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## A study on environmental knowledge and attitudes of teacher candidates

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### Abstract

The main purpose of this study is to investigate knowledge and attitudes of teacher candidates in Social Sciences Education and Science and Technology Education department towards environment. 323 teacher candidates as 171 female and 152 male participated in the study. 43 % of participants find the Internet and television more effective in environmental awareness. They think shortening of natural resources is the biggest problem of the world while urbanization is the biggest issue of Turkey. Teacher candidates have a moderate level environmental knowledge; have more positive attitude in terms of environment but low level environmental behaviors.

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### 1. Introduction

Environmental problems are the most vital problems all mankind face today. The reasons of environmental problems are generally described as industrialization, over population, developments in science and technology, increasing needs and globalization (Davis, 1998; Baykal & Baykal, 2008) while mankind is considered as the most effective factor in environmental problems in terms of their thinking and way of behavior (Watson & Halse, 2005; Negev et al., 2010). Therefore, environmental education is increasing in importance with regard to a sustainable livable environment. The aim of environmental education is to develop a world population with knowledge, skills and attitude as well as individual and social tasks and responsibilities to provide contribution to solutions of present environmental problems and to prevent possible future ones (Kim, 2003; Moseley, 2000). Most of research reveals the relation between environmental knowledge and environmental behavior (Dillon & Gayford, 1997; Hsu, 2004; McMillan et al., 2004; Tikka et al., 2000), however, it is highlighted that environmental knowledge is not an enough component for positive environmental behavior (Hungerford & Volk, 1990; Jensen, 2002). According to Bradley et al. (1999), the most important factor that affects individual behavior is attitude. Environmental attitude can be defined as “learned tendencies in the form of consistent behaviours against environment either positive or negative” (Perlstring, 1997). Kağıtçıbaşı (1998), on the other hand, says that attitudes are not only tendencies or feelings but a combination of thinking, feelings and attitude. In this respect, family is the first social environment in which environmental sensitivity, environmental attitudes and behaviors are formed. However, family members can also

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provide their children with false or missing messages about the interaction of nature, environment and people with regards to their environmental knowledge, consuming and cleaning habits, their importance to animals and plants, their interest and love for nature (Nazlıoğlu, 1991). Since children may create unrecoverable and permanent negative opinions due to these kind of messages perceived in the family, environmental education at early ages becomes much more important in terms of perceiving nature and their relation with nature in a healthy way (Goodall, 1992; Phenice & Griffiore, 2003; Tilbury, 1994). There is no compulsory or selected course called “Environmental Education” in primary schools in Turkey, however, the goals and subjects related to awareness of protecting environment and environmental habits are offered within the content of Science and Technology and Social Studies courses curriculum (Turkish Republic Ministry of Education, 2006). The related literature reveals the importance of teachers in developing positive attitudes towards environment (Ekborg, 2003; Vlaardingerbroek & Neil Taylor, 2007). For instance, teachers who have positive attitude towards environment are found to have more tendencies to environment education in the classes (Chung Ko & Kin Lee, 2003; Kim & Fortner, 2006) while teachers who think themselves lack environmental literacy feel that they have no skills for environmental education (Smith-Sebasto & Smith, 1997; Ferry, 1995; Simmons, 1998). Under the circumstances, it can be concluded that effective environmental education is based on the teachers’ environmental literacy, attitude and habits. Concerning these reasons, the aim of this descriptive study model is to investigate environmental knowledge and attitudes of teacher candidates enrolled in Social Sciences and Science and Technology course teaching departments in terms of different variables. It is hypothesized that the results are important with regards not only to describe the current atmosphere but also to provide contribution to the quality of pre-service teaching programmes.

## 2. Method

### 2.1. The Research model

This is a descriptive study investigating environmental knowledge and attitudes of teacher candidates enrolled in Social Sciences and Science and Technology course teaching departments in terms of different variables.

### 2.2. Population and sample

The population of the study was teacher candidates from the University of Cukurova, the Faculty of Education, Social Sciences Education and Science and Technology Education Department. As the population was easily accessible, no sampling was done. The data was gained from 323 pre-service teachers during 2012-2013 year. Descriptive statistics related to teacher candidates are given in Table 1.

