Educational Sciences: Theory & Practice • 14(4) • 1570-1582

www.edam.com.tr/estp
DOI: 10.12738/estp.2014.4.1706

Elementary School Students' Perceptions of the Future Environment through Artwork

Sibel ÖZSOY[a]
Aksaray University

Berat AHİ[b]
Kastamonu University

Abstract

The purpose of the present study is to investigate first level of elementary school students' perceptions of the future state of the environment through the pictures they draw. The participants of the study are 131 first-grade students, 127 second-grade students, 160 third-grade students, 188 fourth-grade students, and 222 fifth-grade students, totaling 828 students. The study used the survey method, one of the descriptive research methods, to collect data. More specifically, the draw-and-explain technique, in which participants were asked to draw a picture about the environment and then explain their drawings, was used to collect data. In the analysis of the data, both qualitative and quantitative data analysis methods were employed. When the data were analyzed, it was found that 28.5% of the students held perceptions of a clean future environment, that 40.3% held perceptions of a polluted future environment, and 31.2% held perceptions of technological future environment. While a significant difference based on the region of residence and grade level was found in students' perceptions of the future state of the environment, gender did not yield a significant difference. The elementary school students' drawings mostly include elements such as trees, the sun, clouds, humans, birds, butterflies, houses, apartment buildings, mountains, seas, rivers, garbage, and dust bins. When the students' drawings were analyzed, it was found that the students mostly include environmental problems that they were more likely to see in their close environments, such as air pollution, soil pollution, over construction, and traffic. It was also found that students had a limited awareness of the types of pollution and of living and non-living organisms in the environment.

Keywords

Elementary School Students, Environmental Pictures, Perceptions of Environment, Students' Perceptions of Environment in Future.

While the harm caused to nature by humans was limited until the 1800s, with the onset of the industrialization movement and industrial revolution coupled with mistakes committed by both an excessive use and misuse of scientific and technological advancements in daily life, the nature's balance nature has been disrupted. Hence, man has become an obvious threat to nature. Increasing life-expectancy, the previously unseen rapid growth in world population, an ever increasing variety of daily activities, and the growing use of fossil fuels for heating have increased the overall world consumption of fossil fuels. An increase in the amount of toxic gases, including chlorine and

a Sibel ÖZSOY, Ph.D., is currently an associate professor of elementary school science education. Contact: Aksaray University, Faculty of Education, Department of Elementary Education, Campus 68100 Aksaray, Turkey. Email: sozsoy@aksaray.edu.tr

b **Berat AHİ** is currently a research assistant of pre-school teacher education. His research interests include education for sustainable development, education for sustainable development in early childhood education and environmental attitudes. *Correspondence:* Kastamonu University, Faculty of Education, Department of Elementary Education, 37100 Kastamonu, Turkey. Email: bahi@kastamonu.edu.tr

bromine, emitted by industrial activities has led to the thinning of the ozone layer and accordingly, to the deterioration of the balance in nature (McWhirter, Collins, Bryant, Wetton, & Bishop, 2000). Desertification occurs as a result of global warming and acid rains are created by increasing emissions of carbon dioxide (Joireman, Truelove, & Duell, 2010). This poses serious threats not only to human health, but also to agricultural activities (Shepardson, Niyogi, Choi, & Charusombat, 2009). In addition to these environmental problems, an increasing amount of solid waste coupled with problems experienced in their management, the disappearance of plant and animal species (Meydan & Doğu, 2008), energy pollution stemming from the use of fossil fuels (Kruger & Summers, 2000), and radioactive pollution (Erol & Gezer, 2006) are among the prominent environmental problems of today's world.

The most important characteristic of environmental problems is their not being local, but universal (Erten, 2005). Any environmental problem occurring in any part of the world affects the entire world, not to mention all of humanity. Efforts for long term solutions require collaborative research and multidisciplinary perspective (Moslemi et al., 2009). Increasing environmental problems, the rapid depletion of natural resources, and the deterioration of living spaces have forced all nations to cooperate in finding feasible solutions (Cross, 1998). Economically and socially powerful countries have begun to invest efforts to minimize environmental problems and coordinate international efforts to protect natural resources and strengthen environmental economics (Sachiyo, Wongchantra, & Salee, 2011). After a UN conference was held in Stockholm, environmental problems have become to be discussed on a broader platform. In line with the decisions made during the Stockholm Conference, a workshop was organized on environmental problems and their importance in which the importance of environmental education in solving environmental problems was emphasized (UNESCO, 1975). At the end of this workshop, the goal of environmental education was stated as;

> "… to develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solutions of current problems and the prevention of the new ones." (UNESCO, 1975, p. 15).

In 1977, the Tiflis Declaration was issued at the end of the Tiflis International Environmental Education Conference whereby the objectives of environmental education were subsumed under five categories; being, awareness, knowledge, attitude, skill, and participation (UNESCO, 1977). In 1982, for the first time, the term 'sustainable development' appeared in the *Brundtland Report* issued by the Environment and Development Commission of United Nations, entailing the integration of economic life and the environment. In 1992, the term 'education for sustainable development' was coined in the *Rio Conference*. As a result of all these discussions, sustainable development may now be described as the management of natural resources through better approaches and seeking solutions to various environmental problems stemming from the adverse effects of globalization (Tuncer, Sungur, Tekkaya, & Ertepınar, 2005). The protection and renewal of resources find themselves as the base of sustainable development. In sustainable development, social and economic structures, policy, traditions, and culture and political systems are understood to make up various parts of the environment (Bener & Babaoğul, 2008; Cross, 1998). Only through a comprehensive education involving every part of society of these aspects can it awareness of environment and environmental problems increase.

The primary purpose of environmental education is to educate citizens who are aware of and concerning environmental problems, showing positive attitudes toward environment (UN, 2012). These efforts should start with pre-school education and continue through all levels of formal education. In this way, the number of people showing positive values, attitudes and behaviors toward environment will increase (Barraza & Walford, 2002; Short, 2010). Effective environmental education is required to foster attitudes, motivations and commitments to make informed decisions and take responsible action (Barraza & Cuarón, 2004). Especially, formal environmental education will provide an increase in the number of cognitive schema related to environment and this will change people's perspective on the environment (Bonnett & Williams, 1998; Loughland, Reid, Walker, & Petocz, 2003).

