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Investigating Pre-service Teachers' Knowledge and Behaviors toward Environment

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ABSTRACT This study aimed to investigate the relationship between knowledge and behaviors of elementary pre-service teachers who attend various majors. In addition, the knowledge and behaviors of pre-service teachers were compared on different variables. 619 pre-service teachers participated in the study which used the descriptive survey model. "The Test of Knowledge of Environmental Problems" and "Environmentally Sensitive Behavior Scale" were used to collect data in the study. As a result of the study, it was found that pre-service teachers' environment knowledge and behaviors differ in relation to their years of education at the university, their information about environment and nature; and their levels of curiosity towards environment. Furthermore, it was concluded that pre-service teachers' knowledge of environment differed significantly on gender and whether they had taken any environment classes; their behaviors toward environment differed significantly on the frequency of visiting sites of nature, membership in environment clubs/associations, and whether they have family members worried about environmental pollution. Some suggestions based on results were included in the study.

INTRODUCTION

The common use of the term of environment by the societies in daily language began in the beginning of 1970s. Although at first sight the concept of environment looks clear and simple, its complexity is noticed when further studied (Aydogdu and Gezer 2006) and it has many definitions. Dikmen (1993) defines environment as the whole of any socio-economic, cultural, historical, and physical factors affecting all living things throughout their lives whereas according to Usak et al. (2006), the environment is the medium where man sustains all his social, biological, and chemical activities. It includes the surface land by which, along with geology, hydrology-mineralogy (such as oil and water minerals) sources, the natural and non-natural flora and people are affected.

Ever-rising life standards and increasing world population have been effective on natural resources. Meeting basic needs of the increasing population has created serious environmental issues. Water, air, and soil, including those living in them, which are essential for life and environment are damaged, polluted, and destroyed due to careless consumption. This destruction is more apparent especially in densely populated areas. Today, environmental problems are capable of threatening the whole world (Dogan 1997; Sisli 1999; Oweini and Houri 2006; The World Resources Institute 2009).

Communities need to be familiar with ecology and environmental problems in order to understand the quality of issues associated with environment, to develop suggestions for solutions, and to live in harmony with nature and other living things. Perceiving the relationship between man and other living things and the environment, namely perceiving the basic ecologic activities, enables change in individuals behaviors toward environment. Desired change in individuals' behaviors can be achieved through educating individuals, making up the society, about man and the environmental health adequately. Thus, raising healthy generations is possible. It is observed in our century that man's worries about environment multiply (Unal et al. 2001). If people making the environment unlivable want to leave the younger generations a balanced and healthy environment, this will happen through environmental education (Dikmen 1993).

Environment education has two objectives such as teaching method and learning target. These objectives of the environment education consist of two categories such as the knowl-

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edge of content and the change in behaviors (Wang 2013). Environmental education can be defined as raising awareness in all layers of the society; bringing in environmentally sensitive, sustainable, and positive behavioral changes; protecting natural, cultural, historical, social, and aesthetic values; and providing active participation and serving in solutions to problems (The Ministry of Environment 2005).

Environmental education is very important as it raises awareness of environment with all aspects; brings in consciousness of living without harming environment; and teaches how to solve environmental problems. Therefore, it can be said that solving the environmental problems can be possible only through an effective environmental education (Sahin et al. 2004).

Environmental education is provided in three mediums such as homes, local communities, and the schools. The concept of environment established in the family at home is developed within organized education during pre-school, elementary, and secondary years (Demirkaya 2006). However, although there is no particular curriculum designed for environmental education among these formal education curricula, basic knowledge of environment is provided within various subjects in these curricula. There is no particular environmental education policy nationally adopted and applied within the higher education system either. Universities build their own curricula and course contents independently within their organizational structures. Therefore, it is not possible to talk about a standard educational infrastructure or application associated with environment in higher education (Corcoran 2004). Effective teaching programs and strategies are not implemented in order to develop individual environmental responsibilities either (Roth 1981; Hungerford and Volk 1984). It is the ultimate objective for the environmental education to develop responsibility towards environment and to nurture active citizens (Hungerford and Peyton 1976). One of the biggest obstacles to this objective is to be deprived of the knowledge of factors developing responsibility towards environment (Linke 1980).

