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Investigation of Social Studies Teacher Candidates' Attitudes Towards Renewable Energy Sources

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Abstract

This research was prepared in order to examine the attitudes of social studies teacher candidates towards renewable energy sources in terms of various variables. Convenient sampling, one of the purposeful sampling methods, was preferred in the research and the sample group of the research consists of 250 teacher candidates, who are the last level students of universities who teach social studies. In the research, the data were collected by taking the necessary permissions and transferring the scale used to the online environment, taking into account the cost and economic conditions. The Attitude Scale Towards Renewable Energy Sources developed by T. Güneş, K. Alat, and A. İ. C. Gözüm, was used after obtaining the necessary permissions. In addition, the demographic information form prepared by taking the necessary expert opinion within the scope of this research was used as a data collection tool in the research. The Attitude Scale Towards Renewable Energy Sources used in the research was prepared in a 5-point Likert type consisting of 26 items. The causal comparison design, which is among the quantitative methods, was preferred in the research. The data obtained in the study were analyzed using independent groups t-test and one-way analysis of variance (ANOVA).

Keywords: social studies teacher candidates, renewable energy, attitude.

1. Introduction

The environment is the environment in which people, other living things and non-living things in nature live in interaction with each other (Seçgin, Yalvaç & Çetin, 2010). For this reason, the natural environment is important for all living things in the world (Yıldırım, 2016). It can be said that human-environment interaction dates back to ancient times. With the existence of man in the world, his interaction with the natural environment in which he lives has become inevitable People benefited from the natural environment in order to meet their own needs (Çimen & Yılmaz, 2012).

In recent years, as a result of the rapid increase in the population, many problems have started to emerge with the urbanization problems and the secondization (Çolak, Kaymakçı &

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Akpınar, 2015). Problems have occurred in the natural environment due to the increase in seconds and the factors that emerged as a result of the developments in technology (Avan, 2011).

As a result of the increasing human population in the world, the energy needs of societies have also increased. The increase in the energy demands of societies causes an increase in the use of oil, coal and natural gas, which are among the fossil fuels, in energy production (Çakırlar, 2015). It is known that the fossil fuels used to meet the energy needs are not infinite and harm the natural environment (Eroğlu & Aydoğdu, 2016). This leads to the search for sustainable and more environmentally friendly new energy (Bodur & Şenyuva, 2013).

As an alternative to fossil-based energy sources, resources such as solar, wind, wave, hydroelectric, geothermal, biomass and hydrogen energy in nature are called renewable energy sources. These resources can produce energy with the least damage to the environment and can renew themselves in a very short time (Yıldırım, 2016). Due to the high installation costs of renewable energy sources in today's conditions and the problems experienced in the storage of the produced energy, the world still uses fossil fuels in energy production to a large extent (Çolak et al., 2015).

Recently, there are many studies examining the knowledge levels of students and teacher candidates on the use of alternative energy sources and the recycling of materials such as plastic bags, paper, glass, and batteries left to nature (Akanlar, 2019; Alboğa, 2013; Aydın, 2019; Benek, 2019; Birsen, 2020; Can, 2019; Demircan, 2019; Koruoğlu, 2013). There are also studies examining the knowledge levels of teacher candidates about renewable energy sources (Aytar, 2016; Bülbül, 2017; Hür, 2019; Karakaya-Cirit, 2016; Soğancılar, 2018). In Turkey, studies have been conducted to develop an attitude or awareness scale towards renewable energy in the field of education and to measure the attitudes or awareness of teachers in different branches (Morgil et al., 2006; Güneş et al., 2013; Akçöltekin & Doğan, 2013; Bilen, Özen & Sürücü, 2013)

When the relevant literature is examined, there are many studies investigating the awareness levels of students on renewable energy sources and recycling (Arslan, 2019; Şallı, 2011).

Considering the current primary education curriculum in Turkey, it will be easily noticed that the most suitable courses for transferring the subject to students are Social Studies courses in terms of their content. At this point, in addition to the handling of renewable energy resources in the curriculum and textbooks, especially in the Social Studies course, the attitudes of the Social Studies teacher candidates towards renewable energy and their approach to the issue of renewable energy are extremely important as they are the teachers of the future. Because raising conscious students on this subject will be possible with teachers who are conscious and understand the importance of renewable energy. For this reason, examining the attitudes of social studies teacher candidates in Turkey towards renewable energy sources in terms of various variables constitutes the subject of this study.

