

Environmental Ethics Awareness of Teachers

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Abstract

The purpose of the present research is to determine science teachers' and biology teachers' awareness levels of environmental ethics in relation to different variables. The "Environmental Ethics Awareness Scale" developed by Özer and Keles (2016) was used in the research. The research is consisted of 237 people, including 130 science teachers and 107 biology teachers working in different school of Turkey. Independent t test, one way analysis of variance (anova), Kruskal-Wallis analysis and Tukey significance test were used to determine the statistical significance of the obtained data in the research using relational screening model. According to research findings; it is understood that education level, graduation achievement, on the tenure of office and the having environment lesson does not make a meaningful difference for science teachers and biology teachers. However, gender and the institution that worked were significant differences ($p < .05$) in the environmental awareness of science teachers.

Keywords: Environmental ethics, environmental ethics awareness, science teacher, biology teacher

Introduction

The environment can be described as 'the environment in which the living things live, are connected by vital bonds and interact with each other in various forms' (Yıldız & et al., 2005: 14). There is a balance between the living and non-living factors that make up the environment. However, Scientists have pointed out that human-induced activities after the Industrial Revolution led to the destruction of the balance in the periphery (Legget, 2007: 19). People's thoughts and behaviors are also influential in the formation of environmental problems (Watson & Halse, 2005; Kahyaoğlu, 2011; Şenyurt, Temel & Özkahraman, 2011). Mankind has adopted the concept of excessive consumption and destruction, as opposed to benefiting from nature at the rate of its own needs. Moreover, mankind regarded itself as the "master of nature" (Armstrong & Botzler, 1993: 53) and thought that other beings had no value other than their utility (Karaca, 2007). This has resulted in serious degradation of natural balance and serious environmental problems. People are now faced with environmental problems that have previously been ignored (Ertan, 2004). Human nature needs to learn that it is part of nature, not ownership. This will ensure that the person is aware of their responsibilities towards nature. Human is not the owner of nature. He has to learn that human beings are part of nature. This will ensure that the person is aware of their responsibilities towards nature (Özer & Keleş, 2016). It is very important that the individual is aware of the environment ethics. Individuals who are aware of environmental ethics are actively involved in the protection of the environment. Environmental ethics is concerned with the resolution of environmental problems faced by individuals (Freiman, 2006). Environmental ethics is a theoretical discipline that examines all kinds of attitudes and behaviors that people consider important when making decisions about nature, factors that make up nature, or the environment (Karaca, 2007). The environmental ethic evaluates the relationship of people to nature

in a moral framework (Özer & Keleş, 2016) and tries to find the right behavior towards the environment. Environmental ethics allows the individual to appreciate the value of nature (Mahmutoğlu, 2009). It is emphasized that environmental ethics is the responsibility of the environment in which the person lived, and that every living thing should behave in a way that considers the vital rights it possesses (Özer & Keleş, 2016).

Environmental ethical approaches are examined in three categories (Gagnon Thompson & Barton, 1994; Kayaer, 2013; Gerçek, 2016). The humanistic approach sees man as the proprietor of nature (Özer & Keleş, 2016) and values the living and non-human beings outside human beings according to the benefits he provides to man (Gerçek, 2016). The livelihood-based approach considers human beings and other living beings as a whole, evaluating the environment as benefit to these beings.

Living and non-living goods are seen as a whole by environmental-centered approach. Also, ethical approaches of humans about environment are distant from human centered approach to living environment centered approach (Kayaer, 2013). Basic principles of environmental problems are human behaviour, as results of this awareness of humans about environment become an important issue (Erten, 2004). Protecting of environment is not only today's problem but also it is important for future. Therefore, by getting environment education, human's perception, attitude, awareness and consciousness become more effective. According to the literature search, there are many different studies about environmental ethics (Holden, 2003; Preston, 2005; Psarikidou, 2008; Laal, 2009; Mahmutoğlu, 2010; Gražulevičiūtė-Vileniškė & Narvydas, 2012). Approaches about environmental ethics, (Karaca, 2007; Kayaer, 2013; Ağbuğa, 2016), consciousness (Kılıç & İnal, 2010; Talas & Karataş, 2012), awareness (Çabuk & Karacaoğlu, 2003; Şenyurt, Bayık Temel & Özkahraman, 2011; Dolmacı ve Bulgan, 2013), perception (Bülbül, 2013; Gerçek, 2016; Tesfai, Nagothu, Şimek & Fučík, 2016) approach (Saka, Sürmeli ve Öztuna, 2009; Özdemir, 2012) studies are found.