Table 1: Descriptive statistics related to teacher candidates

<b>Gender</b>	<b>F</b>	<b>%</b>	<b>Department</b>	<b>f</b>	<b>%</b>
Female	171	52.9	Social Science Education (SSE)	166	51.4
Male	152	47.1	Science and Technology Education (STE)	157	48.6
Total	323	100.0	Total	323	100.0
<b>Grade</b>			<b>Have taken the “environment” course (EC) or not</b>		
I. Grade	76	23.5	Have taken (optional or compulsory)	111	34.4
II. Grade	87	26.9	Have not taken	212	65.6
III. Grade	82	25.4	Total	323	100.0
IV. Grade	78	24.1			
Total	323	100.0			

### 2.3. Data collection tools

In this study, a questionnaire with two sections was used as data collection tool. The first section had four multiple-choice questions about; general public’ environmental sensitivity (1), information sources as contributors to environmental awareness (2), the biggest environmental issues of the world (3) and of Turkey (4). The second section consisted of Environmental Attitude Scale (EAS) and the Environmental Knowledge Test (EKT) developed by Uzun & Sağlam (2006) The EAS had a 5-likert type scale. It had two sub-scales which are Environmental

Opinion (EO) with 14 items and Environmental Behavior (EB) with 13 items. The reliability coefficient based on Cronbach Alfa of the EAS was 0.80 and the explained variance rate was 58.2 %. The EKT consisted of 25 questions exploring knowledge towards environment. Its reliability coefficient based on Kuder-Richardson 21 formula was 0.89. The lowest and the highest probable scores to be taken from the EB sub-scale were between 13-65, those from EO sub-scale were between 14-70, and those from EAS were between 27-135.

#### 2.4. Data analysis

In order to detect environmental attitudes of teacher candidates, EO and EB scores considering inverted points of the negative sentences and descriptive statistics were performed. As for EKT, on the other hand, each correct answer was evaluated out of 4 and each pre-service teacher got an EKT point out of 100. Mann Whitney U and Kruskal-Wallis tests were used to determine whether there is a significant difference among EO, EB, and EKT scores of participants in terms of mentioned variables.

### 3. Findings

Table 2 shows teacher candidates' views about people's environmental sensitiveness, factors effecting environment awareness, the most important environmental problems in the world and in Turkey.

Table 2. Descriptive statistics of teacher candidates' views about environmental sensitivity, information sources and environmental problems

Environmental sensitivity	f	%	Environmental problems	in Turkey		in the world	
				f	%	f	%
Not at all	68	21.1					
Not	180	55.7	Shortening of natural resources	46	14.2	76	23.5
Some	71	22.0	Erosion	9	2.8	1	0.3
Rather	4	1.2	Air-pollution	29	9.0	28	8.7
A lot	-	-	Solid waste/garbage	30	9.3	37	11.5
Total	323	100.0	Urbanization	92	28.5	46	14.2
			Water pollution (river, lake, sea)	7	2.2	8	2.5
<b>Factors affecting awareness</b>	<b>f</b>	<b>%</b>	Deforestation	58	18.0	40	12.4
Internet-television	139	43.0	Population growth	35	10.8	36	11.1
Educational system	83	25.7	Decrease of biodiversity	16	5.0	48	14.9
Regulatory and voluntary sector	52	16.1	Acid rain	1	0.3	3	0.9
Municipalities	19	5.9	Total	323	100.0	323	100.0
Ministry of Environment	12	3.7					
Daily newspaper and magazines	11	3.4					
Family	7	2.2					
Total	323	100.0					

As it is seen in Table 2, 55.7% of participants think that people are “very little” sensitive of environmental problems while 21.1 % think that people are “not at all” sensitive of those problems. According to the teacher candidates, the most important factor of developing environmental awareness is the Internet and television (43.0%). It is followed by education system (25.7%) and voluntary environment foundations (16.1%) respectively. Families, newspaper and magazines and Ministry of Environment were found ineffective with regards to raising environmental awareness by the participants. As for the most important environmental problems of Turkey, 28.5% of participants indicate urbanization; 18.0% of them indicate deforestation; and 14.2% of them indicate shortening of natural resources. The most important environmental problem of the world was described as shortening of natural resources by 23.5% of the participants. This problem is followed by decrease of biodiversity (14.9 %), urbanization (14.2 %), and solid waste/garbage (11.5%) respectively.

