International Electronic Journal of Environmental Education
Vol. 1, Issue 2, January 2011

Investigation of Undergraduate Students' Environmental Attitudes*

Sacit KÖSE**

Ayşe SAVRAN GENCER

Kudret GEZER

Gül Hanım EROL

Kadir BİLEN

Abstract

Environmental education has been viewed as an important way to educate students about environmental issues beginning from pre-school to higher education. This study is a part of this field- namely, undergraduate environmental education. The purpose of the study is to explore undergraduate students' attitudes towards environment at the end of the course "Environment, Human, and Society". In direction of this basic aim, environmental attitudes of university students were examined according to the gender and faculty type factors. The research was applied at Pamukkale University in School of Foreign Languages during the spring term of 2008-2009 education years. A questionnaire consisting of 2 parts titled "personal information" and "measuring attitude towards environment" was utilized as the means of collecting data. As a result of the study, it could be concluded that undergraduate students had positive attitudes toward the environment as regard to their gender and faculty types. It was emphasized that female students were more sensitive toward environment than male students. At the end, some advices were given in relation with environmental researches.

Keywords: environment, environmental education, environmental attitudes, undergraduate students, gender

Introduction

The environmental problems may increase in a huge amount mainly due to some global negative activities or environmental policies of counties rather than an individual activity. But, as an individual there are a lot of things that can be done to prevent the environmental pollution and the rapid destruction of environment. Only individuals who have environmental

* The manuscript is presented at a conference (International Workshop on Urbanization, Land Use, Land Degradation and Environment, 28th September – 1st October, 2009, Denizli-Turkey).

** Corresponding author: Sacit Köse, Pamukkale University, Faculty of Education, Department of Biology Education, Denizli, Turkey. Phone: +90 258 296 1069. e-mail: sacitkose@gmail.com

ISSN: 2146-0329
www.iejeegreen.com

literacy, awareness, and sensibility would contribute the diminishing the environmental problems. Therefore, environmental education has been viewed as an important way to educate students about environmental issues in identifying and challenging environmental problems in all educational levels including university (Fernandez-Manzanal, Rodriguez-Barreiro & Carrasquer, 2007; Tuncer et al., 2009; Uzun & Sağlam, 2006). In attaining this goal, one of the important outcomes of an effective environmental education is to lead positive changes in students' attitudes and behaviors toward environment. Fernandez-Manzanal et al. (2007) point out that "environmental attitudes provide a good understanding of the set of beliefs, interests, or rules that influence environmentalism or pro-environmental action" (p.990).

In this sense, it is important to explore the attitudes of students toward environment in understanding the environmental behaviors of students and providing need analysis for reconstructing environmental education starting from the pre-school to higher education. But, for Turkish context there are a few studies for measuring and analyzing environmental attitudes of pre-school, primary and secondary school students as regard to some independent variables (Gezer, Çokadar, Köse & Bilen, 2006a; Gezer, Köse & Erol, 2006b; Tuncer, Sungur, Tekkaya, & Ertepınar, 2005a; Tuncer, Ertepınar, Tekkaya, & Sungur, 2005b; Uluçınar-Sağır, Aslan & Cansaran 2008; Yılmaz, Boone & Anderson, 2004), especially the studies about higher education is solely restricted by pre-service teacher education students (Erol & Gezer, 2006; Şama 2003; Tuncer, Sungur, Tekkaya & Ertepınar, 2007).

Among the university students from quite different programs, Ek, Kılıç, Öğdüm, Düzgün and Şeker (2009) investigated first year and senior students' attitudes and sensibilities toward environmental problems by considering additional socio-demographic characteristics. They found that students' attitudes toward environment displayed significant differences in terms of the program they enrolled, grade level, gender, age, fathers' job, and the city they lived longest. As regard to gender, they found that girls had a higher mean score on the Environmental Attitude Scale than boys. They also reached a mean difference among the academic programs in which students enrolled mainly due to vocational school of automotive and health school of nursery.

In order to get a wider point of differences between boys' and girls' environmental attitudes at the higher education level, Tuncer (2008) emphasized gender as a significant factor in determining students' perception towards sustainable development. She found that girls became more sensitive toward sustainable development. Another study from Turkish context, with the sample of students from medicine and health programs, similar results were revealed in environmental attitudes of students as regard to gender, age and for some other demographic

characteristics (Özdemir, Yıldız, Ocaktan, & Sarışen, 2004; Özmen, Çetinkaya, & Nehir, 2005).

