	114	235.17		
Extrinsic Profession	1st Year	112	199.37	3	.26
	2nd Year	102	210.88		
	3rd Year	103	228.36		
	4th Year	114	225.75		

When Table 6 is examined, it is seen that intrinsic and extrinsic motivation levels of teacher candidates' choosing teaching profession and the field they study in did not differ in the subdimensions of intrinsic field ($p = .08$; $p > 0.05$), extrinsic field ($p = .09$; $p > 0.05$), intrinsic profession ($p = .23$; $p > 0.05$) and extrinsic profession ($p = .26$; $p > 0.05$).

Finding with Regard to the Fourth Sub-Problem

In order to determine whether the intrinsic and extrinsic motivation levels of teacher candidates', which are effective in their choice of the teaching profession and the field they study, differed according to the departments they study in, Kruskal-Wallis test was performed. The analysis results are given in Table 7.

Table 7. Analysis of the Teacher Candidates' Motivation Levels Effective in Choosing Profession and Field According to the Variable of the Departments They Study in

Dimension	Department	n	Mean Rank	df	p	Significant Difference
Intrinsic Field	Preschool Teaching (P)	104	258.22	3	**.00***	**C-M PM, T**
	Turkish Language Teaching (T)	102	206.26			
	Mathematics Teaching (M)	122	172.80			
	Classroom Teaching (C)	103	234.18			
Extrinsic Field	Preschool Teaching	104	231.39	3	**.01***	**T-M**
	Turkish Language Teaching	102	239.56			
	Mathematics Teaching	122	188.87			
	Classroom Teaching	103	209.26			
Intrinsic Profession	Preschool Teaching	104	213.56	3	.45	
	Turkish Language Teaching	102	227.57			
	Mathematics Teaching	122	202.75			
	Classroom Teaching	103	222.69			
Extrinsic Profession	Preschool Teaching	104	207.17	3	.23	
	Turkish Language Teaching	102	232.79			
	Mathematics Teaching	122	222.30			
	Classroom Teaching	103	200.83			

According to Table 7, The intrinsic and extrinsic motivation levels of teacher candidates effective in their preference of the teaching profession and the field they study in according to the departments in which they study did not differ in the subdimensions of intrinsic profession (p =.45; p> 0.05) and extrinsic profession (p =.23; p>0.05), but showed a difference in intrinsic field (p=.00; p <0.05) and extrinsic field (p =.00; p <0.05). It is seen that in dual comparisons in sub-dimensions where there is a significant difference, in terms of intrinsic field subdimension, there is a difference between preschool teaching and mathematics teaching in favor of preschool teaching, between preschool teaching and mathematics and Turkish language teaching in favor of preschool teaching, and in terms of extrinsic field subdimension, there is a difference between Turkish language teaching and mathematics teaching in favor of Turkish language teaching.

CONCLUSION AND DISCUSSION

In the study, the intrinsic and extrinsic motivation levels, which are influential in teacher candidates' choosing the teaching profession and the field they study, were determined by using the "Motivation in Profession and Field Selection Scale" developed by Mayr (1998) and adapted to Turkish by Atav & Altunoğlu (2013).

It was observed that the motivations that are effective in teacher candidates' choosing the teaching profession and the field they study were higher in the intrinsic and intrinsic profession subdimensions and lower in the extrinsic and extrinsic professions subdimensions. However, extrinsic motivation sources, as well as intrinsic motivation sources, were influential in teacher candidates' choice of profession and field. Most teacher candidates chose the teaching profession for altruistic or intrinsic reasons, and very few preferred it for extrinsic reasons. Extrinsic motivation sources are essential in choosing teaching as a profession, albeit not so much as altruistic and intrinsic sources of motivation (Yong, 1995, p. 275). However, there are studies similar to this study showing that the intrinsic sources of motivation are more effective in teacher candidates' choosing their profession and the field of study (Acat & Yenilmez, 2004; Bursal & Buldur; 2016; Ekinci, 2017; Çelik et al., 2018; Hellsten & Prytula, 2011; Kahyaoğlu & Kırıktaş, 2017; Yu & Bieger, 2013), there are also studies showing that extrinsic sources of motivation are more effective (İncikabı, Lentil, Biber & Serin, 2016; Yüce, Şahin, Koçer & Kana, 2013; Yong, 1995).

Motivation sources are critical in choosing the teaching profession and the fields of study (Yazıcı, 2009, p. 33). These sources of motivation are influential in teacher candidates' choosing the teaching profession and the field they will study, their academic success during their education and graduation from their faculties. However, they also affect the success of their students after graduation and are a prerequisite for their enthusiasm and motivation in their professional lives (Atav & Altunoğlu, 2013, p. 60; Rothland, 2012, p. 289). It was observed that teacher candidates with high levels of intrinsic motivation generally performed better than those with less intrinsic motivation (Baker, 2004, p. 190), had more positive attitudes toward their profession, were more open to learning and had lower anxiety, and that teacher candidates who chose the profession due to extrinsic factors had more negative attitudes towards the profession (Bozdoğan, Aydın & Yıldırım, 2007; Doğan & Çoban, 2009; Hellsten & Prytula, 2011; Kılcan, Keçe, Çepni & Kılınç, 2014; Bursal & Buldur, 2015). For this reason, it can be said that teacher candidates' sources and levels of motivation in their choice of profession and field have a significant effect on their vocational education and teaching life. It was seen that intrinsic sources of motivation might be more determinant in choosing the profession and field of study for education faculty students. Although the teaching profession is considered advantageous and a common area of employment, intrinsic motivation is seen as the primary factor in selecting the teaching profession, and the field of study is favourable.

It was observed that the motivation of teacher candidates in choosing their profession and the field they study differed in favour of female teacher candidates in the subdimensions of extrinsic field, intrinsic profession, and extrinsic profession according

to gender variable. In the research conducted by Deniz and Görgen (2019), a difference in favour of female teacher candidates was found in the intrinsic profession and extrinsic profession subdimensions and the intrinsic field and intrinsic profession subdimensions in the study conducted by Ekinci (2017). In addition to the studies in which a difference was found in favour of female teacher candidates in terms of intrinsic sources of motivation in teacher candidates' choice of profession and field (Bursal & Buldur, 2016; Hellsten & Prytula, 2011; Yüce, Şahin, Koçer & Kana, 2013), there are also studies in which no significant difference could be detected in terms of intrinsic and extrinsic motivation sources in female and male teacher candidates' choosing their profession and field (Çelik, 2018; Dağ, 2010). In the study conducted by Acat and Yenilmez (2004, p. 137), the finding that female teacher candidates expressed a more favourable opinion regarding their competencies being sufficient for the teaching profession supports the findings of this study. While social gender roles were more effective in the choice of profession in the past, it is seen that individuals' interests and abilities are also taken into account today (Korkut-Owen et al., 2012, p. 144). Teachers' beliefs about their interests and talents in their profession significantly affect their motivation (Yazıcı, 2009, p. 38). In this context, it is seen that male and female teachers consider their interests and abilities at similar levels while choosing their fields.

Considering that the first condition of having a positive attitude towards the teaching profession, which requires patience and dedication, is to love the teaching profession (Dağ, 2010, p. 68), it is seen that teacher candidates preferred the department they studied considering their interests and abilities. It can be said that this situation is vital in terms of increasing the academic success of the teacher candidates, their love of their professions, reaching professional satisfaction and being more effective educators. It was seen that the idea that field education cannot be challenging, the proximity of the place of education to where they live, and family and friends circle were influential in the extrinsic motivation of female teacher candidates to choose the fields they study. It was seen that the intrinsic motivations that were effective for female teacher candidates to choose their profession was being happy to be with children and young people, interest in education, the versatility of the teaching profession and good memories of school age. OECD (2019) data show that the ratio of female teachers in Turkey (59%) is higher compared to the ratio of male teachers (41%). Especially in primary education areas such as kindergarten and primary school teaching, it is seen that female employment is concentrated in parallel with gender roles (Gökçen & Büyükgöze-Kavas, 2018, p. 50). The first teachers of all living things in nature are mothers. With the birth of a human being, the first teacher is mothers, who are female. It is seen that while teaching requires some qualities that should be acquired later, inborn characteristics can also be a determining factor in the selection of the teaching profession.

It was determined that extrinsic sources of motivation for female teacher candidates in choosing a profession were job security, the opportunity to work close to the place of residence and convenient working hours. Economic independence, desire to have a career, and personal satisfaction are among the reasons for working for females (Kumaş & Fİdan, 2010, p. 519). In working life, women are inclined or directed towards professions where they can fulfil their home and family responsibilities in line with traditional gender roles. This is because, even if women participate in working life, they continue to fulfil their home and family responsibilities at the same rate (Gökçen & Büyükgöze-Kavas, 2018, p. 50). In this context, it is seen that female teacher candidates, under the effect of extrinsic sources of motivation, prefer the teaching profession that allows them to be close to their families and continue their domestic responsibilities as they have to gain economic independence and raise their children by working.

It was determined that the motivation of teacher candidates to choose their profession and the field of study did not differ according to the variable of the year of study. According to the research conducted by Deniz and Görgen (2019, p. 337), while the motivational sources that are effective about teacher candidates' professional and field preferences were intrinsic in the first year, they turned into more realistic extrinsic factors such as job security and the convenience of working conditions in the last year of the education process. In the study conducted by Acat and Yenilmez (2004, p. 134), it was seen that 1st-year students thought teaching was less suitable for their interests and abilities, while 4th-year students thought teaching as a profession suitable for them. The education environment and climate are essential to teacher candidates' mental and psychological preparation for the teaching profession (Kartal, 2011, p. 54). In particular, the school experience courses and teaching practices that teacher candidates receive during their education are critical in transforming theoretical knowledge and skills learned into practice. In the research conducted by Kavas and Bugay (2009, pp. 16-17), the teacher candidates stated that they did not see their school experience and teaching practice courses as sufficient for the post-graduation period in terms of hours and content and that they found these courses quite limited for them to gain the necessary teaching skills. The fact that intrinsic and extrinsic motivations in the choice of profession and field did not cause a meaningful differentiation at the year of study level shows that the education they received in the education faculty did not cause a change in their thinking about the choice of profession and field over time. However, it should be considered that the time spent in the education faculty alone without teaching experience and school practices will not be a predictive factor as the education provided in education faculties is primarily theoretical. Since teaching is a profession with practical aspects being more critical than theoretical knowledge, it is predictable that determining motivations for both professional and field preferences would not differ only with the education received in the faculty of education. In this context, it can be said that increasing professional practice courses may significantly affect teacher candidates' motivation regarding the teaching profession.

It was seen that the motivations of teacher candidates in choosing their profession and the field they study in differed in the intrinsic and extrinsic field subdimensions according to the variable of the department they study in. The differentiation in the intrinsic field subdimension between classroom teaching and mathematics teaching departments was in favour of the classroom

teaching department. Between preschool teaching and mathematics and Turkish language teaching departments, it was in favour of the preschool teaching department. Ekinci (2017, pp. 399-340) found no difference in the intrinsic profession and extrinsic field subdimensions according to the variable of the department they studied in the preferences of teacher candidates, while he found a difference in the extrinsic profession and intrinsic field subdimensions. On the other hand, Bursal and Buldur (2016, pp. 336-337) determined that Turkish language and social sciences teacher candidates had higher altruistic and intrinsic preference reasons in the field selection. That teacher candidates studying in preschool, elementary education mathematics and classroom teaching departments had higher extrinsic reasons. Preschool and classroom teaching, which constitute primary education, are the departments that require dealing with young children (Gökçen & Büyükgöze-Kavas, 2018, p. 50). It is seen that teacher candidates who studied in preschool and classroom teaching departments acted with the awareness that they had interests and skills in this field and loved children in their motivation for field preference. The fact that there was a significant difference in the intrinsic motivations of teacher candidates in choosing a field in favour of basic education levels can be considered an indicator of the importance attached to teaching, especially at early childhood and primary education levels. In the extrinsic field subdimension, a significant difference was observed between the Turkish language teaching and mathematics teaching departments in favour of the Turkish language teaching department. It is seen that Turkish language teacher candidates' choosing their fields was affected more by extrinsic sources of motivation such as the education being relatively straightforward, the location where education is received being close to the place of residence, and the influence of the family and friends. Family, school, friends and intimate environment influence the development of general and professional interests (Gati & Givon, 1993 as cited in Dağ, 2010, p. 7). In this context, it is seen that extrinsic motivation sources more influenced Turkish teacher candidates in their field selection.