Approaches about environmental ethics, (Karaca, 2007; Kayaer, 2013; Ağbuğa, 2016), consciousness (Kılıç & İnal, 2010; Talas & Karataş, 2012), awareness (Çabuk & Karacaoğlu, 2003; Şenyurt, Bayık Temel & Özkahraman, 2011; Dolmacı ve Bulgan, 2013), perception (Bülbül, 2013; Gerçek, 2016; Tesfai, Nagothu, Şimek & Fučík, 2016) and approach (Saka, Sürmeli ve Öztuna, 2009; Özdemir, 2012) studies are found.

According to literature search it was seen that there were not enough studies about awareness of ethical approaches about environment. Keleş ve Özer studied about awareness of environmental ethics of educational science teacher's candidates. Moreover, Nagra (2010) studied about ethical awareness of teachers on environment about different varieties.

In the program of Educational Science in Turkey, it is defined that persons who are literacy of science, understand all the interactions between science, humanity, technology and environment, and also have an idea about scientific approaches (MEB, 2013). Teachers have great responsibilities on science literacy persons' awareness, approaches and behaviours about environment. For protecting quality of environment and life on both future and now, some basic aims for solutions have to be produced (Keleş, 2007). Informations of teachers about environment, is important for solving problems (Mosothwane, 1991).

Teachers have to remember to their students about responsibilities on environment and they have to get awareness (Özer & Keleş, 2016). In order to make this kind of consciousness, teachers have to become their awareness much more than students (Keleş, Uzun & Varnacı Uzun, 2010).

It is identified that there is no more studies about environmental ethical awareness on educational science and biology teachers. Therefore this study will be contributed to literature on this area.

Purpose of research

The purpose of the present research is to determine science teachers' and biology teachers' awareness levels of environmental ethics in relation to different variables. On the frame of this aim, answers are searched for below questions:

1. Do science teachers' and biology teachers' differ environmental ethics awareness in terms of gender?
2. Do science teachers' and biology teachers' differ environmental ethics awareness in terms of working institutions?
3. Do science teachers' and biology teachers' differ environmental ethics awareness in terms of education level?
4. Do science teachers' and biology teachers' differ environmental ethics awareness in terms of the having environment lesson?
5. Do science teachers' and biology teachers' differ environmental ethics awareness in terms of the graduation achievement score?
6. Do science teachers' and biology teachers' differ environmental ethics awareness in terms of the the tenure of office?

Methodology

Research model

In this research, the relational screening model was used. The relational screening model is a general screening model used in research to determine the changes in two or more variables and the degree of change (Karasar, 2006, 81).

Data Collection Tool

In this research, "Environmental Ethics Awareness Scale" developed by Özer and Keles (2016) was used. The scale was prepared with a 5-point Likert type scale consisting of 23 questions with 4 factors. Questions on the scale are evaluated by numbering 1 = absolutely disagree, 2 = disagree, 3 = unstable, 4 = agree, 5 = strongly agree. The reliability of your scale by Özer and Keles (2016) was found as cronbach alpha factor of .95. The reliability of this research scale was found to be cronbach alpha number of .92 for science teachers and .96 for biology teachers.

Data Analysis

Data gathered through the frame of the research is analyzed with IBM SPSS-21 statistical program. For the evaluation, we used an independent t-test, variance analysis (anova), Kruskal-Wallis analysis and Tukey test. On the other hand, data is valued with 0.05 meaningfulness level and their percentage, frequency, average and standard deviation values are given.

Research group

The research is consisted of 237 people, including 130 science teachers and 107 biology teachers working in different school of Turkey. When T.C. the Ministry of National Education's curricula are examined, it is observed that the subjects related to

the environment are included in the Science Curriculum and the Biology Course Curriculum. So research was carried out by teachers of science and biology. The research was conducted during the academic years 2016-2017. The distribution of the demographic information of science and biology teachers participating in the research is given in Table 1.

Table 1.

