

# Teacher Candidates' Attitudes, Knowledge Levels and Sensitivities towards Environmental Problems

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## Abstract

A people without children would face a hopeless future; a country without trees is almost as helpless (Theodore Roosevelt). Humans both have been affected by environmental events and have affected their environments by a variety of activities since man has been on earth. However, because of the lack of population for a long time and the absence of technology that can fight nature, people have contended with those given by nature and lived harmony with nature. As technology began to progress rapidly with the industrial revolution, humans have preferred to dominate it rather than being a part of natural balance. Human pressure on natural environment has been increased because of this preference. This increase has led the excessive use of natural resources and to environmental problems. The most effective solution to the problems seems that environmental literacy gives individuals. The aim of this study is to assess the teacher candidates' attitudes, knowledge levels and sensitivities towards environmental problems.

**Keywords:** environmental problems, environmental literacy, teacher candidates.

## 1. Introduction

If the world is a spaceship, we are not its passengers but crew. Every system in the world maintains its existence in an order and balance. It is also possible to talk about this balance for the natural environment we live in. If the relationships of living things (especially people) with each other and with their physical surroundings allow to the healthy development of living things and the environment, then natural balance is achieved. Otherwise, the equilibrium is impaired (Bozkurt & Cansüngü, 2002). Humans both have been affected by environmental events and have affected their environments by a variety of activities since man has been on earth. However, because of the lack of population for a long time and the absence of technology that can fight nature, people have contended with those given by nature and lived harmony with nature (Yıldız *et al*, 2011).

With the industrial revolution of the 19th century and in parallel with rapid population growth and developments in the industry, humans have seen nature as an indispensable resource that they could exploit as they wanted with the increase in need for the environment and its resources. Thus, all these have caused environmental problems that our world is facing today (Gökdağ, 1994). Mahatma Gandhi has drawn attention to this danger and stated that the Earth has enough resources to meet everyone's needs but does not have the resources to meet their ambitions. The main environmental problems that have reached dangerous dimensions today are global warming, depletion of the ozone layer, depletion of natural resources, acid rain, desertification, sourness, drought, deforestation, depletion of living species, crooked urbanization, water and soil pollution (Gökdağ, 1994; Türkmen, 2008). People who cannot realize the dimensions of environmental problems have begun to become more sensitive to environmental problems because of the reduction of resources, the failure to meet the needs and the return of environmental damage as environmental pollution. Therefore, the sensitivity to environmental problems since the second half of the 20th century and the approaches to solve these problems have become increasingly important (Kıışoğlu *et al*, 2010).

The first United Nations Conference on the Human Environment, which was held in Stockholm, Sweden in 1972, is very important because it is the first global assessment of environmental and environmental issues. In a declaration issued after the conference, it was emphasized that responsibility towards the environment should be shared in all the countries of the world and that the countries should be directed to prevent the emergence of environmental problems while developing so that human beings can survive on earth (Wygant, 2004). The First World Climate Conference, which was held in 1979, and the Second World Climate Conference, which was held in 1990, and the Rio Summit, which was held in 1992 and is one of the largest and most comprehensive meetings of the century, and the Second United Nations Conference on Environment and Development are the most important meetings on ecology and environmental issues. These meetings are not only in the past century but also to determine what measures and policies should be taken to protect the environment in the 21st century (Yıldız *et al*, 2011).

Even if all possible measures are taken in the fields of technology, law, politics and economics to solve environmental problems, and even if the large scientific meetings are held globally, it is a reality that environmental problems cannot be solved unless a sustainable society is established, significant changes are made in the lifestyles of people around the world (Selvi, 2007) and these problems (like any other hot issues around the world) are discussed in classrooms as controversial issues (Alagoz 2011, 2014). Therefore, especially in the last quarter century, it has been started to be accepted that people in the international community should be informed with a life-long effective environmental education about the environment and environmental problems (Atasoy & Ertürk, 2008).