2. Purpose of the research

This research aims to examine the attitudes of social studies teacher candidates towards renewable energy sources in terms of various variables. In line with the purpose of the research, answers to the questions listed below were sought:

- What are the attitudes of social studies teacher candidates towards renewable energy sources?
- Do social studies teacher candidates' attitudes towards renewable energy sources differ according to gender?

- Do social studies teacher candidates' attitudes towards renewable energy sources differ according to the variable of membership in environmental protection organizations?
- Do social studies teacher candidates' attitude levels towards renewable energy sources differ according to the variable of participation in environmental protection activities?

3. Method

This research is a descriptive survey in terms of revealing the attitudes of social studies teacher candidates towards renewable energy sources. In the research, causal comparison design was used in order to examine various variables of social studies teacher candidates' attitudes towards renewable energy sources. In causal comparative research, researchers, individuals they try to determine the cause or consequences of differences between or between groups (Fraenkel, Wallen & Hyun 2015: 364).

In this context, the difference between the social studies teacher candidates' attitudes towards renewable energy sources in terms of gender, membership in environmental protection organizations, participation in environmental protection activities were examined. In the research, the levels of attitudes towards renewable energy sources were examined to differencing according to gender, environmental protection organization membership and participation in environmental protection activities.

3.1 *Data collection*

Within the scope of the research, the data were collected by It was collected using the Attitude Scale towards Renewable Energy Sources developed by T. Güneş, K. Alat, and Gözüm, A. İ. C. Permission was obtained from the researchers who developed the scale used in data collection.

In the research, scale items were added to the lime survey system on the internet, taking into account the cost and other conditions during the data collection process. An online link address was sent to the participants in order to respond to the scale. Participants gave their answers to the scale online using this link sent to them. The system automatically recorded participant responses and presented them to the researchers. The data obtained within the scope of the research were transferred to the SPSS program to be analyzed by the researcher.

3.2 *Analysis of data*

The answers obtained from the participants in the study were analyzed using the parametric tests in the SPSS program. In the analysis of the data, first of all, the normality distributions were examined with the Kolmogorov Smirnov test. The use of this test in the normality distribution is due to the fact that the number of participants is 250. In quantitative studies, the Shapiro Wilks test is used when the number of participants is less than 29, and the Kolmogorov-Simirnov (Lilliefors) test is used when it is more (Kalaycı, 2008).

Table 1. Normality test

	Kolmogorov Smirnov		
Renewable Energy Sources Attitude Level	Statistic	df	p
	.840	250	.245

When Table 1 is examined, it is seen that the significance level of the normality test of the data obtained from the answers given by the research participants is p>0.05. The value obtained as a result of the normality test shows that the data exhibit normal distribution. For this reason, parametric tests were preferred in the analysis of the data obtained in the study.

Within the scope of the research, descriptive statistics were used to measure the attitudes of social studies teacher candidates towards renewable energy sources. Since the scale of attitude towards renewable energy sources used in the research is of 5-point scale, average scores between 1.00 and 1.99 are very low, average scores between 2.00 and 2.99 are low, average scores between 3.00 and 3.99 are high, and average scores between 4.00 and 5.00 are very high. In addition, one-way analysis of variance (ANOVA) was applied to analyze the attitudes of social studies teacher candidates towards renewable energy sources according to the variables of membership in environmental protection organizations and participation in environmental protection activities. In case of a significant difference, the Scheffe test was applied by looking at the homogeneity of within-group variances in order to determine which group or groups favored this difference. In the study, independent groups t-test was used in the analysis of social studies teacher candidates' attitudes towards renewable energy sources according to the gender variable.

4. Findings and interpretation

In the study, descriptive findings including the attitudes of social studies teacher candidates towards renewable energy sources are given in Table 2.

Table 2. Descriptive findings of social studies teacher candidates' attitudes towards renewable energy sources

Scale	N	X	Standard error	Standard deviation	Maximum	Minimum
Renewable Energy sources attitude level	250	3.75	0.0512	0.503	5.00	1.00

When Table 2 is examined, it is seen that the social studies teacher candidates' level of attitude towards renewable energy sources is X=3.75. The findings obtained in the study show that the participants' level of attitude towards renewable energy sources is high.