In order for the learners to be informed about the environment, teachers who will educate them should be well-informed about environment. Educating teachers, with high awareness of environment and adequate knowledge of ecology, who can conduct theoretical and practical environmental activities, is very important for the environment education in developing and achieving its objectives (Kahyaoglu et al. 2008). Powers (2004) emphasizes that the efficiency of teacher training programs is associated with the multidimensionality of the programs and points out the following: pre-service teachers will be affecting many students; needs of environmental education are ignored; and higher education does not perform its role on environmental education well.

The studies on environmental education include the studies emphasizing that environmental education increases the knowledge of environment as well as the studies that knowledge of environment alone does not have any effect on raising awareness and environmentally sensitive behaviors. As such, Kinsey and Wheatley (1984) concluded that knowledge that students obtain from environmental studies affect their behaviors towards environmental protection. In addition, Hines et al. (1987) found a correlation coefficient of 0.185 (SD= .122) in their study, according to meta-analysis results obtained on variables of education levels and environmental behavior, which meant that increasing education level was positively effective on increasing environmental behavior. Contrary to these studies, Alp et al. (2008) found that there was a negative relationship between elementary students' commendable behaviors toward environment and their knowledge of environment. Also, Kibert (2000) found no significant relationship between university students' knowledge of environment and their behaviors towards environment just as Negev et al. (2008) found the same in elementary and high school students; Yasar et al. (2012) in elementary 7th grade students; Isildar and Yildirim (2008), Yavetz et al. (2009), Timur (2011), and Karatekin (2011) in university students. In addition, Teksoz et al. (2005) investigated the relationship between environmental literacy sub-dimensions and the effect of gender on these subdimensions, in order to determine the environmental literacy levels in colleges of education in state universities in Ankara.

Kahyaoglu et al.'s (2008) study titled "Elementary Pre-service Teachers' Dispositions toward Environment" compared the data obtained and investigated pre-service teachers' differing perspectives of environment in relation to their majors and years of education.

Uljas's (2001) study titled "The Effect of Social Identity on Dispositions and Behaviors toward Environment" investigated the effect of social identity and values on environmental behavior and attitudes.

Cidlova et al. (2013) in their studies has been compared secondary school students and students who left the school their interest in terms of in environmental education issues and they have been concluded secondary school students lower according to students who school-leaver.

Ozsoy (2012) examined elementary school students the perceptions of the environment through pictures. Students have been observed more frequently environmental problems, such as air pollution, soil pollution, water pollution, urbanization may experience immediate environment. Also, they have been showed that saw students as a part of human nature, affected by environmental problems at the same time like this other creatures.

Erdogan et al. (2012) between 2002 and 2006, the early childhood curriculum has been examined the environmental education.

Nates et al. (2012) knowledge have been concluded that did not influence the students' value or perceive nature and its components.

Morgil et al.'s (2002) study titled "The Study on Environment and Preparing an Environmental Protection Project in Science Education" investigated whether students were adequately aware of environmental education and it looked into the activities that could be conducted in relation to environmental education in science classes.

In the current study, as opposed to the literature, the relationship between elementary preservice teachers' knowledge of and behaviors toward environment was investigated and they were compared on different variables.

MATERIAL AND METHODS

Model

Survey model was used in this study. Karasar (2010) describes the survey model as study aiming to reveal a past or current phenomenon whereas Buyukozturk et al. (2009) define survey models as studies determining participants' views or characteristics such as interest, skill, disposition, and etc.

Population and the Sample

The population of the study consisted of preservice teachers who attended elementary department at Faculty of Education, Canakkale Onsekiz Mart University, and elementary science education department at Faculty of Education, Pamukkale University. 525 pre-service teachers with elementary majors at Canakkale Onsekiz Mart University and 94 pre-service teachers with elementary science education at Pamukkale University constituted the research sample. The research was conducted with 619 pre-service teachers who attended the university during spring 2012- 2013 academic year. Majors of these preservice teachers are given in the Table 1.

