

## The Impact of Environmental Education Based on Nature Experience on the Cognitive and Affective Domains of Primary School Students towards the Environment\*

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### ABSTRACT

In this study, it is aimed to determine the effect of environmental experience based on nature experience on environmental related cognitive and affective domains of primary school students. The study group of the study consisted of 22 students, 11 of whom were girls and 11 were boys, who were in fourth grade of a state primary school in Istanbul-Kadikoy in 2018. In the study, one-group pre-posttest experimental design was preferred from quantitative research methods. The experiment group was provided with 15 hours of environmental education for 3 weeks based on the nature experience. At the beginning and the end of the study, "Environmental Emotion Scale" and "Environmental Information Scale" pre-post tests were applied to the experimental group. In the analysis of the data, "t test analysis" was performed for the related samples. According to the results of the study, environmental education based on nature experience positively influenced and improved the cognitive and affective domains of primary school students.

**Keywords:** Nature Experience, Environmental Education, Cognitive Domain, Affective Domain.

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## Doğa Deneyimine Dayalı Çevre Eğitiminin İlkokul Öğrencilerinin Çevreye Yönelik Bilişsel ve Duyuşsal Alanlarına Etkisi\*

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### ÖZET

Bu araştırmada, doğa deneyimine dayalı çevre eğitiminin ilkökul öğrencilerinin çevreye yönelik bilişsel ve duyuşsal alanlarına etkisinin belirlenmesi amaçlanmaktadır. Araştırmanın çalışma grubunu, 2018 yılında İstanbul-Kadıköy ilçesinde bir devlet ilkokulunda dördüncü sınıfta öğrenim gören 11'i kız 11'i erkek toplam 22 öğrenci oluşturmuştur. Araştırmada nicel araştırma yöntemlerinden tek gruplu ön-son test deneysel desen tercih edilmiştir. Deney grubuna doğa deneyimine dayalı 3 haftalık 15 saat çevre eğitimi verilmiştir. Araştırmanın başında ve sonunda deney grubuna "Çevre Duygu Ölçeği" ile "Çevre Bilgi Ölçeği" ön-son testler uygulanmıştır. Verilerin analizinde ilişkili örneklem için t testi analizi yapılmıştır. Araştırmada ulaşılan sonuca göre doğa deneyimine dayalı çevre eğitimi ilkökul öğrencilerinin çevreye yönelik bilişsel ve duyuşsal alanlarını olumlu yönde etkilemiş ve geliştirmiştir.

**Anahtar Kelimeler:** Doğa Deneyimi, Çevre Eğitimi, Bilişsel Alan, Duyuşsal Alan.

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## **Introduction**

*We do not inherit the earth from our ancestors.  
We borrow it from our children.  
(Native Proverb)*

The Mankind consumes the world entrusted to him in a rough manner. It increases the wasting and extravagance caused by industrialization and human thoughtless use of nature (Erten, 2004) and the individual consumption, at a rate that can be said wildly; the pollution caused by this madness is a common problem of humanity (Aydeniz & Brohi, 1993). However, the point of industrialization has reached the dimensions that threaten the natural balance and unfortunately, it has been faced with environmental disasters which are impossible to restore (Yucel & Morgul, 1991). The natural balance which has the property of renewing itself is losing its power with the excessive pollution it faces (Gungor & Ogelman, 2015, p. 180). In the report "Inheriting a Sustainable World: Atlas on Children's Health and the Environment" explained by The World Health Organization ([WHO], 2017), it is indicated that 25% of children under five years of age, that is 1.7 million, are exposed to an unhealthy and dirty environment each year, so caused the children has lost their lives. In the same report, it is emphasized that the prevention and compensation of the environmental disasters, which are started with industrialization, are again in the hands of mankind. The Mankind should make changes in nature for his own life. However, these changes should be protective rather than ecological disruptive activities. In order to change the environmental information, attitudes and behaviors of people who will take protective measures, they should be educated by formal and informal ways starting from pre-school (Ozbugutu, Karahan, & Tan, 2014).