From a more global perspective, gender differences in environmental attitudes at higher education level have converged on females that are more sensitive toward environmental issues. For example, Fernandez-Manzanal et al. (2007) revealed that female students have higher scores than male students on the attitudes scale, especially in the factors of the need for conservation and environmentally favorable behavior. The differences between males and females' attitudes were elaborated in the meta analysis study by Zelezny, Chua, and Aldrich (2000). In their study, the consistent result of woman who "reports stronger environmental attitudes and behaviors than man" were supported by cross age and across countries studies (p.443).

Purpose and Rationale

Given the importance of a strong sense of positive attitudes toward environment are related to desirable behaviors of sensibility, awareness and consciousness about environmental problems, it seems particularly important to examine university students' environmental attitudes. Therefore, the purpose of this study is to explore preparatory class undergraduate students' attitudes toward environment. More specifically, based on the main problem, the research questions to be addressed in this study are as follows:

R.Q.1: What are undergraduate students' attitudes toward environment?

R.Q.2: Are there any differences in undergraduate students' attitudes toward environment in terms of their gender?

R.Q.3: Are there any differences in undergraduate students' attitudes toward environment in terms of their faculties?

Method

This quantitative study employs a causal-comparative method to measure students' environmental attitudes. A causal-comparative method "determine the cause or consequences that already exist between or among groups of individuals" (Fraenkel & Wallen, 1996; p.341). In this study gender and different faculty types in which students would be enrolled were described as predefined groups in exploring consequences of an environmental course offered in preparatory class.

Sample

The target population of this study is preparatory class students in School of Foreign Languages before starting their programs at Pamukkale University in Denizli, Turkey. The sample was convenient students who enrolled in the course of Environment, Human and Society during

preparatory class. Data in this study were collected from a total number of 376 students. The sample consisted of 203 (54%) females and 173 (46%) males. The sample included 139 (37%) Engineering Faculty, 49 (13%) Medicine Faculty, and 188 (50%) Economics and Administrative Sciences Faculty.

Context

In Turkey there are many universities. Some of them require English Preparatory Class consisting of mainly English courses. Among them, Pamukkale University has recently required a preparatory class for some faculties. Engineering, Economic and Administrative Sciences, and Medicine are the preliminary faculties that require students completed preparatory class before starting their programs. But, the School of Foreign Languages at Pamukkale University has different curriculum or application. The students in the preparatory class additional to English courses must take some courses in Turkish content such as "Environment, Human and Society". The course basically aims to initiate awareness about environmental issues. The students are expected to identify and challenge environmental problems in relation with the society.

Data Collection

The participants completed the questionnaire of the Attitude Scale towards Environment was developed by (Özkan, 2001). The questionnaire consists of 22 items in a five- point Likert type scale and response categories were accomplished by assigning a score of 5 to "strongly agree", 4 to "agree", 3 to "uncertain", 2 to "disagree", and 1 to "strongly disagree. The questionnaire includes four negatively worded items. Negatively written items that were shown with asterisks in Table 1 were reversed at their scores at the beginning of the statistical analysis to provide consistent values between negatively and positively worded items. For one dimensional scale, Cronbach's alpha reliability coeffient was stated as .79 (Özkan, 2001).

A questionnaire consisting of 2 parts titled "Personal Information" and "Measuring Attitude towards Environment" was utilized as the means of collecting data. The questionnaire was applied to students who enrolled in the course of "Environment, Human, and Society" within the context of School of Foreign Languages in the spring semester of 2008-2009 academic years. The data were collected at the end of the course from the voluntary students.

Data Analysis

Data of the present study were analyzed utilizing descriptive statistics (i.e., percentages, means and standard deviations) and inferential statistics by using a statistical analysis package SPSS 17. In the analysis of first research question of the study, descriptive statistics were utilized to determine students' environmental attitudes. Based on the respondents' scores on the scale, individual item means and standard deviations as well

as mean scores and standard deviations for the whole scale were computed. A mean score of was evaluated as medium level around one point standard deviation according to the average level of the scale that someone would get from the scale. Because of the environmental scale consisting of 22 items with a five category response scale, the possible minimum score that someone would gets from the scale is 22 (lowest attitudes) and the maximum score is 110 (highest attitudes) then the average score is around 66 points.

In the analysis of second and third research question, two-way ANOVA was used to determine whether students' environmental attitudes changed in terms of gender and faculty types. In the further analysis of third research question, the Scheffe post hoc tests one-way ANOVA test was used to determine whether students' attitudes changed in terms of their faculties.