Table 1: Pre-service teachers' majors

Major	*f*	*%*
Classroom teaching	240	38.8
Social Studies teaching	41	6.6
Pre-school teaching	150	24.2
Science teaching	188	30.4
Total	619	100.0

According to Table 1, study group consisted of 240 pre-service teachers (maximum) with Classroom Teaching majors and 41 pre-service teachers (minimum) with Social Studies majors. The number of Social Studies pre-service teachers was low because this major had only freshmen students.

Data Collection Techniques

"The Test of Knowledge of Environmental Problems" and "Environmentally Sensitive Behavior Scale" were used as data collection tools in the research. The Test of Knowledge of Environmental Problems and Environmentally Sensitive Behavior Scale were developed by Cimen (2012). Validity study for the Test of Knowledge of Environmental Problems was conducted through expert consultation and KR-20 coefficient of internal validity was found as .74. An expert was consulted with for the validity study of Environmentally Sensitive Behavior Scale and Cronbach's Alpha internal validity coefficient was found as .79. Environmentally Sensitive Behavior Scale is a 5-point Likert scale.

Data Analysis

On the Test of Knowledge of Environment, wrong and blank responses were assigned 0 whereas right responses were assigned 1 point. Environmental knowledge test had totally 25 questions. The lowest possible score on this test was 0 and the highest score was 25. The positive items on environmentally sensitive behavior scale were scored as follows: Strongly Disagree 1, Disagree 2, Neutral 3, Agree 4, and Strongly Agree 5. Negative items were scored in the opposite direction of the positive items. Environmentally sensitive behavior scale consisted of 11 items. The lowest possible score on this scale was 11 and the highest possible score was 55. Histogram graph of the data distribution was obtained and data distribution was found to be normal. In addition to this, the mode, median, and mathematical average of the data distribution, which were found to be equal to one another, show that this data distribution is normal (Kalayci 2010; Buyukozturk 2011). Data obtained from the scales were analyzed through SPSS 21.0 statistical program. Mathematical average, standard deviation, t test for independent samples, and one-way analysis were used for analyzing the data.

RESULTS

Examining the Relationship between Pre-service Teachers' Knowledge of and Behaviors towards Environment

As can be seen in Table 2, there is a low-level, positive and significant ($r=.111$, $p<.01$) relationship between environmental behavior scores and environmental knowledge scores. It can be said that pre-service teachers' environmental knowledge explains only 1% of the change in their behaviors toward environment because the determination coefficient is $r^2=.01$.

Table 2: The relationship between pre-service teachers' knowledge of environment and behavior scores

Parameters		*Environmental behavior*
Environmental Knowledge	r	.111
	p	.006
	N	619

**. Corelation is significantly meaningful at 0.01 level (two-way).

Findings of Pre-service Teachers' Knowledge of and Behaviors towards Environment in Relation to Gender

According to Table 3, scores pre-service teachers obtained from the test of knowledge of environmental problems significantly differ on gender ($t(617)= 2.47$, $p<.05$). Based on this finding, it can be said that environmental knowledge levels of female pre-service teachers were higher than those of male pre-service teachers.

The scores that pre-service teachers obtained from the environmentally sensitive behavior scale do not significantly differ on gender ($t(617)=.025$, $p>.05$). Based on this finding, it can be said that pre-service teachers' behaviors toward environment do not differ on gender.

Findings Associated with Pre-service Teachers' Knowledge of and Behaviors toward Environment on the Variable of Year of Education

According to Table 4, scores pre-service teachers obtained from the test of knowledge of environmental problems and the environmentally sensitive behavior scale significantly differ on the year of education [$F_{(3-615)}=7.62, 5.27$; $p<.05$]. Based on this finding, it can be said that knowledge levels of 3rd and 4th year pre-service teachers were higher than those of 1st and 2nd year students. In addition, it can be said that 1st, 2nd, and 3rd year pre-service teachers' behaviors to-

Table 3: t-test results of scores pre-service teachers obtained from the test of knowledge of environmental problems and environmentally sensitive behavior scale in relation to gender