As a result, it is seen that the motivations of teacher candidates to choose their profession and the field they study mainly originated from intrinsic motivations. This situation is promising for the future of education and the teaching profession in Turkey. However, it was observed that besides intrinsic sources of motivation, a certain level of extrinsic sources of motivation were also influential. These results show that besides the cognitive field, the affective field is also vital in teacher preparation for the profession.

RECOMMENDATIONS

1. Emphasis should be placed on professional practices in the affective field, which motivates preparing teacher candidates for the profession.
2. Before university education, guidance and orientation studies can be conducted to enable them to discover their interests and talents and increase their intrinsic motivation in choosing a profession.
3. To increase professional motivation, practical lesson hours can be increased, so that teacher candidates can get to know their profession in the school environment and spend time with students starting from the first year of study. In this way, it is thought that their intrinsic motivation will increase as they move on to the following years of study.
4. The research is limited to the teacher candidates studying preschool teaching, classroom teaching, mathematics teaching and Turkish language teaching departments in the Faculty of Education at Inönü University. In this context, research can be conducted in different universities and include more departments.
5. The reasons why female teacher candidates' intrinsic motivation is higher than male teacher candidates can be determined in more detail with qualitative research.

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Statements of publication ethics

We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

Researchers' contribution rate

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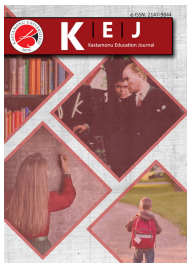

| Research Article / Araştırma Makalesi |

Psychometric Evaluation on Turkish Version of The Approaches and Study Skills Inventory for Students

Öğrenme Yaklaşımları ve Çalışma Becerileri Ölçeğinin Türk Örneklemi Üzerinde Psikometrik Değerlendirmesi[1]

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Keywords

1. Confirmatory analyses
2. Exploratory analyses
3. Psychometric evaluation
4. Approaches and study skills inventory

Anahtar Kelimeler

1. Doğrulayıcı faktör analizi
2. Açıklayıcı faktör analizi
3. Psikometrik değerlendirme
4. Öğrenme yaklaşımları ve çalışma becerileri ölçeği

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Abstract

Purpose: This study aims to analyze the factor structure of the Approaches and Study Skills Inventory for Students (ASSIST) by adapting the second part, which consists of five-point Likert scale, 52 items, and 3 factors (deep, strategic, surface), in Turkish.

Design/Methodology/Approach: For this purpose, firstly one of the authors, Noel Entwistle, was contacted via email, and the necessary permission was received regarding the adaptation of the scale. The English and Turkish versions of the scale, which was translated into Turkish with the help of English and Turkish language experts, were applied to Dokuz Eylül University (DEU) English Language Teacher Education students (N = 46) one week apart.

Findings: It was determined that there was high correlation (r = .805, p=.05) between the scores of the students from both applications. Then, for examining the factor structures of the scale, Exploratory Factor Analysis (EFA) was performed with the data collected from 421 students who are studying at DEU and taking a basic physics course. It was determined that, by removing 5 items with factor loadings below .4 and the difference between factor loadings less than 0.1 from the scale, the scale could be collected under 3 factors compatible with the original factor structure. The scale was subjected to Confirmatory Factor Analysis (CFA) in order to test the compatibility of the three-factor structure of the scale determined by EFA. As a result of CFA, it was determined that the three-factor structure has sufficient compatibility with our data set (χ^2/sd=1.96, RMSEA=.072; CFI=.82, GFI=.78, NFI=.88). Besides, the scale was subjected to discriminant analysis in order to determine how successful the ASSIST was in separating the learning approaches of students and to determine the discriminant functions.

Highlights: With Quadratic Discriminant Analysis, it was concluded that a student assigned to one of the 3 sub-dimensions in the scale could be considered significantly separated from other sub-dimensions, and thus the learning approaches of the students could be determined successfully.

Öz

Çalışmanın Amacı: Bu çalışmanın amacı, öğrenme yaklaşımları ve çalışma becerileri ölçeğinin beşli likert tipi, 52 madde, 3 faktörden (derinsel, stratejik, yüzeysel) oluşan ikinci bölümünün Türkçe uyarlamasının yapılarak, faktör yapısının incelenmesidir.

Materyal ve Yöntem: Bu amaçla ilk olarak yazarlardan Noel Entwistle ile elektronik posta yoluyla iletişim kuruldu ve ölçeğin uyarlanabileceğine ilişkin gerekli izin alındı. İngiliz ve Türk dili uzmanlarından yardım alınarak Türkçeye çevrilen ölçeğin İngilizce ve Türkçe versiyonları Dokuz Eylül Üniversitesi (DEU) İngilizce Öğretmenliği öğrencilerine (N=46) bir hafta arayla uygulandı

Bulgular: Öğrencilerin her iki uygulamadan aldıkları puanlar arasında yüksek düzeyde korelasyon bulunduğu (r= .805, p=.00) belirlendi. Ardından, ölçeğin faktör yapılarının incelenmesi için DEU' de öğrenim gören ve temel fizik dersi alan 421 öğrenciden toplanan veriler ile Açıklayıcı Faktör Analizi yapıldı ve faktör yükleri .4' ün altında ve faktör yükleri arasındaki fark .1' den küçük olan 5 maddenin ölçekten çıkarılması ile ölçeğin orijinal faktör yapısı ile uyumlu 3 faktör altında toplanabileceği belirlendi. Ölçeğin açıklayıcı faktör analizi ile belirlenen üç faktörlü yapısının uyumluluğunu test etmek amacı ile ölçek, doğrulayıcı faktör analizine (DFA) tabii tutuldu. DFA sonunda üç faktörlü yapının veri setimizle yeterli düzeyde uyumlu olduğu belirlendi (χ^2/sd=1.96, RMSEA=.072; CFI=.82, GFI=.78, NFI=.88). Ayrıca ölçeğin öğrencilerin öğrenme yaklaşımlarını birbirinden ayırmada ne derece başarılı olduğunu saptamak ve ayırma fonksiyonlarını belirleyebilmek için ölçek, ayırma analizine tabii tutuldu.

Önemli Vurgular: Yapılan karesel ayırma analizi ile ölçekteki 3 alt boyuttan birine atanan bir öğrencinin, diğer alt boyutlardan anlamlı düzeyde ayrılmış kabul edilebildiği ve böylelikle öğrencilerin öğrenme yaklaşımlarının başarılı şekilde saptanabildiği sonucuna ulaşıldı.

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INTRODUCTION

In the literature, the concept of learning approaches is first encountered in the study of Marton and Saljo (1976). In this study, the University of Gothenburg students were asked to read an article and answer the related topic questions. In the study, some students saw the article they read as a text that needed to be memorized to answer the questions that were expected to be asked. From this point, it was concluded that these students conceptualized learning as accepting knowledge as it is without establishing relationships between facts. Marton and Saljo (1976a; 1976b) called this situation "surface learning". Other students, on the other hand, tried to understand the underlying meaning of the article by considering it as a whole and associating the new ideas it contains with previous knowledge and experiences. This second situation has been defined as "deep learning". In the research conducted after this qualitative study, results that support the findings of Marton and Saljo were revealed, and learning approaches were considered in two dimensions (Morgan, 1993; Chin & Brown, 2000; Trigwell & Prosser, 2004; Ünal & Çoban, 2008; Özkan and Selçuk, 2014 and Çolak, 2015).

While Biggs (1978) and Entwistle and Ramsden (1983), on the other hand, produced similar results in their studies on university students, they also mention the third dimension of learning approaches. In his research, Biggs (1978) mentions these approaches: utilizing, internalizing, and achieving. Entwistle and Ramsden (1983) refer to these dimensions as reproducing, meaning, and achieving or strategic. The first dimension, which Biggs refers to as "utilization" and Entwistle and Ramsden as "reproducing", forms the basis of the surface learning approach. There is direct information transfer and subject dependence here. Since learning is considered an externally imposed task (Lucas, 2001), the acquired information is transferred to the cognitive structure in the form of irregular small stacks, which prevents understanding of the subject (Biggs, 1999). As a result, learning becomes necessary, and the work is not enjoyed—fear of failure in exams functions as short-term motivation. The second dimension, called "internalization" or "meaning", is related to the deep learning approach. Students in this group associate the new knowledge they have learned with their previous experiences (Offir, Lev and Bezalel, 2008) and critically review the learning product they have acquired (Beattie, Collins and McInnes, 1997). Students in this group study because of their interest in the subject or internal motivation and try to grasp the underlying meaning of everything they read. Learning provided by this high level of effort often brings high academic success. Many studies that are conducted support this situation (Byrne, Flood and Willis, 2002; Ekinci, 2009; Batı, Tetik and Gürpınar, 2010; Beşoluk and Önder, 2010; Çolak and Cırık, 2016 and Beyaztaş, and Şahin, 2017). Also, a third dimension of the learning approach, which Biggs called "achieving" Entwistle and Ramsden called "strategic", is mentioned in the studies. In this approach, it was determined that students might prefer deep or surface learning, depending on the situation, to be successful by getting high grades, not to understand the subject or internalize knowledge (Reid, Duvall and Evans, 2007). They are motivated by the sense of competition in the environment (Newble & Entwistle, 1986). However, when the relevant literature is reviewed, it is seen in some studies that this approach is considered a studying approach rather than a learning approach, and thus the strategic approach is not included (Marton & Saljo, 1976; Morgan, 1993; Trigwell & Prosser, 2004; Ünal & Çoban, 2008; Özkan and Selçuk, 2014 and Çolak, 2015).

According to Ramsden (2003), the learning approach is the relationship between the student and the learning task he/she performs and is shaped according to the learner's reaction to the learning-teaching environment (Fry, Ketteridge and Marshall 2003). Depending on the content, the difficulty level, the duration of the subject, and whether it arouses curiosity, the learner can sometimes prefer a deep or surface approach (Marshall & Case, 2005). In other words, learning can occur differently in different environments.

Students who reach university age bring the learning approaches they have taken from their previous lives. It is mainly their previous experience that determines which approach to use during new learning. However, while this situation is seen as an individual difference, it is not fixed. If the individual perceives that the teaching environment has changed, he/she can also rearrange his/her approach. However, classroom environments where appropriate resources are not used, learning materials are not attractive, rote-based assessment methods are used, and the teacher is always active cause students to prefer the surface approach (Çelik, 2013; Spencer, 2003). As a result, they graduate from higher education as individuals who do not research, do not ask, cannot think critically, and are used to memorizing instead of thinking (Çelik, 2013).

Some students are more successful than others because they prefer meaningful or rote learning; in other words, it stems from differences in learning approaches. In meaningful learning, new knowledge is associated with the previous ones, while in rote learning, it is transferred to the cognitive structure in the form of irregular small stacks (Okebukola, 1990). Instead of trying to understand, these students repeat everything as it is. For this reason, they have difficulty remembering details for a long time and fail to apply the knowledge they have acquired to real-life problems (Entwistle & Ramsden, 1983; BouJaoude, Sallaum and Abd-El-Khalick, 2004). Besides, while more effective and permanent learning products are obtained with meaningful learning, it seems impossible to realize this situation by rote learning (She, 2005). For this reason, it is of great importance to determine students' learning approaches in the education process.

Studies on the determination of learning approaches date back to the 1930s. In 1933, Wrenn developed the first known scale in the literature to determine the study habits of students. Since this date, the interest in the subject has increased gradually, and numerous researchers take place in scale development studies (Locke, 1940; Brown & Holtzman, 1955; Biggs, 1987; Tait, Entwistle and Mccune, 1998; Weinstein & Palmer, 2002; Dennis, 2014). One of the most popular scales is the Approaches and Study Skills Inventory for Students (ASSIST), developed by Tait, Entwistle and Mccune (1998). ASSIST has a wide range of uses worldwide and has been translated into many languages (Diseth, 2001; Berberoğlu & Hei, 2003; Zhu, Valcke and Schellens, 2008 Gadelrab, 2011).

