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An Examination of The Relationship Between Social Studies Teachers' Environmental Knowledge and Sustainable Environmental Attitude

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Abstract. This study was conducted to examine the relationship between environmental knowledge and sustainable environmental attitude levels of social studies teachers. In the study, correlational model of quantitative research methods has been employed. The study group consisted of 136 social studies teachers. The data were gathered through "Sustainable Environmental Attitude Scale" developed by Yıldız (2011) and "Environmental Knowledge Test" developed by Karatekin (2011). Frequency, percentage, arithmetic mean, standard deviation, Mann Whitney-U test, Kruskal Wallis test, and Spearman Brown Row Differences Correlation Coefficient were used in the analysis of the data. The study results revealed that social studies teachers have a high level of environmental knowledge and positively sustainable environmental attitude. Moreover, it was found that environmental knowledge and sustainable environmental attitude of social studies teachers did not significantly differ by gender and professional. Finally, it was determined that there was no significant relation between environmental knowledge and sustainable environmental attitude of social studies teachers. It may be recommended to increase in-service training to increase teachers' environmental knowledge levels.

Keywords. Environmental problems, environment education, environmental knowledge, sustainable environmental attitude, social studies.

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The world has a wide range of environmental problems, such as ozone depletion, the greenhouse effect and climate change, fertile lands lost by erosion, forest fires, disappearing plant and animal species, and desertification (Yılmaz, 2006). These problems, which have been increasing especially after the Industrial Revolution, not only the past and present but have also affected future generations (Akçay, 2006; Tombul, 2006). Industrialization initially came to the forefront with the aspect of facilitating human life, but due to its significant impact, it has started to threaten the future and human life day by day. However, human beings, caught between economics and ecology, have tended to choose the side of economics (Karaismailoğlu, 2018). Humans are both the cause of environmental problems and the ones most affected by them (Bradley et al., 1999). Therefore, these problems are also a warning for humankind. (Knapp et al., 1995). Particularly towards the end of the 1960s, increasing pressure on environmental problems led to the agenda of international meetings. In these meetings (UNESCO, 1978; UNESCO-UNEP, 1988), it was agreed that the most permanent solution is the individual's active participation. Accordingly, there is a need for individuals who are conscious and sensitive about environmental problems, have positive attitudes and value judgements, and exhibit environmentally responsible behaviors in their daily lives (Özdemir Özden, 2020). As emphasised by many researchers (e.g., Erten, 2003; Knapp et al., 1995; Özdemir Özden, 2020; Roth, 1992; Stapp et al., 1969; Uzun & Sağlam, 2006), an effective environmental education that will raise these individuals can eliminate environmental concerns for the future.

The primary purpose of effective environmental education is to raise environmentally responsible citizens (Atasoy & Ertürk, 2008; Wilke, 1995). These individuals, who are also called environmentally literate, should have knowledge and attitudes towards the environment and environmental problems, an understanding that humans are part of nature, motivation, and skills to work towards solving and preventing environmental problems, and active participation in maintaining the balance between quality life and environmental protection (Roth, 1992). Schools are the most appropriate environments for raising individuals with these characteristics. Although environmental education is an interdisciplinary field, especially science and social studies courses (Disinger, 2001; Hungerford, 2001) come to the fore at the primary level in schools. In addition, environmental education is traditionally seen as the responsibility of science courses and science teachers. In some studies, conducted in Türkiye, it has been determined that the related subjects and outcomes are more in the science programme (Akınoğlu & Sarı, 2009; Karatekin, 2011). However, environmental problems are more socio-cultural than scientific-technological. Therefore, environmental problems and their solutions have a value-laden characteristic that is somewhat foreign to science fields, and,

logically, social studies courses should play an essential role in environmental education (Hungerford, 2001). Thus, in Özdemir Özden's (2011) study, students also stated that they learned more about environmental education in the social studies course. Briefly, social studies course has an essential place in environmental education. In this sense, the social studies course curriculum (Ministry of National Education [MONE], 2018) concretely includes objectives, skills, and values for environmental education.

