



Exploring environmental literacy through demographic variables

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ABSTRACT. This study aims to investigate the effect of selected demographic variables on pre-service teachers' environmental literacy. Although there are several demographic variables to have some degree of relationship with components of environmental literacy, gender, academic major, and grade level are chosen to investigate further in the Turkish context because of their prevalent usage in earlier studies. The sample of the study is comprised of 560 pre-service teachers enrolled in different academic majors. Environmental Literacy Test (ELT) was used as an instrument to assess environmental literacy and MANOVA was performed to investigate differences of PTs' environmental literacy in terms demographic variables. Findings of the study indicated that gender, year of enrollment, and academic major had significant effect on components of environmental literacy.

Key words: Environmental literacy; pre-service teachers; gender; academic major; year of enrollment

INTRODUCTION

In recent years, environmental issues have become one of the important concerns of the societies. Environmental literacy has been pronounced as one of the most important aspects to be considered for managing environmental problems since 1970s. Importance and requirement of education in solving environmental problems and developing environmental literacy of future generations have been emphasized at each international conference (Brundtland Report, 1987; Johannesburg Summit, 2002; Rio Conference, 1992; Stockholm Conference, 1972), which are known as the milestones in environmental agenda. Originally, literacy is a term that refers to the ability to read and write (Cambridge, 2009). In recent years it has been extended to variety of definitions such as computer literacy, science literacy, cultural literacy, and etc. Considering literacy in the context of environment, environmental literacy was defined as the capacity of taking suitable action for the stability and the development of environment (Roth, 1992) and accepted as one of the major goals of environmental education (Roth, 1992, United Nations Educational, Scientific and Cultural Organization -UNESCO-, 1980). In other words, environmentally literate person shows action towards environment by using necessary knowledge, skills, and disposition (Roth 1992).

Components of Environmental Literacy

Disinger and Roth (1992) argued that major components of environmental literacy are knowledge, skills, attitudes, personal responsibility [concern], and active involvement [responsibility]. Since that 1992 publication (as well as other works) environmental knowledge, environmental responsibility, environmental attitude, and environmental behavior have been considered central components of "environmental literacy". Thus, in line with the recent research, we targeted to investigate environmental literacy in four dimensions, which are environmental attitude, knowledge, concern, and responsibility. Within this content, environmental behavior is defined as individuals' intentions to take part in pro-environmental behaviors that are measured by use of environmental literacy questionnaire. Environmental concern is defined as individuals' sensitivity towards environmental problems. Environmental attitude is defined as individuals' feelings and values related to the environmental issues, and environmental knowledge is defined as individuals' knowledge about current environmental issues. Roth (1992) emphasized that knowledge, skills, and attitudes are important ingredients for performing necessary environmental action or behavior. Hence, environmental literacy needs an education that makes individuals knowledgeable and skilled for working collaboratively with others to state a dynamic

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equilibrium between quality of life and environment (Harvey, 1977). Therefore, formal education has important role in developing environmental literacy (Roth, 1992). Teacher's environmental literacy, on the other hand, is also important because it greatly influences what he/she teaches in environmental education (Hsu, 1997) and consequently development of students' environmental literacy. Then again, it is observed from the literature that demographic features may have relationships with environmental literacy (Tikka, Kuitunen & Tynys, 2000; Tuncer et al. 2009; Zelezny, Chua & Aldrich, 2002). Therefore, combining all, we aimed to explore preservice teachers' (PTs) environmental literacy in relation with some demographic variables. Because, demographic variables that are possibly related to environmental literacy of preservice teachers are important to improve educational policies and curricula both in school programs and teacher education programs.

Demographic Variables and Environmental Literacy

According to the related literature (Blocker & Eckberg, 1997; Bord and O'Connor, 1997; Riechard and Peterson, 1998; Zelezny, Chua, & Aldrich, 2000) there are many demographic variables that have some degree of relationship with components of environmental literacy. Of these variables, gender, academic major, and grade level were chosen to be investigated further in Turkish context because of their prevalent usage in earlier studies.