The first version of the scale, which is the subject of our research and was developed to determine the learning approaches of students, was developed by Entwistle, Hanley, and Hounsell (1979) at the University of Edinburgh under the original name of "Approaches to Studying Inventory" (ASI). This inventory, which was prepared to determine the individual differences in the learning approaches of students in higher education, consisted of 64 items and 16 sub-scales on a five-point Likert scale. In 1981, two short versions of the scale, 30 and 18 items, were published to facilitate the scale's use and shorten the response time (Entwistle, 1981). However, researchers did not recommend their use because both were found inadequate in the field of psychometrics. Entwistle and his colleagues 1992 reviewed ASI and "The Revised Approaches to Studying Inventory (RASI)", consisting of 15 sub-scales collected under 60 items, and five factors (deep, strategic, surface, apathetic approach and academic aptitude) were developed (Duff, 2003). In 1994, a new version of the scale was published by reducing the number of items to 38 (Entwistle & Tait, 1994). A year later, with a revision study, a new factor (Metacognitive Awareness of Studying) was added to the scale, and the number of items was increased to 44 (Entwistle & Tait, 1995).

Considering the developments occurring over time, Tait, Entwistle and Mccune published a new version of the inventory in 1998, originally titled "The Approaches and Study Skills Inventory for Students (ASSIST)," consisting of three sections (What is Learning?, Approaches to Studying, Preferences for different types of course and teaching) and 67 items. The first part is the six-item part in which the individual defines his/her learning. The second part of the scale, which is also the subject of our study, consists of 52 items rated on the five-point Likert scale and collected under three factors. The third and last part of the inventory consists of eight items and measures the learning and teaching preferences of different types of courses.

In this study, it was aimed to analyze the factor structure of the Approaches and Study Skills Inventory for Students (ASSIST) by adapting the second part of it to Turkish, which consists of a five-point Likert scale, 52 items, and three factors (deep, strategic, surface). This research sought answers to "Does the ASSIST Turkish form develop to support the factor structure which Tait, Entwistle and Mccune put forward (1998)?

METHOD/MATERIALS

The first stage of this study is translating the scale, whose original language is English, into Turkish. For this purpose, firstly, one of the authors, Noel Entwistle, was contacted via email, and the necessary permission was received regarding the adaptation of the scale. After that, three English Language Experts translated the scale into Turkish. Two Turkish Language and three Physics Education Experts examined this form in terms of meaning and grammar, and necessary corrections were made. This draft form was read by 38 students studying at the Department of Physics Teacher, and they were asked to answer the scale items by considering the physics course and to identify the items they had difficulty understanding. As a result of the implementation, some items were revised so as not to spoil the meaning. In the next stage, a linguistic equivalence study was conducted to determine the consistency between the Turkish form and the original form of the scale. For this purpose, both forms were applied to 46 students studying in the Department of English Language Teacher Education one week apart. It was determined that there was a high correlation (r=.805, p=.00) between the English-Turkish form.

In the second stage of the study, the factor structures of the scale were evaluated with CFA and EFA. In addition, the scale was subjected to discriminant analysis to determine how successful the ASSIST was in separating students' learning approaches and the discriminant functions.

PARTICIPANTS

Participants of the study consist of 421 students studying at the Departments of Physics, Science, Chemistry, Biology and Elementary Mathematics Teacher at Dokuz Eylul University Buca Faculty of Education. The reason why these departments are preferred is that all students participating in the research have taken a physics course at the university.

FINDINGS

Data analysis was started with Exploratory Factor Analysis (EFA) to test the factor structures of the scale. It was determined by EFA that the scale consists of eight sub-dimensions. Then, Varimax axis rotation was applied to the scale to determine which items showed a high relationship with which factors. As a result, 5 items (4 items from the deep sub-scale and 1 item from the surface sub-dimension) with factor loadings below .4 and difference between factor loadings less than .1 (overlapping) were removed from the scale, KMO value was calculated as .954, and Bartlett test was calculated as (X^2 : 11865.634; p: .00).

Table 1. Items removed from the scale

Factor I	**Deep**
Item Number	
33	Ideas in course books or articles often set me off on long chains of thought of my own.
36	When I read, I examine the details carefully to see how they fit in with what's being said.
52	I sometimes get 'hooked' on academic topics and feel I would like to keep on studying them.
20	I think about what I want to get out of this course to keep my studying well focused
Factor 3	**Surface**
Item Number	
38	I gear my studying closely to just what seems to be required for assignments and exams.

The sub-dimensions of the scale and the factor loadings are seen in Table 2.

Table 2. ASSIST for three-factor structure

Factor I	**Deep**	
Item Number		Loadings
7	I go over the work I've done carefully to check the reasoning and that it makes sense.	.740
34	Before starting work on an assignment or exam question, I think first how best to tackle it.	.725
4	I usually set out to understand for myself the meaning of what we have to learn	.713
30	When I am reading I stop from time to time to reflect on what I am trying to learn from it	.707
11	I try to relate ideas I come across to those in other topics or other courses whenever possible	.689
23	Often I find myself questioning things I hear in lectures or read in books.	.682
26	I find that studying academic topics can be quite exciting at times.	.667
17	When I'm reading an article or book, I try to find out for myself exactly what the author means	.673
21	When I'm working on a new topic, I try to see in my own mind how all the ideas fit together	.664
47	When I have finished a piece of work, I check it through to see if it really meets the requirements.	.663
39	Some of the ideas I come across on the course I find really gripping.	.644
13	Regularly I find myself thinking about ideas from lectures when I'm doing other things.	.634
49	It's important for me to be able to follow the argument, or to see the reason behind things.	.622
46	I like to play around with ideas of my own even if they don't get me very far.	.607
43	Before tackling a problem or assignment, I first try to work out what lies behind it	.604
9	I look at the evidence carefully and try to reach my own conclusion about what I'm studying.	.598
Factor 2	**Strategic**	
Item Number		Loadings
10	It's important to me to feel that I'm doing as well as I really can on the courses here.	.715
5	I organise my study time carefully to make the best use of it.	.688
1	I manage to find conditions for studying which allow me to get on with my work easily.	.680
27	I'm good at following up some of the reading suggested by lecturers or tutors.	.679
41	I keep an eye open for what lecturers seem to think is important and concentrate on that.	.676
44	I generally make good use of my time during the day.	.676
50	I don't find it at all difficult to motivate myself.	.676
2	When working on an assignment, I'm keeping in mind how best to impress the marker.	.669
40	I usually plan out my week's work in advance, either on paper or in my head	.659
18	I'm pretty good at getting down to work whenever I need to.	.653
37	I put a lot of effort into studying because I'm determined to do well.	.638
15	I look carefully at tutors' comments on course work to see how to get higher marks next time.	.633
31	I work steadily through the term or semester, rather than leave it all until the last minute.	.613
28	I keep in mind who is going to mark an assignment and what they're likely to be looking for.	.607
14	I think I'm quite systematic and organised when it comes to revising for exams.	.540
24	I feel that I'm getting on well, and this helps me put more effort into the work.	.476

Continuation of Table 2. ASSIST for three-factor structure

Factor 3		
Item Number	**Surface**	Loadings
6	I find I have to concentrate on just memorising a good deal of what I have to learn.	.753
3	Often I find myself wondering whether the work I am doing here is really worthwhile.	.738
12	I tend to read very little beyond what is actually required to pass.	.721
19	Much of what I'm studying makes little sense: it's like unrelated bits and pieces.	.715
48	Often I lie awake worrying about work I think I won't be able to do.	.692
8	Often I feel I'm drowning in the sheer amount of material we're having to cope with.	.680
35	I often seem to panic if I get behind with my work.	.658
51	I like to be told precisely what to do in essays or other assignments.	.657
29	When I look back, I sometimes wonder why I ever decided to come here.	.653
45	I often have trouble in making sense of the things I have to remember	.653
42	I'm not really interested in this course, but I have to take it for other reasons.	.652
16	There's not much of the work here that I find interesting or relevant	.644
32	I'm not really sure what's important in lectures, so I try to get down all I can.	.640
25	I concentrate on learning just those bits of information I have to know to pass.	.614
22	I often worry about whether I'll ever be able to cope with the work properly	.603

As a result of EFA, it is seen that the "Strategic Learning" sub-dimension of the scale consists of 16 items with factor loadings ranging from .715 to .476, the "Deep Learning" sub-dimension consists of 16 items with factor loadings ranging from .740 to .598 and the "Surface Learning" sub-dimension consists of 15 items with factor loadings between .753-.603.

Table 3 presents the percentage of total explained variance of the 3 sub-dimensions in the scale.

Table 3. ASSIST sub-dimensions

Factors	Number of Items	Variance Percentage	Total Variance Percentage
Strategic	16	18.748	18.748
Deep	16	17.601	36.349
Surface	15	15.636	**51.985**

As a result, it is seen that the scale, consisting of 47 items, is grouped under 3 factors which explain 51.9% of the total variance, and the items in the sub-dimensions and the original form overlap exactly. Cronbach's α reliability coefficients determined for the ASSIST 3-factor structure are presented in Table 4.

Table 4. ASSIST reliability study results

ASSIST and Factors	Number of items	Number items for original version	Cronbach's Alpha	Cronbach's Alpha for original version
Deep	16	20	.84	.87
Strategic	16	16	.83	.91
Surface	15	16	.82	.71
ASSIST	47	52	.82	.87

For the test-retest reliability study, ASSIST was applied twice to 31 students studying at Dokuz Eylül University Science Education Department two weeks apart. Test-retest reliability coefficients of the scale are presented in Table 5.

Table 5. ASSIST test-retest reliability coefficients

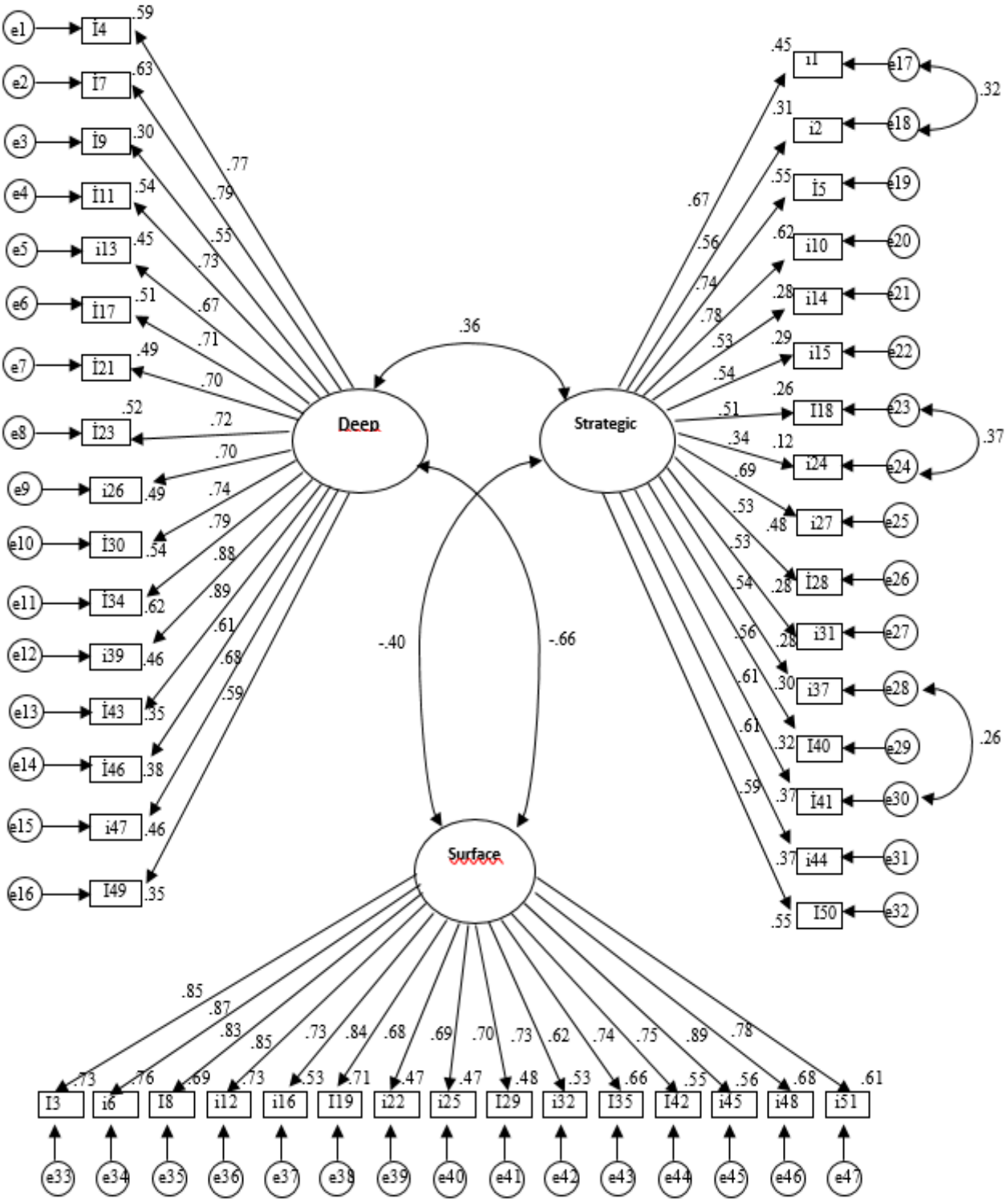
ASSIST and Factors	Application	M	df	r
Deep	1. Application	55.161	6.148	.700
	2.Application	54.064	8.872	
Strategic	1. Application	69.645	10.855	.917
	2.Application	71.774	11.146	
Surface	1. Application	42.483	7.154	.716
	2.Application	42.837	7.470	
ASSIST	1. Application	184.677	15.843	.813
	2.Application	185.870	19.236	

Results show that the 47-item scale is highly reliable.