The origins of contemporary conceptualizations of environmental education are based on educational movements related to nature, conservation and non-school education in the late 19th century and early 20th century. The United Nations Educational, Scientific and Cultural Organization (UNESCO) has led the work of making a general definition of environmental education from the beginning of the 1970s. The aim of environmental education is to create a world that is aware of the natural environment and its problems, is concerned about these problems, and has the knowledge, skills, attitudes, motivation and commitment to work based on individual and team work to solve current problems and to prevent new ones (UNESCO, 1977 UNESCO, 1978; UNESCO, 1987; United Nations (UN), 1992). It is a world in which environment does not need the protection. In addition, UNESCO-UNEP (UNESCO-United Nations Environment Program) has set four objectives for participation in the evaluation competence with awareness, knowledge and skills (UNESCO-UNEP, 1976, p.2; UNESCO, 1978). Theories and practices in environmental education from 1980 to the present day have provided a steady increase in the number of evaluations and research activities (Mesel & Coyle, 2005; Hines *et al*, 1987; Iozzi, 1984; Rickinson, 2001; Volk & McBeth, 1997; Zelezny, 1999).

The basis of environmental education is to protect nature and natural resources. Thus, it may be possible to influence human behavior. The main goal of environmental education is to gain positive and lasting behavioral changes and to provide active participation of individuals in solving problems (Şimşekli, 2004). Environmental education aims to educate individuals who are aware of regional, national and global problems, approach to these problems with sensitivity and interest, make voluntary efforts to resolve these problems, and have high ecological culture, environmental ethics and environmental awareness level (Stapp, 1969; Atasoy & Ertürk, 2008). The most important and ultimate goal of environmental education is to educate environmentally literate individuals who are willing to protect the environment in society and bear the consequences of responsibility for reducing the harm to the environment (Kıyıcı *et al*, 2014; Roth, 1992; Tuncer *et al*, 2008).

Human population has been over 7 billion in 2011, is expected to exceed 10 billion in 2100 (United Nations). On the other hand, the need for clean water, clean water, fuel and habitable areas will increase even more (Disinger, 1989; Fleming, 2009; McBeth *et al.*, 2011). Changes on natural and artificial environments will continue to create serious economic and other social impacts. Only the suppression of the declining fish stocks on the cultures and economies of many islands and coastal communities are feeling the complexity and intensity of these changes. Disagreements on what is the best approach to address these issues will continue to struggle with social and political systems. The purpose of developing environmental literacy is to prepare people to understand and address these issues (McKeown-Ice, 2000; Ruskey & Wilke, 2005; Simmons, 1991; Volk *et al*, 1984). Only an environmentally literate society will be able to find practical and evidence-based solutions to these challenges (Hollweg *et al*, 2011).

Many environmental literacy framework programs have been published since 1990. Each of these reflects the objectives of 1978 UNESCO by addressing information (awareness and knowledge), cognitive skills, affective qualities (attitudes) and behavior (eg, Hungerford & Volk, 1990, Roth, 1992, Simmons, 2005 Wilke, 1995). These researchers have tried to give a consistent direction to environmental literacy, through the incorporation and synthesis of descriptive structures, national program frameworks and research findings. Since 1995, these framework programs have guided researches (Volk & McBeth, 1997), studies to develop measurement tool (Wilke, 1995) and various national assessments of environmental literacy (Erdogan, 2009; McBeth *et al*, 2011; Negev *et al*, 2008; Shin *et al*, 2005).

Environmental literacy is the expected outcome of environmental education, and environmental literacy, environmental competence and devotion to the environment are defined as the three stages of environmental literacy (Teksoz *et al*, 2014). Disinger & Roth (1992), who attaches particular importance to the multi-dimensional nature of environmental literacy, summarizes the different definitions of environmental literacy and defines environmental literacy as "to perceive and interpret the health of environmental systems and take the necessary steps to maintain, improve or develop the health of these systems". Disinger & Roth (1992) have gone further and have explained that the origins of environmental literacy were found in (a) relationships between

natural and social systems, (b) human beings as a whole with nature, (c) technological progress and choice, (d) developmental learning through the life cycle. They have also emphasized that environmental literacy is based on environmental sensitivity, knowledge, skills, attitudes, values, personal investing, responsibility and active participation. Since this study, environmental knowledge, environmental responsibility, environmental attitudes and environmentally friendly behaviors have been considered as fundamental components of environmental literacy (Morrone *et al*, 2001; Hollweg *et al*, 2011; Teksoz *et al*, 2014).