The descriptive statistics of EAS and EKT points of teacher candidates can be seen in Table 3.

Table 3. Descriptive statistics of EAS and EKT

	N	Minimum	Maximum	Mean	Std. Deviation
EO sub-scale	323	31.00	70.00	63.52	7.26
EB sub-scale	323	13.00	58.00	37.79	7.97
EKT	323	24.00	92.00	64.60	13.12

The values gained through dividing the arithmetic mean given in the Table 3 into the number of items are 4.53 in EO sub- questionnaire while they are 2.90 in EB sub-questionnaire. Considering the 5 Likert-scale, the results mostly fall between “I completely agree” in terms of environmental opinion and “sometimes” in terms of environmental behavior. These results reveal that teacher candidates show positive attitude with regards to environmental thinking while they are placed close to negative level in terms of behaviors. The teacher candidates’ environmental knowledge was found middle level (64.60%) according to the EKS mean scores. Table 4 illustrates the results of Mann Whitney U test performed in order to describe whether there is a significant difference between the EAS and EKT points of participants in terms of gender and departments.

Table 4. Differences in teacher candidates’ EAS and EKT scores according to gender and department

Gender	N	Mean Rank	Sum of Ranks	U	p	Dept.	N	Mean Rank	Sum of Ranks	U	p	
EO	Female	171	162.92	27859.50	12838.500	.850	SSE	166	178.83	29685.50	10237.500	.001*
	Male	152	160.96	24466.50			STE	157	144.21	22640.50		
	Total	323					Total	323				
EB	Female	171	162.93	27861.50	12836.500	.849	SSE	166	158.80	26360.50	12499.500	.526
	Male	152	160.95	24464.50			STE	157	165.39	25965.50		
	Total	323					Total	323				
EKT	Female	171	158.23	27056.50	12350.500	.438	SSE	166	180.57	29974.50	9948.500	.000*
	Male	152	166.25	25269.50			STE	157	142.37	22351.50		
	Total	323					Total	323				

As can be seen in Table 4, there is no significant gender difference in teacher candidates’ environmental knowledge and attitudes ( $p > .05$ ). Besides, it has also been found that pre-service teachers enrolled at Social Sciences Teaching Department have high EO and EKT points ( $U=10237.500$ ,  $p < .005$ ;  $U=9948.500$ ,  $p < .001$ ). Table 5 shows the analysis results done to detect whether there is a significant difference between the EAS and EKT points of teacher candidates in terms of class level and taking the “Environment” course (EC) or not.

Table 5. Differences in teacher candidates’ EAS and EKT scores according to grade and The Situation Whether Have Taken the “EC” or not

Grade	N	Mean Rank	df	X <sup>2</sup>	p	Have a taken EC	N	Mean Rank	Sum of Ranks	U	p		
EO	I.	76	173.25	3	3.175	.365	EO	Have taken	111	168.83	18740.50	11007.500	.339
	II.	87	153.16					Have not taken	212	158.42	33585.50		
	III.	82	169.54					Total	323				
	IV.	78	152.97										
	Total	323											
EB	I.	76	166.78	3	2.791	.425	EB	Have taken	111	174.01	19315.50	10432.500	.094
	II.	87	173.09					Have not taken	212	155.71	33010.50		
	III.	82	155.96					Total	323				
	IV.	78	151.33										
	Total	323											
EKT	I.	76	161.49	3	5.826	.120	EKT	Have taken	111	178.46	19809.00	9939.000	.021*
	II.	87	147.36					Have not taken	212	153.38	32517.00		
	III.	82	159.10					Total	323				
	IV.	78	181.8										
	Total	323											

As can be seen from Table 5, there is no significant difference between teacher candidates’ environmental knowledge and environmental attitudes in terms of class level ( $p > .05$ ) and the pre-service teachers taking the EC show higher EKT points ( $U=9939.000$ ,  $p < .05$ ).

