

Full Length Research Paper

Examining the behavior and thinking levels of secondary school students (6th-8th GRADES) towards the environment according to gender

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The aim of this study is to examine the behavior and thinking levels of secondary school students towards the environment according to grade and gender. Relational screening model was used for the study. The sample includes a total of 958 (512 females and 446 males) secondary school students. Of the participants, 261 (27.2%) are in 6th grade, 461 (48.1%) are in 7th grade, and 236 (24.6%) are in 8th grade. The sample was chosen randomly. As a data collection tool, Environmental Attitude Scale developed by Uzun and Sağlam was used. Using ANOVA, the study shows that there is a statistically significant difference between the levels of environmental behavior in terms of grade (F (2-952), $p < .01$). In order to determine the source of the difference, post-hoc least significant difference (LSD) test was implemented, and the findings indicated that there is a significant difference between 6th and 7th grades and 6th and 8th grades. There is also a statistically significant difference between the environmental behavior levels of students according to their gender (F (1-952), $p < .01$). There is no statistically significant difference according to their gender and grades (F (2-952), $p > .05$). However, a significant difference was found between the levels of environmental thinking of secondary school students according to gender (F (1-952), $p < .01$). The level of environmental thinking of male students ($X = 33.94$) is higher than that of females ($X = 31.39$).

Key words: Environmental behavior, environmental thinking, secondary school, gender differences.

INTRODUCTION

With the rapid increase in population and in turn the needs of people in the 21st century, many problems have occurred such as fast and unconscious air and water consumption, contamination and irregular urbanization. As natural balance gets ruined, significant environmental problems arise also. This situation makes the members

of political and scientific societies to think about the reasons. Environment education is considered herein (Akinoğlu and Sarı, 2009). Environment education became a current issue for the education system in the 70s when the search for a solution to environmental problems was very common. Recognizing that environmental corruption

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rooted in the interaction between humans and the environment can be healed by humans themselves, environmental education is considered as the main way to provide cognitive, emotional and behavioral changes (Özdemir, 2007). Environment education should be constructed to affect positively individuals' values and behaviors and to make them consider the natural environment. The main purpose is to develop environmental awareness and sensibility to protect and use the environment (Başal, 2003: 366).

Environment education has three domains: cognitive, affective and behavioral. The cognitive aspect includes developing individuals' literacy in ecological culture and environment, while the affective includes constructing values, behaviors, and attitudes towards the environment and environmental problems (Doğan, 1997; Hsu, 2004). Behavioral aspect comprises training individuals who try to take responsibilities for solving environmental problems and perform these responsibilities (Değirmenci, 2012). The main purpose of environmental educators is to develop environmental literacy and change people's behaviors towards the environment by training responsible citizens in the environment (Knapp, 2000). Environmental literacy is to comprehend the relationship of people and societies with their environment in a deeper way (Orr, 1990). Individuals who have environmental literacy are aware of the effects of activities about science, technology, culture, and agriculture on natural systems, and make effective decisions to provide the sustainability of the environment. Individuals who have the attitudes, values, and skills that can transform their knowledge on the environment to behavior are called literates in the environment (Goldman et al., 2006). There are two important concepts for environment literacy: Attitude towards environment and behavior towards the environment. Attitude towards environment refers to all positive and negative manner and thoughts about people's helpful behaviors to the environment such as fears, anger, anxiety because of environmental problems; values and readiness for problems' solutions. Behavior includes active and planned participation which aims to solve problems. The categories of environmental behavior are persuasion, consumers' behavior, physically protection behavior, political and legal behaviors (Volk and Mcbeth, 2001). Recently, the instructional curriculum of developed countries has the common aim to train individuals who have information, skills, and attitudes on the importance of science and technology for the environment by constructing scientific literacy (Aydın, 2006). The required skills which shape the societies of the future gather under the concept of scientific literacy. Considering the importance of physical sciences for the development of science and technology, science education is also gaining importance in education (Demirci, 1993).

Apart from environmental education, personal variables such as gender and age might have an effect on the attitudes toward the environment. For instance, Teksöz et

al. (2010) found a significant difference in the attitudes towards the environment, interest in the environment and using the environment in terms of females; and in knowledge in the environment in terms of male pre-service teachers.

The aim of this study is to examine the behavior and thinking levels of secondary school students towards environment according to grade and gender. The research questions are as follows:

- 1). Is there a significant difference in the environmental behavior levels of secondary school students towards environment according to their gender?
- 2). Is there a significant difference in the environmental behavior levels of secondary school students towards environment according to their grades?
- 3). Is there a significant difference in the environmental behavior levels of secondary school students towards environment according to their gender and grades?
- 4). Is there a significant difference in the environmental thinking levels of secondary school students towards environment according to their gender?
- 5). Is there a significant difference in the environmental thinking levels of secondary school students towards environment according to their grades?
- 6). Is there a significant difference in the environmental thinking levels of secondary school students towards environment according to their gender and grades?