There are many proposed models related to environmental literacy among environmental literacy studies. For example, Kollmuss & Agyeman (2002) developed a model that explains the gap between environmental information and environmental awareness. The environmentally friendly behaviors in this study were expressed through a combination of many factors, including internal factors such as motivation, positive environmental information, awareness, values, attitudes, empathy, control focus, responsibilities and priorities. The authors emphasized that different levels of knowledge should be distinguished and drew attention that people should have a basic knowledge of the behaviors and environmental problems that would be consciously displayed as environmentally friendly. However, they have not established a direct relationship between environmentally friendly behavior and environmental information and have expressed that environmental awareness, values and attitudes are seen in the same way as emotional inclusion, which they define as building a complex structure and they call as "environmentally friendly awareness"(also called Jensen & Schnack, 2006).

Jensen (2002) proposed comments and recommendations for elaborating the model proposed by Kollmuss & Agyeman (2002). In this article, Jensen actually opened the debate on the concept of knowledge and its role in environmental issues and tried to shed light on the link between knowledge, behavioral change and action (See. Tsevereni, 2011). In fact, Jensen (2002) participates in Kollmuss and Agyeman (2002) on whether information alone will not lead to environmental action or behavior change. Therefore, according to Jensen (2002), if environmental education is to improve the ability to influence action and change, then the relevant information and intuition must be essentially directed towards action. This has several consequences for the kind of knowledge that will be the focal points in education and learning planning, practice and evaluation in environmental education.

In this study, environmentally literate individual was defined as individuals with adequate information, positive attitudes, attitudes towards environmental responsibility, and concerns about environmental problems. Therefore, skills and/or behaviors were not included in the study. In developing countries such as Turkey and especially the countries that are struggling with serious environmental problems such as water pollution, drought, insufficient or ineffective solid waste and wastewater management, recycling, fossil energy dependence, air pollution, soil pollution, erosion, marine pollution, the identification of the behavioral and affective tendencies of especially teacher candidates for environmental problems will prepare the ground for future generations to deal with serious environmental problems more efficiently and efficiently. One of the most effective ways to leave a better world for future generations is to educate first teacher's candidates and thus the students, who will create future generations, about environmental problems. In this context, the following questions were answered in this study:

#### *1.1. Problems of Research*

1. Is there a relationship between the participants' class levels and the achievement test scores?
2. Is there a relationship between the participants' class levels and human-environment relation?
3. Is there a relationship between the participants' class levels and the level of involvement in environmental problems?
4. Is there a relationship between the participants' education sections and the achievement test scores?
5. Is there a relationship between the participants' education sections and human-environment relation?
6. Is there a relationship between the participants' education sections and the level of involvement in environmental problems?
7. Is there a relationship between the region where the participants spent their childhood and the achievement test scores?
8. Is there a relationship between the region where the participants spent their childhood and human-environment relation?
9. Is there a relationship between the region where the participants spent their childhood and the level of involvement in environmental problems?
10. Is there a relationship between the participants' gender and the achievement test scores?

11. Is there a relationship between the participants' gender and human-environment relation?
12. Is there a relationship between the participants' gender and the level of involvement in environmental problems?

## **2. Method**

### *2.1. Design of the Study*

This study has been prepared using relational screening technique among quantitative research techniques. The screening technique aims to collect information by giving answers to the questions directed to participants. Because of systematic data collection with a large group of participants in the screening technique, it is frequently used in many studies (Böke, 2009). The relational screening technique aims to understand the degree of association between two and more variables (Karasar, 2016).

### *2.2. Participants of the Study*

A total of 516 students who have attended in Classroom Teacher Education, Mathematics Teacher Education, Turkish Language Teacher Education and Social Studies Teacher Education in Gaziantep University Nizip Faculty of Education were enrolled in the study. According to the participants' class levels, there were 151 (29.3%) people in the first class, 156 (30.2%) in the second class, 112 (21.7%) in the third class and 97 (18.8%) in the fourth class. According to the participants' education sections, there were 144 (27.9%) in mathematics teacher education, 198 (38.4%) in classroom teacher education, 99 (19.2%) in social studies teacher education and 75 (14.5%) in Turkish language education. According to the region where the participants spent their childhood, 48 (9.3%) participants lived in the farm, 44 (8.5%) participants lived in the rural area, 67 (13%) participants lived in the small town, 111 (21.5%) participants lived in the urban area and 246 (47.7%) participants lived in the metropolitan area. According to the participants' gender, 355 (68.8%) participants were female and 161 (31.2%) participants were male.