In our world, the increase in environmental pollution in way such that limiting the life, also increased the significance of the implementation of training programs that will enable the education of the conscious individuals, who has the environmental information and realize the deteriorations in the nature and in her/his surrounding and who developed sensitivity through the awareness that she/he obtained, and it made that obligatory (Ozdemir, 2010). In other words, as a result of the increase in environmental problems in the

whole world, environmental education has become an individual and social necessity (The Republic of Turkey, Ministry of Environment and Forests, 2004, p. 455). Environmental education is an education that aims to develop and change individuals' environmental ethics, consciousness, knowledge, attitude and behavior in a positive direction (Atasoy & Erturk, 2008; Gulay-Ogelman & Gungor, 2015). This education is very important for societies to develop a behavior that protects the environment. This is defined as environmental awareness, not to be neutral and insensitive to the deterioration of the environment, not to exhibit selfish behaviors to the environment in which it lives, and to develop environmentally friendly behaviors. Environmental knowledge is the attitude of the person towards the environment and behaviors that are beneficial to the environment (Ertem, 2004). In this sense, the aim of environmental education is to educate individuals who are sensitive and positive behaviors to the environment (Ministry of Environment and Forestry, 2004, p. 452).

As environmental problems increased, the necessity of environmental education became more perceptible. The North American Association for Environmental Education (NAAEE) is an association founded to promote environmental education in the world and to support the work of individuals and groups interested in environmental education through education, research and service and to educate individuals in environmental literacy (NAAEE, 2001, 2017). NAAEE (2010) defines the environmental literacy individuals as the individuals who have knowledge, intellectual skills, attitudes, experience and motivation, and who understand the environmental processes and systems, and who can analyze global, social, cultural, political, economic and environmental relations for the purpose of making the decisions related with the environment and acting accordingly, and as the individuals, members of societies and as the world citizen, who assess various aspects of the environmental problems for making the responsible decisions. NAAEE, in order to achieve these objectives, supports effective education, problem-solving, policy-making and the analysis and understanding of environmental issues and questions as the basis of management (NAAEE, 2001). Similarly, it is stated that environmental education should be given to children of compulsory

school age to create a healthy environment (Ministry of Environment and Forestry, 2004, pp. 455-456).

It is necessary to include the love of environment and nature into the environment curiosity that starts as soon as children are born. Positive nature experiences in early childhood are important for the development of nature sensitivity (Nykänen & Kinnunen, 1992, cited in Jeronen, Jeronen, & Raustia, 2008). The formation of environmental awareness and love of nature in the students can be provided by empathy developed for nature at an early age (Yasaroglu, 2012, p. 22). Human awareness increases to the extent that empathy can be established, and children whose awareness are increased through the trainings provided love and protect nature and environment (Gulay-Ogelman & Gungor, 2015, p. 182). Nature experiences in childhood have shown that when they are adults, they are effective in protecting nature and developing an environmentalist perspective (Wells & Lekies, 2006). According to Guler (2009), environmental education should be carried out in nature so that children can improve their environmental awareness. Nature-based environmental education increases children's interest in environmental information and ecological life (Otto & Pensini, 2017). Environmental education based on nature experience has shown that environmental awareness and environmental risk perceptions of students increased (Ozdemir, 2010). While the environmental information of students does not directly affect their behavior, affective factors affect the behaviors towards the environment (Alp, Ertepinar, Tekkaya, & Yilmaz, 2006).

Preservation of ecological balance, introduction of recycling and increasing its activities and finding solutions to environmental problems can be realized through environmental education. In environmental education based on nature experience, “Ecological Learning” or “Green Class” applications are used. These practices are very valuable for students to understand the habitats of living beings, recognizing their relationships with inanimate assets, recognizing recycling in the nature cycle and being willing to participate in recycling activities (Ozdemir & Uzun, 2006). Environmental education and developing the empathy with the environmental in the environmental education and exhibiting protective behavior are very important in terms of future sustainability (Inal, Kaya, Uyanik, & Yasar, 2012, p. 31).