Gender

It can be concluded based on the research findings investigating the differences of environmental literacy components according to gender that, gender difference is a paradox in explaining the attitude, concern, and behavior components of environmental literacy. There are studies indicating that females are more concerned, have more positive attitudes and behavior toward environment compared to males (Hsu, 1997; Hunter, Hatch & Johnson 2004; Tuncer, Ertepinar, Tekkaya, Sungur 2005; Yilmaz, Boone, & Anderson 2004). In a recent research study, Zelenzy, Chua, and Aldrich (2000) conducted a research series on the relationship between gender and environmentalism which comprises of attitude, concern, and behavior. In their first study, the authors surveyed a sample of primary and secondary school students, in two-year period in California by using a composition of scales such as environmental attitude, responsibility, concern, and knowledge. Based on their results, Chua and Aldrich (2000) concluded that females reported stronger environmental attitude and concern than males. In the proceeding research, graduate level students (N= 2,160) were surveyed in 14 countries from Europe, Latin America and United States (Schultz, & Zelenzy, 1999). The results of the study revealed that females had more positive attitude and more concern compared to males in 10 countries out of 14. In the third attempt, Zelenzy et al., (2000) worked with 119 university students and they found that females have stronger environmental responsibility than males. They concluded, as a result, that females have positive attitudes, concern, and responsibility toward environment no matter they lived in Europe or in the US. On the contrary to females' superiority over males, some other studies revealed that males were better compared to females in terms of environmental literacy. For example, McDonald and Hara (1994) conducted a study with 233 males and 306 females and proclaimed that even though gender was a weak predictor of the environmental concern, males were more likely to express environmental concern than females. In another study Tindall, Davies, and Mauboules (2003) found that although women were more likely to engage in environmental behaviors and demonstrated high level of concern, they did not demonstrate high level of activism as males. Similar results and conclusions were derived from the results of "General Social Survey 1993" reported by Blocker and Eckberg (1997) that, women tend to show more environmental concern compared to men, but they are not environmentally more active than men.

For the Turkish context, recent studies showed similar pattern in favor of females. Results obtained from surveys with K-12 level students showed that females exhibit more positive attitudes, more concern and responsibility compared to males (Alp, Ertepinar, Tekkaya, & Yilmaz, 2006; Tuncer et al., 2005). Moreover, Tuncer et al. (2009) studied with preservice teachers and their results were in favor of females with respect to environmental attitude and concern dimensions of environmental literacy.

However, in Turkey the studies including preservice teachers as participants are limited with small number of publications.

The underlying reasons of gender difference in environmental literacy of males and females could be explained in the light of current structural and socialization based theories. To better understand the gender difference Blocker and Eckberg (1997) studied how the social status of the women and their home caring role affected their approach in environmental issues. Blocker and Eckberg (1997) concluded that women tend to have more environmental concerns than men, because of their social and structural position in society. According to the authors, however, the difference between men and women lessens when women's social status, economical power, and trust in science get higher.

Concisely, having above mentioned opposing arguments in mind and having few research related to PTs EL and gender difference in Turkey, we decided to conduct this study to investigate gender roles in environmental literacy in Turkish context.

Academic Major

Higher education is a fruitful medium for PTs to develop their environmental literacy. Major enrolled has an important role in differentiating PTs' environmental literacy. Related literature stated that PTs who enrolled environment-affiliated majors such as science, agriculture, geography, and life sciences had higher environmental literacy -knowledge, attitude, concern, and behavior- than those whose enrolled in non-environment affiliated disciplines such as social studies, history, literature, mathematics, computer science, arts, or physical education (Goldman, Yavetz, & Pe'er, 2006, 2007; Moody, Alkaff, Garrison, & Golley, 2005). Goldman et al. (2006) surveyed environmental literacy of 765 preservice teachers from different academic majors in Israel. The results indicated significant mean differences among academic major groups. It was concluded that students who enrolled in environmentally affiliated fields (environmental science, agriculture, geography, land of Israel studies, natural and life sciences) have higher environmental behavior scores than students in non-environmentally affiliated fields (social studies, history, literature, mathematics, physics, computers, arts, physical education). In the same way, Pe'er, Goldman, and Yavetz (2007) reported that, students enrolled in environment related majors have more positive environmental attitude and are more concerned about environmental issues compared to those enrolled in non-environmentally affiliated majors. Tikka, Kuiten, and Tynys (2000) investigated effect of academic backgrounds of individuals on their environmental literacy components. Sample of the study consisted of 464 students from 17 different academic majors. The results showed that individuals having biology background exhibited more positive attitudes toward environment and they had higher level of environmental knowledge than students with other academic backgrounds. However, individuals having economics and technology background exhibit negative attitudes towards environment. There are also similar studies conducted in Turkey. The results of these studies revealed consistent results with the literature in terms of the role of academic major on environmental literacy of individuals. For example Ozden (2008) studied with 850 preservice teachers and reported that the preservice teachers enrolled in elementary education (who take science and environment related courses) have more positive attitudes compared to secondary mathematics education students and social science students (who do not take similar science and environment related courses as elementary education students do). Ozden (2008) considered students academic backgrounds while interpreting the observed differences in environmental literacy. In brief, literature indicates that students in environment affiliated departments have more environmental knowledge and positive attitudes towards environment than students in non-environment affiliated departments. These studies considered environmental attitudes and knowledge more often than other aspects of the environmental literacy. Therefore, with regards to the above mentioned literature, we consider academic major as an important variable in investigating PTs' environmental literacy.