In the study, the attitudes of social studies teacher candidates towards renewable energy sources were analyzed by using independent groups t-test according to the gender variable. The obtained results are given in Table 3.

Table 3. Attitude levels towards renewable energy sources and their findings on gender variable

Scale	Gender	N	X	Standard deviation	t	sd	p
Renewable Energy sources attitude Scale	Male	138	3.67	0.38	1.057	246	0.004
	Female	112	3.84	0.96			

When Table 3 is examined, it is seen that the attitudes of the participants towards renewable energy sources differ in favor of female according to the gender variable (p<0.05). In the study, female social studies teacher candidates' attitudes towards renewable energy sources are higher than male teacher candidates (X=3.84>X=3.67). This finding obtained in the study is similar to the findings of the previous study by Baydar, Ersoy and Ongun (2022). In this study, it was determined that female teacher candidates had higher environmental awareness levels than male teacher candidates. Due to the close relationship between environmental awareness and the use of renewable energy resources, it can be stated that female teacher candidates may have higher attitudes towards the use of renewable energy resources.

In the study, ANOVA findings in which the attitudes of social studies teacher candidates towards renewable energy sources were examined according to the variable of membership in environmental protection organizations are given in Table 4.

Table 4. ANOVA test of findings related to the variable of membership to environmental protection organizations of teacher candidates' attitudes towards renewable energy sources

Scale	membership in environmental protection organizations	N	X	SS	Sd	F	p
Renewable Energy sources attitude Scale	does not have any membership	142	3.35	0.42	246	2.74	0.020
	1-2 organizations	76	3.92	0.37			
	3+ organizations	32	3.98	0.39			

When Table 4 is examined, it has been determined that the attitudes of social studies teacher candidates towards renewable energy sources differ significantly according to the variable of membership in environmental protection organizations (p=0.020<0.05). Scheffe test was used to see which group or groups favored this significant difference. The findings of the Scheffe test are given in Table 5.

Table 5. Scheffe test of findings related to the variable of membership to environmental protection organizations of teacher candidates' attitudes towards renewable energy sources

Renewable Energy sources attitude		X	Difference Between Means	p
does not have any membership	1-2 organizations	3.92	-0.506	0.02*
	3+ organizations	3.98	-0.602	0.01*
1-2 organizations	does not have any membership	3.35	0.506	0.02*
	3+ organizations	3.98	-0.005	0.17
3+ organizations	does not have any membership	3.35	0.602	0.01*
	1-2 organizations	3.92	0.005	0.17

At the end of the Scheffe analysis conducted in the research, a significant difference was found between the participants who are members of 1-2 organizations and those who are not members of any organization, in favor of the participants who are members of 1-2 organizations (p=0.02<0.05). At the end of the Scheffe analysis conducted in the research, a significant difference was found between the participants who are members of 3 or more organizations and

those who are not members of any organization, in favor of the participants who are members of 3 or more organizations (p=0.01<0.05). In line with this finding obtained in the research, it can be said that the candidates who are members of any environmental protection organization have higher attitudes towards renewable energy sources than candidates who are not members of environmental protection organizations (X=3.92>X=3.35 and X=3.98>X=3.35).

The ANOVA findings in which the attitudes of social studies teacher candidates towards renewable energy sources were examined according to the variable of participation in environmental protection activities are given in Table 6.

Table 6. ANOVA test of the findings related to the variable of participation in environmental protection activities of teacher candidates' attitudes towards renewable energy sources

Scale	Level of Participation In Environmental Protection Activities	N	X	SS	Sd	F	p
Renewable Energy sources attitude Scale	those who do not engage in any activity	85	3.07	0.51	246	3.12	0.001
	1-2 Activities	110	3.98	0.63			
	3+ Activities	55	4.20	0.58			

When Table 6 is examined, it has been determined that the attitudes of social studies teacher candidates towards renewable energy sources differ significantly according to the variable of participation in environmental protection activities (p=0.001<0.05). Scheffe test was used to see which group or groups supported this significant difference. The findings of the Scheffe test are given in Table 7.