Demographic information of science teachers and biology teachers

		Science teachers		Biology teachers	
		N	%	N	%
Gender	Female	81	62.3	65	60.7
	Male	49	37.7	42	39.3
Working institution	Public school	81	62.3	64	59.8
	Private school	49	37.7	43	40.2
On the tenure of office	0-5 years	89	68.5	62	57.9
	6-10 years	26	20.0	24	22.4
	>10 years	15	11.5	21	19.6
Education level	University	92	70.8	40	37.4
	Master	38	29.2	67	62.6
Graduation achievement score	0.0-2.49	4	3.1	5	4.7
	2.50-2.99	67	51.5	35	32.7
	3.00-3.49	42	32.3	38	35.5
	3.50-4.00	17	13.1	29	27.1
The having environment lesson	Yes	115	88.5	89	83.2
	No	15	11.5	18	16.8
		130	54.9	107	45.1

Findings

In the research, an answer to question "*Do science teachers' and biology teachers' differ environmental ethics awareness in terms of gender?*" was searched the independent t-test results obtained are given in Table 2.

Table 2.

The results of t-test for gender variable

Branch	Gender	N	\bar{X}	sd	t	p
Science teachers	Female	81	4.60	128	2.466	.015*
	Male	49	4.40			
Biology teachers	Female	65	4.46	105	0.56	.576
	Male	42	4.38			

* $p < .05$

When the data in Table 2 were examined, it was founded that the scores of science teachers are ($t(128) = 2.466$; $p < .05$) and biology teachers are ($t(105) = 0.56$; $p > .05$). A difference was found between the male and the female participants of the science teachers in favor of the female teachers (4.60) and this difference is statistically significant. According to these results, it can be said that gender is an effective variable in environmental ethics awareness science teachers. However, it turned out to be not a difference related with gender for biology teachers. It can be said that gender is not an effective variable in environmental ethics awareness of biology teachers.

In the research, an answer to question "*Do science teachers' and biology teachers' differ environmental ethics awareness in terms of working institutions?*" was searched. The independent t-test results obtained are given in Table 3.

Table 3.

The results of t-test for working institution variable

Branch	Institution	N	\bar{X}	sd	t	p
Science teachers	Public school	81	4.60	128	2.375	.019*
	Private school	49	4.40			
Biology teachers	Public school	64	4.46	105	0.533	.595
	Private school	43	4.39			

* $p < .05$

When the data in Table 3 were examined, it was founded that the scores of science teachers are ($t(128) = 2.375$; $p < .05$) and biology teachers are ($t(105) = 0.533$; $p > .05$). A difference was found between the public school and the private school participants of the science teachers in favor of the public school teachers (4.60) and this difference is statistically significant. According to these results, it can be said that working institution is an effective variable in environmental ethics awareness science teachers. However, it turned out to be not a difference related with for working institution biology teachers. So, it can be said that working institution is not an effective variable in environmental ethics awareness of biology teachers.

In the research, an answer to question "*Do science teachers' and biology teachers' differ environmental ethics awareness in terms of education level?*" was searched. The independent t-test results obtained are given in Table 4.

Table 4.

The results of t-test for education level variable

Branch	Education level	N	\bar{X}	sd	t	p
Science teachers	University	92	4.49	128	-1.608	.110
	Master	38	4.63			
Biology teachers	University	40	4.28	105	-1.726	.087
	Master	67	4.52			

* $p < .05$

When the data in Table 4 were examined, it was founded that the scores of science teachers are ($t(128) = -1.608$; $p > .05$) and biology teachers are ($t(105) = -1.726$; $p > .05$). According to this result, it can be said that education level does not have the effect on environmental ethics awareness of science teachers and biology teachers. When the averages are analyzed, it can be seen that education level creates a positive effect on environmental ethics awareness of science teachers, but a negative effect to environmental ethics awareness of biology teachers.

In the research, an answer to question "Do science teachers' and biology teachers' differ environmental ethics awareness in terms of the having environment lesson was searched. The independent t-test results obtained are given in Table 5.

Tablo 5.

T-test analysis results according to the having environment lesson

<i>Branch</i>	<i>The having environment lesson</i>	<i>N</i>	<i>\bar{X}</i>	<i>sd</i>	<i>t</i>	<i>p</i>
Science teachers	Yes	115	4.52	128	-.142	.887
	No	15	4.54			
Biology teachers	Yes	89	4.46	105	.285	.285
	No	18	4.27			

* $p < .05$

When the data in Table 5 were examined, it was founded that the scores of science teachers are ($t(128) = -0.142$; $p > .05$) and biology teachers are ($t(105) = .285$; $p > .05$). According to this result, it can be said that having environment lesson does not have the effect on environmental ethics awareness of science teachers and biology teachers. When the averages are analyzed, it can be seen that having environment lesson creates a negative effect to environmental ethics awareness of science teachers, but a positive effect to environmental ethics awareness of biology teachers.