Year of enrollment

Year of enrollment is reported in many studies as one of the components of environmental literacy (Alp et al., 2006; Negev, Sagy, Garb, Salzber, & Tal, 2008). Alp et al. (2006), for example conducted a study to investigate how EL changes among 6th, 8th and 10th grade level students in Turkey. The results of the study, realized with 1977 primary school students in 22 schools, revealed that there was statistically significant effect of grade level on environmental knowledge and attitude scores of

students; that 8th graders had higher environmental knowledge scores than 6th graders, 10th grader had higher knowledge scores than 6th and 8th graders. Therefore, Alp et al. (2006) concluded that environmental knowledge increases when students pass to the upper grade levels. Negev et al. (2008), on the other hand, conducted a national survey in Israel to evaluate 6th and 12th grade students' environmental literacy. The analysis of the data collected from 1,591 6th grade and 1,530 12th grade students showed that, knowledge scores of 12th graders were significantly higher than 6th graders, whereas the authors reported no statistically significant differences for attitude and behavior components of environmental literacy. The research on the year of enrollment as a function of EL has been mainly performed with primary and high school levels, there is not much research related to relation between year of enrollment and EL of PTs. Cabuk and Karacaoglu (2003) is one of them; they studied with preservice teachers to evaluate the effect of year of enrollment on the EL and found that year of enrollment has a significant effect on environmental literacy of preservice teachers. The authors reported that, senior (4th year) students have more sensitivity towards environment compared to freshman (1st year) and students at other enrollment years.

Accordingly, this study aims to investigate the effect of selected demographic variables on preservice teachers' environmental literacy. More specifically the research questions investigated in this study were:

- Is there any significant difference between male and female PTs' environmental literacy?
- Is there any difference in environmental literacy of PTs of different academic majors?
- Is there any difference in environmental literacy of PTs in different years of enrollment?

METHOD

Sample

Target population was all preservice teachers in faculty of education at a research and teaching oriented public university located in Ankara, the capital of Turkey. The population of the study was 1466 PTs. A total of 560 PTs participated in this study. The rate of participants in our sample to the total population was 38 %. The samples of the study were recruited from preservice teachers enrolled in different academic majors at the faculty of education. The academic majors involved in our study were elementary science education (ESE), elementary mathematics education (EME), early childhood education (ECE), computer education and instructional technologies (CEIT), and foreign languages education (FLE). The sample characteristics according to gender, grade level and academic major are presented in Table 1 below.

Table 1. *The Sample*

	<i>Number</i>	<i>%</i>
Gender		
Female	377	67.3
Male	173	32.7
Grade level		
Freshman	171	31
Sophomore	129	23
Junior	130	23
Senior	129	23
Academic Major		
ESE	139	31
EME	96	17
ECE	91	16
CEIT	112	20
FLE	122	22

Instrument

Environmental Literacy Test (ELT) was designed to assess environmental literacy in four dimensions. These dimensions are knowledge, attitude, behavior, and concern. Each of these dimensions are measured by a distinct set of items: knowledge (11 items), attitudes (7 items), behavior (19 items), and concern (8 items). The instrument is composed of close-ended items which made it easy for statistical analysis. Knowledge component of questionnaire addresses respondents' knowledge about current environmental issues. The knowledge components were developed by National Environmental Educational and Training Foundation (NEEFT) and Roper. It has been used for assessment of Americans' environmental literacy for a decade (Coyle, 2005). The environmental attitude items targeted evaluating feelings and values related to environment while the environmental behavior dimension measured individuals' responsibility toward the environment and their intention to be a part of environmental behavior. Concern dimension items focused on participants' sensitivity toward environmental problems. For the environmental knowledge items, correct items were coded as 1 and incorrect items and "I do not know" item were coded as 0 for 11 items. For the other components that are Likert type scale, a point range from 1 to 5 were assigned, 1 to "strongly disagree", 2 to "disagree", 3 to "undecided", 4 to "agree", and 5 to "strongly agree. The instrument was originally developed in English and subsequently translated, adapted, and evaluated into Turkish (Tuncer et al., 2009). The Turkish version of the questionnaire was peer-reviewed by three experts in the field of science education and one expert in the field of environmental science. The internal consistency of the knowledge, attitudes, behavior, and concerns dimensions were found to be 0.88, 0.64, 0.80, 0.88, using Cronbach alpha respectively (Tuncer et al., 2009). The internal consistency of the knowledge, attitudes, behavior, and concern components in our study were found to be .42, .51, .81, and .81 by using Cronbach alpha respectively.