Later, the scale was subjected to Confirmatory Factor Analysis in order to test the compatibility of the three-factor structure of the ASSIST, determined by EFA.

CFA is being applied to test whether the scales, which were previously discovered and combined under fewer factors, are similar to the sample in which the research was conducted (Byrne, 2010).

Figure 1. Confirmatory Factor Analysis for the three-factor structure.



In Figure 1, latent variables (deep, strategic, and surface) are expressed as a circle, and observable variables (items in the scale) are expressed as squares. Also, in the diagram, there is a measurement error caused by randomness depending on each observed variable. Values on the one-way arrows show the path coefficient of an observed variable on the latent variable, and values on the two-way arrows show the correlation between the latent variables. Accordingly, a positive and significant relationship (r = .36, p <.05) between deep learning and strategic learning, a negative and significant relationship (r = -.40, p <.05) between deep learning and surface learning, a negative and significant relationship (r = -.66, p <.05) between strategic learning and surface learning were found. The two-way arrow between the two error terms also indicates that there is variance between the variables. In order to decide whether the model has been verified, Fit Indices should be examined. MI (Modification Indicies) suggests modifications associated with the model to the investigator by looking at the covariance between observed and latent variables. These modifications are created on the basis of error terms and indicate the chi-square value that was not originally predicted but will be acquired in the model by making the corresponding edit. According to the results; the values, obtained when the error terms 23 and 24, 17 and 18, 28, and 30 are associated with each other, are presented in Table 6.

Table 6. Goodness of fit results of the three-factor model

Scale	χ^2	df	χ^2/df	RMSEA	CFI	GFI	NFI
ASSIST	2024.70	1028	1.96	.072	.82	.78	.88

Chi-Square Compatibility Test tests the hypothesis whether the model developed and the model emerging in the covariance structure of the observation variables are different. The ratio of chi-square to degrees of freedom less than 3 gives the result that the general fit of the model is acceptable. In our data set, this value is seen as 1.96. Root Mean Square Error of Approximation (RMSEA) is the square root of the average of predicted errors and takes values between 0-1. Giving values close to zero indicates that there is a minimum error between observed and generated matrices. Values of 0.05 and smaller indicate perfect fit, and values up to 0.08 indicate acceptable fit. The RMSEA value of .072 in our data set indicates acceptable fit. Comparative Fit Index (CFI) compares the covariance matrix estimated by the model with the covariance matrix of the H_0 hypothesis model and takes values ranging from 0-1. As it approaches 1, it indicates that the goodness of fit increases. This value was found as .82 in our data set. The Goodness of Fit Index (GFI) shows the amount of covariance between observed variables calculated by the default model and takes values between 0-1. Exceeding 0.90 means an excellent model indicator. The GFI was calculated as .78 in our data set. Normed Fit Index (NFI) is calculated by dividing the chi-square value of the tested model by the chi-square value of the independent model (Ullman, 2001) and takes values between 0-1. Values above 0.90 indicate acceptable fit. This value was found as .88 in our data set.

These results indicate that the three-factor model is fit adequately with the data set.

In the next stage, the scale was subjected to discriminant analysis to determine how successful the ASSIST was in separating groups, and to determine discriminant functions.

Discriminant Analysis is a method used to calculate the functions that serve to determine group profile discriminant functions, and thus to predict with a minimal error which group the newly observed units should be assigned to.

Discriminant Analysis is examined in two different groups, linear and square, according to whether the covariance matrices of the groups are equal or not. Linear Discriminant Analysis assumes that the covariance matrices of all groups are similar, whereas Quadratic Discriminant Analysis does not use the assumption that the covariance matrices of the groups are similar.

For this reason, Box's Test of Equality of Covariance Matrices was performed first and at the end of the test, Box's was determined as M = 91.842, F = 7.46, df1 = 12, df2 = 71555.91, and p = .000. Since Box's M test (p <.05) indicated that group covariance matrices are not similar, Quadratic Discriminant Analysis was used for the data. The data obtained as a result of the analysis are presented in Tables 7 and 8:

Table 7. Wilks' Lambda test results

Fonction	Wilks' Lambda	χ^2	df	p
1-2	.117	439.213	6	.00*
2	.387	194.818	2	.00*

p<.05*

Wilks' Lambda is a statistical analysis that tests whether the means of the groups are different from each other. As a result of the analysis, it was determined that the groups were separated significantly from each other. Accordingly, a student assigned to one of the three groups (deep, strategic, and surface) in the scale can be considered to be significantly separated from the other groups, and thus learning approaches can be determined.

The Discriminant Functions determined as a result of the analysis are as below:

Table 8. The Discriminant functions

	Groups		
	1. Group (Y_1)	2. Group (Y_2)	3. Group (Y_3)
Surface (X_1)	.959	.515	.523
Strategic (X_2)	.812	1.376	.951
Deep (X_3)	.635	.680	1.038
Constant	-62.201	-74.878	-69.982

Discriminant functions create a real prediction model that can be used to classify new observations. Accordingly, discriminant functions for the groups were determined as follows: the 1st group surface learner (Y1), the 2nd group strategic learner (Y2), and the 3rd group deep learner (Y3).

1. Group: Y_1=-62.201 + .959X_1 + .812X_2 + 0.635X_3 (Surface)

2. Group: Y_2=-74.878 + .515X_1 + 1.376X_2 + .680X_3 (Strategic)

3. Group: Y_3=-69.982 + .523X_1 + .951X_2 + 1.038X_3 (Deep)

DISCUSSION

In this study, the 2nd part of the ASSIST inventory developed by Tait, Entwistle and Mccune (1998), consisting of a five-point Likert scale, three factors, and 52 items, was adapted to Turkish, and validity and confidence studies were conducted. At the end of the study, it was determined that, with EFA, our data set could be classified under three factors. This situation supports the 3-factor structure that Tait, Entwistle and Mccune (1998) proposed.

The first of the determining factors (deep) consists of sixteen items. These items are the same as the sixteen items in the group called deep approach by Tait, Entwistle and Mccune (1998). The second factor (strategic); contains 16 of the 20 items in the group named as a strategic approach by Tait, Entwistle and Mccune (1998). Four items with factor loadings below .4 and the difference between factor loadings less than .1 (overlapping) were removed from the scale. On the other hand, the third factor (surface) contains 15 of the 16 items in the group, initially named a surface approach of the scale. In this group, an item with a factor loading below 0.4 was removed from the scale at the end of EFA.

CFA, adapted to the scale, showed that the three-factor model adequately fits with the data set. As a result, the three-factor structure required the removal of 5 items from the scale consisting of 52 items. Although five items removed from the scale increased unexplained variance, it made it easier to use because it shortened the response time.

With discriminant analysis applied to our data set, it was determined that a student assigned to one of the three groups (deep, strategic, and surface) in the scale could be considered to be significantly separated from the other groups. Thus, students' learning approaches could be specified successfully.

When the relevant literature is examined, it is seen that similar results are found in two different studies. ASSIST was adapted to Turkish by Senemoğlu (2011) and Coşkun, Özeke, Budakoğlu, Tutan, Nazlı, and Aksoy (2017). In her study, Senemoğlu (2011) applied the original form of ASSIST, Turkish and English, to the students of the Turkish and American faculty of education. As a result, the three main dimensional structure of the scale was confirmed by removing one item from the deep and strategic learning dimension and two items from the surface learning dimension for the Turkish form. Coşkun, Özeke, Budakoğlu, Tutan, Nazlı, and Aksoy (2017) worked with medical school students in their research and stated that three main dimensional structure was preserved by removing a total of 8 items from the Turkish form of the scale. In the last case, there are 44 items in total, including 14 items in the deep learning dimension, 20 in the strategic learning dimension, and ten in the surface learning dimension.

When the studies conducted abroad on this subject are examined, it is seen that ASSIST has been translated into many languages (Diseth, 2001; Berberoğlu & Hei, 2003; Zhu, Valcke and Schellens, 2008 Gadelrab, 2011). Although a measurement tool can show different structures when applied to different cultures, studies nevertheless show that the ASSIST three-dimension structure is confirmed in almost every culture at the higher education level.

However, there are few studies examining physics learning approaches in our country and abroad (Prosser and Millar, 1989; Prosser, Walker and Millar, 1996; Nguyen, 1998 Dickie, 2003; Selçuk, Çalışkan and Erol, 2007 Çelik, 2013). It is believed that this situation increases the importance of the study. While the science of physics enables us to understand the universe we live in, it also enables us to produce technology by imitating nature. In addition, as the natural sciences develop, the theories and techniques of physics and research methods are more needed (İnan, 1988). From this point of view, the importance of physics education is indisputable, and the basis of research on this subject is how students learn physics (Chiou, Lee ve Tsai, 2013). With the ASSIST Turkish form developed, it is thought that determining the physics learning approaches of the students studying at higher education level in our country will answer the question of how they learn physics.

The research was conducted on teacher candidates. It is thought that determining the learning approaches of teacher candidates in the pre-service period with a reliable measurement tool and performing studies that direct them to deep learning approaches will be highly effective in their students' approaches to learning in their professional lives. Student learning approaches are influenced by variables such as the learning-teaching environment, teaching methods and techniques used, and teachers' teaching approaches (Trigwell & Prosser, 2004). There is no doubt that, for students to achieve meaningful learning by adopting deep learning approaches, the most critical task belongs to the teachers (Çoban & Ergin, 2008). When teachers prepare interactive and creative learning environments that require learners to be active, it is observed that students' motivation increases, and they get away from undesirable situations such as memorizing or competing with each other (Honkimaki, Tynjala and Valkonen, 2007). Students are more inclined to adopt a deep learning approach in such learning environments. Relevant literature shows that assessment methods are also effective in students' learning approaches (Çelik, 2013; Gijbels & Dochy, 2006; Scouller, 1998). Assessment methods that do not require cognitive thinking reveal the surface approach in students, while problem-based assessment methods that require high-level cognitive thinking support the deep approach (Byrne, Flood and Willis, 2002). In this context, it is believed that teachers who have adopted a deep learning approach will also positively affect their academic success by directing their students to deep learning in both learning-teaching and evaluation processes. When the literature was reviewed, it was determined that there is a significant positive relationship between deep learning and academic success in many related studies (Çelik, 2013; Selçuk, Çalışkan and Erol, 2007; Senemoğlu, Berliner, Yıldız, Doğan, Savaş and Çelik, 2007; Bernardo, 2003 and Ellez and Sezgin, 2002).