	Gender	*N*	*X*	*SD*	*df*	*t*	*p*
Environmental Knowledge	Female	463	14.42	3.99	617	2.47	.000*
	Male	156	13.44	4.93			
Environmental Behavior	Female	463	38.73	5.17	617	.025	.67
	Male	156	38.72	5.71			

$p<.05$

Table 4: ANOVA results of scores that pre-service teachers obtained from the test of knowledge of environmental problems and environmentally sensitive behavior scale on the year of education

	Year of education	*N*	*X*	*SD*	*F*	*p*	*Significant difference*
Environmental Knowledge	1	181	13.37	4.40	7.62	.000*	3-1
	2	47	12.44	4.09			3-2
	3	214	14.92	4.45			4-1
	4	177	14.56	3.67			4-2
	Total	619	14.17	4.26			
Environment Behavior	1	181	37.43	5.06	5.27	.001*	2-1
	2	47	39.17	5.73			3-1
	3	214	39.21	5.05			4-1
	4	177	39.37	5.54			
	Total	619	38.73	5.30			

$p<.05^*$

ward environment were more positive than those of 1st and 2nd year pre-service teachers.

Findings on Pre-service Teachers' Knowledge of and Behaviors toward Environment in Relation to Their Information about Environment and Nature and Curiosity Levels

According to Table 5, scores pre-service teachers obtained from the test of knowledge of environmental problems and the environmentally sensitive behavior scale significantly differ on their information about environment and nature and curiosity levels [$F_{(3\text{-}615)}$=11.80, 30.05; 4.76 $p<.05$]. According to the LSD test conducted in order to know between which groups the difference lies, it can be said that as pre-service teachers' information about environment and nature and curiosity levels increase, their environmental knowledge and behaviors increase positively.

Findings on Pre-service Teachers' Knowledge of and Behavior towards Environment in Relation to taking Environment Classes

According to Table 6, whereas environmental knowledge scores of pre-service teachers who had taken and not taken environment classes significantly differ, their environmental behavior scores do not significantly differ ($t(617)=4.27$, $p<.05$; $t(617)= 1.74$, $p>.05$). Based on this finding, it can be said that environmental knowledge levels of pre-service teachers who had taken environment classes were higher compared to environmental knowledge levels of those who

Table 5: ANOVA results of scores that pre-service teachers obtained from the test of knowledge of environmental problems and environmentally sensitive behavior scale on their information about environment and nature and curiosity levels

	Curiosity level	*N*	*X*	*SD*	*F*	*p*	*Significant difference*
Environmental Knowledge	None	31	10.58	5.48	11.80	.000*	Much-none
	Very little	101	13.12	4.73			Medium-none
	Medium	335	14.64	3.80			Medium-very little Much-none
	Much	152	14.60	4.20			Much-very little
	Total	619	14.18	4.26			
Environment Behavior	None	31	35.06	6.16	30.05	.000*	Much-(none-very little-medium)
	Very little	101	37.04	5.02			Medium-(none-very little)
	Medium	335	38.19	4.55			
	Much	152	41.80	5.52			
	Total	619	38.73	5.30			

$p<.05^*$

Table 6: t-test results of scores that pre-service teachers obtained from the test of knowledge of environmental problems and environmentally sensitive behavior scale in relation to taking environment classes

	Environment class	*N*	*X*	*SD*	*df*	*t*	*p*
Environmental Knowledge	Taken	346	14.82	4.18	617	4.27	.000*
	Not taken	273	13.36	4.24			
Environmental Behavior	Taken	346	39.06	5.36	617	1.74	.082
	Not taken	273	38.31	5.21			

*p<.05

had not taken environment classes. In other words, environment classes increase the environmental knowledge levels of pre-service teachers. In addition, it can be said that pre-service teachers' behaviors toward environment do not differ on environment classes taken.