Though interest in environmental problems started to arouse in 1970s, in Turkey, protecting the environment was guarantee by the state in the 1982 constitution. With the 7th Five-year Development Plan Environmental Specialization Commission Report prepared by the Prime Ministry State

Planning Organization, the framework for environmental education was drawn. In the following eighth and ninth five-year development plans, the issues of sustainable development and education for sustainable development were also mentioned (Erol & Gezer, 2006; Meydan & Doğu, 2008; Özsoy, 2012a; Yücel & Morgil, 1999).

Raising environmental awareness through environmental education in today's world has both national and universal dimensions. Therefore, education instilling environmental awareness should be provided across all levels of schooling, starting from an individual's very first years of education (Yücel & Morgil, 1999). In Turkey, environmental education started to be offered during students' first year at elementary school with the inclusion of Environment, Health, Traffic, and Reading course in the curriculum in 1992 (Meydan & Doğu, 2008). However, the desired outcomes of the course were remained unachievable for many reasons, including a lack of effort in developing new teaching programs, the lack of connections between the different levels of schooling, the fact that this course was taught not by subject teachers specialized in this subject, but by teachers from different subject areas, and due to its being an elective class achieved (Erol & Gezer, 2006; Yücel & Morgil, 1999). With the program being reformed in 2004, environmental education was included in the syllabi of different courses, including even pre-school education and with the same reform, the relationship between science, technology, society, and the environment was integrated into the syllabi of science and technology courses from 4th to 8th grade. Later with the elementary school program update in 2013, the concept of 'sustainable development awareness' began to be emphasized.

Research on environmental education, both in the world and in Turkey, mostly focuses on issues such as environmental knowledge (Cheng & So, 2011; Erdoğan, 2011; Timur & Yılmaz, 2011), environmental literacy (Erdoğan, 2009; Özsoy, Ertepınar, & Sağlam, 2012; Stevenson, Peterson, Bondell, Mertig, & Moore, 2013), and environmental attitudes (Esa, 2010; Şama, 2003; Tuncer, Sungur, Tekkaya, & Ertepınar, 2007; Volk & Cheak, 2003). Yet, the number of studies dealing with issues such as children's opinions about the environment, what type of environment they expect in the future, and their perceptions of the environment in the future (Öztürk, Olgan, & Tuncer, 2012; Taşkın & Şahin, 2008) is relatively limited (Campbell, Jerez, Erdoğan, & Zhang, 2010; Özsoy, 2012a).

When the related research in the literature is examined, it is seen that research conducted with children employs such data collection instruments as observation, group interviews, individual interviews with children, and video-recording (Einarsdottir, Dockett, & Perry, 2009). Research has revealed that not only do children feel the most at ease while drawing, they also establish a closer relationship with the researcher whereby they are eager to participate in the research process without feeling pressured (Barraza, 1999; Dove, Everett, & Preece, 1999). Moreover through drawing, it is possible for children to describe inner feelings within a visual structure, to understand their emotions, and to define their real opinions, desires, and wishes (Coates, 2002; Einnarsdottir et al., 2009; Leonard, 2006; Moseley, Perrotra, & Utley, 2010; Piperno, Di Biasi, & Levi, 2007). Moreover, it may be difficult for children to explain their feelings through words, especially as far as the concepts relating to technology are considered. Hence, because drawings are not only used to explain a memory and state, but also to narrate a story (Minkoff & Riley, 2011), feelings can be expressed better through them (Dove et al., 1999). Punch (2002), on one hand, describes the advantages of having children draw as the development of children's creativity, active use of cognitive skills, provision of sufficient time for children to think and, on the other, states that while doing all of these, if children are encouraged to rid themselves of their aesthetic and artistic anxieties, the process can be rendered quite entertaining. Vygotsky (1971) and Pillar (1998) argue that during the drawing process, children can make effective use of their imagination so that they can clearly reflect their opinions, indicating that there is a close association between drawing and thinking processes. Drawing is also of great importance for the cognitive and affective development of children (Coates & Coates, 2006). Each drawing is a unique production of the child and broadly reflects his/her opinions (Yavuzer, 2010). Pahl (1999) views drawings as concrete reflections of the child and as the first stage of his/her creativity (as cited in Coates, 2002). Moreover, drawings involve the traces of cultural environment with many links related to many different areas able to be created within a single drawing (Cox, 2005). In addition, drawings have instructional aspects. Just as children are involved in verbal and physical communication by interacting with surrounding objects and individuals, they can learn new things by both drawing and then analyzing their own drawings (Anning, 2002). Drawings involve a lot

of information from the affective and intellectual worlds of the child (Pillar, 1998). What is important is a good analysis and interpretation of a drawing (Punch, 2002). Due to such characteristics, children's drawings can reveal much more than their written or oral products; hence, they are increasingly becoming popular among researchers.

Alerby (2000) conducted a study to elicit children's opinions about the environment through their drawings. At the end, they classified the children's drawings about the environment into four groups: (1) clean environment, (2) polluted environment, (3) both clean and polluted environment, and (4) activities required to protect the environment. A similar study was conducted by Shepardson (2005) whose purpose was to determine children's knowledge about the environment. It was found that children are able to define what the environment is, conceptually, in a very limited manner. In their study, Shepardson, Wee, Priddyve, and Harbor (2007) identified children's mental models about the environment. When the literature in Turkish is examined, it is seen that there are a number of studies aiming to determine children's opinions regarding the environment as a concept itself. Taşkın and Şahin (2008) investigated how six-year old pre-school students conceptualized the environment, the effects that students' place of residence and family socio-economic status had on their perceptions, and what type of environment in which they would like to live. Yardımcı and Kılıç (2010) carried out a study whose goal was to reveal the meanings eighth grade students attached to the environment and environmental problems. Özsoy (2012a) investigated the environmental perceptions of children though their drawings. Barraza (1999) aimed to determine how children perceive the environment's current and future state. He found that while 43% of the children drew the current environment with underlying positive perceptions, 54% of them drew the future state of the environment with underlying negative perceptions. A similar study was performed by Fleer (2002) among children aged 5 and 12 with one of the important findings being that as students' age increases, so do negative perceptions of the environment become stronger.