In the research, an answer to question "Do science teachers' and biology teachers' differ environmental ethics awareness in terms of the graduation achievement score?" was searched. The obtained one-way analysis of variance (anova) results are given in Table 6 and Table 7.

Tablo 6.

Frequency, mean and standard deviation for graduation achievement score

<i>Graduation achievement</i>	<i>Science teachers</i>			<i>Biology teachers</i>		
	<i>N</i>	<i>\bar{X}</i>	<i>ss</i>	<i>N</i>	<i>\bar{X}</i>	<i>ss</i>
Other	4	4.55	.24	5	4.43	.22
2.50-2.99	67	4.52	.36	35	4.52	.62
3.00-3.49	42	4.48	.64	38	4.30	.83
3.50-4.00	17	4.66	.28	29	4.49	.54
	130	4.53	.46	107	4.53	.67

Tablo 7.

The results of one-way ANOVA test for graduation achievement score

		<i>Squares All</i>	<i>sd</i>	<i>Squares Average</i>	<i>F</i>	<i>p</i>
Science teachers	Between Groups	.374	3	.125	.576	.632
	In-Group	27.273	126	.216		
	All	27.647	129			
Biology teachers	Between Groups	1.062	3	.354	.767	.515
	In-Group	47.512	103	.461		
	All	48.575	106			

* $p < .05$

When the data in Table 6 and Table 7 were examined, it was founded that the scores of science teachers are $[F(3,126)=.576;p>.05]$ and biology teachers are $[F(3,103)=.576;p>.05]$. According to this result, it can be said that graduation achievement score does not have the effect on environmental ethics awareness of science teachers and biology teachers.

In the research, an answer to question "*Do science teachers' and biology teachers' differ environmental ethics awareness in terms of the tenure of office?*" was searched. The obtained one-way analysis of variance (anova) results are given in Table 8, Table 9. The obtained analysis of Kruskal Wallis results are given in Tablo 10. The Kruskal-Wallis test, a nonparametric test, was performed because the homogeneous distribution of the data obtained in terms of the tenure of office was not achieved for science teachers'

Table 8.

Frequency, mean and standard deviation for the tenure of office

Biology Teachers			
<i>The tenure of office</i>	<i>N</i>	<i>\bar{X}</i>	<i>ss</i>
0-5 years	62	4.48	.55
6-10 yeas	24	4.37	.81
>10 years	21	4.34	.84
	107	4.43	.67

Table 9.

The results of one-way ANOVA test for the tenure of office

		Squares	sd	Squares	F	p
		All		Average		
Biology Teachers	Between Groups	.425	2	.212		
	In-Group	48.150	104	.463	.459	.633
	All	48.575	106			

* $p<.05$

When the data in Table 8 and Table 9 were examined, it was founded that the scores of biology teachers are $[F(2,104)=.459; p>.05]$. According to this result, it can be said that the tenure of office does not have the effect on environmental ethics awareness of biology teachers.

Table 10.

The results of Kruskal-Wallis H test for the tenure

Science teachers					
<i>The tenure of office</i>	<i>N</i>	<i>Line Avr.</i>	<i>sd</i>	<i>X^2</i>	<i>p</i>
0-5 years	89	66.39			
6-10 yeas	26	67.40	2	.901	.637
>10 years	15	56.90			

* $p<.05$

When the data in Table 8 and Table 9 were examined, it was founded that the scores of science teachers are $(X^2=.901; p>.05)$. According to this result, it can be said that the tenure of office does not have the effect on environmental ethics awareness of science teachers.

Results and Discussion

In this research, it was aimed to determine the environmental awareness of science teachers and biology teachers. According to this aim, the effect of variables such as "gender, institution, level of education, the having environment lesson, graduation achievement score, the tenure of office " are examined.