Findings on Pre-service Teachers' Knowledge of and Behaviors toward Environment in Relation to the Frequency of Visiting Nature Sites

According to Table 7, whereas the scores that pre-service teachers obtained from the environmentally sensitive behavior scale differ significantly on the frequency of visiting nature sites [$F_{(3\text{-}615)}$=9.47, p<.05], the scores that they obtained from the test of knowledge of environmental problems do not significantly differ [$F_{(3\text{-}615)}$=2.48, p>.05]. Based on this finding, it can be said that pre-service teachers who visited nature sites very often had more positive behaviors toward environment than those who never visited, rarely visited, and occasionally visited nature sites. In addition, as pre-service teachers' frequency of visits to nature sites increased, their environmental knowledge levels increased. However, there is no statistically significant difference on this. Based on current finding, it can be said that pre-service teachers' behaviors toward environment do not differ on the frequency of visiting nature sites.

Findings on Pre-service Teachers' Knowledge of and Behaviors towards Environment in Relation to Membership in Environment Club/Association

According to Table 8, whereas pre-service teachers' scores of behaviors toward environment significantly differ in relation to membership in club/association (t(617)=3.80, p<.05), their scores of environment knowledge do not significantly differ (t(617)= .46, p>.05). Based on the current finding, it can be said that behaviors of pre-service teachers who were members in environment clubs/associations were more positive than those of non-member pre-service teachers.

Table 7: ANOVA results of scores that pre-service teachers obtained from the test of knowledge of environmental problems and environmentally sensitive behavior scale on the frequency of their visiting nature sites

	Frequency	*N*	*X*	*SD*	*F*	*p*	*Significant difference*
Environmental Knowledge	None	63	13.17	5.00	2.48	.060	
	Rarely	167	13.89	4.28			
	Sometimes	202	14.71	4.02			
	Very often	187	14.19	4.18			
	Total	619	14.17	4.26			
Environmental Behavior	None	63	37.07	6.61	9.47	.000*	Very often- (None, Rarely, Sometimes)
	Rarely	167	38.19	5.40			
	Sometimes	202	38.19	4.87			
	Very often	187	40.35	4.82			
	Total	619	38.73	5.30			

p<.05*

Table 8: t-test results of scores that pre-service teachers obtained from the test of knowledge of environmental problems and environmentally sensitive behavior scale in relation to membership in environment club/association

	Member	*N*	*X*	*SD*	*df*	*t*	*p*
Environment Knowledge	Yes	42	14.47	4.27	617	.46	.63
	No	577	14.15	4.27			
Environment Behavior	Yes	42	41.71	5.22	617	3.80	.000*
	No	577	38.51	5.25			

*p<.05

In addition, it can be said that pre-service teachers' environment knowledge levels were similar in relation to membership in environment clubs/ associations.

Findings on Pre-service Teachers' Environmental Knowledge and Behaviors in Relation to a Family Member Worried about Environmental Pollution

According to Table 9, whereas pre-service teachers' environmental behavior scores significantly differ on having a family member worried about environmental pollution ($t(617)=3.85$, $p<.05$), their scores of environmental knowledge do not significantly differ ($t(617)= 1.32$, $p>.05$). Based on the current finding, it can be said that environment behaviors of the pre-service teachers who had a family member worried about the environmental pollution were more positive than those of the pre-service teachers who did not have a family member worried about environmental pollution. In addition, it can be said that pre-service teachers' environment knowledge levels were similar in relation to a family member worried about environmental pollution.

DISCUSSION

A low-level, positive, and significant relationship was found between the scores pre-service teachers obtained from the test of knowledge of environmental problems and the environmentally sensitive behavior scale. Alp et al. (2008) found a negative relationship between elementary students' environment friendly behaviors and environment knowledge and computed the determination coefficient as .06. Altinoz (2010) found a weak relationship between the scores of environment knowledge and behavior (r=0.181). However, Kibert (2000) found no significant relationship between university students' knowledge of environment and their behaviors towards environment just as Negev et al. (2008) found the same in elementary and high school students; Yasar et al. (2012) in elementary 7th grade students; Isildar and Yildirim (2008), Yavetz et al. (2009), Timur (2011), and Karatekin (2011) in university students.