Data Collection and Analysis

Data collection procedure was carried out during 2008- 2009 spring semester. Collected data were analyzed by using SPSS 15.0 (Statistical Package for Social Sciences). MANOVA was performed to investigate differences of PTs' environmental literacy in terms gender, grade level, and academic major effect environmental literacy and alpha level was set to 0.05 for all analysis. Dependent variables for MANOVA were the components of the environmental literacy (knowledge, attitude, behavior, and concern) and the independent variables were gender, grade level, and academic major. Preliminary assumptions were performed to check for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices and multicollinearity. According to the results, normality assumption was not violated. Outliers were defined and deleted by checking multivariate normality. No evidence of non-linearity was observed. For multicollinearity and singularity assumption were met as suggested by Pallant (2007) for conducting MANOVA. Results of Levene's test of equality of variances were not significant for all dependent variables. This result referred that equality of variances assumption was met. In addition, Box's test was not significant $p > .001$ and Wilks' Lambda value was used for interpretation of the findings. The results of the preliminary analysis revealed that we met assumptions of for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices and multicollinearity.

Having met the assumptions, the MANOVA analysis was run to examine whether there were statistical mean differences for the independent variables; gender, grade level, and academic major with respect to dependent variables knowledge, attitude, behavior, and concern.

RESULTS

The results given in Table 2 below revealed that there were significant differences between males and females, among grade levels, and among enrolled academic majors with respect to dependent measures. These observed differences in multivariate test were investigated further in relation to each of the dependent variable. In follow up analysis, Bonferroni adjustment was used to reduce chance of Type I

error as suggested by Tabacknick and Fidel (2007). In its simplest form, Bonferroni adjustment was division of alpha level to the number of dependent variables. In this case alpha level .05 divided to four which was number of our dependent variable. Thus, significance level was reduced to .0125 from .05. Results were displayed in Table 2.

Table 2
MANOVA Results with respect to Independent Variables

<i>IV</i>	<i>Wilks' Lambda</i>	<i>F</i>	<i>df</i>	<i>p</i>	<i>Eta squared</i>
Gender	.934	8.810	4	.000	.066
Grade level	.929	3.121	12	.000	.024
Academic Major	.932	2.232	16	.003	.017

Table 3
Follow-Up Pairwise Comparisons

	Dependent Variables	<i>df</i>	<i>F</i>	<i>p</i>	Eta Squared
Gender	Knowledge	1	9.41	.002*	.018
	Attitude	1	4.79	.029	.009
	Behavior	1	14.37	.000*	.028
	Concern	1	10.78	.001*	.021
Year of Enrollment	Knowledge	3	7.11	.000*	.041
	Attitude	3	1.04	.371	.006
	Behavior	3	2.60	.051	.015
	Concern	3	3.23	.022	.019
Academic majors	Knowledge	4	2.87	.023	.022
	Attitude	4	1.85	.117	.015
	Behavior	4	3.82	.005*	.029
	Concern	4	1.26	.282	.010

As the results of the follow up analysis display (Table 3), *gender* is the only independent variable that causes significant differences in the 3 dependent variables; environmental knowledge, environmental concern and environmental behavior. And *year of enrollment* is the other independent variable, which causes significant differences in environmental knowledge together with *gender*. *Academic major*, on the other hand is the only independent variable which causes significant differences in environmental behavior together with *gender*. Lastly and interestingly, environmental attitude is the only dependent variable which does not change with any of the independent variables of this research (Table 3).

After finding the above mentioned results related to relationships among independent variables (*gender*, *year of enrollment*, *academic majors*) and the components of EL (*knowledge*, *attitude*, *behavior*, *concern*), post hoc analyses were performed to find how those independent variables resulted in differences on the EL components. At this step, each pairwise comparison was tested by using Bonferroni adjustment at the .050 divided by 4 or .0125. It was found, as a result of pairwise comparisons, that female PTs had significantly positive environmental behavior and higher concern than male PTs. However, male PTs seemed of having more knowledgeable, as far as environmental issues are concerned, compared to female PTs. Furthermore, knowledge scores of senior PTs were significantly higher than freshman and sophomore PTs. When academic major of PTs was considered, on the other hand, PTs enrolled in FLE had seemed to have significantly more positive environmental behavior compared to PTs

enrolled in EME and those enrolled in ECE department had significantly more positive environmental behavior than those enrolled in EME department (Table 4).