### *2.3. Data Collection Tools*

In this study, the Environmental Literacy Scale which was developed by Tuncer et al. (2009) was used as data collection tool. The scale consists of four parts. In the first part, there is demographic information part consisting of four items. In the second part, there is a multiple-choice information test consisting of 11 items. The reason for the application of the knowledge test is to understand the participants' prior knowledge of environmental literacy. In the third part, a five-point likert type scale consisting of 29 items was used in order to understand the relationship level between the environment and human beings in the participants. The answers of the items on this scale are listed as (1) absolutely disagree, (2) disagree, undecided (3), agree (4), strongly agree (5). In the fourth part, a five-point likert type scale consisting of 9 items was used in order to understand the perceptions of the participants towards environmental problems. The answers of the items on this scale are listed as 'unrelated (1), slightly related (2), undecided (3), moderately related (4), very related (5)'.

### *2.4. Analysis of Data*

The Environmental Literacy Scale which was developed by Tuncer et al. (2009) was applied a total of 136 students to make the validity and reliability study. After the application, the cronbach alpha reliability coefficient of the scale was found to be 0.89. This indicates that the scale is highly reliable (Büyüköztürk, 2016). Expert opinions were also used for the scope and construct validity of the scale. The scale that was ready for the application was applied to 516 teacher candidates. SPSS 22.00 package program was used for the analysis of the data. The Independent Sample t-test and the one-way ANOVA were performed to understand the relationships between the variables. When the analyzes were carried out, it was also examined whether the distribution was homogeneous. The Kruskal Wallis test and the Mann Whitney U test were used to determine whether the data did not show normal distribution. If the data showed normal distribution, the parametric tests were used.

### 3. Findings and Comments

#### 3.1. Analysis of the first sub-problem

When Table 1 was examined, the homogeneity of the data was examined first. Because p value was less than 0.05, the values of Skewness and Kurtosis were examined to determine whether the distribution was homogeneous. Skewness (-.804) and Kurtosis (-.987) values were found to be between -2 and 2 values. Therefore, the parametric tests were used for the analysis of the data.

Table 1. The relationship between the participants' class levels and the achievement test scores

Achievement test score	Sum of squares	Degree of independence	Average of squares	F	p
Intergroup	1124.815	3	374.938	6.479	.00
In-group	29629.532	512	57.870		
Total	30754.347	515			

When Table 1 was examined, there was a statistically significant difference between the participants' class levels and the points they got from the achievement test [F (4.511) =1.613, p< 0.05]

#### 3.2. Analysis of the second sub-problem

The Kruskal Wallis test was used because the data of this sub-problem did not show normal distribution.

When Table 2 is examined, the student number for each class level and their average ranks are seen. The statistics table was examined to determine whether the students who have educated at different class levels had different scores for their opinion on human-environment relation.

Table 2. The relationship between the participants' class levels and human-environment relation

Class level	N	Average rank	df	Chi-Square	P
First class	151	257.58	3	4.786	.188
Second class	156	272.97			
Third class	112	263.04			
Fourth class	97	231.41			
Total	516				

Because p value was higher than 0.05, there was no statistically significant difference between the participants' class levels and the scores for their opinion on human-environment relation.

#### 3.3. Analysis of the third sub-problem

When Table 3 was examined, the homogeneity of the data was examined first. Because p value was higher than 0.05, it was determined that the distribution was homogeneous. Therefore, the parametric tests were used for the analysis of the data.

Table 3. The relationship between the participants' class levels and the level of involvement in environmental problems

Achievement test score	Sum of squares	Degree of independence	Average of squares	F	P
Intergroup	383.482	4	95.870	1.613	0.170
In-group	30370.865	511	59.434		
Total	30754.347	515			

When Table 3 is examined, it can be seen that there was no statistically significant difference between the participants' class levels and the level of involvement in environmental problems [ $F(4,511) = 1.613, p > 0.05$ ]

### 3.4. Analysis of the fourth sub-problem

The homogeneity of the data was examined first. Because p value was higher than 0.05, it was determined that the distribution was homogeneous. Therefore, the parametric tests were used for the analysis of the data.