Results

The problem under investigation is to explore undergraduate students' environmental attitudes. Further, some independent variables were considered to determine the differences between the perceptions of the undergraduate students' environmental attitudes. The respondents' scores on the environmental scale were analyzed by utilizing descriptive statistics. For this study, raw scores ranged from 24 to 105 with a mean score of 67.44 and a standard deviation of 22.65. It was a very close value to the average level that someone would get from the scale. Therefore, we can conclude that university students in this context indicated positive attitudes toward environment at the medium level. This was supported by other studies utilizing the Scale of Attitude towards Environment for different samples (Gezer, et al., 2006a; Çetin, 2003) in which they obtained higher scores on the scale.

They also indicated an average mean score of "3" according to the respondents' mean scores on the scale for all the items as it can be seen in Table 1. According to the descriptive result of this study, the undergraduate students indicated positive environmental attitudes. However, the total scale score and item scores were clustered just above the mid-point.

Table 1

Total scale and item means and standard deviations of respondents' scores on the attitudes scale towards environment, (n = 376)

Item Number		*M*	*SD*
Item 1	I like to learn something about the environment.	3.15	1.58
Item 2	I would like to contribute to the solution of problems related to the environment.	3.18	1.57
*Item 3	I'm sick of hearing the word "Environmental protection".	3.37	1.57
Item 4	I believe that the most important factor on environmental pollution is human.	2.94	1.52
Item 5	I read articles published about the environment.	3.12	1.15
Item 6	I prefer to buy products that do not harmful for the environment.	2.94	1.27
Item 7	I believe that environmental problems are the most priorities to solve	3.02	1.30
Item 8	I do not prefer to use products which are sold in plastic bottles	2.88	1.15
Item 9	I'm always very sad about forest fires.	3.00	1.76
*Item 10	I don't draw attention about "ozone layer".	3.12	1.62
*Item 11	I believe that garbage thrown by people doesn't damage the world.	3.15	1.68
Item 12	I believe that air pollution damage to the environment.	3.11	1.72
Item 13	I believe that hunting is an activity needed to be banned.	3.11	1.20
Item 14	I believe that environmental pollution is the most important problem in nature.	2.90	1.23
Item 15	I always take care of throwing a used newspaper and paper to recycling bins.	2.99	1.48
Item 16	I would like to have more environment-related courses at school to be more environmentally conscious.	3.16	1.19
Item 17	I would like to work as a volunteer in the environment-related projects.	3.06	1.14
*Item 18	It doesn't bother me whether there is a nuclear power plant where I live in.	2.96	1.61
Item 19	I believe that reduction of forests and destruction of plants doesn't mean only cutting trees. It means also destroying animals and the environment.	2.99	1.65
Item 20	I believe that population growth is an environmental problem.	3.48	1.38
Item 21	I believe that environmental pollution is the most important factor for the nature.	3.11	1.44
Item 22	I'm especially interested in environmental and ecological issues in biology course.	3.02	1.15
Total Scale (Min 22-Max 110)		67.44	22.65

In order to investigate the research question 2 and 3, undergraduate students' attitudes toward environment were evaluated by means of gender and faculty types. A two-way Analysis of Variance (ANOVA) was conducted on the Attitude Scale toward Environment to evaluate the main and interaction effects of gender and faculty type at the significance level .05, as seen in Table 2. Results revealed statistically significant main effects of gender, faculty types, and their interaction effects.

Table 2
Results of two-way ANOVA on the attitude scale towards environment

Source	*SS*	*df*	*MS*	*F*	*p*
Gender	26470.116	1	26470.116	147.309	.000
Faculty types	18583.209	2	9291.605	51.709	.000
Faculty*Gender	20640.071	2	10320.036	57.432	.000
Error	66306.091	369			
Corrected total	191095.024	374			

A statistically significant mean difference was found between boys' and girls' attitudes toward environment [F (1,369) = 147.09; p = .000]. When the mean scores given in Table 3 were examined, it was found that girls hold higher attitudes toward environment than boys.