Table 4
Multiple Comparisons for Behavior, Attitude, Concern, and Knowledge Components of Environmental Literacy

IVs	Behavior		Attitude		Concern		Knowledge	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Male	3.997	.032	3.331	.035	3.665	.067	.584	.013
Female	4.141	.020	3.435	.022	3.931	.043	.536	.009
Freshman	4.003	.039	3.349	.044	3.653	.084	.531	.017
Sophomore	4.039	.033	3.444	.037	3.755	.071	.529	.014
Junior	4.126	.038	3.388	.042	3.861	.080	.550	.016
Senior	4.120	.036	3.368	.040	3.952	.076	.622	.015
ESE	4.117	.035	3.438	.038	3.863	.074	.576	.015
EME	3.961	.038	3.298	.042	3.875	.081	.512	.016
ECE	4.054	.058	3.415	.064	3.638	.123	.581	.024
CEIT	4.068	.037	3.358	.041	3.859	.079	.571	.016
FLE	4.153	.041	3.427	.046	3.749	.088	.560	.017

As a result of all, the relationships among environmental literacy of the preservice teachers of this study and the selected demographic variables are summarized in Figure 1. As presented in the figure, among the four demographic variables gender is the one that creates differences in most of the components of EL. Environmental knowledge, environmental concern, and environmental behaviour of preservice teachers are significantly different by gender. Environmental knowledge and environmental behaviour of preservice teachers are also significantly different by years of enrollment and academic major respectively. Environmental attitude, on the other hand, is the only component of EL which does not result in any differences by demographic variables selected for this research.

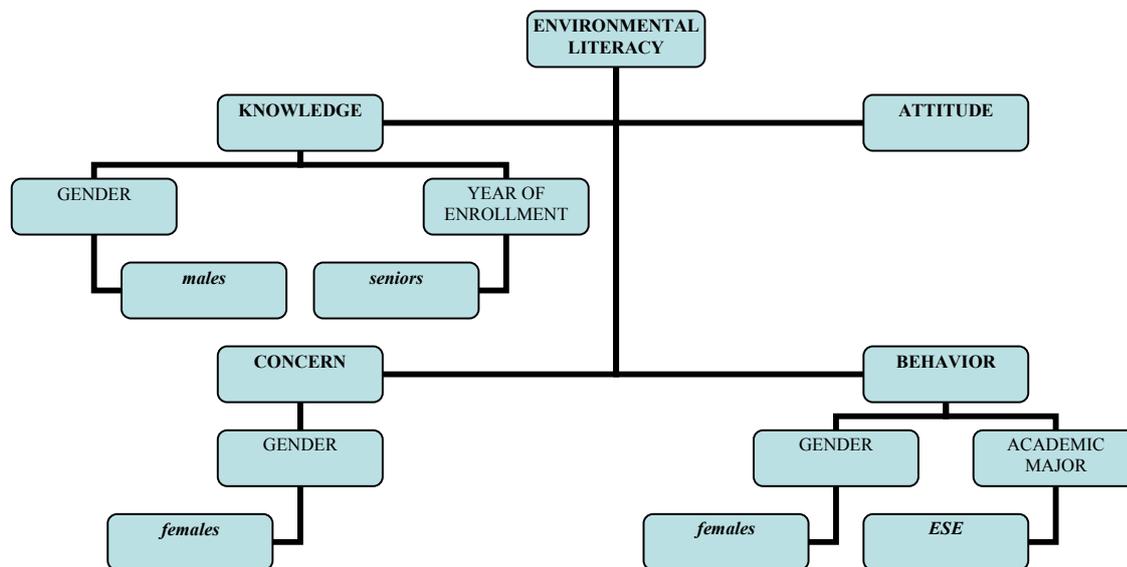


Figure 1. The relationships among the components of EL and demographic variables.