When the related literature in Turkish is examined, it is seen that there are different studies making use of children's drawings for various purposes. These are: the image of a scholar (Buldu, 2006; Türkmen, 2008) perceptions of the shape of the world (Özsoy, 2012b), perceptions of the Internet (Ersoy & Türkkan, 2009), perceptions of the European Union (Belet & Türkkan, 2007), and perceptions of the human figure (Dağlıoğlu, Çalışandemir, Alemdar, & Bencik-Kangal, 2010). However, no study is to be found dealing with students' perceptions of the environment's future state in Turkish literature. In this regard, the present study seeks answers to the following questions.

1. What are elementary school students' perceptions of the current state of the environment?

2. What are the elementary school students' perceptions of the future state of the environment?

3. Do children's region of residence, grade level, and gender significantly affect children's perceptions of the future state of the environment?

Method

In order to determine elementary school students' perceptions of the future state of the environment, the present study was conducted during the spring term of the 2011-2012 school year. The study employed the survey model since it aims to describe a situation as it is at present or was in the past (Karasar, 2008). The study is cross-sectional in nature. The cross-sectional survey design is a survey design used to collect information from very different samplings at a certain time interval (Wiersma & Jurs, 2005).

Study Group

The study group of the current study consists of 828 elementary school first level (the Turkish primary school system is divided into two levels) students selected through the convenient sampling method. The data related to the participants' region of residence, grade level, and gender are presented in Table 1.

Table 1
Distribution of the Study Group Students According to Their Region of Residence, Grade Level, and Gender

Demographic features		*f*	*%*
Gender	Female	461	55.7
	Male	367	44.3
Region of Residence	Urban	635	76.7
	Rural	193	23.3
Grade Level	1st Grade	131	15.8
	2nd Grade	127	15.3
	3th Grade	160	19.3
	4th Grade	188	22.7
	5th Grade	222	26.8
TOTAL		828	100

Data Collection Instrument

In order to determine the children's perceptions regarding the future state of the environment, the draw and explain technique was used (Shepardson, 2005). The draw and explain technique is a diagnostic method used to understand children's opinions and how they structure concepts (McWhirter et al., 2000). Though children's drawings include some creative elements, they are actually representative pictures. Unlike creative pictures, representative pictures include more cultural elements and viewpoints (Anning & Ring, 2004). Throughout the application process, the students were asked to draw the pictures of the current state of the environment, how the environment fifty years from now would appear, and then explain them. It should be noted that although some researchers express their reservations against small children's interpretation of the future, the participants of the current study are at the concrete operational stage according to Piaget's development theory, meaning that they can generate their own cognitive maps based on their prior knowledge, make predictions, and solve problems (Berk, 2009). Palmer (1993) presented more important data. He conducted a study with children of the same age group as those of the current study in order to determine their perceptions of the effects of motor vehicles on the future state of the environment (Batterham, Stanisstrett, & Boyes, 1996) and energy pollution (Krugger & Summers, 2000), which are more specific issues than those of the current study, by using interview and questionnaire techniques. In the preset study however, the participants were asked to draw pictures of the current state of the environment and how the environment fifty years from now would appear, and then explain them.

Data Analysis

While analyzing the data, both quantitative and qualitative analysis techniques were employed. For the quantitative analysis, frequencies (*f*) and percentages (%) were calculated to determine the frequency with which the children used the elements in their drawings and a Chi-square was run to determine whether the students' region of residence, gender, and grade level significantly affect their perceptions of the environment. Since the number of the data was higher than 50, a Kolmogorov-Smirnov (K-S) normality test was carried out whose result was found to be $p < .05$. It was therefore concluded that the data did not display normal distribution (Büyüköztürk, 2009). As the dependent variable (perceptions of the future state of the environment) and independent variables (gender, region of residence, and grade level) are ordinal and discrete, the researchers decided to run a Chi-square independent. A Chi-square independent test is a non-parametric test used in to analyze ordinal and discrete variables able to be categorized (Balcı, 2009; Büyüköztürk, 2009; Fraenkel & Wallen, 2009). As a result of the Chi-square independent test, since a correlation was detected between the variables, the phi coefficient was calculated to determine its direction (Erkuş, 2011). In the qualitative data analysis section of the study, an explicative content analysis method was employed. The aim of performing a content analysis is to elicit individuals' beliefs, values, attitudes, and thoughts by means of visual, written, and oral materials (Balcı, 2009; Fraenkel & Wallen, 2009). Through this analysis, it is possible to subsume and organize similar data under a number of certain concepts and themes (Yıldırım & Şimşek, 2008). Prior to coding, all the data were examined by the researchers in order to gain insight of have an idea. Following this examination, all the elements included in the drawings were determined to be the codes of the study. After the determination of the codes, themes were determined and codes were placed in compliance with the themes. In order to establish the reliability and validity of the data, the codes and themes were revised by the researchers and were also analyzed by an expert in the science education field by following the same procedure.

Findings

Findings Obtained from Descriptive Analysis

Eighty-nine percent (89%) of the students' drawings illustrated that they perceived today's world to host a clean environment. In their drawings of the current environment, the students included such elements as various plants and animals, houses, apartment buildings, mountains, the sun, clouds, and rivers. Fifty-three percent (53%) of the students drew trees, 47.8% of them drew sun, 41.3% drew houses, 38.6% drew humans, and 37.2% drew clouds in their pictures.