Moreover, as it is known, the mediation of teachers in a successful teaching process cannot be denied. The role of the teacher as a model is indisputable, especially in learning, such as environmental awareness and the development of responsible behaviours towards the environment. Therefore, it is essential to examine social studies teachers' knowledge, skills, attitudes and behaviours towards the environment and the relationships between them to determine their competencies towards environmental education as a model. In the literature, it is seen that most of the related studies were conducted with science teachers (e.g., Aksu, 2009; Erol, 2005; Sarışan Tungaç, 2015; Timur et al., 2012; Yıldız, 2011) and pre-service teachers (e.g., Akıllı & Yurtcan, 2009; Kahyaoğlu & Özgen, 2012; Kayalı, 2010; Öcal, 2013; Sadık, 2013; Şama, 2003; Timur & Yılmaz, 2011). There is no research that reveals the relationship between environmental knowledge and attitudes of social studies teachers. This study aims to determine whether there is a relationship between social studies teachers' environmental knowledge and sustainable environmental attitudes. Specifically, the study seeks to address the following sub questions.

1. What are social studies teachers' environmental knowledge and sustainable environment attitude levels?
2. Do social studies teachers' levels of environmental knowledge and sustainable environmental attitudes differ significantly according to gender and professional seniority?
3. Is there a relationship between social studies teachers' environmental knowledge and sustainable environmental attitude levels?

Method

Research Model

In this study, the correlational research model, which is one of the quantitative research methods, was employed. Correlational research is characterised by examining the relationships between two or more variables without any direct manipulation or intervention on these variables. Through this method, the intrinsic relationships between variables can be observed in their natural

context. This method provides insights into the natural relationships between variables without changing or intervening in their states (Büyüköztürk et al., 2014).

Study Group

The study focused on social studies teachers working in public secondary schools affiliated with Kütahya Provincial Directorate of National Education. No special sampling was conducted since it was possible to reach the entire target group. An online data collection tool was presented to all teachers, and 136 teachers responded based on voluntary participation. Of these participants, 35.3 per cent identified themselves as female and 64.7 per cent as male. 28.7% of the teachers had 1-5 years of professional seniority, 27.2% had 6-10 years of professional seniority, 24.2% had 11-15 years of professional seniority, 14% had 16-20 years of professional seniority, and 5.9% had 21 years or more of professional seniority.

Data Collection Tools

The following data collection tools were used in the study:

Environmental knowledge test. The environmental knowledge test developed by Karatekin (2011) consists of 21 items and 3 sections (ecological knowledge, general environmental knowledge, and socio-political-economic knowledge). Question 21 was not used in the present study since it was appropriate for pre-service teachers and not for teachers. The KR20 reliability coefficient of the test was calculated as 0.71. In addition, it was determined that the average item difficulty index of the environmental knowledge test was 0.60, and the average item discrimination was 0.39.

Sustainable environment attitude scale. The scale developed by Yıldız (2011) was prepared in a 5-point Likert format and consists of twenty-seven items. KMO value was calculated as .882, and Barlett's test result was 7014.473 ($p=.000$). The scale consists of three factors. The factor loadings of the items ranged between .469 and .777. The lowest correlation value for the items was calculated as .287, and the highest value was calculated as .685. Cronbach's alpha reliability coefficient of the scale is .89. In the process of data collection, the initial step involved obtaining the necessary permissions from the Kütahya Provincial Directorate of National Education. Following this, school administrations were contacted via phone to communicate with social studies teachers, who were then provided with the link to the form. For schools near the researcher's residence, face-to-face meetings were arranged, during which the social studies teachers completed the online form. The entire online data collection phase spanned four months.