METHODOLOGY

Relational screening model was used for the study. Karasar (2012) defined relational screening model as research which aims to determine the degree of covariance of two or more than two variables.

The universe of the study is the 6th, 7th and 8th grades of secondary school students attending public and private schools in Pamukkale District in Denizli. A total of 3000 students attending 45 state and private secondary schools in Pamukkale District consist of the universe. The sample includes a total of 958 (512 females and 446 males) secondary school students. Of the participants, 261 (27.2%) are in 6th grade, 461 (48.1%) are in the 7th grade, and 236 (24.6%) are in 8th grade. The sample was chosen randomly.

As a data collection tool, Environmental Attitude Scale developed by Uzun and Sağlam (2006) was used. The scale comprises 27 items and two sub-dimensions named Environmental Behavior Sub-Dimension and Environmental Thinking Sub-Dimension. The scores got from 13-item Environmental Behavior Sub-Dimension are between 13 and 65, while from 14-item Environmental Thinking Sub-Dimension is between 14 and 70. The higher the score from the dimensions, the higher is the level of environmental behavior and thinking. The reliability coefficient of Environmental Attitude Scale is 0.80 and 0.76 (Spearman-Brown two-half test correlation). As for the Environmental Behavior Sub-Dimension, the reliability coefficient is calculated as 0.88 and 0.81 (two-half test correlation), and for the Environmental Thinking Sub-Dimension, it is 0.80 and 0.75 (two-half test correlation). The inter-reliability coefficient of the scale is .815 for the current study. The scale was fulfilled by each student individually for the study. To analyze the data, two factors ANOVA and Post Hoc Least Significant Difference (LSD) test were used.

Table 1. Descriptive statistics of environmental behavior levels according to gender and grade.

Grade	Female			Male			Total		
	N	X	Sd	N	X	Sd	N	X	Sd
6 th grade	137	42.69	9.57	124	40.94	11.36	261	41.86	10.47
7 th grade	245	39.11	10.23	216	36.70	10.56	461	37.98	10.45
8 th grade	130	38.50	9.53	106	34.32	10.51	236	36.62	10.18
Total	512	39.91	10.01	446	37.31	11.03	958	38.70	10.57

Table 2. ANOVA results for environmental behavior levels according to gender and grade.

Source	Sum of Squares	df	Mean of Squares	F	p
Grade	4035.856	2	2017.928	18.965	0.000*
Gender	1688.071	1	1688.071	15.865	0.000*
SXC	195.822	2	97.911	0.920	0.399
Error	101297.160	952	106.405		
Total	1542252.0000	958			

*p<0.01.

FINDINGS

According to the findings of ANOVA, there is a statistically significant difference between the levels of environmental behavior in terms of grade ($F(2,952)$, $p<0.01$) (Tables 1, 2 and 3). In order to determine the source of the difference, Post Hoc LSD test was implemented, and the findings indicated that there is a significant difference between 6th and 7th grade and 6th and 8th grades. The level of environmental behavior of 6th-grade students ($X=41.86$) is higher than that of 7th ($X=37.98$) and 8th grades ($X=36.62$).

There is also a statistically significant difference between the environmental behavior levels of students according to their gender ($F(1,952)$, $p<0.01$). The environmental behavior levels of female students ($X=39.91$) is higher than of the males ($X=37.31$). There is no statistically significant difference between according to their gender and grades ($F(2,952)$, $p>0.05$) (Tables 4 and 5). However, a significant difference was found between the levels of environmental thinking of secondary school students according to gender ($F(1,952)$, $p<0.01$). The level of environmental thinking of male students ($X=33.94$) is higher than of females ($X=31.39$).

DISCUSSION

Results show a significant difference between the levels of environmental behavior of the students in terms of their grades. According to this, 6th-grade students have a higher level of environmental behavior than the others (Table 3). In Aydın and Çepni (2012)'s study, a significant difference was found between 6th and 8th grade students

in favour of 6th grade and between 7th and 8th grade students in favour of 7th grade students. These findings might be evaluated as a decrease in the levels of attitudes and behaviors towards environments as the grade level increases. This might be because of the busy schedule of the students for the high school entrance exams. Esen (2011) also found significant difference in environment knowledge in terms of grades. This difference is rooted in 5th and 8th grades. In another study, Sarıgöz (2013) concluded that 9th-grade students have more positive behaviors than the students at 10th and 11th grades while 11th-grade students have a more sensitive approach for the environment than the students at 10th grade have. Sarıgöz (2013) commented that at 9th grade, students attend environment class and this may cause more sensitive behavior for the environment. However, as the grade level increases, the effect of this course might decrease and the level of sensitivity to the environment might decrease as well. According to grade, there is no significant difference between the levels of environmental thinking. Consistent with the current study, Aydın and Kara (2011) also found no statistical difference between high school students' sensitiveness to the environment according to their grades. In Esen (2011)'s study, there found no significant difference between the students' attitudes towards environment according to grades. In a study conducted with college students (Şahin et al., 2016) on the effect of grade level on pre-service teachers' knowledge, usage and attitude to the environment and their interest in environmental problems, results showed that 1st and 4th-grade students in Primary Education and Science Education Departments differentiate according to their knowledge, usage, and attitude to the environment and their interest in environmental

Table 3. LSD results for the difference between groups according to grade.