When the students' drawings of the future state of the environment are examined, it is seen that 40.3% of the students depicted a polluted environment, 31.2% of them drew a technological environment, and the remaining 28.5% drew a clean environment. The elements used in the drawings of the future environment are similar to those used in drawings

of current environment. The most frequently used element in the drawings depicting the future environment is the sun. Out of the students, 37.8% drew the sun, 35.4% drew trees, 32.7% drew humans, 29.2% drew cars, and 28.9% drew houses in their pictures. Another important point observed in the students' drawings of the future environment is the inclusion of elements such as robots, rockets, and UFOs in their drawings.

Findings Obtained from Inferential Analysis

The results of the Chi-Square Independent Test conducted in order to analyze the relationship between the students' region and city of residence, grade level, and gender and their perceptions of the future state of the environment are presented in Table 2.

Table 2
The Results of the Chi-Square Independent Test Conducted to Analyze the Relationship Between the Students' Region of Residence, Grade Level, and Gender and Their Perceptions of the Future State of the Environment

Region of Residence		Clean	Polluted	Technological	Total
Urban	N	151	297	187	635
	%	23.8	46.8	29.4	100.0
Country	N	85	37	71	193
	%	44.0	19.2	36.8	100.0
Total	N	236	334	258	828
	%	28.5	40.3	31.2	100.0
X^2=51.83sd=2p=.00*					
Grade Level		Clean	Polluted	Technological	Total
1st Grade	N	50	64	17	131
	%	38.2	48.9	13.0	100.0
2nd Grade	N	37	62	28	127
	%	29.1	48.8	22.0	100.0
3rd Grade	N	62	65	33	160
	%	38.8	40.6	20.6	100.0
4th Grade	N	37	51	100	188
	%	19.7	27.1	53.2	100.0
5th Grade	N	50	92	80	222
	%	22.5	41.4	36.0	100.0
Total	N	236	334	258	828
	%	28.5	40.3	31.2	100.0
X^2=84.91sd=8p=.00*					
Gender		Clean	Polluted	Technological	Total
Girl	N	144	186	131	461
	%	31.2	40.3	28.4	100.0
Boy	N	92	148	127	100.0
	%	25.1	40.3	34.6	100.0
Total	N	236	334	258	828
	%	28.5	40.3	31.2	100.0
X^2=5.23sd=2p=.73					

*$p < .05$

When table 3 is examined, it is seen that there is a significant difference in the students' perceptions of the future environment based on their region of residence X^2(2, N=828)=51.83, p = .00. As a result of the phi test run to determine the direction of the correlation and effect size, the coefficient was found to be .25. Hence, it can be argued that the students living in urban areas perceive a dirtier future environment than do those living in the country. As a result of the effect size analysis, a relationship with positive direction and small effect size was found between the region of residence and environmental perceptions. A significant difference based on grade level was also found in the students' perceptions of the future environment X^2(8, N=828)=84.91, p = .00. As a result of the phi test conducted, the coefficient was found to be .32. As such, there is a relationship with positive direction and medium effect size between the students' grade level and environmental perceptions. As students' grade level increases, so do students' perceptions of either a polluted future environment and/or a technological environment. Gender was found to have no significant effect on the students' perceptions of the future environment X^2(2,N=828)=5.23, p = .73.

Findings Obtained from the Content Analysis

As a result of the content analysis conducted in order to contribute to a better understanding of students' perceptions of the future state of the environment, the drawings were subsumed under three themes, being a clean environment, a polluted environment, and a technological environment.

Perception of a Clean Environment: In the drawings collected under this theme, students depicted the environment as clean, beautiful, and full of green areas. Trees and grass were among the most frequently used elements. In their drawings, animals such as birds, butterflies, and cats were frequently included. An example may be seen in Picture 1.

Picture 1
An Example of Clean Environment Drawings (3rd Grade Female Student)

The note written on the back of the drawing by the student: Here, the child is happy even though her environment is a bit polluted, the river is polluted, but it will be clean in the future. All this dirt will be removed and human beings will live in a clean environment together with animals.

Of the human figures drawn by students in their drawings, 9.3% falling into this theme were drawn as people smiling and happy or while playing. Furthermore, 7.7% of the sun figures in this theme were drawn smiling. No element of dirt can be seen in the drawings depicting a clean environment. Interestingly, 8.0% of the students included a dust bin in their drawings. Moreover, the houses drawn by students are usually one-story with a garden. Many of the houses drawn included a chimney. In some of the houses drawn with a chimney, either very short or thin smoke was drawn coming out of the chimney. Here the chimney is believed not to be drawn to represent pollution, but rather to represent the traces of continuing life. Not many car figures are included in the clean environment drawings, and there is no exhaust gas in those drawings depicting car figures.

Perception of a Polluted Environment: In many of the drawings depicting a polluted environment, solid wastes; turned-down or spilled-over garbage cans; smoke emitted by houses, apartment buildings, and cars; factory and industrial wastes; polluted seas, rivers, and lakes; felled trees; dead flowers; and animals are seen. One example of a polluted environment is presented in Picture 2.

Picture 2
One Example of Polluted Environment Drawings (5th Grade, Female Student)

The note written on the back of the picture by the student: I think our environment is very clean today. We can go outside and spend time in parks. In the future, parks will be replaced by houses, people will throw litters onto the streets, people will have difficulty breathing and they will be unhappy.

The drawings in this theme include apartment buildings rather than houses as were commonly seen in the clean environment drawings. Specifically, multi-storey congested apartment buildings without gardens are commonplace. Thick and long smoke coming from the chimneys of apartment buildings is frequently illustrated. Factories are a common element of these drawings. In these drawings, the number of cars increases with the majority of these cars drawn emitting exhaust gas. Hence, it can be concluded that the students think that urban sprawl and traffic jams have negative effects on the environment. In many of the drawings of a polluted environment, turned-down or spilled-over garbage cans; solid wastes spread across seas, rivers, and lakes; dead animals; arid places; collapsed houses; apartment buildings; and parks can be seen. Although human figures are frequently used in this theme, they are drawn in such a way to give an appearance of unhappiness. Moreover, people are drawn while cutting trees, throwing litters, spitting or setting fire. In some of the drawings, human figures that are ill or looking for water are also seen. There is usually unhappy expression on the face of sun figure.