Data Analysis

As an initial step, reliability analyses were conducted specifically for the sample involved in this study. The reliability coefficient was calculated as .85 for the knowledge test and .83 for the attitude scale. A reliability coefficient of .70 and higher is considered sufficient for the reliability of test scores (Büyüköztürk, 2014). Then, to decide on the statistical analysis technique, the normal distribution feature of the attitude and knowledge scores of the teachers was examined. Skewness and kurtosis coefficients, histogram, Q-Q Plot graph, and box-line graph were analysed, and Kolmogorov-Smirnov values were calculated. This value was calculated as .032 for the knowledge test and .000 for the attitude scale. Since the calculated p-value was less than .05, it was found that the data did not show normal distribution characteristics, and non-parametric techniques could be used (Büyüköztürk, 2014). Accordingly, frequency, percentage, and arithmetic mean were used to analyse the research data. Mann Whitney U and Kruskal Wallis techniques were employed for comparisons between groups. In addition, the Spearman-Brown Rank Difference correlation coefficient was used to determine the relationship between environmental knowledge and sustainable environmental attitude. The significance level was accepted as .05 in analysing the data. In the interpretation of the data, 0-10 points between “low”, 11-15 points between “medium”, 16-20 points between “high” for Environmental Knowledge Test; 27-62 points between “low”, 63-98 points between “medium”, 99-135 points between “high” for Sustainable Environment Attitude Scale.

Results

Social Studies Teachers' Level of Environmental Knowledge

The general distribution of social studies teachers' scores from the environmental knowledge test is presented in Table 1.

Table 1.

General Distribution of Social Studies Teachers' Scores from the Environmental Knowledge Test

N	Minimum	Maximum	Arithmetic Mean	Standard Deviation
136	4	19	14.20	2.96

According to Table 1, the lowest score is 4, while the highest score is 19. The standard deviation of the participants' scores is 2.96, and the arithmetic mean is 14.20. Based on these findings, it can be said that social studies teachers have a moderate level of environmental knowledge.

Social Studies Teachers' Environmental Knowledge Regarding Variables

According to the sub-problems of the study, it was examined whether the environmental knowledge of social studies teachers differed significantly regarding gender and professional seniority variables. The results of the Mann-Whitney U-Test for environmental knowledge scores are presented in Table 2.

Table 2.

Mann Whitney U- Test Results of Social Studies Teachers' Environmental Knowledge Scores in Terms of Gender

Gender	n	Mean Rank	Rank Sum	U	p
Female	48	74.69	3585.00	1815.00	.172
Male	88	65.13	5731.00		

According to the rank means given in Table 2, the knowledge scores of female teachers are higher than those of male teachers. However, this difference between the scores is not statistically significant ($U=1815.00$, $p>.05$). In other words, it can be said that gender is not a variable affecting social studies teachers' environmental knowledge levels. The results of the Kruskal-Wallis Test for the professional seniority variable are presented in Table 3.

Table 3.

Kruskal Wallis Test Results of Social Studies Teachers' Environmental Knowledge Scores in Terms of Professional Seniority

Professional Seniority	n	Mean Rank	sd	χ^2	p
1-5 years	39	61.99	3	5.168	.160
6-10 years	37	72.35			
11-15 years	33	69.97			
16-20 years	19	78.89			
21 years and over	8	51.69			

According to the rank averages in Table 3, social studies teachers' environmental knowledge scores differ according to their professional seniority. While the highest mean score was obtained by teachers with 16-20 years of professional seniority, the lowest was obtained by teachers with 21 years of professional seniority and over. However, these differences between the groups were not statistically significant ($\chi^2(3)=5.168$, $p>.05$). According to this finding, it can be said that professional seniority is not a variable affecting social studies teachers' environmental knowledge levels.

Social Studies Teachers' Attitude Levels Towards Sustainable Environment

The overall distribution of the scores that the social studies teachers received from the scale has been detailed and presented in Table 6 for further analysis and understanding.

Table 4.

General Distribution of Social Studies Teachers' Scores from the Sustainable Environment Attitude Scale

(N)	Minimum	Maximum	Mean	Standard Deviation
136	86	135	115.02	10.81

As seen in Table 4, the lowest score of the social studies teachers who participated in the study from the sustainable environment attitude scale was 86, while the highest score was 135. The standard deviation of the scores is 10.81. The arithmetic mean of the participants' scores was 115.02. Accordingly, it can be said that social studies teachers have strong and positive sustainable environmental attitudes. To analyse the opinions and attitudes of social studies teachers in more detail, their responses to each scale item are presented in Table 5.