DISCUSSION

Gender is found as one of the major demographic variables creating differences on the behavior and concern components of EL (Figure 1). More specifically, female pre service teachers of this study display more positive environmental behavior and more concern compared to males. This result is consistent with previous studies conducted in both Turkey and in other countries (Hsu, 1997; Hunter et al. 2004; Tuncer et al., 2005; Yilmaz et al., 2004; Zelenzy et al., 2000). Females being more concerned and behaving positively toward environment, on the other hand, can be explained by the sex roles of individuals in their daily life as stated by Blocker and Eckberg (1997). Also Tikka et al. (2000) stated that females have positive environmental attitude and feel more responsible towards environment, because, they have a traditional responsibility for looking after their children and home and therefore, caring for the environment may be perceived as a natural feature inherent in women. Indeed, as reported by Tuncer et al. (2009), there are two theories parallel to this explanation in the literature; socialization-based theories and structural theories. Socialization-based theory sets that females are more likely than males to associate themselves with ‘caregiver’ roles and this leads women to be more in tune with their locality and the world at large and, consequently, to turn their compassion toward the ecological environment. Therefore, women’s close affinity with nature is viewed as a result of socialization due to cultural and social-structural forces rather than resulting from biological differences. Structural theories suggest that it is the gendered segmentation of the economy and workplace that frames the perspective of women and men toward the environment. Although women may be knowledgeable and accepting of the aims of economic growth, they are more prone, than men, to question the consequences of such growth. The reasoning behind this argument lies in the combination of women’s role as caregivers for children and their role in the household, where they do most of the housework, in addition to working in the paid labour force. This role is in direct contrast to men’s historical “bread winner” role (Weaver, 2002: 83). The findings of the current study can be explained by considering the propositions of both theories. From the point of view of the socialization-based theory, gender difference in environmental behaviour and concern in favour of females can be attributed to the different socialization of males and females: females are socialized to be more altruistic, cooperative, nurturing, and interdependent while males are socialized to be more independent and competitive (Zelezny et al., 2000). Thus, females who are expected to be responsible for looking after their home and children tend to demonstrate more positive behaviour. Moreover, as is the case in other parts of the world, in Turkey, environmental topics in general are considered as appropriate areas for female interest. Therefore, considering the theories and explanations posited (deposed) in literature, the finding that female preservice teachers have more favourable behaviour and concern toward the environment than males is an expected outcome. We have also found that, male PTs had significantly better knowledge scores than female PTs. A similar situation, knowledge difference in gender, was defined as a “gap” in NEETF and Roper (Coyle, 2005) report. It is reported in this study that, although males and females have the same level of education, males reported higher level of environmental knowledge. Moreover, this study also mentioned that knowledge gap is true for all age groups and begin to form in early years. It was stated that, in educational perspective, higher knowledge levels of males may be due to their knowledge and involvement in science and technology. A meta analysis conducted by Weinburg (1995) emphasized males’ interest in science more than females. Thus, higher knowledge scores for male PTs found in our study can be based on the male students’ interest in science. As a result, the results of the current study suggested that gender should be seen as a significant predictor of environmental literacy. Moreover, differences in gender orientation toward environmental literacy should be considered among stakeholders in education and members of the society.

One other demographic variable investigated in this study was grade level. Significant differences were found among the grade levels corresponding to environmental knowledge components of EL. It was observed that environmental knowledge developed more when the participants’ year of enrollment increased. In that, senior PTs’ knowledge scores were found to be significantly higher than freshman and sophomore PTs. Similar findings were also reported by earlier studies (Alp et al., 2006; Negev et al., 2008). In Turkish context Alp et al. (2006) reported that grade level has significant effect on

environmental knowledge of individuals for high school students. According to this study, the students in higher grade levels had higher environmental knowledge scores when their scores were compared with those students in lower grade levels. Alp et al. (2006) related higher scores of higher graders with their experiences with nature that makes understanding of basic environmental issues easier. Moreover, Cabuk and Karacaoglu (2003) obtained consistent results for preservice teachers in Turkish context. Therefore, in light of the results of the current study and the related literature, one can conclude that PTs experiences with nature and their higher education might develop their environmental knowledge.

Finally, MANOVA analysis revealed that the PTs enrolled in FLE and ECE departments had significantly higher environmental behaviors when compared with EME students. When mean scores were examined for each department, it was observed that EME and CEIT groups obtained the lowest scores for environmental behavior. Ozden's (2008) study also revealed consistent results with our findings. Ozden (2008) found that PTs enrolled in mathematics department reported less favorable environmental behavior than other groups. Goldman et al. (2006) also reported similar results for their study conducted in Israel. They stated that environment affiliated academic majors have higher behavior scores than non-environment affiliated ones such as mathematics education department. Tikka et al. (2006) also found that biology and forestry majors' students reported higher level of environmental activity when compared with technical majors such as engineering and economics. When we consider the previous research results regarding academic majors we can see the parallel results for EME students. We also consider EME program as non-environment affiliated program and more technical and domain specific when compared with other departments included in our study. However, as being non-environment affiliated program FLE and ECE students' high environmentalist behaviors might result from their interest in daily life issues than students in mathematics department. In addition to this, high number of female students in FLE and ECE departments might also lead to having higher behavior scores.