CONCLUSION AND RECOMMENDATIONS

It is seen that the Turkish form of ASSIST is a valuable measurement tool for students in higher education. Findings obtained from teacher candidates' data are essential in revealing which outputs the scale gives at the higher education level. However, our research findings are limited to data collected from teacher candidates studying Physics, Science, Chemistry, Biology and Elementary Mathematics Teacher Departments at Dokuz Eylül University. All the students who participated in the study took a physics course at the university, and they answered the Turkish form of the scale considering the physics course. In advanced studies, more detailed research can be planned for courses with larger sample groups and students in different departments. In this way, with the help of the developed ASSIST Turkish form, it will be possible to determine how students ' learning approaches change according to the different courses (quantitative and verbal).

In their study on determining the learning approaches of students studying at three different universities in our country, Çoban and Ergin (2008) concluded that the students of the three universities have a similar level but significantly surface learning tendency. At the same time, it is thought that this situation is due to the widespread use of rote learning and teaching in higher education. In this context, by determining the physics learning approaches of students studying at the higher education level with a reliable measurement tool, more detailed studies can be planned, which are thought to contribute to the review and development of physics teaching programs and methods being applied today.

It has been revealed in many studies that the teaching approaches used by teachers in their professional life are highly effective in the learning approaches of students (Meyer & Muller, 1990; Entwistle, 1990; Ramsden & Entwistle, 1981; Richardson, 2003; Kember, 2004; Segers, Gijbels and Thurlings, 2008 and Pimparyon, Caleer, Pemba and Roff, 2009). It is known that the students of teachers who focus on transferring knowledge tend towards the surface approach, while those who organise learning-oriented classroom activities prefer the deep approach more (Çelik, 2013; Trigwell, Prosser and Waterhouse, 1999). By their nature, faculties of education are expected to train teachers who can think critically, know the research, be sceptical about previous results, conduct logical results, perform meaningful learning, and adopt deep learning. In this context, with the help of ASSIST Turkish form, studies can be planned in which the learning approaches of the teacher candidates in our country will be determined and compared from the point of view of different universities.

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Statements of publication ethics

We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

Researchers' contribution rate

The first author played an active role in writing the conceptual framework, data collection and discussion conclusions of the research, and the second author played an active role in analysis process.

Ethics Committee Approval Information

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| Research Article / Araştırma Makalesi |

School-Related Factors Affecting 12th Grade Students' Academic Success While Preparing for Higher Education

Yükseköğretime Hazırlanırken 12. Sınıf Öğrencilerinin Akademik Başarılarını Etkileyen Okulla İlgili Faktörler[1]

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Keywords

1. Higher Education
2. Academic Success
3. School Environment
4. School Management
5. Administrators

Anahtar Kelimeler

1. Yükseköğretim
2. Academic Başarı
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Abstract

Purpose: The purpose of the research is to determine the views of students, teachers and school principals about factors affecting and the extent to which factors affect what degree to 12th-grade students' academic in the school environment during the high school preparation period. For this purpose, addressing school-related factors affecting academic success in terms of students, teachers, and administrators will provide educational administrators, who are individuals who coordinate all processes related to school, to evaluate how they manage the processes of their academic success through the eyes of students and teachers.

Design/Methodology/Approach: Descriptive survey model from quantitative research methods was used in the research. A proportional stratified sampling type of stratified sampling method was used to determine the study sample. Totally 2509 participants, that is 2072 students, 380 teachers and 57 administrators, participated in the research.

Findings: It was concluded that teachers think school-related factors affect students' academic achievement more than administrators and students. In this context, it can be said that the responsibility that school administrators feel towards increasing academic success is less than the teachers. According to the research results, it was concluded that students' perceptions of academic success differ according to their gender, the type of school they attend and the school's success. Teachers' and administrators' perceptions do not differ according to their gender, the type of school they work in, and the school's success.

Highlights: To adapt the managerial behaviours of administrators to the era and reflect them to practice in education environments, school administrators should provide training to gain skills.

Öz

Çalışmanın amacı: Bu araştırmanın amacı; yükseköğretime hazırlanırken 12. sınıf öğrencilerinin okullarında akademik başarılarını hangi faktörlerin ne derece etkilediğine ilişkin kendilerinin, öğretmenlerinin ve okul yöneticilerinin görüşlerinin belirlenmesidir. Bu amaca yönelik olarak; akademik başarıyı etkileyen okulla ilgili faktörlerin öğrenciler, öğretmenler ve yöneticiler açısından ele alınması okulla ilgili tüm süreçleri koordine eden bireyler olan eğitim yöneticilerine akademik başarılarına ilişkin okullarındaki süreçleri yönetme biçimlerini öğrenci ve öğretmenlerin gözünden değerlendirme fırsatı sunacaktır.

Materyal ve Yöntem: Araştırmada nicel araştırma yöntemlerinden betimsel tarama modeli uygulanmıştır. Çalışma örnekleminin belirlenmesinde olasılıklı örnekleme yöntemlerinden tabakalı örnekleme yönteminin orantılı tabakalı örnekleme türü kullanılmıştır. Araştırmaya 2072 öğrenci, 380 öğretmen ve 57 yönetici olmak üzere 2509 kişi katılmıştır.

Bulgular: Öğretmenlerin, yönetici ve öğrencilere göre okulla ilgili faktörlerin öğrencilerin akademik başarılarına etkisinin daha fazla olduğunu düşündükleri sonucuna ulaşılmıştır. Bu bağlamda, okul yöneticilerinin akademik başarının artmasına yönelik hissettikleri sorumluğun öğretmenlere göre daha az olduğu söylenebilir. Araştırma sonuçlarına göre; öğrencilerin akademik başarıya ilişkin algılarının cinsiyetlerine, devam ettikleri okul türüne ve okulun başarısına göre farklılaştığı, öğretmen ve yöneticilerin algılarının ise cinsiyetlerine, görev yaptıkları okul türüne ve okulun başarısına göre farklılaşmadığı sonucuna ulaşılmıştır.

Önemli Vurgular: Eğitim ortamlarında yöneticilerin yönetsel davranışlarının çağa uyumlanması ve uygulamaya yansıması için ortaöğretim yöneticilerine beceri kazandırmaya yönelik eğitimler verilmelidir.

[1] This study is produced on the Ph.D. Thesis titled "Factors Affecting 12th Grade Students' Academic Success and Future Expectations at Schools While Preparing for Higher Education", completed by Halime GÜNGÖR under the supervision of Prof. Dr. Şefika Şule ERÇETİN in Hacettepe University, Department of Educational Sciences, Department of Educational Administration, Supervision, Planning and Economics in July 2020.

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INTRODUCTION

Their educational level of them shapes the lives of individuals. In this sense, it can be said that under normal circumstances, high education level indicates good living conditions. Since development is continuous in today's world, society needs individuals who know how to criticize, question, think, interpret and have creative skills (Demircan & Tanrıseven, 2014). Although the social, spiritual, emotional, physical and academic development of the student by his/her age and level is a whole, the student's academic success plays a crucial role in education. Individuals' academic success or failure is significant for themselves, their families, and society (Kaptan & Korkmaz, 2000); in addition, it is important to determine the decreasing factors that the academic success of students (Altınkurt, 2008). The first education of individuals who experience the process of birth, growth, development and change begins in the family and on the other hand, formal education begins when children reach school age in order to ensure the integration of individuals into society and to raise individuals who are suitable for social goals. The learning process of individuals who have completed school age continues throughout their life, both in business and social life. The task of the education system is to measure the student's academic success, make decisions about the students according to the results obtained, and direct the students to the field where they will be successful in their interests and abilities (Metin, 2016).

Success in formal education in Turkey is determined by the scores obtained from the exams. For this reason, both teachers and parents advise students that they should be successful by getting high grades in the exams. At this point, academic success or school success becomes more important. When evaluated in terms of society, it is seen that people with high academic success are distinguished from those with low academic success. It is accepted that people with high academic success have the potential for a more qualified workforce (Mencik, 2017).

The fact that the input and output of educational institutions are human shows that schools have critical importance in developing successful cooperation with society (Çelik & Namalır, 2018). As a result of the reflection of the developments in technology today on the lives of societies; although the expectations of the society from the individuals and the expectations of the individual from the society have increased and differentiated (Duru, Duru & Balkıs, 2014), the higher the qualifications of the individual who has completed the formal education process, the higher his/her contribution to the society will be. A qualified workforce with high academic success is essential for social development (Hoge, Smit and Crist, 1997). It is accepted that academically successful students who are motivated to their goals, can motivate themselves, can cope with the difficulties they encounter, who accept success as an essential condition, who develop and renew themselves, who are equipped with the knowledge, are a vital force in the development of society (Bakan & Güler, 2017). In this sense, all organizational members must cooperate under school administrators' leadership to realize educational institutions' aims, objectives, mission and vision. When individuals in organizations are allowed to develop their ideas, rather than viewing organizational goals as intimidating features, the organization and management will benefit more from this situation than individuals in the organization (Erçetin & Bisaso, 2016). One of the most important goals of educational institutions is to raise academically successful individuals. Academic success, which is a necessity for adapting to the era rather than being the aim of the education system today, allows the development of new perspectives by changing the traditional view on education and the permanence of the learned information (Eker & Coşkun, 2012). Society strengthens by raising individuals suitable for the needs and expectations of society. Social needs and expectations evolve in proportion to the current age. In this sense, academic success can be defined as achieving its goal by displaying behaviours in line with the goals of the individuals and accordance with the gains in the education programs and the determined performance indicators.

Many factors affect academic success, but the main factor is school management and management style. Managers are primarily responsible for planning, executing and evaluating all activities related to the student's academic success. All activities related to the school are carried out with the management and coordination of the school principals with their consent and knowledge of the school principal. In this context, it can be said that the main factors related to the academic success of the students and the school are the educational administrators. The purpose of the research is to determine the views of students, teachers and school principals about factors affecting and the extent to which factors affect what degree to 12th-grade students' academic success during the university preparation period. For this purpose, addressing school-related factors affecting academic success in terms of students, teachers, and administrators will provide educational administrators, who are individuals who coordinate all processes related to school, to evaluate how they manage the processes of their academic success through the eyes of students and teachers.

METHOD/MATERIALS

A descriptive survey model from quantitative research methods was used in the research. A proportional stratified sampling type of stratified sampling method was used to determine the study sample. The study sample was planned to be composed of 12th-grade students, teachers and school administrators of 24 schools, which were determined by taking 17 districts of Bursa as strata. Since the number of schools in the Büyükorhan, Harmancık, Keles, and Orhaneli districts is low, no schools were included in the sample as a result of the sample calculations. The sample was calculated as 1 school in Gemlik, Gürsu, İznik, Karacabey, Kestel, Mudanya, Mustafakemalpaşa, Orhangazi, Yenişehir districts. In order to increase the internal consistency of the research, at least two schools were selected from the districts, one with high academic success and one with low academic success.

Therefore, in the districts that were calculated as 1 school in the sample, 2 schools were applied, each with a low and a high base score.

The research included 2509 participants, 2072 students, 380 teachers and 57 administrators. The personal information form prepared by the researchers and the Academic Achievement Scale developed by Erçetin, Güngör, and Hamedoğlu (2020) were used as data collection tools in the research. According to the Exploratory and Second Level Confirmatory Factor Analysis conducted by the researchers, the scale consists of 6 dimensions and 26 items, including school administrators and management style, teacher-related factors, curriculum, teaching environment and contribution of parents, physical qualifications, the impact of the student's characteristics. It was found that the corrected item-total correlations of the scale ranged between .45 and .86, and the Cronbach's alpha coefficients were between .71 and .99. Data collection tools were applied to the schools by the researcher in February and March of the academic year 2019-2020. First, the Kolmogorov Smirnov Test was used to test whether the scores of the variables about the specified categories are suitable for the normal distribution, and whether the variance condition was met or not was tested by the Levene's Test. Mann-Whitney U test was used to test the difference between the two categories of the variable in non-parametric tests, the t-test was used in parametric tests, and Kruskal-Wallis was used to test the difference when there were more than two categories in non-parametric tests, and ANOVA was used in parametric tests. ACCORDING TO KRUSKAL-WALLIS TEST RESULTS, Mann-Whitney U was used for multiple comparisons of statistically significant results. Scheffe Test was used for multiple comparisons of the results that were found to be significant according to the ANOVA result (Büyüköztürk et al., 2014; Can, 2017). The response given by the participants to the Academic Achievement Scale were evaluated and interpreted as follows; if the arithmetic means obtained is between 4.21 and 5.00, this means "the highest effects" academic success; if it is between 3.41-4.20, "highly affects", if it is between 2.61-3.40, it affects academic success in "medium level", if it is between 1.81-2.60, it affects academic success in "low level", if it is between 1.00-1.80 it does not affect academic success. Characteristics of the research sample are presented in Table 1.