Table 5.

Social Studies Teachers' Responses to the Sustainable Environment Attitude Scale Items

Items		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. The idea of inventing vehicles that pollute the air as little as possible excites me.	<i>f</i>	-	1	9	42	84
	%	-	0.7	6.6	30.9	61.8
2. The thought that harmful gases released into nature may exceed the carrying capacity of nature frightens me.	<i>f</i>	-	1	4	37	94
	%	-	0.7	2.9	27.2	69.1
3. It worries me to know that increasing pollution in the atmosphere is the cause of global climate change.	<i>f</i>	-	-	3	50	83
	%	-	-	2.2	36.8	61
4. It worries me that one of the reasons for the water shortage in the future is the increase in human population.	<i>f</i>	5	10	7	59	55
	%	3.7	7.4	5.1	43.4	40.4
5. To ensure the continuity of water for future generations, I prefer to use less pesticides, industrial products and household cleaners that cause pollution.	<i>f</i>	3	1	4	53	75
	%	2.2	0.7	2.9	39	55.1
6. The negative impact of chemicals accumulated in crops on other links in the food chain bothers me.	<i>f</i>	-	1	8	35.3	79
	%	-	0.7	5.9	35.3	58.1
7. I do not care about soil loss in other parts of the world.	<i>f</i>	66	50	10	6	4
	%	48.5	36.8	7.4	4.4	2.9
8. It is unnecessary to invest in renewable energy sources by thinking about the future.	<i>f</i>	77	43	8	3	5
	%	56.6	31.6	5.9	2.2	3.7
9. The idea of using these resources carefully to ensure the sustainability of energy resources is unnecessary.	<i>f</i>	82	37	6	8	3
	%	60.3	27.2	4.4	5.9	2.2

Table 5 (continued).

Social Studies Teachers' Responses to the Sustainable Environment Attitude Scale Items

10. Considering that fossil energy resources may one day be exhausted; it is unnecessary to use these resources carefully.	<i>f</i>	80	39	7	4	6
	<i>%</i>	58.8	28.7	5.1	2.9	4.4
11. The thought that nature cannot renew the resources we consume rapidly worries me.	<i>f</i>	10	3	5	51	67
	<i>%</i>	7.4	2.2	3.7	37.5	49.3
12. I am happy when I see recycling advertisements for a sustainable environment.	<i>f</i>	2	1	10	52	71
	<i>%</i>	1.5	0.7	7.4	38.2	52.2
13. I ignore the recycling emblem on the packaging of the products I buy.	<i>f</i>	31	41	35	22	7
	<i>%</i>	22.8	30.1	25.7	16.2	5.1
14. I find it necessary to give education about recycling in schools.	<i>f</i>	2	6	4	32	92
	<i>%</i>	1.5	4.4	2.9	23.5	67.6
15. I prefer to use products from bottles where the deposit process is applied.	<i>f</i>	9	11	31	45	40
	<i>%</i>	6.6	8.1	22.8	33.1	29.4
16. I do not prefer to use cloth bags, mesh bags, or paper bags instead of bags.	<i>f</i>	30	42	35	22	7
	<i>%</i>	22.1	30.9	25.7	16.2	5.1
17. I ignore the fact that the products I buy are multi-use rather than disposable.	<i>f</i>	36	35	30	25	10
	<i>%</i>	26.5	25.7	22.1	18.4	7.4
18. It is a distressing situation that we do not see enough recycling bins in the environment.	<i>f</i>	1	2	4	47	82
	<i>%</i>	0.7	1.5	2.9	34.6	60.3
19. It scares me that rapidly increasing consumption is an important obstacle to the sustainability of the environment.	<i>f</i>	3	1	5	54	73
	<i>%</i>	2.2	0.7	3.7	39.7	53.7
20. When we consume more than nature can give us, it is unnecessary to think that the future will be affected by this situation.	<i>f</i>	72	38	8	7	11
	<i>%</i>	52.9	27.9	5.9	5.1	8.1
21. I would be happy to attend seminars on consumption habits for sustainability.	<i>f</i>	4	6	28	49	49
	<i>%</i>	2.9	4.4	20.6	36	36
22. It is unnecessary to think that resources will run out when the human population increases.	<i>f</i>	67	50	7	7	5
	<i>%</i>	49.3	36.8	5.1	5.1	3.7
23. It does not concern me if the increase in human population prevents the sustainability of the natural balance.	<i>f</i>	77	42	6	6	5
	<i>%</i>	56.6	30.9	4.4	4.4	3.7
24. It is a waste of time to explain what I have learnt about sustainability to my family and close circle.	<i>f</i>	73	46	9	3	5
	<i>%</i>	53.7	33.8	6.6	2.2	3.7
25. I would like sustainability to be a philosophy of life in order to leave a good environment for our children.	<i>f</i>	1	1	1	50	83
	<i>%</i>	0.7	0.7	0.7	36.8	61
26. I am glad that people meet their raw material needs and reduce their pressure on nature through recycling practices.	<i>f</i>	1	-	-	60	75
	<i>%</i>	0.7	-	-	44.1	55.1
27. I find it important that people are told that natural resources are not infinite through recycling campaigns.	<i>f</i>	1	-	2	39	94
	<i>%</i>	0.7	-	1.5	28.7	69.1