It is becoming more and more important to train individuals who are conscious of the environment. Environmental awareness enables the development of positive attitudes and behaviors to protect the environment which is the living space of all living things. As is the case in many countries, the protection of the environment is also subject to the laws in our country. The aim of the Environmental Protection Law No. 2872 is as follows: "To ensure the protection of the environment, which is the common existence of all living things, in line with the principles of sustainable environment and sustainable development principles." (Official Gazette, 1983, 18132, p. 499). In order to perform the environmental education in schools in a planned manner, the Ministry of Environment and Ministry of National Education signed "Protocol on Cooperation in Environmental Education Issues" on the date of 14.10.1999, and started the implementation of the 2003-2004 Academic Year Applied Environmental Education Pilot Project (Ministry of Environment and Forestry, 2004). In the content of seventeen sustainable development objective identified by The United Nations Development Program (UNDP), the stoppage of the environmental deterioration by supporting the projects, which are in the areas of climate change, renewable energy, energy efficiency, land degradation, water management, sustainable development, protected areas and biodiversity, are included (UNDP, 2018). Recycling of wastes within sustainable development projects has a substantial place in national economies. Recycling primarily prevents wastefulness thus prevents to go for nothing of the waste materials which may be beneficial, and it prevents unnecessary energy use, also reduces the use of raw materials and prevents the problem of waste materials in crowded areas (Foundation for Environmental Protection and Packaging Waste Assessment [CEVKO], 2017). In recycling, it is aimed to prevent the formation of wastes and to make then reusable by exposing the solid wastes such as glass, plastic and paper to physical and chemical processes (Gonullu, Dogan, & Çelik, 2015).

The nature education, supported by activities, has a positive effect on environmental attitudes of children. In a study on recycling and evaluation of wastes, it was observed that the education given to the students provided protection of the environment and the use of resources more effectively without wasting, and the education

provided through experiencing had very impressive results (Onur, Caglar, & Saglam, 2016, p. 2467). The most effective, permanent and attractive learning is experience-based learning (Ballantyne & Packer, 2009). In terms of developing a positive attitude towards recycling, which is one of the main environmental protection activities, it is important to provide training for nature experienced practice. From this point of view, this study has been tried to determine the effect of environmental education based on nature experience in the cognitive and affective domains of the students towards the students' surroundings. For that purpose, the following hypotheses were tested.

H<sub>1-1</sub>: Environmental education based on nature experience positively affects the students' cognitive domain for environment and recycling.

H<sub>1-2</sub>: Environmental education based on nature experience positively affects the students' affective domain for environment and recycling.

## **Method**

### **Research Design**

In this study, experimental designs were used from quantitative research methods. “The research pattern is a deliberate plan developed by the researcher in order to answer the questions or test the hypothesis of the research” (Buyukozturk, 2014). Experimental study is the study of the cause and effect relationship between variables (Buyukozturk, 2014). The study was carried out according to the experimental pattern of single group pre-post test. The effect of the program applied in a single-group pre-post test experimental pattern is tested with the study performed on a single group. The path followed in the single-group pre-post test experimental pattern is given in Table 1.

**Table 1. Research Design**

| <b>Experimental Group</b>   | <b>Pre-test</b>  | <b>Experimental Process</b>                                | <b>Post-test</b>   |
|---|--|--|--|
| DG (student group in which environmental education based on nature experience is performed) | Environmental Emotion Scale<br>Environmental Information Scale | Environmental training program based on nature experience) | Environmental Emotion Scale<br>Environmental Information Scale |

Applied nature training is provided to the experimental group. The training program was prepared by researchers. Trainings were given by researchers and the lecturers who are in charge of civil society organizations and public institutions.

### **Study Group**

The study was conducted in the Kadikoy district of Istanbul in 2017/2018 academic year on a group of 11 girls and 11 boys with a total of 22 students who were randomly defined from students who were in the grade four in a primary school.