Female pre-service teachers' environment knowledge levels are higher than those of male pre-service teachers. Pre-service teachers' behaviors toward environment do not differ on gender. In majority of studies conducted on environment knowledge, environment knowledge level was found either to be low or to be medium. Yilmaz et al. (2002) applied three different questionnaires in university and secondary education settings. Their study concluded that students' levels of environment knowledge were inadequate. Aydemir (2007) found that science and technology teachers' levels of environment

Table 9: t-test results of scores that pre-service teachers obtained from the test of knowledge of environmental problems and environmentally sensitive behavior scale in relation to a family member worried about the environmental pollution

	Worried	*N*	*X*	*SD*	*df*	*t*	*p*
Environment Knowledge	Yes	475	14.30	4.24	617	1.32	.18
	None	144	13.76	4.32			
Environment Behavior	Yes	475	39.18	5.19	617	3.85	.000*
	None	144	37.25	5.42			

*p<.05

knowledge were low just as Kose (2010) found the same in high school students; Atasoy and Erturk (2008) in 6th, 7th, and 8th grade students. Arcury (1990) conducted a phone questionnaire with 680 participants living in Kentucky and found that their environment knowledge levels were low. Armagan (2006) found elementary 7th and 8th grade students' levels of environment knowledge medium level as well as Timur, Timur, and Yilmaz (2013) found the same in elementary pre-service teachers. When studies comparing environment knowledge levels on gender, it is observed that Altinoz (2010) and Atasoy and Erturk (2008) found that environment knowledge levels significantly differ in favor of female students. However, Makki et al. (2003) concluded in their studies that secondary students' levels of environment knowledge did not significantly differ on gender just as Timur (2011) found the same in science and technology pre-service teachers; Karatekin (2011) in social studies pre-service teachers; Alp et al. (2006) in 6th, 8th, and 10th grade students; Akyol and Kahyaoglu (2010) in 6th, 7th, and 8th grade students; and Ulucinar et al. (2008) in elementary 7th and 8th grade students. In addition, Yilmaz et al. (2013) asked secondary students to draw with the concept of environment and concluded in their study that more variety (concept of environment) was included in favor of females in the 5th, 6th, and 7th grade drawings and in favor of males in the 8th grade drawings. When the studies comparing behaviors toward environment on gender, it is seen that Erdogan (2009) found that 5th grade students' responsible behaviors toward environment did not differ on gender just as Karatekin (2011) found the same in social studies pre-service teachers; Altinoz (2010) in science and technology pre-service teachers; and Budak et al. (2005) in university students. However, Timur (2011) investigated science and technology pre-service teachers' behaviors toward environment and found a significant difference in favor of females just as Alp et al. (2006) found the same in 6th, 8th, and 10th grade students.

As the years of education increase, the level of environment knowledge increases. Second and third year pre-service teachers' behaviors toward environment are more favorable than those of the first year pre-service teachers. When studies comparing the environment knowledge on years of education, it is seen that Atasoy and Erturk (2008) and Akyol and Kahyaoglu (2010) found that as 6th, 7th, and 8th grade students' years of education increased, their levels of environment knowledge increased too, just as Alp et al. (2006) found the same with 6th, 8th, and 10th grade students; O'Brien (2007) with university students. However, Karatekin (2011) compared first and second year social studies pre-service teachers' environment knowledge levels and found a significant difference in favor of the first year pre-service teachers. Ulucinar et al. (2008) compared the environment knowledge levels of elementary 7th and 8th grade students and found a significant difference in favor of 7th grade students. When behaviors toward environment in relation to years of education are investigated, it is observed that Karatekin (2011) found that fourth year social studies pre-service teachers' behaviors towards environment were more favorable than those of the first, second, and the third year pre-service social studies teachers. Kibert (2000) found that as the years of education increased, the positive behaviors toward environment also increased.

As pre-service teachers' levels of information on environment and nature and curiosity towards environment increased, their levels of environment knowledge also increased. Karatekin (2011) found that as pre-service teachers' levels of curiosity towards environment increased, their levels of knowledge of and behaviors toward environment also increased. Erdogan (2009) also found that as the level of curiosity towards environment increased, the responsible behaviors toward environment also increased. Guler (2013) found that as 8th grade students' levels of information of environment and nature and curiosity towards environment increased, their positive behaviors toward environment also increased.