Table 4. The relationship between the participants' education sections and the achievement test scores

Achievement test score	Sum of squares	Degree of independence	Average of squares	F	p
Intergroup	74.367	3	24.789	9.609	0.000
In-group	1320.881	512	24.789		
Total	1395.248	515			

According to Table 4, there was a statistically significant difference between the participants' education sections and the achievement test scores [ $F(3,512) = 9.609, p < 0.05$ ].

### 3.5. Analysis of the fifth sub-problem

The homogeneity of the data was examined first. Because p value was higher than 0.05, it was determined that the distribution was homogeneous. Therefore, the parametric tests were used for the analysis of the data. The one way Anova table is given below.

Table 5. The relationship between the participants' education sections and human-environment relation

Achievement test score	Sum of squares	Degree of independence	Average of squares	F	P
Intergroup	1.485	3	0.495	0.182	0.909
In-group	1393.763	512	2.722		
Total	1395.248	515			

It can be clearly seen from the table 5 that, there was no statistically significant difference between the participants' education sections and human-environment relation [ $F(3,512) = 0.182, p > 0.05$ ].

### 3.6. Analysis of the sixth sub-problem

When Table 6 was examined, the homogeneity of the data was examined first. Because p value was less than 0.05, the values of Skewness and Kurtosis were examined to determine whether the distribution was homogeneous. Skewness (-.352) and Kurtosis (-.131) values were found to be between -2 and 2 values.

Therefore, the parametric tests were used for the analysis of the data.

Table 6. The relationship between the participants' education sections and the level of involvement in environmental problems

Achievement test score	Sum of squares	Degree of independence	Average of squares	F	p
Intergroup	815.206	3	271.735	4.647	.003
In-group	29939.141	512	58.475		
Total	30754.347	515			

When Table 6 was examined, it can be seen that there was a statistically significant difference between the participants' education sections and the level of involvement in environmental problems [ $F(3,512) = 4.647, p < 0.05$ ].

### 3.7. Analysis of the seventh sub-problem

When Table 7 was examined, the homogeneity of the data was examined first. Because p value was higher than 0.05, it was determined that the distribution was homogeneous. Therefore, the parametric tests were used for the analysis of the data.

Table 7. The relationship between the region where the participants spent their childhood and the achievement test scores

Achievement test score	Sum of squares	Degree of independence	Average of squares	F	p
Intergroup	383.482	4	95.870	1.613	.170
In-group	30370.865	511	59.434		
Total	30754.347	515			

According to Table 7, there was no statistically significant difference between the region where the participants spent their childhood and the achievement test scores [ $F(4,511) = 1.613, p > 0.05$ ].

### 3.8. Analysis of the eighth sub-problem

The Kruskal Wallis test was used because the data of this subproblem did not show normal distribution.

Table 8 shows the number of students and their average ranks. The statistics table was examined to determine whether the students who spent their childhood in different residential areas had different scores for their opinion on human-environment relation.

Table 8. The relationship between the region where the participants spent their childhood and human-environment relation

Class level	N	Average rank	df	Chi-Square	p
Rural area, farm	144	254.83	3	1.046	.790
Rural area, not farm	98	264.63			
Small town	99	247.60			
Urban area	75	263.75			
Total	516				

According to this result, because p value was higher than 0.05, there was no statistically significant difference between the region where the participants spent their childhood and human-environment relation.

### 3.9. Analysis of the ninth sub-problem

The homogeneity of the data was examined first. Because p value was higher than 0.05, it was determined that the distribution was homogeneous. Therefore, the parametric tests were used for the analysis of the data.

Table 9. The relationship between the region where the participants spent their childhood and the level of involvement in environmental problems

Achievement test score	Sum of squares	Degree of independence	Average of squares	F	p
Intergroup	16.420	4	4.105	1.521	.195
In-group	1378.828	511	2.698		
Total	1395.248	515			

When Table 9 was examined, it can be said that there was no statistically significant difference between the region where the participants spent their childhood and the level of involvement in environmental problems [ $F(4.511) = 1.521, p > 0.05$ ].

### 3.10. Analysis of the tenth sub-problem

Table 10. The relationship between the participants' gender and the achievement test scores

Groups	N	Average Score	Ss	df	t	p
Female	355	6.44	1.64	514	-2.835	0.00
Male	161	6.8	1.62			

According to data from table 10, there was a statistically significant difference between the participants' gender and the achievement test scores [ $t(59) = -2,835 p < 0.05$ ].