### **Data Collection Tools and the Collection of Data**

In the study, the Environmental Sentiment Scale (ESS) and the Environmental Information Scale (EIS) developed by Avan (2011) were used. Environmental Sentiment Scale was used to measure the impact of environmental education based on environmental experience on the affective domain of the students, and Environmental Information Scale was used to measure the impact on cognitive domain of the students. Environmental Sentiment Scale consists of 17 items and 4 factors. The sub-dimensions are called as "the desire to live in a clean environment (between the articles 1-7)", "the reuse of plastics (between articles 8-11)", "how the plastics, which are scattered around the environment, affect us emotionally (between articles 12-15)" and "the effect of the use of plastic and glass on human health (between articles 16 and 17)". "Cronbach Alpha Reliability Coefficient" of the scale in this study was calculated as 0.70. Environmental Information Scale consists of 22 items and 3 factors. The sub-dimensions are called as "recycling and environmental problems (between articles 1-3)", "damages to environment caused by plastics (between article 14-19)", "the use of



plastics as an energy source (between articles 20-22). Cronbach alpha value of the scale was 0.84. The scales are 5-point Likert-type scales. The data were collected by the researchers by applying the pretest and posttest to the scales working group.

### **Experimental Process**

The training program based on the nature experience used in the research was prepared by the researchers. The study is planned as one lesson hour per week and 15 lesson hours per week. Klauter and Köhler (1991) proposed a 4-stage training model for the environment education based on experience of nature as → Living (Experience) → Knowing → Understanding → Behavior and Values. In this study, "Living (Experience) → Knowing → Understanding → Emotion" training progress was followed. Within the framework of the training program, the separation and storage of the wastes in the solid waste center were examined, the plants in the botanical park were introduced and endemic plants were examined, and some studies were carried out in the salt garden, which is a part of the botanical park and showing the effects of environmental disasters on plants and soil. Within the framework of the training program, the nature, environment and recycling animation films on the subject of the education they will receive were presented to the students. In the schoolyard, the play called "I am Discovering Trees", which was written by the researchers was played, and the study with the purpose of knowing the trees that they named with their own characteristics. The compost conversion unit prepared for the recycling of organic wastes in the botanical park was visited, and endangered plants and tropical plants were examined in the conservatory greenhouse. During the study, students were enabled to actively participate in the education through the training named "Recycling Adventure of Water" by ISKI officials, and through the workshops of "The Story of Water" and "Seed and the Journey of Seed" by CEKUL, and of "Sustainable Environment" by the Creative Children Association. In the framework of the education, students are enabled to experience the activities given below.

- ✓ Below given practices were conducted to ensure that children have knowledge about biodiversity, and to enable people to realize the harm that they give to nature while creating their living spaces, and to ensure that human beings can create living

spaces without damaging the environment and nature, and to enable them to reflect on their feelings.

✓ While exploration and observation were carried out in the school yard, they were asked to observe and explain the characteristics of the trees that they saw every day.

✓ In the study on the tree varieties in the schoolyard, the trees in the garden of their school were introduced. Together, the trees were named, and the names were hung on the branches of the trees.

✓ In the schoolyard, the play called "The Discovery Road in My School" was played, and it was observed whether they recognized the trees or not.

✓ A workshop, called "World of Discovery" which aims to raise awareness of nature and sustainability, by the Association of Creative Children.

✓ In NGBB, which is the only botanical park in the world that was set up between highways, the nature walk was performed. The discussions were made on the plants available here and the effects of environmental pollution. They received information from experts here, and they were informed about the endangered plants in the NGBB (Nezahat Gokyigit Botanical Park) park in nature walk. Also, endangered and endemic species were examined.

✓ They were enabled to conduct observations for the determination of recyclable wastes in their environment. Observations and determinations that they carried out were discussed. Animation Film with "Recycle" theme was shown to them.

✓ In Kadikoy Municipality - Solid Waste Recycling Center, this group was informed by a specialist. They were enabled to ask the questions in their minds to the experts.

✓ The Animation Cartoon Film named "Technological Waste" was shown to them, and they were asked to list the technological wastes in their houses.

✓ Determination of the technological wastes in their homes, and launching a campaign at the school to participate in the

"Recycling of Technological Wastes" competition organized by Kadikoy Municipality.

✓ Different habitats were examined in the NGBB, and tropical plants in the conservatory and the frogs living in reed beds were examined.

✓ National Geographic Nature Documentary was watched. The species they saw in this film were talked about. Information on endangered organisms and environmental awareness was given.