Whereas pre-service teachers' taking environment classes significantly increases their levels of environment knowledge, that does not statistically differ their behaviors toward environment. Altinoz (2010) concluded that science and technology pre-service teachers who took environment classes had higher levels of knowledge of and behaviors toward environment than those of the same population who did not take environment classes. Akbas (2007) found no significant difference between levels of environment and ecology knowledge in relation to taking environment classes, with science pre-service teachers during pre-university periods. Karatekin (2011) found that whereas environment behaviors of pre-service teachers who took environ-

ment classes at university significantly differed, their levels of environment knowledge did not significantly differ.

Environment behaviors of the pre-service teachers who often visit nature sites are more favorable than those of the pre-service teachers who never, rarely, and occasionally visit nature sites. In addition, levels of environment knowledge of pre-service teachers do not differ on the frequency of visiting nature sites. Karatekin (2011) found that as the visits to nature sites increased, the knowledge of and behaviors toward environment positively increased. Erdogan (2009) concluded that 5th grade students' responsible behaviors toward environment increased in relation to having been to nature sites. However, Guler (2013) found that as the frequency of 8th grade students' visits to nature sites increased, their levels of environment knowledge also increased.

Whereas pre-service teachers membership in environment clubs/associations positively affects their behaviors toward environment, that does not differ their levels of environment knowledge. As visits to nature sites are available within the club/association membership, the current result coincides with the results of environment knowledge and behavior in relation to the frequency of visiting nature sites. The environment behaviors of the pre-service teachers with club/association membership positively increase but their levels of environment knowledge do not differ.

Whereas environment behaviors of pre-service teachers with a family member worried about environmental pollution differ positively, their levels of environment knowledge do not differ. Karatekin (2011) found that behaviors of those pre-service teachers with a family member worried about environmental pollution were more favorable. Erdogan (2009) concluded that environment behavior levels of the pre-service teachers with a family member worried about the environmental pollution were higher. Guler (2013) found that levels of environment knowledge of 8th grade elementary students with and without a family member worried about environmental pollution were similar.

CONCLUSION

There is a low-level, positive, and meaningful relationship between pre-service teachers' scores of knowledge of and behaviors toward environment.

Female pre-service teachers' levels of environment knowledge were higher than those of male pre-service teachers. Pre-service teachers' behaviors toward environment do not differ on gender.

As the year of education increased, the environment knowledge level increased. Second and third year pre-service teachers' behaviors toward environment were more positive than those of first year pre-service teachers.

As pre-service teachers' information and curiosity levels about environment and nature increased, their levels of environment knowledge and behaviors increased.

Pre-service teachers' taking environment class significantly differed their environment knowledge whereas it did not differ their environment behavior statistically significantly.

Environment behaviors of pre-service teachers who often visited nature sites were more favorable than those of pre-service teachers who never, rarely, and occasionally visited nature sites. In addition, pre-service teachers' environment knowledge levels did not differ on the frequency of visiting nature sites.

Whereas pre-service teachers' membership in environment clubs/associations affected their behaviors toward environment positively, it did not affect their levels of environment knowledge levels.

Whereas environment behaviors of pre-service teachers who had a family member worried about environmental pollution differed positively, their environment knowledge did not differ.

RECOMMENDATIONS

Websites that pre-service teachers can easily reach for environmental information may be built and continuously updated.

As environment knowledge levels of pre-service teachers taking environment classes significantly increase, environment classes may be added in the curricula with no environment classes, for a more livable environment.

As pre-service teachers' frequency of visits to nature sites increased and their positive behaviors towards environment increased too, trips to nature sites should be organized for more sensitive behaviors in pre-service teachers who will be educating the future generations.

More support must be provided for TUBITAK projects prepared for teachers and pre-service teachers, within nature education.

As environment behaviors of pre-service teachers with memberships in environment clubs/associations are more sensitive, numbers of environment clubs/associations within the university should be increased.

As environment behaviors of pre-service teachers with a family member worrying about the environmental pollution are more sensitive, awareness of environment must be raised among families and information about environment must be provided on papers, magazines, radio, and TV.

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