### 3.11. Analysis of the eleventh sub-problem

Because the data did not show a normal distribution, the Mann Witney U test, a nonparametric test technique, was used to analyze this sub-problem.

Table 11. The relationship between the participants' gender and human-environment relation

	N	U	Z	p
Female	355	28211.500	-.233	.815
Male	161			
Total	516			

Having data from table 11, there was no statistically significant difference between the participants' gender and human-environment relation because p value was less than 0.05.

### 3.12. Analysis of the twelfth sub-problem

Table 12. The relationship between the participants' gender and the level of involvement in environmental problems

Groups	N	Average Score	ss	df	t	p
Female	355	33.67	7.2	514	1.159	0.247
Male	161	32.81	8.74			

The difference between the groups was statistically insignificant [ $t(514) = 1.159$   $p > 0.05$ ].

When Table 12 was examined, it can be said that there was no statistically significant difference between girls and boys. In other words, there was no statistically significant difference between the participants' gender and the level of involvement in environmental problems ( $U=28211.500$ ;  $p=.815$ ;  $p > 0.05$ ).

## 4. Result

The best time to plant a tree was 20 years ago. The second-best time is now (Chinese Proverb). Human being has to endure environmental problems because they have neglected the natural life, and it seems that it will. However, environmental degradation has seriously threatened the descendants of human beings and other species and has imposed international obligation to solve environmental problems on national and international platforms. Since the source of the problem is human beings, the most effective step toward resolving environmental problems will ensure that societies are involved in the legal framework. Considering the issue in terms of the education, cultivating environmentally literate individuals seems to be one of the effective steps.

Although environmental literacy has different definitions (Hsu & Roth, 1995, 1996, 1998; Morrone *et al*, 2001), the training of individuals with enough knowledge and experience to deal with environmental problems seems to be the right definition. The importance of the issue has been understood at the very beginning. Although the studies on environmental literacy involved many parts of the society and cultures, the studies which were performed on primary and secondary school students have drawn attention (Perkes, 1973; Eysers, 1975; Richmond & Morgan, 1977; Ndayitwayeko, 1994; Wilke, 1995; Kuhlemeier *et al*, 1999; Makki *et al*, 2003; Alp *et al*, 2006; Chu *et al*, 2007; Alp *et al*, 2008; Erdogan & Ok, 2008; Istanbulu, 2008; Okesli, 2008; Sarkar *et al*, 2008; Negev *et al*, 2008; Varisli, 2008; Erdogan, 2009; McBeth & Volk, 2010; McBeth *et al*, 2011). However, the most studied groups are teachers (Hsu & Roth, 1999; Robinson *et al*, 2007; Michail *et al*, 2007) and teacher candidates (Tosunoğlu, 1993; Kibert, 2000; Goldman *et al*, 2006; Pe'er *et al*, 2007; Sevinç *et al*, 2010; Tuncer *et al*, 2008; Kışoğlu, 2009; Tuncer *et al*, 2009; Yavetz *et al*, 2009; Aksoy & Karatekin, 2011; Kahyaoğlu, 2011; Karatekin, 2011; Timur, 2011; Teksoz *et al*, 2012; Artun *et al*, 2013; Alagoz & Akman, 2016). When the potential is considered that teachers and lessons bring students to face with a series of environmental problems, this is not surprising.

The important point in the studies is that participants' general knowledge and attitudes towards environmental literacy were measured (Pe'er *et al*, 2007; Istanbulu, 2008; Okesli, 2008; Sevinç *et al*, 2010; Tuncer *et al*, 2008;

Kıřođlu, 2009; Yavetz *et al*, 2009; Karatekin, 2011; Aksoy & Karatekin, 2011). While some studies have expressed that the participants' level of knowledge about environmental issues was low and their attitudes towards environmental problems were positive (Kibert, 2000; Goldman *et al*, 2006; Pe'er *et al*, 2007; Tuncer *et al*, 2008, 2009; Yavetz *et al*, 2009; Amirshokoohi, 2010), others have supported a more general understanding of environmental literacy, consisting of knowledge, attitudes and skills towards environmental literacy (Ballantyne & Packer, 1996; Hungerford & Volk, 1990; Morrone *et al*, 2001). In this study, participants' environmental literacy levels were assessed by examining the relationships between the variables such as gender, education section, class level and the region where they spent their childhood.