Perception of a Technological Environment: The third group obtained from analyzing the research data consists of drawings reflecting technological perceptions of the environment. In these drawings, students usually drew flying cars, flying people, flying houses, skyscrapers, rockets, robots, and UFOs. A sample drawing of a technological environment is given in Picture 3.

Picture 3
A Sample Drawing of Technological Perception of Environment (4th Grade, Male Student)

The note written on the back of the drawing by the student: In today's world, many tasks are done by people. In the future, many of them will be done by robots. We will deal with different tasks.

In these pictures, human figure were frequently drawn. People are depicted while driving flying cars, flying together with a rocket, and with happy faces. Though not too many, there are some plants and animals drawn in these pictures. While the tree is the most frequently drawn plant, birds are the most frequently drawn animals.

While there is no one-story houses drawn in the pictures, there are many apartment buildings and

skyscrapers. Vehicles are mostly depicted in the form of flying cars. In some of the drawings, a journey by rocket to other planets is seen. Another element seen in these pictures is the existence of UFOs. Based on their drawings, it can be claimed that the students think that UFOs will be objects frequently encountered in the future.

Discussion

In the present study, the purpose was to elicit primary school students' perceptions of the future state of the environment. In this study, significant correlations were determined between students' perceptions of the future environment and their region of residence, gender, and grade level. The Chi-Square Test results revealed that those students living in the countryside have more positive perceptions of the future state of the environment than do students living in urban areas. When the perceptions were examined in terms of grade level, it was found that as grade level increases, so do perceptions of the future environment being polluted, as do depictions of technology. These findings concur with the findings of other studies (Alerby, 2000; Barraza, 1999; Fleer, 2002). It is believed that the students living in urban areas are confronted with negative effects of environmental deterioration more often; hence, it seems only natural for them to expect dirtier environment in the future. Bognern and Wiseman (1997) reported that the young people living in urban areas and suburbs have more positive opinions about the environment when compared to their rural counterparts. However, when their behaviors toward the environment are examined, it is seen that their actual behaviors are more negative than are those of their rural counterparts. Erdoğan (2009) and Tuncer, Tekkaya, Sungur, and Ertepınar (2005) argued that one of the factors affecting responsible behaviors toward the environment is students' place of residence. No significant correlation was found between the students' gender and perceptions of the future state of the environment. These results are parallel to the findings reported in the literature (Eagles & Demare, 1999; Tuncer et al., 2005).

Three themes emerged in the present study; (1) a clean environment, (2) a polluted environment, and (3) a technological environment. The findings of the present study exhibit a number of similarities with those reported in the literature. Alerby (2000) and Fleer (2002) found that students' perception of the future state of the environment was one full of technological elements. Likewise in the present study, it was found that 6.6% of first grade students, 10.9% of second grade students, 12.8% of fourth grade students, 38.8% of fifth grade students, and 31.0% of fifth grade students' perceptions of a future environment full of technological elements. Out of the 828 students participating in the present study, 258 (31.2%) drew pictures reflecting the perception of a future environment making heavy use of technological. Today' s rapid developments in the fields of science and technology, an increasing use of products manufactured through these new technologies in daily life, and the frequent broadcast of news focusing on technological advancements are believed to have affected students' perceptions of future live.

Out of the total 828 participants of the study, 40.3% (N=334) drew pictures depicting a polluted environment. Broken down into grade level, 19.2% of first grade students, 18.6% of second grade students, 19.5% of third grade students, 15.3% of fourth grade students, and 27.5% of fifth grade students have perceptions of a polluted environment in the future. Among the first graders, a perception of clean environment seems to be dominant, whereas among the fifth graders, a perception of a technologically enhanced environment seems to be dominant. Yet, in all the grades, a perception of a polluted environment is the most common. This particular finding of the study concurs with Fleer finding (2002) in which he reports that as an individual's age increases, his perception of the future state of the environment becomes increasingly negative. The present study revealed that the perception of a polluted environment is the highest among fifth graders. In general, the environmental perceptions of students living in rural areas were found to be more positive than those of students living in urban areas. This finding is supported by Barraza (1999) in which he found that both in Mexico and in England, the students living in rural areas have more positive perceptions of the future environment.

In the present study, a total of 42 codes describing future perceptions of the environment were produced. The most commonly used among these codes was the sun. Also among these codes are both biotic elements, such as humans, animals and plants as well as abiotic elements, such as the sun, mountains, rivers, and seas. Yet, although the overall diversity of these elements is low, the diversity of animals and abiotic elements in the drawings of students living in rural areas is more than the level of diversity in the drawings

of students living in urban areas. In the drawings of the students living in rural areas, together with animals such as birds, butterflies, dogs, and cats; farm animals, such as cows, sheep, rabbits, and ducks are also seen, whereas in the drawings of the students living in urban areas, mostly birds, cats, and dogs are seen. According to Snaddon, Tuncer, and Foster (2008), the farther away children are from a natural environment, the less knowledgeable they become about the diversity of natural elements. Miller (2007) states that as children become more removed from nature, their sensitivity toward nature and both the living and non-living elements of nature becomes weaker. Children usually draw the elements that they see in their close surroundings. Therefore, it is not surprising to see less diversity in the drawings of children living in urban areas. This was also noted by Fleer (2002), who emphasized the necessity of considering the difference between urban and rural areas in future research. Shepardson (2005) reported that students were able to provide a very limited definition of the concept of environment from an ecological view. Keinath (2004) and Alerby (2000) found that children included in their drawings only the biotic and abiotic elements that they see in their close surroundings.