Table 1. Characteristics of the research sample

Districts	12th Grade Students	Teacher	Administrators	
Gemlik	183	7	3	
Gürsu	98	19	4	
İnegöl	229	59	7	
İznik	59	16	2	
Karacabey	50	9	5	
Kestel	147	20	5	
Mudanya	170	32	4	
Mustafakemalpaşa	56	15	3	
Nilüfer	172	25	3	
Orhangazi	94	21	2	
Osmangazi	574	81	12	
Yenişehir	51	17	3	
Yıldırım	189	59	4	
Total	2072	380	57	
General Total				2509

FINDINGS

Descriptive statistics of students', teachers' and administrators' perceptions of school-related factors affecting students' academic success are presented in Table 2.

When Table 2 is examined, it is seen that the average point of teachers' perceptions of school-related factors affecting students' academic success are $\bar{x}$=4.21, perceptions of administrators are $\bar{x}$=4.12, and perceptions of students are $\bar{x}$=3.81. While teachers think that school-related factors affect students' academic success at the highest level, administrators and students think that they affect them at the high level. When the averages of the sub-dimensions of the scale are examined, it is seen that the highest average is in the dimension of the effect of the impact of students' individual characteristics (teacher $\bar{x}$=4.51, administrator $\bar{x}$=4.46) according to the perceptions of teachers and administrators, and in the dimension of teacher-related factors ($\bar{x}$=4.14) according to student perception. In this sense, the teachers and administrators participating in the research think that impact of students' individual characteristics that affect the academic success of the students the most and make a difference in academic success, while the students participating in the research attribute the high academic success to teachers. When the averages of the perceptions of teachers and administrators in the sub-dimensions of the scale are examined, it is seen that the lowest average is in the dimension of curriculum (teacher $\bar{x}$=3.74, administrator $\bar{x}$=3.49), and according to student perceptions, the lowest average is in the dimension of the teaching environment and contribution of parents ($\bar{x}$=3.51).

Table 2. Descriptive statistics of students', teachers' and administrators' perceptions of school-related factors affecting students' academic success.

Variables	Group	N	X̄	ss	Max.	Min.	Level
Academic Success	Student	2072	3.81	.71	1	5	high level
	Teacher	380	4.21	.57	1	5	the highest level
	Administrator	57	4.12	.72	1	5	high level
1. School Administrators and Management Style	Student	2072	3.74	.82	1	5	high level
	Teacher	380	4.31	.67	1	5	the highest level
	Administrator	57	4.21	.77	1	5	the highest level
2. Teacher Related Factors	Student	2072	4.14	.94	1	5	high level
	Teacher	380	4.42	.68	1	5	the highest level
	Administrator	57	4.32	.87	1	5	the highest level
3. Curriculum	Student	2072	3.61	.98	1	5	high level
	Teacher	380	3.74	.79	1	5	high level
	Administrator	57	3.49	1.01	1	5	high level
4. Teaching Environment and Contribution of Parents	Student	2072	3.51	.84	1	5	high level
	Teacher	380	4.01	.69	1	5	high level
	Administrator	57	4.03	.76	1	5	high level
5. Physical Qualifications	Student	2072	3.95	.96	1	5	high level
	Teacher	380	4.29	.70	1	5	the highest level
	Administrator	57	4.22	.86	1	5	the highest level
6. Impact of Students' Individual Characteristics	Student	2072	4.06	1.01	1	5	high level
	Teacher	380	4.51	.78	1	5	the highest level
	Administrator	57	4.46	.81	1	5	the highest level

Kruskal Wallis test results on the perceptions of students, teachers and administrators about school-related factors affecting their academic success are presented in Table 3.

Table 3. Kruskal Wallis test results on the perceptions of students, teachers and administrators about school-related factors affecting their academic success

Variables	Group	N	X̄	Rank Av.	χ^2	p	Difference
Academic Success	Student	2072	3.81	1180.41	126.718	.000*	Student-Administrator
	Teacher	380	4.21	1618.53			Student-Teacher
	Administrator	57	4.11	1543.04			
	Total	2509	3.88				
1. School Administrators and Management Style	Student	2072	3.74	1164.08	189.141	.000*	Student- Administrator
	Teacher	380	4.31	1695.59			Teacher- Administrator
	Administrator	57	4.21	1622.79			
	Total	2509	3.84				
2. Teacher Related Factors	Student	2072	4.14	1220.79	27.819	.000*	Student- Teacher
	Teacher	380	4.42	1423.43			
	Administrator	57	4.32	1375.82			
	Total	2509	4.18				
3. Curriculum	Student	2072	3.61	1246.51	4.404	.111	-
	Teacher	380	3.74	1317.45			
	Administrator	57	3.45	1147.11			
	Total	2509	3.62				
4. Teaching Environment and Contribution of Parents	Student	2072	3.51	1174.60	147.355	.000*	Student- Administrator
	Teacher	380	4.01	1633.98			Teacher- Administrator
	Administrator	57	4.02	1651.02			
	Total	2509	3.60				
5. Physical Qualifications	Student	2072	3.95	1213.64	39.433	.000*	Student- Teacher
	Teacher	380	4.29	1454.23			
	Administrator	57	4.21	1430.26			
	Total	2509	4.01				
6. Impact of Students' Individual Characteristics	Student	2072	4.06	1194.17	87.618	.000*	Student- Administrator
	Teacher	380	4.51	1546.21			Student- Teacher
	Administrator	57	4.45	1524.96			
	Total	2509	4.13				

*p<.05

When Table 3 is examined, it is seen that the perceptions of teachers, administrators and students regarding the factors affecting the academic success of students are found statistically significantly different [$\chi^2_{(2)}$ = 126.718, p< .05]. As a result of multiple comparisons of the Mann-Whitney U Test, it was found that perceptions of administrators (x̄=4.11 high level) and

teachers (x̄=3.81 high level) about the factors affecting students' academic success were higher than students (x̄=3.81 high level) and this difference is statistically significant. When the scores related to the dimensions of the scale are examined, it is seen that statistically significant difference was found according to the views of teachers, students and administrators in the dimensions of school administrators and management style, teacher-related factors, teaching environment and contribution of parents, physical qualifications, and the impact of students' individual characteristics [$\chi^2_{(2)}$ = 189.141, p< .05]. As a result of the multiple comparisons of the Mann-Whitney U-Test, perceptions of administrators (x̄=4.21 the highest level) are higher than students (x̄=3.74 high level) and perceptions of teachers (x̄=4.31 the highest level) are higher than administrators (x̄=4.21 the highest level) in school administrators and management style dimension. The perceptions of administrators (x̄=4.02 high level) are higher than students (x̄=3.51 high level) and teachers (x̄=4.01 high level) in teaching environment and contribution of parents dimension. The perceptions of administrators (x̄=4.45 the highest level) are higher than students (x̄=4.06 high level) and perceptions of teachers (x̄=4.51 the highest level) are higher than administrators (x̄=4.45 the highest level) in impact of students' individual chracteristics dimension. The perceptions of administrators (x̄=4.42 the highest level) are higher than students (x̄=4.14 high level) in teacher related factors dimension and similarly perceptions of teachers (x̄=4.29 the highest level) are higher than students (x̄=3.95 high level) in physical qualifications dimension. The views of administrators, teachers and students are similar in curriculum dimension. Mann-Whitney U test results according to the gender of students' self-perceptions about school-related factors affecting their academic success are presented in Table 4.

Table 4. Mann-Whitney U test results according to the gender of students' self-perceptions about school-related factors affecting their academic success

Variables	Sex	N	X̄	Rank Av.	U	P
Academic Success	Female	1152	3.91	1129.52	422766.000	.000*
	Male	920	3.80	920.03		
	Total	2072	3.81			
1. School Administrators and Management Style	Female	1152	3.84	1114.52	440042.500	.000*
	Male	920	3.62	938,81		
	Total	2072	3.74			
2. Teacher Related Factors	Female	1152	4.22	1095.34	462137.500	.000*
	Male	920	4.03	962.82		
	Total	2072	4.14			
3. Curriculum	Female	1152	3.70	1094.00	463680.000	.000*
	Male	920	3.49	964.50		
	Total	2072	3.61			
4. Teaching Environment and Contribution of Parents	Female	1152	3.59	1092.03	465953.000	.000*
	Male	920	3.42	966.97		
	Total	2072	3.51			
5. Physical Qualifications	Female	1152	4.04	1108.24	447274.500	.000*
	Male	920	3.83	946.67		
	Total	2072	3.95			
6. Impact of Students' Individual Characteristics	Female	1152	4.18	1112.42	442464.000	.000*
	Male	920	3.91	941.44		
	Total	2072	4.06			

*p<.05

When Table 4 is examined, it is seen that students' perceptions of school-related factors that affect their academic success are found statistically significantly different according to gender (U=422766.000, p< .05). Perceptions of female students (x̄=3.91 high level) are higher than male students (x̄=3.80 high level). In the dimensions of the scale, students' perceptions of the factors affecting their academic success are found significantly different in all dimensions according to the gender of the students. In all dimensions, female students' perceptions of school-related factors affecting their academic success (respectively x̄=3.84 high level, x̄=4.22 the highest level, x̄=3.70 high level, x̄=3.59 high level, x̄=4.04 high level, x̄=4.18 high level) are higher than male students (respectively x̄=3.62 high level, x̄=4.03 high level, x̄=3.49 high level, x̄=3.42 high level, x̄=3.83 high level, x̄=3.91 high level). Mann-Whitney U Test results according to gender of teachers' perceptions of school-related factors affecting students' academic success are presented in Table 5**.**

When Table 5 is examined, it is seen that teachers' perceptions of school-related factors that affect students' academic success do not differ significantly according to their gender (U= 16128.500, p< .05). In other words, the views of male and female teachers on school-related factors affecting students' academic success are similar.

Table 5. Mann-Whitney U Test results according to gender of teachers' perceptions of school-related factors affecting students' academic success

Variables	Sex	N	X̄	Rank Av.	U	P
Academic Success	Female	182	4.26	200.88	16128.500	.077
	Male	198	4.16	180.96		
	Total	380	4.21			
1. School Administrators and Management Style	Female	182	4.36	197.17	16804.500	.251
	Male	198	4.27	184.37		
	Total	380	4.31			
2. Teacher Related Factors	Female	182	4.48	198.35	16589.500	.167
	Male	198	4.37	183.29		
	Total	380	4.42			
3. Curriculum	Female	182	3.79	195.24	17155.000	.417
	Male	198	3.70	186.14		
	Total	380	3.74			
4. Teaching Environment and Contribution of Parents	Female	182	4.06	197.15	16808.000	.256
	Male	198	3.97	184.39		
	Total	380	4.01			
5. Physical Qualifications	Female	182	4.37	200.51	16196.500	.084
	Male	198	4.23	181.30		
	Total	380	4.29			
6. Impact of Students' Individual Characteristics	Female	182	4.56	200.79	16146.000	.061
	Male	198	4.46	181.05		
	Total	380	4.51			

*p<.05

Mann-Whitney U Test results of administrators' perceptions of school-related factors affecting students' academic success by gender are presented in Table 6.

Table 6. Mann-Whitney U Test results of administrators' perceptions of school-related factors affecting students' academic success by gender

Variables	Sex	N	X̄	Rank Av.	U	P
Academic Success	Female	14	3.97	25.82	256.500	.409
	Male	43	4.16	30.03		
	Total	57	4.11			
1. School Administrators and Management Style	Female	14	4.01	24.61	239.500	.249
	Male	43	4.27	30.43		
	Total	57	4.21			
2. Teacher Related Factors	Female	14	4.21	26.71	269.000	.539
	Male	43	4.35	29.74		
	Total	57	4.32			
3. Curriculum	Female	14	3.46	28.14	289.000	.823
	Male	43	3.49	29.28		
	Total	57	3.49			
4. Teaching Environment and Contribution of Parents	Female	14	3.93	26.96	272.500	.595
	Male	43	4.06	29.66		
	Total	57	4.02			
5. Physical Qualifications	Female	14	4.07	25.57	253.000	.364
	Male	43	4.26	30.12		
	Total	57	4.21			
6. Impact of Students' Individual Characteristics	Female	14	4.16	22.75	213.500	.076
	Male	43	4.55	31.03		
	Total	57	4.45			

*p<.05

When Table 6 is examined, it is seen that the perceptions of the administrators regarding the school-related factors that affect the academic success of the students do not differ significantly according to their gender (U= 256.500, p> .05). In other words, the views of male and female administrators on school-related factors that affect students' academic success are similar. Kruskal Wallis Test results of students' own perceptions of school-related factors affecting their academic success according to school type are presented in Table 7.