Table 3
Descriptive statistics of university students by means of gender and faculty types

		N	*M*	*SD*
Gender	Girls	203	81.92	17.22
	Boys	172	50.58	15.24
Faculty types	Engineering	139	54.05	17.94
	Medicine	49	83.20	8.38
	Economics	188	73.30	23.18

As regard to main effect of faculty types, a statistically significant mean differences were found amongst Engineering Faculty, Medicine Faculty, and Economic and Administrative Sciences Faculty on the Attitude Scale toward Environment [F (2, 369) = 51.709, p = .000]. The Scheffe post-hoc tests were conducted to determine the mean score differences between groups. The comparison of mean scores according to the faculty type indicated that Medicine Faculty students expressed more positive environmental attitudes than both Engineering and Economic and Administrative Sciences Faculties. In addition, Economic and Administrative Sciences Faculty students displayed more positive environmental attitudes than Engineering students.

As regard to interaction effects of gender and faculty types there were significant differences [F (2, 369) = 57.432, p = .000]. Figure 1 indicates that environmental attitudes of girls have highest score with the faculty of Economic and Administrative Sciences while boys with the faculty of Medicine have the highest score.

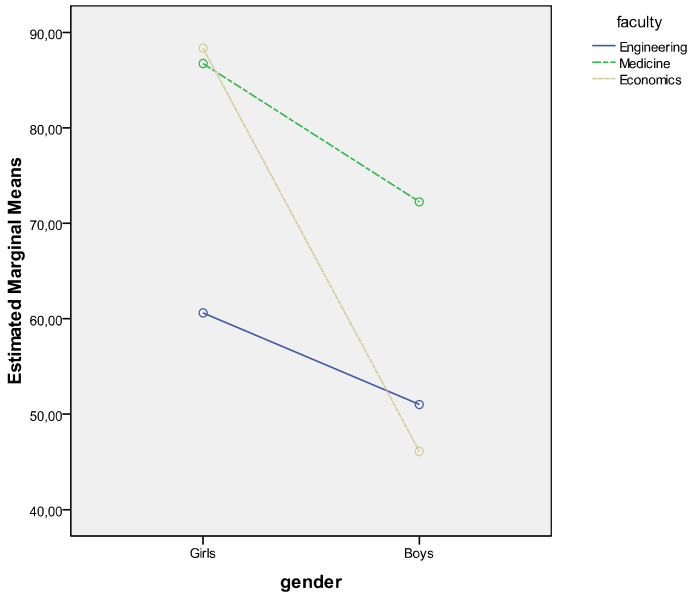

Figure 1. The interactions effects of gender and faculty types on the attitude scale toward environment

Discussion and Conclusion

According to the descriptive result of this study, the undergraduate students indicated positive environmental attitudes. However, the total scale score and item scores were clustered just above the mid-point. It would be expected near to the higher points after they enrolled in the environmental course. Otherwise, consistent with the previous literature university students were found at a low level of awareness and sensibility to environmental problems (Kahraman, Yalçın, Özkan, & Aggül, 2008; Özdemir et al., 2004). It was the limitation of the study to relate the effect of the course on the environmental attitudes of students; therefore an experimental design would be suggested to see the relations more clearly.

In our education system, beginning from the pre-school to secondary school in some extent to which the curriculum may cover environmental science education as a main subject or integrated in a related domain. In higher education, only a few departments include environmental science courses or environmental education courses such as biology, science education, environmental engineering etc. On the other hand, many departments of social sciences, medicine and economics do not include

environmental issues in any way. Therefore, it is a good sign for Pamukkale University to integrate a course related to environment during preparatory class before starting an academic education. From the point of the university students' views, Ek et al., (2009) and Özmen et al., (2005) indicated that an environmental course should be included at university education as well as primary and secondary education. For the future implications, the content and delivering of the environmental course would be restructured to get obtain more interests of university students from a wide range faculties and different backgrounds in handling environmental issues and improving their environmental attitudes. In addition, it should be investigated for the most suitable place of the environmental course whether in the School of Foreign Languages or departmental course.

A two-way ANOVA was revealed main and interaction effects of gender and faculty types. The results revealed significant differences in the perceptions of male and female students' environmental attitudes. This finding is consistent with the literature that many other studies found female students had more positive attitudes toward environments (Ek et al., 2009; Fernandez-Manzanal et al. 2007; Jenkins and Pell, 2006; Özmen et al., 2005; Tuncer et al., 2005a). In the same line for Turkish context, Tuncer et al., (2005b) obtained girls being more aware of environmental problems and individual responsibilities as well as having more positive attitudes than boys. The consistent attitude differences between boys and girls also have been supported by across country studies (Zelezny et al., 2000). Also, girls seem to be socially responsible and make a significant contribution to environmental protection (Jenkins and Pell, 2006; Zelezny et al., 2000). For future implications, environmental education activities or courses at any level of education system would be adjusted to account for boys' and girls' different interests.