The codes used in the perceptions of a clean environment are similar to those in another study (Alerby, 2000; Barraza, 1999; Fleer, 2002; Shepardson, 2005). In the drawings depicting a clean environment, elements such as a smiling sun (7.7%), green and thick trees (27.8%), green areas (10.5%), birds (8.1%), and houses (%23.4) were included. In the drawings depicting a polluted environment on the other hand, elements such as an unhappy sun (2.5%), felled and dead trees (7.6%), apartment buildings (14.3%), chimney smoke (6.4%), exhaust gas (1.4%), and turned-down garbage cans (26.3%) were frequently used. This particular finding is parallel to that reported by Sadık, Çakan, and Artut (2009) and that by Yardımcı and Kılıç (2010). In both of the studies, students depicted exhaust gas emitted by cars, chimney smoke coming from houses, and garbage as the being main causes of polluted environment. Though there are some similarities between the drawings of a clean environment and those of a technological environment, there are also different elements, such as robots (5.8%), rockets (1.8%), and UFOs (2.1%) in the drawings depicting a technological environment. Another remarkable finding of the study is that the students view ca lean environment as being complementary to a technological environment. In almost all of the drawings included in the theme of a technological environment, the environment was depicted as clean. This may indicate that the students believe that developments in the fields of science and technology can contribute to finding a solution to environmental problems. This finding concurs with Fleer (2002), who stated that children having perceptions of a technological environment stated that with the help of technological developments, the environment will be protected and remain clean.

Human figures in the drawings are particularly remarkable with 82.5% of first grade students, 86.2 of second grade students, 80.8% of third grade students, 74.0% of fourth grade students, 70.6% of fifth grade students including human figure in their drawings. The type of human figures varies depending on students' perceptions of the environment. Specifically, in drawings reflecting clean and technological environment perceptions, human figures are depicted as happy, working in the garden, cleaning, and playing. In drawings of dirty environments, on the other hand, human figures are depicted as unhappy, cutting trees, throwing litter onto the ground, and setting things on fire. These illustrations show that students are aware of the mutual-interaction between humanity and the environment. While the environment affects the mood of people, people also affect the environment (Milfont & Sibley, 2012). Connell, Fienn, Lee, Sykes, and Yencken (1999) reported that according to students, the entity most responsible for causing environmental problems is man. Shepardson et al. (2007) found that children do not relate the environment to man. The findings of the present study are supported by Shepardson et al. (2007).

The daily experiences of children are highly effective in shaping their perceptions (Özsoy, 2012a). Though the number of codes obtained in the present study is quite high, a low diversity of plants and animals, as well as a limited number of types of environmental pollution in the drawings, indicate that children have a limited experience with the environment. According to Punch (2002), leading relatively isolated lives and being away from TV, magazines, cartoons, and other mass communication tools and stimulants in a more natural environment result in a single unsophisticated viewpoint restricting individuals to what they see in their close environment. Hence, the objective of environmental education should be to remove these restrictions and raise individual's awareness of the environment. Though Miller (2007) and Zoldosova and Prokop (2006) argue

that education systems confine people to their houses, keeping them away from nature, through an appropriate planning, this problem can be overcome. Therefore, integrated environmental education can provide an effective learning environment for children to learn. Hence, researchers think that environmental education should be given in an environment integrated with nature. It is claimed that children's drawings are a useful data collection tool as they create environments where children can freely reflect their feelings and opinions. The diversity of the data collected in the present study supports this argument. It is a well-known fact that children, due to their developmental and emotional characteristics, cannot feel free and comfortable when completing questionnaires or interviews (Punch, 2002). However, when the technique of drawing is employed, they can draw whatever they think and feel without any hesitation. Therefore, children can use drawings as a means of effective communication (Anning & Ring, 2004). Though children's drawings are effective evaluation tools, data collection through drawings is not very widespread in the literature. Thus, drawings can be used by future research to look at the causes of environmental pollution, solutions to environmental problems, and types of pollution.

References/Kaynakça

Alerby, E. (2000). A way of visualising children's and young people's thoughts about the environment: A study of drawings. *Environmental Education Research, 6*(3), 206-222.

Anning, A. (2002). Conversations around young children's drawing: the impact of the beliefs of significant others at home and school. *NSEAD, 21*(3), 197-208.

Anning, A., & Ring, K. (2004). *Making sense of children's drawings.* New York: Open University Press.

Balcı, A. (2009). *Sosyal bilimlerde araştırma; Yöntem, teknik ve ilkeler* (7. basım). Ankara: Pegem Akademi.

Barraza, L. (1999). Children's drawings about the environment. *Environmental Education Research, 5*(1), 49-66.

Barraza, L., & Cuarón, A. D. (2004). How values in education affect children's environmental knowledge. *Journal of Biological Education, 39*(1), 18-23.

Barraza, L., & Walford, R. A. (2002). Environmental education: A comparison between English and Mexican school children. *Environmental Education Research, 8*(2), 171-186

Batterham, D., Stanisstreet, M., & Boyes, E. (1996). Kids, cars and conversation: Children's ideas about the environmental impact of motor vehicles. *International Journal of Science Education*, *18*(3), 347-354.

Belet, Ş. D. ve Türkkan, B. (2007, Nisan). İlköğretim öğrencilerinin yazılı anlatım ve resimsel ifadelerinde algı ve gözlemlerini ifade biçimleri (Avrupa Birliği örneği).VI. Ulusal Sınıf Öğretmenliği Sempozyumu'nda sunulan sözlü bildiri, Anadolu Üniversitesi, Eskişehir.

Bener, Ö. ve Babaoğul, M. (2008). Sürdürülebilir tüketim davranışı ve çevre bilinci oluşturmada bir araç olarak tüketici eğitimi. *Hacettepe Üniversitesi Sosyolojik Araştırmalar E-Dergisi, 5*(1), 1-10.

Berk, L. (2009). *Child development* (8th ed.). Boston: Pearson.

Bonnett, M., & Williams, J. (1998). Environmental education and primary children's attitudes towards nature and the environment. *Cambridge Journal of Education 28*(2), 159-174

Bogner, F. X., & Wiseman, M. (1997). Environmental perception of rural and urban pupils. *Journal of Environmental Psychology*, *17*, 111-122.

Buldu, M. (2006). Young children's perceptions of scientist: A preliminary study. *Educational Research, 48*(1), 121-132.