In the light of the obtained data, it is not wrong to say that as the class level of college students increased, achievement test scores increased and they had more knowledge about environmental problems. The students discuss topics related to environmental problems in class and discuss environmental problems in an open class environment, prepare homework and make presentations on the subject and use information resources (Internet, visual and written media and books) in daily life. It can be said that these contribute positively to this result. Although it is not a part of the study, it can be predictable that the increased level of knowledge about environmental problems will increase students' anxiety levels about environmental problems and will affect positively their attitudes towards environmental problems. Studies also support this finding (Alp *et al.*, 2006; Tuncer *et al*, 2009; Teksoz *et al*, 2012).

Compared to the students attending Mathematics Teacher Education and Turkish Language Teacher Education, the students attending Classroom Teacher Education and Social Studies Teacher Education had more environmental information and were more concerned with environmental problems. This result is not surprising in students attending Classroom Teacher Education, where "Environmental Education" is a compulsory subject, and in students attending Social Studies Teacher Education, where "Contemporary World Problems" is a compulsory subject. On the other hand, it has been shown that the environment where teacher candidates grew up in had no effect on high scores on the achievement test for environmental issues. In Turkey, the number of individuals who have high education levels of environmental problems, who do not avoid taking responsibility for the solution of environmental problems and who attempt to show in any environment their reaction to environmental problems in the whole country is low. It can be argued that this result is not surprising, given the vast majority of those are waiting to live in their own lives to react to environmental problems. The studies support this result (Tosunoglu, 1993, Kisoglu, 2009, Timur, 2011). Another finding is similar and it is assumed that teacher candidates attending Classroom Teacher Education and Social Studies Teacher Education are more concerned with environmental problems compared to the teacher candidates attending Mathematics Teacher Education and Turkish Language Teacher Education. However, the data reveal that the education sections do not influence on the development of opinion on human-environment relation. In other words, the education sections do not have a positive influence on the attitudes towards the environment. Although it is stated that teacher candidates attending Classroom Teacher Education and Social Studies Teacher Education have more environmental information and are more concerned with environmental problems compared to teacher candidates attending Mathematics Teacher Education and Turkish Language Teacher Education, the education sections do not influence on attitudes towards environmental problems. Although Tuncer *et al.* (2009) have reached results supporting it; other studies have yielded results in the opposite direction. For example, Teksoz *et al.* (2012) stated that a high level of environmental knowledge affects the anxiety and attitudes of college students as well as their personal responsibilities towards environmental protection and that environmental knowledge is an important preliminary indicator of anxiety, attitudes and responsibility towards the environment. He added that environmental concern is associated with both environmental attitudes and natural environment activities at a significant level and noted that attitudes are also an important pre-indicator of environmental responsibility.

There was no positive relationship between the region where the participants spent their childhood and the achievement test scores. In other words, whether teacher candidates have grown up in city, in the town or in the village, they could not have knowledge about the natural environment and its elements. Considered that environmental education and the solution of environmental problems have been generally given little place in the Turkish education system and our teachers have no enough knowledge for environmental education, the lack of sufficient knowledge about environmental problems during the period of childhood years in teacher candidates is considered as a predictable outcome. The studies support this finding (Tosunoglu, 1993; Kisoglu, 2009; Timur, 2011). It can be said that the residential areas where the teacher candidates have spent their childhood years have no effect on the adoption of an environmentally friendly approach to human-environment relations in them and thus have no experience in dealing with environmental problems. Likewise, it cannot be said that living

environments have a positive effect on environmental information (Tosunoglu, 1993; Kisoglu, 2009; Timur, 2011). Unlike this finding, Hsu & Roth (1998), who examined the level of environmental literacy of middle school teachers in Taiwan, found that teachers who live in the areas where they grew up or who live in urban areas take more place in environmental protection activities. Although environmental activities are not included in the scope of this study, it is accepted that the residential areas have a positive effect on certain parts of environmental literacy.