CONCLUSIONS

Differences in gender, academic major and year of enrollment of preservice teachers' environmental literacy were explored in this study. Findings of the study indicated that gender, year of enrollment, and academic major had significant differences on components of environmental literacy. As a demographic variable, gender appeared to create more differences in environmental behavior, concern, and knowledge of PTs. Thus, being aware of gender differences on environmental literacy of PTs may help us develop better curriculum to decrease gender differences. Environmental literacy should be merged into curriculum in a way that every individual can participate to the protection of environment with an equal responsibility. Thus, despite any gender differences environmental literacy should be perceived as a kind of national and universal responsibility.

Besides gender, it was observed that environmental knowledge increases with year of enrolment. Despite this increase in knowledge, no significant increase in environmental behavior was observed. This finding suggests that we need to focus more on how PTs interpret and reason environmental knowledge.

Furthermore, differences among departments need to be paid attention. All teachers without departmental difference are responsible in solution of environmental problems. Existing environmental problems endeavors go beyond accepting environmental issues as a domain specific subject matter. Environmental literacy should be brought to all members of the society without major selection, gender and grade level. Every member of society is responsible for being aware of environmental behaviors. Thus, PTs, teachers of the future, have additional importance in developing environmental attitude, concern, and positive behavior of their students through their formal education. As a developing country Turkey needs to pay more attention to environmental education. Every year millions of students graduate from schools while millions of them just enter. In such a society, teachers have amplifying effect on maintaining environmental literacy skills of students. This role of teacher is the key element of succeeding in creating national and global environmental literacy in public. Moreover, in Turkey, university students give more importance to technological developments than environmental problems

(Berberoglu & Tosunoglu, 1995). This priority given to the development of technology should not pass in front of the protection of environment. This failure was observed in many developed countries in which environmental problems could not be changed back into former conditions. Organisation for Economic Co-operation and Development (OECD) simulation report (2008) indicated that if developing countries, like Turkey, do not consider importance of environmental problems against development of country, they will face irreversible damage in environment in twenty years. By considering the demographic characteristics of the future teachers this study findings may contribute to the ways how we can build an environmentally literate country and for a global literacy.

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Demografik Değişkenler ile Çevre Okuryazarlığının Araştırılması

Öz. Bu çalışmanın amacı seçilmiş demografik değişkenlerin aday öğretmenlerin çevre okuryazarlığına etkisinin araştırılmasıdır. Türkiye koşulları ve önceki çalışmaların sonuçları göz önüne alınarak, çevre okuryazarlığı bileşenlerini etkileyen demografik değişkenler arasından cinsiyet, sınıf (yıl) ve akademik alan bu çalışmanın değişkenleri olarak seçilmiştir. Çevre okuryazarlığının belirlenmesi amacı ile Çevre Okuryazarlığı Testi kullanılmış ve aday öğretmenlerin çevre okuryazarlığı ile cinsiyet, sınıf ve akademik alan değişkenleri arasında farkların belirlenmesi için MANOVA kullanılmıştır. Çalışmanın bulguları cinsiyet, sınıf (yıl) ve akademik alan değişkenlerinin çevre okuryazarlığını etkileyen değişkenler olduğunu göstermiştir.

Amaç ve Önem: Bu çalışmanın amacı, aday öğretmenlerinin çevre okuryazarlığının demografik değişkenlerle etkileşimini incelemektir. Çevre okuryazarlığı ile çeşitli seviyelerde ilişkili olduğu bilinen birçok değişken olmasına rağmen, bu çalışmada Türkiye ile ilgili çalışmalara katkıda bulunmak amacı ile seçilen demografik değişkenler cinsiyet, akademik alan ve yıl (sınıf) olarak belirlenmiştir.

Yöntem: Çalışmanın örneklemini farklı dallarda eğitim gören 560 aday öğretmen oluşturmaktadır. Çevre okuryazarlığı Çevre Okuryazarlığı Testi uygulaması ile belirlenmiş ve aday öğretmenlerin çevre okuryazarlığı ile demografik değişkenler arasındaki ilişki MANOVA ile analiz edilmiştir.