As Table 5 shows, it is evident that social studies teachers showed high agreement with the positive items on the scale. The highest rates of agreement belong to the items that *I am glad that people meet their raw material needs and reduce their pressure on nature through recycling practices* (99.2%), and *it worries me to know that increasing pollution in the atmosphere is the cause of global*

climate change (97.8%) and *I would like sustainability to be a philosophy of life in order to leave a good environment for our children* (97.8%). In other words, it can be said that almost all of the social studies teachers have positive attitudes towards recycling practices and are concerned about the fact that pollution in the atmosphere causes climate change and believe that sustainability should be a philosophy of life.

According to Table 5, one of the items that social studies teachers disagreed with the most was *“it is unnecessary to invest in renewable energy resources by thinking about the future”* (88.2%). When the above items are analysed, it is seen that the relevant attitude statements with low agreement are concluded with negative statements such as “it is unnecessary, it does not concern me, it is a waste of time”. The fact that social studies teachers do not agree with these items can be accepted as an indicator of their positive attitudes towards the environment.

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In Table 5, it is seen that the rate of teachers’ preference for the “neutral” option is low except for five remarkable items. It is seen that the items with high rates of neutral are *I ignore the recycling emblem on the packaging of the products I buy* (25.7%), and *I do not prefer to use cloth bags, mesh bags, or paper bags instead of bags* (25.7%). It is seen that the above items, which a significant number of social studies teachers have ticked “no idea”, are mostly about recycling. On the other

hand, it was stated that they would be happy to reduce the pressures on nature with recycling practices. It can be said that teachers think positively about recycling, but some teachers abstain from the statements about transforming into behaviour.

Sustainable Environmental Attitudes of Social Studies Teachers in Terms of Variables

Regarding the sub-problems of the study, it was analysed whether social studies teachers' scores on sustainable environmental attitudes differed significantly in terms of gender and professional seniority. The results of the Whitney U-Test related to gender are presented in Table 6.

Table 6.

Mann Whitney U- Test Results of Social Studies Teachers' Sustainable Environmental Attitude Scores Regarding Gender

Gender	n	Mean Rank	Rank Sum	U	p
Female	48	61.52	2953.00	1777.00	.127
Male	88	72.31	6363.00		

According to the mean ranks in Table 6, it is seen that the sustainable environmental attitude scores of male social studies teachers are higher than those of female social studies teachers. However, this difference is not statistically significant ($U=1777.00$, $p>.05$). In other words, it can be said that gender is not a variable affecting social studies teachers' sustainable environmental attitudes. The Kruskal Wallis Test results related to professional seniority are presented in Table 7.

Table 7.