There was statistically significant difference environmental awareness of science teachers in terms of gender. Environmental awareness of female science teachers are higher than male science teachers. So, it can be said that gender is an effective variable in environmental ethics awareness science teachers. There was not statistically significant difference environmental awareness of biology teachers in terms of gender. It can be said that gender is not an effective variable in environmental ethics awareness of biology teachers. However, when the averages were examined (Table 2), environmental awareness of female biology teachers are higher than male biology teachers. Many studies on this subject have produced results. For instance, in the study of Keles and Özer (2016), it stated that environmental ethics awareness level of female was higher than male pre-service teachers. Tesfaye et al. (2016), they stated that the perceptions of secondary school students about environmental services differ in favor of female students. According to a report by Pherigo (1997), female have higher environmental concerns than men. Wongchantra, Boujai, Sata, & Neungchalem (2008) stated that the environmental education-training process females' were more effective and environmental ethics were higher. These results support the findings of the research. However, contrary to the findings of the research in the literature, Özdemir (2012) stated that there is no difference in the ethical attitudes towards the periphery of senior students in terms of gender. Nagra (2010) stated that secondary school and primary school teachers' awareness of environmental ethics did not differ in terms of gender. Turan (2009) stated that there is no significant difference between ethnic approaches of the secondary school students regarding the environment in terms of gender.

There was statistically significant difference environmental awareness of science teachers in terms of working institution. A difference was found between the public school and the private school participants of the science teachers in favor of the public school teachers. There was not statistically significant difference environmental awareness of biology teachers in terms of working institution. It can be said that working institution is not an effective variable in environmental ethics awareness of biology teachers. However, when the averages were examined (Table 3), it has been seen that environmental ethics awareness in public biology teachers have higher than private biology teachers.

There was not statistically significant difference environmental awareness of teachers who are science teachers and biology teachers, in terms of education level. It can be said that education level is not an effective variable in environmental ethics awareness of teachers. However, when the averages were examined (Table 4), it stated that the increase in the level of education in science and biology teachers leads to an increase in the environmental ethics awareness of level. As the level of education increases, environmental ethic perception is expected to increase (Tikka, Kuitunen and Tynys, 2000; Wilkinson, 2002). Gerçek (2016) stated that the perception of environmental ethics of university students was not significantly different from the level of education. Tesfai et al. (2016) stated that there was no significant difference in perception of environmental ethics of secondary students compared to the level of education. This result overlaps with the findings of the research.

There was not statistically significant difference environmental awareness of science teachers and biology teachers, in terms of having environment lesson. It can be said

that having environment lesson is not an effective variable in environmental ethics awareness of science teachers and biology teachers. However, when the averages were examined (Table 5), it stated that having environment lesson creates a negative effect to environmental ethics awareness of science teachers, but a positive effect to environmental ethics awareness of biology teachers. In the study of Keles and Özer (2016), it was stated that the environmental ethics awareness levels of prospective teachers who take environment courses in undergraduate education were increased. This result overlaps with the findings of the research. It has been determined that environmental education does not have a positive effect on the awareness level of environmental ethics for science teachers. It can be said that this result is caused by the inadequacy of the environmental lesson which plays an active role in the formation of environmental ethics in the individuals (Çabuk and Karacaoğlu, 2003; Demir and Yalçın, 2014). This finding in the research has shown that environmental education should be examined in terms of its quality.

There was not statistically significant difference environmental awareness of science teachers and biology teachers, in terms of graduation achievement score. It can be said that graduation achievement score is not an effective variable in environmental ethics awareness of science teachers and biology teachers. However, when the averages were examined (Table 6), it determined that as the graduation achievement score increased, environmental ethics awareness of teachers increased. Probable, teachers with high grades are more interested in the environmental course. For this reason, there are differences in the levels of ethical awareness towards the environment. Atılı, Uzun, Saraç, Sağlam and Sağlam (2014) stated that there is a positive relationship between students' academic achievement score and ethical approach scores towards the environment. This supports the findings of the research.

There was not statistically significant difference environmental awareness of science teachers and biology teachers, in terms of the tenure of office. It can be said that the tenure of office is not an effective variable in environmental ethics awareness of science teachers and biology teachers. However, when the averages were examined (Table 8 and 10), it determined that as the the tenure of office decreased, environmental ethics awareness of teachers increased. This is thought to be due to the fact that the information of the newly graduated teachers is current. Bülbül (2013) stated that raising the grade level in teacher candidates in his study caused a decrease in environmental awareness. Keles and Özer (2016) stated that knowledge of the environment course influenced the environmental ethical awareness of teacher candidates. These results are consistent with the findings of the investigation.

According to the findings of this research, it is thought that similar studies should be done with reference to different samples and variables. Thus, it is possible to generalize the variables affecting awareness of environmental ethics. In addition, studies should be carried out to show the importance of the environmental course that teacher candidates take during undergraduate education.

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