Table 7. Kruskal Wallis Test results of students' own perceptions of school-related factors affecting their academic success according to school type

Variables	School Type	N	X̄	Rank Av.	χ^2	p	Difference
Academic Success	VTHS	645	3.57	832.21	110.160	.000*	VTHS-SHS
	AHS	993	3.92	1128.42			VTHS-AHS
	AİHHS	182	3.88	1097.32			VTHS-AİHHS
	SHS	252	3.96	1153.25			
	Total	2072	3.81				
1. School Administrators and Management Style	VTHS	645	3.54	903.15	48.948	.000*	VTHS-SHS
	AHS	993	3.83	1093.87			VTHS-AHS
	AİHHS	182	3.89	1151.66			VTHS-AİHHS
	SHS	252	3.81	1068.57			
	Total	2072	3.74				
2. Teacher Related Factors	VTHS	645	3.84	864.92	80.120	.000*	VTHS-SHS
	AHS	993	4.26	1111.43			VTHS-AHS
	AİHHS	182	4.25	1138.25			VTHS-AİHHS
	SHS	252	4.32	1106.93			
	Total	2072	4.14				
3. Curriculum	VTHS	645	3.45	935.21	29.576	.000*	VTHS-SHS
	AHS	993	3.68	1082.36			VTHS-AHS
	AİHHS	182	3.60	1028.42			
	SHS	252	3.76	1120.89			
	Total	2072	3.61				
4. Teaching Environment and Contribution of Parents	VTHS	645	3.39	958.60	19.000	.000*	VTHS-SHS
	AHS	993	3.53	1053.53			VTHS-AHS
	AİHHS	182	3.63	1111.96			VTHS-AİHHS
	SHS	252	3.64	1114.28			
	Total	2072	3.51				
5. Physical Qualifications	VTHS	645	3.59	805.82	152.411	.000*	VTHS-SHS
	AHS	993	4.13	1155.07			VTHS-AHS
	AİHHS	182	3.89	1004.95			VTHS-AİHHS
	SHS	252	4.19	1182.50			AİHL-AHS
	Total	2072	3.95				AİHL-SHS
6. Impact of Students' Individual Characteristics	VTHS	645	3.74	850.30	94.174	.000*	VTHS-SHS
	AHS	993	4.21	1127.16			VTHS-AHS
	AİHHS	182	4.16	1116.20			VTHS-AİHHS
	SHS	252	4.21	1098.28			
	Total	2072	4.06				

*p<.05

When Table 7 is examined, it is seen that students' perceptions of the factors affecting their academic success differ significantly according to the type of school [$\chi^2_{(3)}$ = 110.160, p< .05]. As a result of multiple comparisons of the Mann-Whitney U Test, perceptions of the factors affecting the academic success of the students attending Science High School (x̄=3.96 high level), the students attending Anatolian High School (x̄=3.92 high level) and the students attending Anatolian Imam Hatip High School (x̄=3.88 high level) are higher than the students attending Vocational Technical Anatolian High School (x̄=3.78 high level) and these differences were statistically significant. When the scores of the dimensions of the scale are examined, it is seen that the students' perceptions about the factors affecting their academic success in all sub-dimensions differ significantly according to the type of school they attend. Perceptions of the factors affecting the academic success of the students attending Science High School (x̄=3.83 high level), the students attending Anatolian Imam Hatip High School (x̄=3.89 high level) are higher than the students attending Vocational Technical Anatolian High School (x̄=3.54 high level) in school administrators and management style dimension [$\chi^2_{(3)}$ = 80.120, p< .05]. Similarly, perceptions of the factors affecting the academic success of the students attending Science High School (x̄=4.32 the highest level), the students attending Anatolian High School (x̄=4.26 the highest level) and the students attending Anatolian Imam Hatip High School (x̄=4.25 the highest level) are higher than the students attending Vocational Technical Anatolian High School (x̄=3.84 high level) in teacher related factors dimension [$\chi^2_{(3)}$ = 110.160, p< .05]. Perceptions of the factors affecting the academic success of the students attending Science High School (x̄=3.76 high level), the students attending Anatolian High School (x̄=3.68 high level) are higher than the students attending Vocational Technical Anatolian High School (x̄=3.45 high level) in curriculum dimension [$\chi^2_{(3)}$ = 29.576, p< .05]. Perceptions of the factors affecting the academic success of the students attending Science High School (x̄=3.64 high level), the students attending Anatolian High School (x̄=3.53 high level) and the students attending Anatolian Imam Hatip High School (x̄=3.63 high level) are higher than the students attending Vocational Technical Anatolian High School (x̄=3.39 medium level) in teaching environment and contribution of parents dimension [$\chi^2_{(3)}$ = 19.000, p< .05]. Perceptions of the factors affecting the academic success of the students attending Science High School (x̄=4.19 high level),

the students attending Anatolian High School (x̄=4.13 high level) and the students attending Anatolian Imam Hatip High School (x̄=3.89 high level) are higher than the students attending Vocational Technical Anatolian High School (x̄=3.59 high level); perceptions of the factors affecting the academic success of the students attending Science High School (x̄=4.19 high level) and the students attending Anatolian High School (x̄=4.13 high level) are higher than the students attending Anatolian Imam Hatip High School (x̄=3.89 high level) in pyshical qualificiations dimension [$\chi^2_{(3)}$ = 152.411, p< .05]. Perceptions of the factors affecting the academic success of the students attending Science High School (x̄=4. high level), the students attending Anatolian High School (x̄=4.21 high level) and the students attending Anatolian Imam Hatip High School (x̄=4.16 high level) are higher than the students attending Vocational Technical Anatolian High School (x̄=3.74 high level) in impact of students' individual characteristics dimension [$\chi^2_{(3)}$ = 94.174, p< .05]. Kruskal Wallis Test results of teachers' perceptions of school-related factors affecting students' academic success according to school type are presented in Table 8.

Table 8. Kruskal Wallis Test results of teachers' perceptions of school-related factors affecting students' academic success according to school type

Variables	School Type	N	X̄	Rank Av.	χ^2	p	Difference
Academic Success	VTHS	147	4.20	184.87	4.835	.184	-
	AHS	147	4.24	202.58			
	AİHHS	44	4.03	163.94			
	SHS	42	4.26	195.73			
	Total	380	4.21				
1. School Administrators and Management Style	VTHS	147	4.23	171.50	10.331	.016*	VTHS-AHS
	AHS	147	4.40	209.49			
	AİHHS	44	4.33	203.82			
	SHS	42	4.23	176.61			
	Total	380	4.31				
2. Teacher Related Factors	VTHS	147	4.37	178.16	10.548	.014*	AİHS-SHS
	AHS	147	4.49	204.27			
	AİHHS	44	4.20	160.60			
	SHS	42	4.60	216.81			
	Total	380	4.42				
3. Curriculum	VTHS	147	3.76	192.33	4.525	.210	-
	AHS	147	3.74	190.61			
	AİHHS	44	3.56	163.02			
	SHS	42	3.90	212.50			
	Total	380	3.74				
4. Teaching Environment and Contribution of Parents	VTHS	147	4.07	199.32	3.631	.304	-
	AHS	147	4.01	191.35			
	AİHHS	44	3.84	164.36			
	SHS	42	4.01	184.01			
	Total	380	4.01				
5. Physical Qualifications	VTHS	147	4.34	193.83	9.480	.024*	AİHHS-VTHS
	AHS	147	4.32	196.66			AİHHS-AHS
	AİHHS	44	3.98	144.26			
	SHS	42	4.37	205.74			
	Total	380	4.29				
6. Impact of Students' Individual Characteristics	VTHS	147	4.48	185.25	3.088	.378	-
	AHS	147	4.57	201.73			
	AİHHS	44	4.32	176.99			
	SHS	42	4.56	183.71			
	Total	380	4.51				

*p<.05

When Table 8 is examined, it is seen that teachers' perceptions of the factors affecting students' academic success do not differ significantly according to the type of school they work in [$\chi^2_{(3)}$ = 4.835, p> .05]. When the dimensions of the scale are examined, it is seen that the perceptions of the teachers regarding the school-related factors that affect the academic success of the students in the dimensions of the curriculum, teaching environment and contribution of parents, and the impact of students' individual characteristics do not differ significantly according to the type of school that the teachers work in, but in the dimensions of school administrators and management style [$\chi^2_{(3)}$ = 10.331, p> .05], teacher-related factors [$\chi^2_{(3)}$ = 10.548, p> .05], physical qualificications [$\chi^2_{(3)}$ = 9.480, p> .05], it is seen that perceptions of teachers differ significantly according to the type of school they work in. As a result of the multiple comparisons of the Mann-Whitney U Test, the perceptions of the teachers working in Anatolian High School (x̄=4.40, the highest level) regarding the factors affecting their academic success, are higher than those working in the Vocational Technical Anatolian High School (x̄=4.23 highest level) in school administrators and management style dimension. The

perceptions of the teachers working in Science High School (x̄=4.60, the highest level) regarding the factors affecting their academic success, are higher than those working in the Anatolian İmam Hatip High School (x̄=4.20 high level) in teacher related factors dimension. The perceptions of the teachers working in Voacational Technical High School (x̄=4.34, the highest level) regarding the factors affecting their academic success, are higher than those working in the Anatolian İmam Hatip High School (x̄=3.98 high level) and those working in the Anatolian High School (x̄=4.32 high level) in physical qualifications dimension. Kruskal Wallis Test results of administrators' perceptions of school-related factors affecting students' academic success according to school type are presented in Table 9.

Table 9. Kruskal Wallis Test results of administrators' perceptions of school-related factors affecting students' academic success according to school type

Variables	School Type	N	X̄	Rank Av.	χ^2	p	Difference
Academic Success	VTHS	26	4.07	28.42	1.781	.619	-
	AHS	18	4.10	26.61			
	AİHHS	5	4.42	37.30			
	SHS	8	4.08	31.06			
	Total	57	4.11				
1. School Administrators and Management Style	VTHS	26	4.12	26.69	1.716	.633	-
	AHS	18	4.30	28.81			
	AİHHS	5	4.48	35.20			
	SHS	8	4.12	33.06			
	Total	57	4.21				
2. Teacher Related Factors	VTHS	26	4.25	27.67	2.038	.565	-
	AHS	18	4.37	28.33			
	AİHHS	5	4.80	38.70			
	SHS	8	4.08	28.75			
	Total	57	4.32				
4. Teaching Environment and Contribution of Parents	VTHS	26	3.96	27.94	1.893	.595	-
	AHS	18	4.02	27.53			
	AİHHS	5	4.44	38.40			
	SHS	8	3.97	29.88			
	Total	57	4.02				
6. Impact of Students' Individual Characteristics	VTHS	26	4.40	28.08	.357	.949	-
	AHS	18	4.49	28.81			
	AİHHS	5	4.55	30.70			
	SHS	8	4.47	31.38			
	Total	57	4.45				

*p<.05

When Table 9 is examined, it is seen that the perceptions of the administrators regarding the school-related factors that affect the academic success of the students do not differ significantly according to the type of school they work in [$\chi^2_{(3)}$ = .187, p> .05]. ANOVA is applied because curriculum and pyhsical qualifications dimensions have normal distribution. Results are presented in Table 10.