Kruskal Wallis Test Results of Social Studies Teachers' Sustainable Environmental Attitude Scores in Terms of Professional Seniority

Professional Seniority	n	Mean Rank	sd	χ^2	p
1-5 years	39	72.51	4	1.631	.803
6-10 years	37	63.41			
11-15 years	33	67.36			
16-20 years	19	74.42			
21 years and over	8	63.13			

According to the mean ranks in Table 7, it is seen that social studies teachers' sustainable environmental attitude scores differ in terms of their professional seniority. Teachers with a professional seniority of 16-20 years had the highest mean score, while teachers with a professional seniority of 21 years and over had the lowest mean score. However, these differences between the groups were not statistically significant ($\chi^2(4)=1.631$, $p>.05$). According to this finding, it can be said that professional seniority is not a variable affecting social studies teachers' sustainable environmental attitudes.

The Relationship Between Social Studies Teachers' Environmental Knowledge and Sustainable Environmental Attitude Levels

Spearman-Brown Rank Difference correlation coefficient was calculated to determine whether there is a significant relationship between social studies teachers' environmental knowledge and sustainable environmental attitudes. The results are presented in Table 8.

Table 8.

Spearman-Brown Rank Difference Correlation Coefficient between Social Studies Teachers' Environmental Knowledge and Sustainable Environmental Attitudes

		Sustainable Environmental Attitude
Environmental Knowledge	Pearson Correlation	.134
	Sig. (2-tailed)	.121
	N	136

The analysis results given in Table 8 show that there is no significant relationship between social studies teachers' environmental knowledge and sustainable environmental attitudes ($r=0.134$, $*p>.05$).

Discussion and Conclusion

In this study, it was observed that social studies teachers possess a moderate level of environmental knowledge. Upon reviewing the relevant literature, no studies specifically examined social studies teachers' environmental knowledge levels. However, there are some studies focused on science and technology course teachers. For instance, in a study conducted by Aydemir (2007), science and technology course teachers were found to have moderate environmental knowledge. Moreover, several studies in the literature focus on pre-service social studies teachers. These studies determined that pre-service teachers exhibited a moderate level (Karatekin, 2011; Sadık, 2013) and a low level (Alagöz, 2009) of environmental knowledge.

In the study, it was determined that social studies teachers showed high participation in the positive items of the sustainable environment attitude scale and did not participate in the negative items. However, a significant abstention was observed in the items aimed at transforming their thoughts into action. The reasons for this need to be investigated and discussed. It was found that social studies teachers generally have a high level of positive sustainable environmental attitudes. As for environmental knowledge, there is no research conducted with social studies teachers on environmental attitudes. However, there are many studies conducted with pre-service teachers in social studies and other fields that are in line with the results of this study (Ahi & Özsoy, 2015; Gül

et al., 2018; Karatekin, 2011; Kayalı, 2010; Malkoç, 2011; Öcal, 2013; Sadık, 2013). In these studies, it was determined that teachers had a high level of positive environmental attitude. In some studies (Arık & Yılmaz, 2017; Eroğlu Doğan, 2013; Gürbüz & Çakmak, 2012; Kahyaoğlu & Özgen, 2012; Polat & Kırpık, 2013), it was found that pre-service teachers in different fields had moderate positive attitudes towards the environment. When analysing the results of the studies, it is seen that attitudes towards the environment are mostly high across all groups. However, the gradual increase in negative behaviours towards the environment in Türkiye constitutes a contradiction. It may be necessary to investigate the reasons for this situation.

In the study, it was determined that the environmental knowledge levels of social studies teachers did not change in terms of gender. Similarly, in some studies (Karatekin, 2011; McDaniel & Alley, 2005; Sarışan Tungaç, 2015; Timur & Yılmaz, 2011), it was determined that gender did not make a significant difference in the environmental knowledge scores of adults. In some studies, conducted for primary and high school students in the literature, it was determined that gender did not create a significant difference (e.g. Esen, 2011; İncekara & Tuna, 2010; Özdemir Özden, 2011; Sağır et al., 2008). However, there are studies that do not coincide with these results. According to a study conducted by Sadık and Çakan (2010) with biology students, it was found that males had higher levels of environmental knowledge. In Eroğlu Doğan's (2013) study conducted with prospective biology teachers, a significant difference was found in favour of females. In studies conducted with primary and high school students, it was concluded that female students had higher environmental knowledge levels (Atasoy & Ertürk, 2008; Çavuşoğlu et al., 2017; Gök & Afyon, 2015; Taycı, 2009; Uzun, 2007).