✓ "The Story of Water", the workshop on the current situation of water resources in the world and in our country and the steps to be taken for the protection of water resources was carried out by CEKUL.

✓ "Training of Water Treatment of the City in which They Live" was given by ISKI officials. An animation film about water treatment was shown in the classroom. Water pollution concepts were discussed.

✓ CEKUL Foundation, with the study named "I am Learning from the Nature" gave training to learn about different species and habitats in nature.

✓ In Nezahat Gokyigit Botanic Park, nature and compost storage centers were examined. They made inspections in the compost storage area. They were informed about the organic wastes.

### **Analysis of Data**

The data were analyzed over the total score obtained from the scales. Descriptive analysis and related samples t-test were performed in the analysis of the data. Related samples t test tests whether the difference between the group average is meaningful (Buyukozturk, 2014). SPSS computer program was used in data analysis.

### **Findings**

The data were collected with the help of "Environmental Sentiment Scale" and "Environmental Information Scale", and descriptive and related samples were analyzed by t test. The results of the descriptive analysis are given in Table 2.

**Table 2. Descriptive Analysis Results of Scales**

|                  | Information Pre-test | Sentiment Pre-test | Information Post-test | Sentiment Post-test |
|------------------|----------------------|--------------------|-----------------------|---------------------|
| <b>N</b>         | 22                   | 22                 | 22                    | 22                  |
| <b>Average</b>   | 3.19                 | 3.20               | 3.98                  | 4.31                |
| <b>Median</b>    | 3.13                 | 3.13               | 3.97                  | 4.44                |
| <b>Mode</b>      | 3.14                 | 2.68               | 3.55                  | 4.47                |
| <b>Std. Dev.</b> | .43                  | .56                | .60                   | .443                |
| <b>Variance</b>  | .19                  | .32                | .36                   | .196                |
| <b>Range</b>     | 1.41                 | 2.11               | 2.18                  | 1.68                |
| <b>Minimum</b>   | 2.50                 | 2.26               | 2.82                  | 3.32                |
| <b>Maximum</b>   | 3.91                 | 4.37               | 5.00                  | 5.00                |

Table 3 shows that the levels of environmental information ( $\bar{X}=3.19$ ) before environmental education based on the nature experience and the levels of emotion ( $\bar{X}=3.20$ ) were “**moderate**”; the levels of environmental information ( $\bar{X}=3.98$ ) after environmental education based on the nature experience of the students were “**good**” and the levels of emotion ( $\bar{X}=4.31$ ) were “**very good**”.

The results of the related groups t test where the average scores of the students' environmental knowledge levels are compared before and after the environmental education based on the nature experience are given in Table 3.

**Table 3. T-Test Results of Average Points of Environmental Information Scale Pre-test and Post-test**

| Measurement      | N  | $\bar{X}$ | Ss   | sd | t     | p    |
|------------------|----|-----------|------|----|-------|------|
| <b>Pre-test</b>  | 22 | 3.19      | .436 |    |       |      |
| <b>Post-test</b> | 22 | 3.98      | .601 | 21 | 5.880 | .000 |

When Table 3 is examined, it was determined that the students' environmental knowledge level increased significantly as a result of environmental experience based on nature experience ( $t_{[21]}=5.88$ ,  $p<.01$ ). While the average level of environmental knowledge of the students before the environmental education based on nature

experience was  $\bar{X}=3.19$ , the environmental information levels after the education increased to  $\bar{X}=3.98$ . This finding shows that environmental education based on nature experience has a significant effect on increasing the environmental knowledge level of students. Table 4 presents the results of the related groups t test, in which students' environmental sentiment levels are compared before and after environmental education based on the nature experience.

**Table 4. T-Test Results of Average Points of Environmental Sentiment Scale Pre-test and Post-test**

| Measurement | N  | $\bar{X}$ | Ss   | sd | t     | p    |
|-------------|----|-----------|------|----|-------|------|
| Pre-test    | 22 | 3.20      | .568 | 21 | 8.479 | .000 |
| Post-test   | 22 | 4.31      | .443 |    |       |      |

When Table 4 is examined, it was determined that environmental sentiment levels increased significantly as a result of environmental experience of students based on nature experience ( $t_{[21]}=8.47$ ,  $p<.01$ ). While the environmental sentiment average of the students before environmental education based on the nature experience was  $\bar{X}=3.20$ , the environmental sentiment levels after the training increased to  $\bar{X}=4.31$ . This finding shows that environmental education based on nature experience has an important effect on increasing the students' environmental sentiment levels.