Table 10. ANOVA on academic success by school type

Academic Success	Sources of Variation	Sum of Squares	df	Mean Squares	F	p	Difference
3. Curriculum	Between Groups	55.581	3	18.527	1.156	.335	-
	Within Groups	849.262	53	16.024			
	Total	904.842	56				
5. Physical Qualifications	Between Groups	26.065	3	8.688			
	Within Groups	1003.654	53	18.937	.459	.712	-
	Total	1029.719	56				

*p<.05

According to Table 10, it is seen that the perceptions of the administrators about the school-related factors that affect the academic success of the students in the dimensions of curriculum and physical qualifications do not differ significantly according to the type of school they work in [$F_{(2,54)}$= .704, p>.05]. Mann-Whitney U Test results of students' own perceptions of school-related factors affecting their academic success according to the success of the school are presented in Table 11.

According to Table 11, it is seen that students' perceptions of school-related factors that affect their academic success differ significantly according to the success of the school (U= 343333.500, p< .05). It was found that the perceptions of the students who attend school with high success (x̄=3.91 high level) about the factors affecting academic success are higher than the students who attend school with low success (x̄=3.60 high level).

Table 11. Mann-Whitney U Test results of students' own perceptions of school-related factors affecting their academic success according to the success of the school

Variables	Success of the School	N	X̄	Rank Av.	U	P
Academic Success	High	1417	3.91	1121.70	343333.500	.000*
	Low	655	3.60	852.17		
	Total	2072	3.81			
1. School Administrators and Management Style	High	1417	3.81	1074.27	410548.500	.000*
	Low	655	3.60	954.79		
	Total	2072	3.74			
2. Teacher Related Factors	High	1417	4.25	1104.78	367321.500	.000*
	Low	655	3.89	888.80		
	Total	2072	4.14			
3. Curriculum	High	1417	3.69	1089.45	389037.000	.000*
	Low	655	3.43	921.95		
	Total	2072	3.61			
4. Teaching Environment and Contribution of Parents	High	1417	3.55	1064.05	425031.000	.002*
	Low	655	3.42	976.90		
	Total	2072	3.51			
5. Physical Qualifications	High	1417	4.11	1143.61	312291.000	.000*
	Low	655	3.59	804.78		
	Total	2072	3.95			
6. Impact of Students' Individual Characteristics	High	1417	4.20	1113.11	355516.000	.000*
	Low	655	3.77	870.77		
	Total	2072	4.06			

*p<.05

When the dimensions of the scale were examined, it was found that the students' perceptions of the factors affecting their academic success differed significantly in all dimensions according to the success of the school that the students attended. When the scores related to the dimensions of the scale are examined, it can be said that the perceptions of the students who attend the school with high success (respectively x̄=3.81 high level, x̄=4.25 the highest level, x̄=3.69 high level, x̄=3.55 high level, x̄=4.11 high level, x̄=4.20 high level) in all dimensions about the school-related factors affecting their academic success are higher than the students who attend the school with low achievement (respectively x̄=3.60 high level, x̄=3.89 high level, x̄=3.43 high level, x̄=3.42 high level, x̄=3.59 high level, x̄=3.77 high level). Mann-Whitney U Test results of teachers' perceptions of school-related factors affecting students' academic success according to school success are presented in Table 12.

Table 12. Mann-Whitney U Test results of teachers' perceptions of school-related factors affecting students' academic success according to school success

Variables	Success of the School	N	X̄	Rank Av.	U	P
Academic Success	High	218	4.24	199.10	15782.500	.076
	Low	162	4.16	178.92		
	Total	380	4.21			
1. School Administrators and Management Style	High	218	4.38	204.89	14522.000	.003*
	Low	162	4.22	171.14		
	Total	380	4.31			
2. Teacher Related Factors	High	218	4.49	201.59	15240.000	.018*
	Low	162	4.33	175.57		
	Total	380	4.42			
3. Curriculum	High	218	3.75	190.69	17616.500	.969
	Low	162	3.74	190.24		
	Total	380	3.75			
4. Teaching Environment and Contribution of Parents	High	218	4.01	188.95	17319.500	.748
	Low	162	4.02	192.59		
	Total	380	4.01			
5. Physical Qualifications	High	218	4.32	197.04	16233.000	.172
	Low	162	4.26	181.70		
	Total	380	4.29			
6. Impact of Students' Individual Characteristics	High	218	4.58	200.73	15427.000	.024*
	Low	162	4.40	176.73		
	Total	380	4.51			

*p<.05

According to Table 12, it is seen that teachers' perceptions of school-related factors that affect students' academic success do not differ significantly according to the success of the school they work in (U= 15782.500, p> .05). When the dimensions of the

scale were examined, it was determined that students' perceptions of the factors affecting their academic success were determined according to the success of the school they work in did not differ significantly in curriculum (U= 17616.500, p> .05), teaching environment and contribution of parents (U= 17319.500, p> .05) and physical qualifications (U= 9466,000, p> .05) dimensions, but it was found that there is a statistically significant difference in the dimensions of school administrators and management style, (U= 14522,000, p< .05) teacher-related factors (U= 15240,000, p< .05) and impact of the students' individual characteristics (U= 15427,000, p< .05). In the dimensions of school administrators and management style, teacher related factors, impact of students' individual characteristics; it is seen that the perceptions of teachers working in schools with high success (respectively x̄=4.38 the highest level, x̄=4.49 the highest level, x̄=4.58 the highest level) are higher than those working in schools with low success (respectively x̄=4.22 the highest level, x̄=4.33 the highest level, x̄=4.40 the highest level). Mann-Whitney U Test results of administrators' perceptions of school-related factors affecting students' academic success according to school success are presented in Table 13.

Table 13. Mann-Whitney U Test results of administrators' perceptions of school-related factors affecting students' academic success according to school success

Variables	Success of the School	N	X̄	Rank Av.	U	P
Academic Success	High	30	4.14	29.07	403.000	.974
	Low	27	4.08	28.93		
	Total	57	4.11			
1. School Administrators and Management Style	High	30	4.30	31.40	333.000	.245
	Low	27	4.11	26.33		
	Total	57	4.21			
2. Teacher Related Factors	High	30	4.31	28.83	400.000	.934
	Low	27	4.32	29.19		
	Total	57	4.32			
4. Teaching Environment and Contribution of Parents	High	30	4.03	28.57	392.000	.835
	Low	27	4.02	29.48		
	Total	57	4.02			
5. Physical Qualifications	High	30	4.29	30.65	355.500	.419
	Low	27	4.13	27.17		
	Total	57	4.21			
6. Impact of Students' Individual Characteristics	High	30	4.52	30.30	366.000	.496
	Low	27	4.38	27.56		
	Total	57	4.45			

*p<.05

When Table 13 is examined, it is seen that the perceptions of the administrators regarding the school-related factors that affect the academic success of the students do not differ significantly according to the success of the school they work in (U= 403.000, p> .05). T-test is applied because curriculum dimension has normal distribution. Results are presented in Table 14.

Table 14. t-test on academic success according to school success

Academic Success	Success of the School	N	$\overline{x}$	ss	df	t	p
3. Curriculum	High	30	3.38	,98421	55	-.817	.417
	Low	27	3.60	1,03371			

*p<.05

According to Table 14, it is seen that the perceptions of the administrators regarding the school-related factors that affect the academic success of the students in the dimension of the curriculum do not differ significantly according to the success of the school they work in [$t_{(55)}$ = .907, p>.05].

DISCUSSION

The way leadership is presented directly relates to an educational institution's success, which explains why all leaders at various levels struggle to determine the best way to lead their followers and their institutions (Erçetin & Bisaso, 2018). When the studies in the literature are examined, it is seen that they overlap with the results of the research. As a result of the research, it was determined that the school administrators and the management style were influential in the student's academic success. Similarly, in the study by Erçetin and Bisaso (2016), it was concluded that the leadership behaviours of school administrators affect academic success. In the study carried out by Özdemir (2016), it was concluded that the relationship between the managerial behaviours of school principals and the academic success of students was realized indirectly and at a low level through teachers.

It has been determined that gender is a variable that affects academic success according to student perceptions. However, the gender of administrators and teachers is not an influential variable in academic success. Researches support the results of the

research. In the study by Uzun (2005), in which gender variable was found to affect academic success, it was concluded that there was a significant difference in favour of girls. According to the results of the research conducted by Aslanargun, Bozkurt and Sarıoğlu (2016), to determine the relationship between the demographic variables affecting the students' academic success, it was found that gender is one of the factors affecting academic success. In the study conducted by Yörük (2007), it was determined that the students' productive work habits scores showed a significant difference in favour of male students according to gender. According to the results of the research conducted by Gök (2015) and Aydın (2010), it has been revealed that the gender variable has an impact on academic success. In addition, supporting the results, it was revealed in the study conducted by Sapp (2009) that the age variable also affects academic success. According to the research results, school type is an influential variable in students' perceptions of school-related factors that affect academic success. However, according to the administrators' views, it is not an influential variable. Supporting the results of the research, in the study conducted by Yörük (2007), it was concluded that the academic success and productive study habits scores of high school students differ significantly according to the school type (General High School and Anatolian High School).

CONCLUSION AND RECOMMENDATIONS

In this research, it was concluded that teachers think that school-related factors affect students' academic achievement more than administrators and students, so we can say that school administrators feel the responsibility of increasing academic success is less than the teachers. Teachers and administrators think that it is the individual characteristics of the students that most affect their academic success of the students. It was concluded that the students participating in the research attributed their high academic achievement to the teachers. In this context, the fact that teachers and administrators attribute the most influential factor to students, and students to teachers, suggests that all three groups may develop a behaviour of holding other groups accountable instead of self-criticizing about the problems and problems that may be experienced in academic success. It is concluded that female students think that school-related factors affect students' academic success more than male students. It can be said that male students may be more influenced by other factors such as family, environment, and friendship relations rather than school-related factors. According to student perceptions, it was concluded that school type is one of the factors affecting academic success. It was concluded that students attending Science High School, Anatolian High School and Anatolian Imam Hatip High School think that the factors related to school have more effect on their academic success than those attending Vocational Technical Anatolian High School. It can be said that this situation may be due to the thoughts of the students attending the Vocational Technical Anatolian High School rather than the goals of academic success to develop their profession. According to the perceptions of teachers and administrators, it was concluded that school type is not one of the factors affecting academic success. It has been concluded that the teachers working in Anatolian High School think that the school administrators and management style, which is one of the school-related factors, have a more significant effect on the student's academic success than the teachers working in the Vocational Technical Anatolian High School. It can be said that the effect of support and training courses, university preparation courses and trial exams planned by the administration in Anatolian High Schools on students' academic success may be effective in teachers' perceptions in this direction. It was concluded that the teachers working in the Science High School thought that the effects of teacher-related factors on the student's academic success were more than those working in the Anatolian Imam Hatip High School. It can be said that the preparatory courses for higher education given by the teachers in the school to the students attending the Science High School, the studies conducted under the guidance of the teachers, and the question-solving hours can be effective in the perceptions of the teachers. It was concluded that the teachers working in the Vocational Technical Anatolian High School thought that the physical variables, one of the school-related factors, had a more significant effect on the student's academic success than the teachers working at the Anatolian Imam Hatip High School and Anatolian High School. It can be said that teachers working in Vocational Technical Anatolian High School may experience the effects of physical variables on students more in vocational courses and workshops.

According to the research results, the school's success is an influential variable in the students' perceptions of the school-related factors affecting academic success. However, according to the administrators' views, it is not an influential variable. It has been concluded that students who attend school with high success think that school-related factors have more effect on their academic success than those with low success. It can be said that the competition and competition environment, motivation, goal setting and goal-oriented studies among students attending school with high success may affect their perceptions about academic success. It has been concluded that the teachers working in the schools with high success think that the effects of the school-related factors such as school administrators and management style, teacher-related factors, and the individual characteristics of the students on the academic success of the students are more than the teachers working in the schools with low success. It can be said that since the teachers working in schools with high academic success are more motivated to succeed because the school aims to achieve academic success, teachers' perceptions differ in this direction.

As a result of the research, it was found that the administrators' perceptions about the school-related factors that affect the student's academic success did not differ significantly according to the type of school they work in and the success of the school they work in. In this context, To adapt the managerial behaviours of administrators to the era and reflect them to practice in an educational environment, school administrators should provide training to gain skills. The academic success of the student should be evaluated at the level of the development of the skill of transferring knowledge to live, rather than the increase in the

level of knowledge, and the education programs should be updated with the acquisitions that enable students to develop skills suitable for the century in which they live.

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Statements of publication ethics

We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

Ethics Committee Approval Information

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