Table 7. Scheffe test of findings on the variable of participation in environmental protection activities of teacher candidates' attitudes towards renewable energy sources

Renewable Energy sources attitude		X	Difference Between Means	p
those who do not engage in any activity	1-2 Activities	3.98	-0.813	0.01*
	3+ Activities	4.20	-0.996	0.01*
1-2 Activities	those who do not engage in any activity	3.07	0.813	0.01*
	3+ Activities	4.20	-0.047	0.30
3+ Activities	those who do not engage in any activity	3.07	0.813	0.01*
	1-2 Activities	3.98	0.047	0.30

As a result of the Scheffe analysis conducted in the research, a significant difference was found between the participants who participated in 1-2 activities and those who did not participate in any environmental protection activities, in favor of the participants who participated in 1-2 environmental protection activities (p=0.01<0.05). As a result of the Scheffe analysis conducted in the research, a significant difference was found between the participants who participated in 3 or more environmental protection activities and those who did not participate in any environmental protection activities in favor of the participants who participated in 3 or more environmental protection activities (p=0.01<0.05). According to this finding reached in the

research, it can be said that social studies teacher candidates participating in environmental protection activities have higher attitudes towards renewable energy sources than those who do not participate in any environmental protection activities.

5. Discussion, conclusion, and recommendations

In this study, it was concluded that the social studies teacher candidates' attitudes towards renewable energy sources were high. Celikler and Kara (2011) aimed to determine the awareness of primary school mathematics and social studies teacher candidates about renewable energy according to various variables with their article titled "Primary school mathematics and social studies teacher candidates' awareness on renewable energy." When the awareness of teacher candidates about renewable energy sources was examined, a significant difference emerged in favor of social studies teacher candidates. This result is similar to the results of the research. Fırat, Sepetcioğlu and Kiraz (2012) aimed to reveal the attitudes of pre-service teachers towards renewable energy and whether they differ according to some variables with their article titled "Examination of pre-service teachers' attitudes towards renewable energy." According to the findings, it was determined that the attitudes of teacher candidates towards renewable energy vary on the basis of department, gender, class and environmental education they received at the university. In general, the attitudes of teacher candidates towards renewable energy sources are positive. These results are similar to the results of the research.

In the study, the level of attitudes of social studies teacher candidates towards renewable energy sources was examined according to the gender variable. It was concluded that female teacher candidates' attitudes towards renewable energy sources differ significantly compared to male teacher candidates. Bilen, Özel, and Sürücü (2013) aimed to examine the attitudes of pre-service teachers towards renewable energy with their article titled "Attitudes of pre-service science teachers towards renewable energy." In the study, it was determined that there was no significant difference according to the gender variable. Similarly, Bozdogan and Yigit (2014), in their article titled "Examination of pre-service teachers' views on alternative energy sources in terms of different variables," found that there was no significant difference between the concepts that prospective teachers put forward about renewable energy and the gender variable. These results contradict with the research results. Fırat, Sepetcioğlu, and Kiraz (2012) concluded in their study that teacher candidates' attitudes towards renewable energy differ significantly in favor of female candidates according to the gender variable. This result is similar to the results of the research.

In the study, it was concluded that the attitudes of social studies teacher candidates towards renewable energy sources differed significantly according to the variable of having membership in environmental organizations. It has been concluded that social studies teacher candidates who are members of at least 1 environmental protection organization have a higher level of attitudes towards renewable energy sources than candidates who are not members of any environmental protection organization. In the study, it was determined that the attitudes of social studies teacher candidates towards renewable energy sources differed significantly according to the variable of participation in environmental protection activities. It was concluded that the pre-service teachers who did not participate in any environmental protection activities had lower attitudes towards renewable energy sources than the pre-service teachers who participated in at least one environmental protection activity.

In this study, the attitudes of social studies teacher candidates towards renewable energy sources were examined in terms of various variables. In line with the results obtained in the study, the opinions of teacher candidates on renewable energy sources can be the subject of further studies. Educational courses can be given in authorized institutions for teacher training for renewable energy sources. Environmental protection organizations for renewable energy

sources can be promoted by teacher candidates. Participation of teacher candidates in environmental protection activities for renewable energy sources can be supported.

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