The Scheffe post-hoc tests revealed differences among the mean scores of students in terms of their faculties on the Attitude Scale toward Environment. The comparison of mean scores according to the faculties indicated that Medicine Faculty students expressed more positive environmental attitudes than both Engineering and Economic and Administrative Sciences Faculties. In addition, Economic and Administrative Sciences Faculty students displayed more positive environmental attitudes than Engineering Faculty students. This finding is consistent with the literature that many other studies found differences among to the different academic programs (Ek et al., 2009; Özmen et al., 2005). For this study, it would be expected medicine and engineering students to have more positive attitudes than economics when their secondary school science background is considered because of medicine and engineering students coming from secondary schools' science branch including more biology and environmental science subjects. Conversely, for the students who will enroll economics and administrative departments this would be the first time to take a course related with environment.

Therefore, they might be more interested with environmental issues resulting more positive attitudes than engineering students.

Nowadays, environmental problems have increased rapidly. Then, educating people is the main way to reduce environmental problems by creating consciousness and sensibility toward environment. Education is a long-life process, so it is crucial to teach subjects about environment beginning from pre-school and continue to the university education and so on. Within the context of higher education it seems to be more important because students at the universities today will drive our life in the future. Some of them may be engineers in large factories or administrative staff in private and public places in the future as directly policy makers or applying pressure on policy makers in diminishing the environmental problems. Therefore, universities for all programs should provide an education program covering environmental science to nurture conscious and sensitive graduate students toward environment.

♦ ♦ ♦

Biographical statements

Dr. Sacit Köse is currently an Associate Professor of Biology Education at Pamukkale University. He was born in Edirne, Turkey. He has BSc and MSc degree in Biology Education from Dokuz Eylül University and PhD degree from Karadeniz Technical University in the same field in 2004. His research interests including determination and overcoming students' misconception, to challenge students' conceptions and students' use of conceptual change text, computer-assisted material, concept mapping, cooperative learning and POE as an aid to their conceptual understanding of science concepts, students' attitude toward science/biology/computer/environment and perceptions of science. He is on editorial/review boards for Computers & Education, Scientific Research and Essays, Eurasian Journal of Educational Research, Essays in Education, and World Applied Sciences Journal.

Dr. Ayse Savran Gencer was born in Turkey at 1975. She has BSc degree in Biology Education from Middle East Technical University and MSc - PhD degree from Middle East Technical University University in the field of Biology Education. She is working as an assistant professor in the Faculty of Education of Pamukkale University in Turkey. As a senior lecturer she gives courses at undergraduate and graduate levels. Her research includes mainly elementary and secondary science teacher education with interests of their teacher efficacy beliefs, classroom management beliefs, reflective thoughts, and learning approaches. As regard to science education and environmental education, her research examines constructivist ways of learning such as cooperative learning, concept mapping and currently Vee diyagrams and learning journals. She is in the editorial board of some peer-reviewed journals such as Teaching and Teacher Education.

Dr. Kudret Gezer is currently an Associate Professor of Biology at Pamukkale University. He was born in Mugla, Turkey. He has BSc and PhD degree in Biology from Dokuz Eylül University and MSc degree from Anadolu University in the same field. His research interests including wild mushrooms, antimicrobial and antioxidant activities of wild *mushroom* species, culture mushrooms production and environmental education.

Gül Hanım Erol is currently a Research Assistant of Elementary Science Education at Pamukkale University. She was born in Isparta, Turkey. She has BSc and MSc degree in Elementary Science Education from Pamukkale University and still PhD student in Pamukkale University in the same field. Her research areas are Environmental Education, Teacher Education, Nature of Science and Scientific Argumentation.

Dr. Kadir Bilen was born in Nigde, Turkey at 1980. He has BSc and MSc degrees in Science Education from Pamukkale University and PhD degree from Gazi University in the field of Science Education. He is working as a research assistant in the Faculty of Education of Pamukkale University in Turkey. His major interests are teacher education as a means of effetive teaching of science and effective science teacher. As regard to science education, his research includes understanding pre-service science teachers' science process skills, attitudes and *nature* of *science through* constructivist ways of learning including "Predict-Observation-Explain" (POE). As a research assistant, he is conducting science laboratory studies.

References

Çetin, G. (2003). *The effect of conceptual change instruction on understanding of ecology concepts.* Unpublished doctoral dissertation, METU, Ankara.