#### 4. Discussion and conclusion

The study reveals that most teacher candidates believe people are less aware of environmental problems. This result is similar to those of many related research on teachers and teacher candidates (Altın, 2001; Karadayı, 2005; Erol, 2005). The cornerstone of environmental awareness lies behind raising environmental awareness of people (Sward, 1999) and environmental awareness requires individuals with environmental knowledge (DiEnno & Hilton, 2005). Therefore, the result may be based on the fact that pre-service teachers with more environmental knowledge evaluate people's environmental knowledge as inadequate and their environmental attitude as negative. It was found that urbanization, deforestation and shortage of natural resources were defined as the most important environmental problems of Turkey while shortage of natural resources, decreasing of biodiversity and urbanization were defined as the most important problems of the world. According to the Turkish Republic Ministry of Environment and Forest (2008), urbanization, water pollution, solid waste, air pollution, erosion and desertification, noise pollution and deforestation are the most important problems at national level. The underlying environmental problems in global level, on the other hand, are described as temperature changes and global warming, ozone layer depletion, deforestation (Baykal & Baykal, 2008). In this respect, it can be resulted that teacher candidates are more aware of environmental problems at national level.

The research study shows that teacher candidates considering themselves with positive attitude in terms of environmental thought, in fact, have environmental attitude close to negative level. The value people give to environment becomes solid in their behavior and people with environmental sensitiveness are expected to show useful behavior for their environment. However, having environmental knowledge and having positive thoughts are not enough for people to show responsible behavior for their environment (Bamberg, 2003; Erten, 2005; Sadık & Çakan, 2010). The reason could be the fact that people might be affected by many social, cultural, economic, and emotional factors when they decide to behave and perform in support of environment. According to Diekmann & Preisendörf (1992), it is easy for people to perform environmental behaviors that do not require self-devotion or spending money from their own pocket. This view was also supported by the answers of pre-service teachers who said "very often" for the item "I share my environmental knowledge with my friends" but "rarely" for the item "I can work unpaid for long time if it is needed for a livable environment" and "sometimes" for the item "I prefer environmental friendly items although they are more expensive". The related research illustrates the fact that men have more environmental knowledge (Gambro & Switzky, 1999; Kahyaoglu & Özgen, 2011; Teksöz et al., 2010), women are more environment sensitive (Çimen et al., 2011; Mohai, 1991; Tikka et al. 2000), and senior pre-service teachers have more environmental knowledge and attitude (Çabuk & Karacaoğlu, 2003; Yılmaz et al., 2002; Yıldırım et al, 2012). Environmental attitude started at very early ages and if there is no important experience or circumstances, it does not change very easily (Kağıtçıbaşı, 1988). Therefore, the reason why no significant difference was found between environmental knowledge and attitudes of teacher candidates in terms of gender and class might be the fact that teaching practices in classrooms are not effective enough to change the attitudes. Although there are a few courses related to environment in the curricula of education programmes, teacher candidates at Social Sciences Teaching Department were found to have more environment knowledge and more positive environment attitude, which may result from differences in teaching practices even though they have similar contents. Another important result of the study is that participants determined the Internet and television as the most important factor in raising environmental awareness. The rationale behind it could be two reasons one of which is the theoretical teaching of courses related to environment (Akıllı & Yurtcan, 2009) and the other the power of media in reaching large masses or personal preference in knowledge acquisition. In the related literature on environmental issues, television is found as more preferred and more effective source of information compared to printed resources (Aksu & Avcı, 2009; Altın, 2001; Erol, 2005; Pe'er et al., 2007; Spellman et al., 2010).

To sum up, the results of this study show that environmental knowledge and positive thoughts of teacher candidates are not sufficient for them to put into practice. In this respect, it can be suggested that (1) course contents should be enriched the way that deals with global issues, (2) activities that might affect the environmental attitudes and behaviors (practical and interrelated activities based on natural environment, projects, group work, discussions, case studies, audio and visual simulations, brain storming, etc) should be involved more than theoretical knowledge, (3) instructors must be a good model for the teacher candidates about the environmental behaviors, and (4) television and the Internet should be made use of more in this respect.

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