Bulgular: Çalışmanın bulgularına göre kız ve erkek öğrencilerin çevre okuryazarlığının davranış, ilgi, ve bilgi boyutlarında anlamlı farklılıklar bulunmaktadır. Fakat çevre okuryazarlığının tutum boyutu ile ilgili olarak kız ve erkek öğrenciler arasında anlamlı bir fark gözlenmemiştir. Farklı sınıflardaki öğrencilerin çevre okuryazarlığı incelediğinde sadece çevre bilgisi açısından anlamlı farklılık bulunmuş, çevre okuryazarlığının davranış, ilgi ve tutum boyutlarında farklılık gözlenmemiştir. Akademik alan açısından incelendiğinde çevre okuryazarlığının sadece davranış boyutunda anlamlı bir farklılık elde edilmiştir. Öte yandan, cinsiyet, akademik alan ve yıl ile çevre okuryazarlığı bileşenleri arasında istatistiksel olarak anlamlı farklılıklar bulunmuştur. Buna göre cinsiyet, çevre bilgisi, endişe ve davranış başlıklı bağımlı değişkenlerin tümünde anlamlı farklılıklar gösteren tek bağımsız değişkendir. Ek olarak yıl (sınıf), çevre bilgisi bileşeninde, cinsiyet ile birlikte, anlamlı farka yol açan diğer bağımsız değişkendir. Öte yandan, akademik alan, cinsiyet ile birlikte, çevresel davranış boyutunda anlamlı farka yol açan bağımsız değişkendir. Çevresel tutum ise, hiçbir bağımsız değişken ile anlamlı fark göstermeyen tek bağımlı değişkendir (Tablo 3).

Tartışma, Sonuç, ve Öneriler: Çevre okuryazarlığı ile ilişkili olduğu düşünülerek seçilen demografik değişkenlerden cinsiyet en fazla farklılık gösteren değişken olarak bulunmuştur. Bu değişkeni akademik yıl ve alan izlemiştir. Çevre okuryazarlığının tutum boyutunda ise hiçbir demografik değişken açısından farklılık bulunmamıştır.

Cinsiyet açısından bakıldığında bizim çalışmada gözlenen kız öğrencilerin çevre olaylarına yönelik davranış ve ilgi boyutunda erkeklere nazaran daha fazla olumlu yönde görüş bildirmeleri daha önce yapılan çalışmaların bulguları ile benzerlik göstermektedir (Hsu, 1997; Hunter ve diğerleri., 2004; Tuncer ve diğerleri., 2005; Yılmaz ve diğerleri., 2004; Zeleny ve diğerleri., 2000). Kız öğrencilerin bu yöndeki olumlu yaklaşımları günlük yaşamda kızlara yüklenen günlük yaşamdaki sorumlulukların neden olabileceği düşünülmektedir (Blocker ve Eckberg, 1997). Aynı şekilde Tikka ve diğerleri (2000) tarafından da kızların günlük yaşamda daha çok çocuk ve ev ile ilgilenmelerinin onlarda doğal olarak bir koruma içgüdüsünün oluşmasına ve bununda çevresel olaylarda daha olumlu bir tutum sergilemesine neden olduğu tartışılmıştır.

Sınıf seviyesi açısından bakıldığında çevre bilgisinin sınıf düzeyi arttıkça artması beklenen bir bulgudur. Bu sonuç öğrencilerin üniversitede aldıkları dersler ve diğer faaliyetler sayesinde çevre bilgililerini yılar geçtikçe arttırdıklarını göstermektedir. Bu bulguda daha önce yapılan bazı çalışmaların bulgularını desteklemektedir (Alp ve diğerleri., 2006; Negev ve diğerleri., 2008).

Akademik alan açısından veriler incelendiğinde İngilizce ve okulöncesi öğretmenliği bölümü öğretmen adaylarının matematik öğretmenliği bölümü öğretmen adaylarından daha fazla çevre olaylarına yönelik olumlu davranış sergilemektedirler. İngilizce ve okulöncesi bölümlerinin daha sosyal bilim alanlarına ağırlık vermesi bu bölümlerde okuyan öğretmen adaylarının daha teknik konuları içeren matematik bölümü gibi bölümlerinin öğretmen adaylarından daha olumlu çevre okuryazarlığı sergilemesinin nedeni olabileceğini düşünmekteyiz. Nitekim Tikka ve diğerleri (2006) yaptıkları çalışmada mühendislik ve ekonomi gibi teknik alanlardaki öğrencilerin biyoloji ve orman bilimleri alanlarında okuyan öğrencilerden daha düşük çevresel aktiviteleri olduğunu bulmuşlardır.