### **Conclusion, Discussion and Recommendations**

The main reasons for the environmental problems that we consider today as a problem in the world and in our country stem from the lack of knowledge and awareness. A society, who does not have knowledge and consciousness, cannot realize that other societies will use the world in which they live now (Ministry of Environment and Forestry, 2004, p. 455). However, environmental awareness of children is high (Vatansever Bayraktar & Firat, 2018). According to children, although environmental problems are not independent of each other, most of these problems are caused by people. In addition, children concern and fear for the environment today and in the future (Sadik, 2014). Therefore, it has revealed the importance and necessity of environmental education in order to make individuals

in specific sense, and society in general sense, and to make it a behavioral way. Today, the aim of environmental education is to educate individuals with ecological literacy, environmental knowledge, positive attitude towards the environment and transformed into behavior (Demir & Yalcin, 2014, p. 17). In this study, it is aimed to determine the effect of environmental education based on the nature experience given to the fourth-grade students on the cognitive and affective areas of students. In this study, it is aimed to determine the effect of environmental education based on the nature experience provided to the fourth-grade students on the cognitive and affective domains of students.

When "experience-based learning" and "teacher-centered learning" are compared, 49% of students' learning is based on experience and 31% is based on teacher-centered education (Ballantyne & Packer, 2009). At the beginning and at the end of our study, according to the findings obtained by the application of environmental information and environmental sentiment scales to the experimental group, the significant increase in the environmental information levels and environmental sentiment levels of the students showed that environmental education based on nature experience increased the awareness of students about their environment and recycling activities. According to these findings, it can be said that environmental education based on nature experience significantly increases the cognitive and affective levels of the students about the nature and recycling activities. These results are in parallel with the studies in the literature. For example, in the experimental study conducted by Lisowski and Disinger (1991) with 79 students, the effect of nature experience on the understanding of environmental concepts was investigated. Plant and animal observations were made for 7 days and their habitats were examined. It has been shown in the tests that the studies in nature have an influence on the learning of the ecological terms and the use of them later. Bogner and Wiseman (2004) in their experimental studies showed that environmental education given to children based on nature experience has a positive effect on their positive attitude towards environment and development of protection consciousness. In the research conducted by Uzun, Saglam and Uzun (2008), the applied environmental education based on the green class model increased the students' level of environmental awareness and provided the

permanence of learning. In their study, Ballantyne and Packer (2008) found that in addition to the knowledge that the students had in the classroom, giving nature-trained environmental education increased their knowledge more, and provided permanent changes in their attitudes and behaviors. Onur, Caglar and Salman's (2016) study showed that the recycling and recovery training showed positive changes in children against the evaluation of wastes. In a study by Wells and Lekies (2006), it was found that there was a positive relationship between environmental behaviors in older children due to their nature experience, such as hiking or playing in the forest or camp, collecting flowers or crops, and tree or seed bread and plant care.

Based on the results of the research, it can be suggested to add environmental observation and environmental examination as much as possible to the environmental education given in the schools in the appropriate environment and conditions. The recycling activities which are at the forefront of environmental protection activities can be performed in the school as applied, and trips to centers where recycling activities such as solid waste recycling, water treatment plant can be organized. Schools can cooperate with non-governmental organizations operating in the field of environmental protection and participate in training and workshops organized by these organizations during the academic year. An environment can be created to introduce students to nature and environment education at the earliest ages, to create as much opportunities as possible, to experience the environmental knowledge they have learned in the school environment and to increase their environmental awareness. Educators should support environmental experience based on nature experience and organize activities that enable children to receive environmental education based on experience from the young ages. In order to provide students with natural consciousness, tree planting, tree care, nature walks, and camps can be organized regularly and in certain periods.

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