Büyüköztürk, Ş. (2009). *Sosyal bilimler için veri analizi el kitabı*(10. basım). Ankara: Pegem Akademi.

Campbell, T., Jerez, W. M., Erdoğan, E., & Zhang, D. (2010). Exploring science teachers' attitudes and knowledge about environmental education in three international teaching communities. *International Journal of Environmental & Science Education, 5*(1), 3-29.

Cheng, I., & So, W. (2011). Teachers' pro-environmental qualities: Bridging the gaps in environmental knowledge, attitude and behavioral intentions. *Educational Research Journal, 26*(2), 271-286.

Coates, E. (2002). 'I forgot the sky' children's stories contained within their drawings. *International Journal of Early Years, 10*(1), 21-35.

Coates, E., & Coates, A. (2006). Young children talking and drawing. *International Journal of Early Years Education, 14*(3), 221-241.

Connell, S., Fien, J., Lee, J, Sykes, H., & Yencken, D. (1999). If it doesn't directly affect you, you don't think about it': A qualitative study of young people's environmental attitudes in two Australian cities. *Environmental Education Research, 5*(1), 95-113.

Cox, S. (2005). Intention and meaning in young children's drawing. *NSEAD, 24*(2), 115-125.

Cross, T. (1998). Teachers' view about what to do about sustainable development. *Environmental Education Research, 4*(1), 41-52.

Dağlıoğlu, H. E., Çalışandemir, F., Alemdar, M., & Bencik-Kangal, S. (2010). Examination of humans figure drawings by gifted and normally developed children at preschool period. *Elementary Education Online, 9*(1), 31-43.

Dove, J. E., Everett, L. A., & Preece, F. W. (1999). Exploring a hydrological concept through children's drawing. *International Journal of Science Education, 21*(5), 485-497.

Eagles, P. F. J., & Demare R. (1999). Factors influencing children's environmental attitudes. *The Journal of Environmental Education*, *30*(4), 33-37.

Einarsdottir, J., Dockett, S., & Perry, B. (2009). Making meaning: Children's perspectives expressed through drawings. *Early Child Development and Care, 179*(2), 217-232.

Erdoğan, M. (2009). *Fifth grade students' environmental literacy and the factors affecting students' environmentally responsible behaviors* (Doctoral dissertation). Retrieved from http://tez2.yok.gov.tr/.

Erdoğan, M. (2011). Ekoloji temelli yaz doğa eğitimi programının ilköğretim öğrencilerinin çevreye yönelik bilgi, duygusal eğilimler ve sorumlu davranışlarına etkisi. *Kuram ve Uygulamada Egitim Bilimleri*, *11*, 2223-2237.

Erkuş, A. (2011). *Davranış bilimleri için bilimsel araştırma süreci* (3. basım). Ankara: Seçkin

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.

Ersoy, A., & Türkkan, B. (2009). Perceptions about Internet in elementary school children's drawings. *Elementary Education Online, 8*(1), 57-73.

Erten, S. (2005). Okul öncesi öğretmen adaylarında çevre dostu davranışların araştırılması. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 28,* 91-100.

Esa, N. (2010). Environmental knowledge, attitude and practices of student teachers. *International Research in Geographical and Environmental Education, 19*(1), 39-50.

Fleer, M. (2002). Curriculum compartmentalisation? A futures perspective on environmental education. *Environmental Education Research, 8*(2), 137-154.

Fraenkel, J. R., & Wallen, N. E. (2009). *How to design and evaluate research in education* (7th ed.). Boston: McGraw-Hill Higher Education.

Joireman, J., Truelove, H. B., & Duell, B. (2010). Effect of outdoor temperature, heat primes and anchoring on belief in global warming. *Journal of Environmental Psychology, 30,* 358-367.

Karasar, N. (2008). *Bilimsel araştırma yöntemi* (18. basım). Ankara: Nobel Yayın Dağıtım.

Keinath, S. D. (2004). *Environmental education and perceptions in eastern Nepal: Analysis of student drawing.* USA: Michigan Technological University.

Kruger, C., & Summers, M. (2000). Developing primary school children's understanding of energy waste. *Research in Science & Technological Education, 18*(1), 5-21.

Leonard, M. (2006). Children's drawings as a methodological tool: Reflections on the develop plus system in northern Ireland. *Irish Journal of Sociology, 15*(2), 52-66.

Loughland, T., Reid, A., Walker, K., & Petocz, P. (2003). Factors influencing young people's conceptions of environment. *Environmental Education Research, 9*(1), 3-19

McWhirter, J. M., Collins, M., Bryant, I., Wetton, N. M., & Bishop, J. N. (2000). Evaluating 'safe in the sun', a curriculum programme for primary schools. *Health Education Research: Theory & Practice, 15*(2), 203-217.

Meydan, D. ve Doğu, S. (2008). İlköğretim ikinci kademe öğrencilerinin çevre sorunları hakkındaki görüşlerinin bazı değişkenlere göre değerlendirilmesi. *Selçuk Üniversitesi Ahmet Keleşoğlu Eğitim Fakültesi Dergisi, 26,* 267-277.

Milfont, T. L., & Sibley, C. G. (2012). The big five personality traits and environmental engagement: Associations at the individual and societal level. *Journal of Environmental Psychology, 32,* 187-195.

Miller, D. L. (2007). The seeds of learning: Young children develop important skills through their gardening activities at a midwestern early education program. *Applied Environmental Education & Communication, 6*(1), 49-66.

Minkoff, Y., & Riley, J. (2011). Perspectives of time-use: Exploring the use of drawings, interviews and rating-scales with children aged 6-7 years. *Journal of Occupational Science, 18*(4), 306-321.

Moseley, C., Perrotta, B. D., & Utley, J. (2010). The Draw-an-Environment Test Rubric (DAET-R): Exploring pre-service teachers' mental models of the environment. *Environmental Education Research, 16*(2), 189-208.

Moslemi, J. M., Capps, K. A., Johnson, M. S., Maul, J., McIntyre, P, B., Melvin, A. M., Vadas, T. M., …Weiss, M. (2009). Training tomorrow's environmental problem solvers: An integrative approach to graduate education. *BioScience, 59*(6), 514-521.