(I) Grade	(J) Grade	Mean difference (I-J)	Sig.
6 th grade	7 th grade	3.8773*	0.000*
	8 th grade	5.2392	0.000*
7 th grade	6 th grade	-3.8773*	0.000*
	8 th grade	1.3619	0.099
8 th grade	6 th grade	-5.2392*	0.000*
	7 th grade	-1.3619	0.099

*p<0.01.

Table 4. Descriptive statistics of environmental thinking levels according to gender and grade.

Grade	Female			Male			Total		
	N	X	Sd	N	X	S	N	X	Sd
6 th grade	137	31.43	5.88	124	33.48	8.96	261	32.40	7.55
7 th grade	245	31.85	7.53	216	34.41	9.13	461	33.05	8.40
8 th grade	130	30.50	5.17	106	33.54	9.17	236	31.86	7.39
Total	512	31.39	6.58	446	33.94	9.08	958	32.58	7.94

problems. This might be because as the grade level increases, courses on the environment may contribute to the scores of pre-service teachers' knowledge, usage, and attitude to the environment and their interest in environmental problems.

The level of female students' environmental behavior is found to be higher than that of males, while the level of male students' environmental thinking is found to be higher than that of females (Table 5). There is a significant difference between environmental behavior and thinking levels. There are some studies that have parallel results as the current study. For instance, Uzun (2007) indicated that there is a significant difference between the environmental thinking of high school students according to their gender, but there is no for environmental behavior. Kaya et al. (2009) revealed a significant difference in environmental behaviors of high school students according to gender, not in their environmental thinking. In a study conducted with 6-8th grades by Benli et al. (2015), female students have a higher level of attitudes than the males have. In a similar way, Sarigöz (2013) found that girls think more sensitively about the environment than the boys in a study conducted with 921 secondary school students. In some research, it is indicated that the reason for the sensitivity of the girls may be rooted in their higher level of anxiety about the environment than the boys (Deniş and Genç, 2007; Spellman et al., 2003). In another study, Aydın and Çepni (2012) stated that environmental attitude scores of male students are higher than those of

females. In their study with college students, Sarsour et al. (2015) indicated that females get higher scores of environmental awareness than males. In contrast, Kayhaoğlu and Kırıktaş (2015) found no significant difference between environmental behaviors and thinking of high school students according to gender. Esen (2011) found no significant difference in environment information according to gender in his study with 106 primary school students. In another study (Akillı and Genç, 2015) conducted with 713 secondary school students, environmental literacy was found to have no significant difference in terms of gender.

Along with the limitations of the current study, there can be some implications for future studies. In the current study, the behavior and thinking levels of students for the environments were determined via their self-reports. Research might be conducted with more crowded samples including teachers, parents, and peers. Students' environmental behaviors and thinking might be examined with the variables of academic achievement, free-time activities, and parents' attitudes towards the environment. Examining the behavior and thinking level according to various variables have great significance in terms of outlining the determinations of environmental attitudes in adolescence. In this way, educational programs might be developed in order to create positive behaviors and attitudes for the environment in little children and adolescents. The number and variety of activities such as tours, making projects might be increased. In social activities and clubs conducted in secondary schools, some

Table 5. ANOVA results for environmental thinking levels according to gender and grade.

Source	Sum of squares	df	Mean of squares	F	p
Grade	208.435	2	104.218	1.691	0.185
Gender	1422.364	1	1422.364	23.080	0.000*
SXC	30.467	2	15.234	0.247	0.781
Error	58669.652	952	61.628		
Total	1077691.000	958			

*p<0.01.

implementations for environment education might take place. Schools with specific themes such as ecologic school might be found. More research is needed for gender differences in environmental attitudes. Under which conditions gender differences take place should be determined. Seminars and educational programs on the environment should be organized for families. In secondary schools, projects about environment education should be made including families. The number of data collection tools about the issue can be increased through studies among Turkey sample. Secondary school students' attitudes towards environments and the determinants of these attitudes can be searched in different countries and Turkey with intercultural studies. Laçin-Şimşek (2011) stated that respect and values for the environment are neglected in primary school science and technology course books. In our time to discriminate human problem and environment problem is difficult; beyond doubt it is extremely important to identify an individual value for the protection of the environment, and to develop an environment and values education based on this. Moreover, longitudinal studies might be conducted in order to observe the effects of the curriculum. With longitudinal studies, it is possible to examine the effect of secondary school education on environmental attitudes in adulthood. Furthermore, learning settings, in which students can show their interest, attitudes, and behaviors towards the environment can be constructed; and studies examining the reasons for difference between various school types should be conducted.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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