On the other hand, there was no statistically significant relationship between the scores of the teacher candidates' opinions about human-environment relation and their class levels. According to this, it can be said that teacher candidates are not sensitive about dealing with environmental problems at any class level. Based on the finding that the environmental knowledge of upper class teacher candidates increased, although it is argued that there may be an increase in their concerns about environmental problems, it is understood that they are not put into practice or at least the teacher candidates have no such intention. From this point, it can be argued that the candidate teachers are not willing for environmental behaviors requiring participation skills and do not want to be held responsible (Karatekin, 2011; Aksoy & Karatekin, 2011). However, Dillon and Gayford (1997) found a relationship between the attitudes of teacher candidates and their emotions. Tikka et al. (2000), who worked with college students in Finland, found a significant relationship between knowledge, attitudes and behavior. Lessons are only at the theoretical level and participants are exposed to information bombardment of virtual and visual media, especially outside the school. In contrast, the rate of reading books is gradually decreasing. Therefore, while the level of knowledge increases, there is no positive change in attitudes and behaviors. According to the report on Reading Habits of DESAM, which is the R & D unit of the Democratic Educators' Union, the books read in Turkey generally deal with issues of politics, love and sexuality. The Turkish people spend only 6 hours a year reading books. Turkey is behind most African countries in terms of reading books. While 14 percent of the population in Japan, 12 percent of the population in the United States, 21 percent of the population in England and France regularly read books, only 0.1 percent of the population in Turkey read books. Japanese reads an average of 25 books a year, a Swiss reads an average of 10 books a year, French reads an average of 7 books a year, and a Turkish reads a book every 10 years.

Finally, gender is a matter mentioned in environmental literacy studies. Although there are significant relationships in favor of female students in the literature (eg Tosunoglu, 1993 and Tuncer *et al*, 2009 reported that female students' attitudes towards environmental problems are positive), the data obtained suggested that participants being female or male has no an influence on whether they have adopted a nature-friendly approach to the human-environment relation. Moreover, it was concluded that gender was not effective in dealing with environmental problems of the participants. Finally, gender also makes no a statistically significant difference in solving environmental problems. Although studies have shared findings in favor of female students, there are also studies that find out that teacher candidates' environmental literacy levels do not differ according to gender (Tosunoğlu, 1993; Kışoğlu, 2009; Timur, 2011; Artun *et al*, 2013).

## 5. Suggestions

The table that emerges when the data are interpreted is that the teacher candidates' attitudes, knowledge levels and sensitivities towards environmental problems are low. Thus, we also need to think differently as citizens of this country. Teachers that train children who make up 30% of the population but 100% of the future need to think more, think differently and to be more interested in burning problems. We must place at the center of our understanding of education, which is Walter Lippmann's word—"Where all think alike, no one thinks very much." Because the results of the international education evaluation institutions are not good for Turkey. For example, PISA (The Programme for International Student Assessment), which is one of the international measurement instruments that include multiple components of environmental literacy until today, has been applied to 540 thousand students aged 15 in 72 countries and economic regions. Then, its results have been published in December 2016. 35 from these 72 countries and economic regions are the countries of the Organization for European Economic Cooperation (OECD). While Turkey ranks 50th among 72 countries, its performance declined compared to previous tests. It was 52th in science title, 50th in reading and 49th in mathematics (OECD, 2016). Our children are in a difficult position in the order of success in the areas (science, reading and mathematics) where they need to be strongest so that they can cope with all kinds of problems, not just environmental problems. Therefore, we should start thinking differently.

To better understand the situation of environmental literacy, we must make national and international measurements more often and we should prepare better. However, when it is considered in a broader context, it

is understood that this alone will not be sufficient. We need assessment studies to determine the degree of effect of different environmental education programs and approaches on any components of environmental literacy (eg McBeth et al., 2011; UNESCO, 1978). In addition, well designed studies should be done to further improve environmental literacy (eg by targeting different learners and pushing boundaries) and to better understand how to maximize the potential of the approach and environmental education programs (McBeth et al., 2011; UNESCO, 1978). Curriculum-based assessment results, which are often part of assessment and research studies, can play a role in guiding which educational programs and approaches will be more productive for students with different qualities (such as different age groups, personal history, skills, learning styles). While we recognize the importance of such studies, this is not the point that we concentrate. Our aim is to play a leading role in the preparation of a measurement framework program for large-scale assessments such as the NELA (Top Educational Leadership Preparation Program) and PISA (The Programme for International Student Assessment). The results of such large-scale assessments will help us to determine where the improvements in environmental literacy reach success and where educational advances are needed.

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