Özsoy, S. (2012a). İlköğretim öğrencilerinin çevre algılarının çizdikleri resimler aracılığıyla incelenmesi. *Kuram ve Uygulamada Eğitim Bilimleri, 12*(2), 1117-1139.

Özsoy, S. (2012b). Is the earth flat or round? Primary school children's understandings of the planet earth: The case of Turkish children. *International Electronic Journal of Elementary Education, 4*(2), 407-415.

Özsoy, S., Ertepınar, H., & Sağlam, N. (2012). Can eco-schools improve elementary school students' environmental literacy levels? *Asia-Pacific Forum on Science Learning and Teaching, 13*(2), 1-7.

Öztürk, D. K., Olgan, R., & Tuncer, G. (2012). A qualitative study on Turkish preschool children's environmental attitudes through ecocentrism and anthropocentrism. *International Journal of Science Education, 34*(4), 629-650

Palmer, J. A. (1993). Development of concern for the environment and formative experiences of educators. *Journal of Environmental Education*, *24*(3), 26-30.

Pillar, A. D. (1998). What do children think about the drawing process? *NSEAD, 17*(1), 81-86.

Piperno, F., Di Biassi, S., & Levi, G. (2007). Evaluation of family drawings of physically and sexually abused children. *European Child & Adolescent Psychiatry, 16*(6), 389-397.

Punch, S. (2002). Research with children: The same or different from research with adults? *Childhood, 9*(3), 321-341.

Sachiyo, M., Wongchantra, P., & Salee, B. (2011). The participation management of children and youth by environmental education principle. *European Journal of Social Sciences, 23*(2), 246-261.

Sadık, F., Çakan, H. ve Artut, D. (2009, Ekim). Çocuk resimlerine yansıyan çevre sorunlarının *sosyo-ekonomik farklılıklara göre analizi*. XVIII. Ulusal Eğitim Bilimleri Kurultayı'nda sunulan bildiri, Ege Üniversitesi, İzmir.

Şama, E. (2003). Öğretmen adaylarının çevre sorunlarına yönelik tutumları. *Gazi Eğitim Fakültesi Dergisi, 23*(2), 99-110.

Shepardson, D. P. (2005). Student's ideas: What is an environment? *Journal of Environmental Education, 36*(4), 49-58.

Shepardson, D. P., Niyogi, D., Choi, S., & Charusombat, U. (2009). Seventh grade students' conception of global warming and climate change. *Environmental Education Research, 15*(5), 549-570.

Shepardson, D. P., Wee, B., Priddy, M., & Harbor, J. (2007). Students' mental models of the environment. *Journal of Research in Science Teaching, 44*(2), 327-348.

Short, P. C. (2010). Responsible environmental action: Its role and status in environmental education and environmental quality. *The Journal of Environmental Education, 41*(1), 7-21

Snaddon, J. L., Turner, E. C., & Foster, W. A. (2008). Children's perceptions of rainforest biodiversity: Which animals have the lion's share of environmental awareness? *PlosONE, 3*(7), 1-5.

Stevenson, K. T., Peterson, M. N., Bondell, H. D., Mertig, A. G., & Moore, S. E. (2013). Environmental, ınstitutional, and demographic predictors of environmental literacy among middle school children. *PlosONE, 8*(3), 1-11.

Taşkın, Ö. ve Şahin, B. (2008). "Çevre" kavramı ve altı yaş okul öncesi çocuklar. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi, 23*(1), 1-12.

Timur, S. ve Yılmaz, M. (2011). Fen bilgisi öğretmen adaylarının çevre bilgi düzeylerinin belirlenmesi ve bazı değişkenlere göre incelenmesi. *Gazi Üniversitesi Gazi Eğitim Fakültesi Dergisi, 31*(1), 303-320.

Tuncer, G., Sungur, S., Tekkaya, C., & Ertepınar, H. (2005). Young attitude on sustainable development: A case study. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 29,* 187-193.

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., Tekkaya, C., Sungur, S., & Ertepınar, H. (2005). The effects of region and gender on students' attitudes towards environment. *Eğitim ve Bilim, 30*(136), 77-83.

Türkmen, H. (2008). Turkish primary students' perceptions about scientist and what factors affecting the image of the scientists. *Eurasia Journal of Mathematics, Science & Technology Education, 4*(1), 55-61.

United Nations Educational, Scientific and Cultural Organization. (1975). *The international workshop on environmental education. Belgrade final report.* Paris: UNESCO Press.

United Nations Educational, Scientific and Cultural Organization. (1977). *Intergovermental conference on environmental education. Tbilisi final report.* Paris: UNESCO Press.

United Nations. (2012). *The future we want*. New York: United Nations Press

Volk, T. L., & Cheak, M. J. (2003). The effects on an environmental education program on students, parents and community. *The Journal of Environmental Education, 34*(4), 12-25

Vygotsky, L. S. (1971). *The psychology of art.* Cambridge: The MIT Press.

Wiersma, W., & Jurs, S. G. (2005). *Research methods in education* (8th ed.). Boston: Allyn and Bacon.

Yardımcı, E., & Kılıç, G. B. (2010). Children's views of environment and environmental problems. İlköğretim *Online, 9*(3), 1122-1136.

Yavuzer, H. (2010). *Resimleriyle çocuğu tanıma* (10. basım). İstanbul: Remzi Kitabevi

Yıldırım, A. ve Şimşek, H. (2008). *Sosyal bilimlerde nitel araştırma yöntemleri* (6. basım). Ankara: Seçkin.

Yücel, A. S. ve Morgil, F. İ. (1999). Çevre eğitiminin geliştirilmesi. *Balıkesir Üniversitesi Fen Bilimleri Enstitüsü Dergisi, 1*(1), 76-89.

Zoldsova, K., & Prokop, P. (2006). Education in the field influences children's ideas and interest toward science. *Journal of Education and Technology, 15*(3), 304-313.