Ek, H. N., Kılıç, N., Öğdüm, P., Düzgün, G., & Şeker, S. (2009). 1st and 4th grade students' who are taught in different areas at Adnan Menderes University attitudes toward environment problems and sensitiveness to environmental issues. *Kastamonu Journal of Education, 17*(1), 125-136.

Erol, G. H., & Gezer, K. (2006). Prospective of elementary school teachers' attitudes toward environment and environmental problems. *International Journal of Environmental and Science Education, 1*(1), 65-77.

Fernández-Manzanal, R., Rodríguez-Barreiro, L., & Carrasquer, J. (2007). Evaluation of environmental attitudes: analysis and results of a scale applied to university students. *Science Education, 91*(6), 988-1009.

Fraenkel, J. R., & Wallen, N. E. (1996). *How to design and evaluate research in education*. (3rd ed.). New York, McGraw-Hill.

Gezer, K., Çokadar, H., Köse, S., & Bilen, K. (2006a). Comparison of high school students' attitudes toward environment: A Buldan case. Buldan Symposium. Denizli, Turkey, 71-77.

Gezer, K., Köse, S., & Erol, G. H. (2006b). A comparison of Çal, Bekilli and Buldan high school students' attitudes toward environment. Çal Symposium. Denizli, Turkey, 662-666.

Jenkins, E. W., & Pell, R. G. (2006). "Me and the environmental challenges": A survey of English secondary school students' attitudes towards the environment. *International Journal of Science Education, 28*(7), 765-780.

Kahraman, S., Yalçın., M., Özkan, E., & Aggül, F. (2008). Prospective elementary school teachers' aware of global warming and levels of knowledge. *Journal of Gazi Education Faculty, 28*(3), 249-263.

Özdemir, O., Yıldız, A., Ocaktan, E., & Sarışen, Ö. (2004). Medical student' aware and sensitiveness about environmental problems. *Ankara University, Medicine Faculty Bulletin, 57*(3), 117-127.

Özkan, Ö. (2001). Remediation of seventh grade student's misconceptions related to ecological concepts through conceptual change approach. Unpublished master's thesis, METU, Ankara.

Özmen, D., Çakmakçı-Çetinkaya, A., & Nehir, S. (2005). University students' attitudes towards environmental problems. *TAF Preventive Medicine Bulletin, 4*(6), 330-344.

Şama, E., (2003). Prospective of school teachers' attitudes toward environmental problems. *Journal of Gazi Education Faculty, 23*(2), 99-110.

Tuncer, G., Sungur, S., Tekkaya, C., and Ertepınar, H. (2005a). Environmental attitudes of the 6th grade students from rural and urban areas: a case study for Ankara. *Journal of Hacettepe Education Faculty, 26,* 167-175.

Tuncer, G., Ertepınar, H., Tekkaya, C., & Sungur, S. (2005b). Environmental attitudes of young people in Turkey: Effects of school type and gender. *Environmental Education Research, 11*(2), 215-233.

Tuncer, G., Sungur, S., Tekkaya, C., & Ertepınar, H. (2007). A comparative study on pre-service teachers' and elementary students' attitudes towards the environment. *International Research in Geographical and Environmental Education, 16*(2), 188-198.

Tuncer, G. (2008). University students' perception on sustainable development: A case study from Turkey. *International Research in Geographical and Environmental Education, 17*(3), 212-226.

Tuncer, G., Tekkaya, C., Sungur, S., Çakıroğlu, J., Ertepınar, H., & Kaplowitz, M. (2009). Assessing pre-service teachers' environmental literacy in Turkey as a mean to develop teacher education programs. *International Journal of Educational Development, 29*, 426-436.

Uluçınar-Sağır, Ş., Aslan, O., & Cansaran, A. (2008). An investigation of elementary students' knowledge and attitudes of environment in terms of different variables. *Primary Education Online, 7*(2), 496-511.

Uzun, N., & Sağlam, N. (2006). Environmental attitude scale for high school students. *Journal of Hacettepe Education Faculty, 30,* 240-250.

Yılmaz, Ö., Boone., W. J., & Anderson, H. O. (2004). Views of elementary and middle school Turkish students toward environmental issues. *International Journal of Science Education, 26*(12), 1527-1546.

Zelezny, L. C., Chua, P., & Aldrich, C. (2000). Elaborating on gender differences in environmentalism. *Journal of Social Issues, 56*(3), 443-457.