In the study, it was determined that social studies teachers' sustainable environmental attitudes did not change in terms of gender. Similar results were obtained in many studies with different samples (Aksu, 2009; Akbaş, 2007; Demirel et al., 2009; Esen, 2011; Gürbüz & Çakmak, 2012; Karadayı, 2005; Köse, 2010; Malkoç, 2011; Polat & Kırpık, 2013; Sağır et al., 2008; Uzun, 2007). However, there are many studies with different results. In the studies conducted with all primary school teachers (Ahi & Özsoy, 2015), classroom teachers (Gül et al., 2018) and pre-service social studies teachers (Karatekin, 2011; Öcal, 2013), a significant difference was found in favour of females. However, in many studies conducted with pre-service teachers in different branches (Akıllı & Yurtcan, 2009; Arık & Yılmaz, 2017; Eroğlu Doğan, 2013; Güşta Şahin & Doğu, 2018; Kahyaoğlu & Özgen, 2012; Kayalı, 2010; Sadık & Çakan, 2010; Şama, 2003; Timur et al., 2013), the significant difference was in favour of males. Moreover, it was determined that female students had more

positive environmental attitudes in studies on early age groups (Atasoy & Ertürk, 2008; Gök & Afyon, 2015; Gökçe et al., 2007; Nalçacı & Beldağ, 2012; Özdemir Özden, 2011; Taycı, 2009).

In the study, it was found that both environmental knowledge levels and sustainable environmental attitudes of social studies teachers did not change in terms of their professional seniority. However, in Sarışan Tungaç's (2015) study, science teachers with less seniority years were found to have more environmental knowledge. Moreover, in some studies conducted with science and primary school teachers, similar results were obtained in terms of environmental attitudes (Aksu, 2009; Sarışan Tungaç, 2015). According to Ahi and Özsoy (2015), professional seniority was found to be a variable that made a significant difference.

The study's results indicated no significant relationship between teachers' environmental knowledge and sustainable environmental attitudes. Similarly, in Esen's (2011) study with gifted students at the primary school level, it was determined that there was no relationship between students' environmental knowledge and attitudes. However, many studies in the literature have revealed a significant relationship between environmental knowledge and attitude. According to Atasoy and Ertürk (2008), Sadık (2013), and Uzun (2007), there is a moderate positive and significant relationship between environmental attitudes and environmental knowledge. In the studies conducted with students, it was found that there was a positive relationship between environmental knowledge and environmental attitudes (Çavuşoğlu et al., 2017; Özdemir Özden, 2011; Taycı, 2009).

Recommendations

Recommendations for The Findings

The results of the study reveal that teachers do not have a high level of environmental knowledge. It is of great importance to increase teachers' environmental knowledge. Initiatives such as in-service seminars, online training sessions, conferences and panel discussions can be effective in this regard. Moreover, other research findings similarly point to moderate to low levels of environmental knowledge during pre-service education. To address this problem, teacher training programmes may need to be strengthened in terms of environmental education courses, or the quality of the education provided may need to be improved.

Recommendations for The Researchers

The results of the study reveal that teachers do not have a high level of environmental knowledge. It may be useful to conduct further studies to investigate the reasons behind this finding.

The study also reveals that social studies teachers have high levels of positive sustainable environmental attitudes. In other literature in the field, moderate to high levels of positive attitudes were also found. However, the increasing negative behaviours towards the environment in our country constitute an interesting contradiction. Studies can be conducted to investigate the reasons behind this contradiction. On the other hand, a similar study can be repeated with a larger sample or in different provinces to collect more data about social studies teachers' current knowledge and attitude levels. In this study, only professional seniority and gender variables were analysed. The effect of other variables can be investigated. Although there are many quantitative studies in the literature, as seen in this study, qualitative studies can be conducted to understand better the reasons affecting teachers' environmental knowledge and attitudes.

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