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# Effects of Nature Education on Environmental Knowledge and Attitude as an out of School Learning Environment

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## ABSTRACT

The main purpose of nature education is to help students to recognize and understand nature for a sustainable future and a liveable environment, to teach the importance of the world in which they live by providing education that integrates individuals with nature. In this respect, it is very important to implement nature education and to evaluate the results. The purpose of this study was to investigate the effects of nature education in an out-of-school learning environment on the environmental attitude and environmental knowledge of the primary schools' 7th and 8th grade students. In this context, single group pretest-posttest experimental design was used in the study. The study group was determined by the stratified sampling method. In this context, 47 7th and 8th grade students in the province of Kastamonu in the 2015-2016 academic year were selected according to their disadvantages and volunteered to participate in the study. As a data collection tool, environmental knowledge testing and attitude scale towards the environment was used. The data were analyzed by t-test for dependent samples. As a result of the education, it was found that there was a significant increase in the knowledge level of the students and a positive change in their attitudes. According to these findings, it is concluded that nature education serves its purpose and should be expanded.

***Keywords:*** *Nature Education, Ecology, Sustainable Environment, Out-of-School Learning*

# Okul Dışı Öğrenme Ortamı Olarak Doğa Eğitiminin Çevre Bilgisi ve Tutumu Üzerine Etkisi


## ÖZET

Doğa eğitimlerin temel amacı öğrencilerin sürdürülebilir bir gelecek ve yaşanabilir bir çevre için doğayı tanımalarına ve anlamalarına yardımcı olacak, bireyleri doğayla bütünleştirecek bir eğitim vererek yaşadığı dünyanın önemini kavratmaktır. Bu açıdan ekoloji temelli doğa eğitimleri uygulanması ve sonuçlarının değerlendirilmesi oldukça önemlidir. Bu çalışmanın amacı, okul dışı öğrenme ortamında doğa temelli eğitimin, ilköğretim 7. ve 8. sınıf öğrencilerinin çevresel tutum ve çevre bilgileri üzerindeki etkilerini araştırmaktır. Bu bağlamda çalışmada tek grup öntest-sontest deney tasarımı kullanılmıştır. Çalışma grubu tabakalı örneklem yöntemi ile belirlenmiştir. Bu kapsamda dezavantaj durumlarına göre 2015-2016 eğitim-öğretim yılında Kastamonu ilinde bulunan yedinci ve sekizinci sınıf düzeyinde öğrenim gören ve çalışmaya katılmaya gönüllü olan 47 öğrenci seçilmiştir. Veri toplama aracı olarak çevresel bilgi testi ve çevreye yönelik tutum ölçeği kullanılmıştır. Veriler bağımlı örnekler için t-testi ile analiz edilmiştir. Öğrencilerin eğitim sonucunda bilgi düzeylerinde önemli derecede bir artış olduğu ve tutumlarında da olumlu yönde değişim gerçekleştiği tespit edilmiştir. Bu bulgulara göre doğa eğitiminin amacına hizmet ettiği ve yaygınlaştırılması gerektiği sonucuna ulaşılmıştır.


***Anahtar Kelimeler:*** *Doğa Eğitimi, Ekoloji, Sürdürülebilir Çevre, Okul Dışı Öğrenme*


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## 1. INTRODUCTION

In the world, living and nonliving creatures constantly interact with each other in various circles. Carbon cycle, water cycle and life cycle are some of the examples. Although these cycles seem sustainable in a balance, it is thought that conscious out-of-cycle activities of human beings are not at peace with the environment and nature itself. People on earth use natural sources for various purposes and benefits besides accommodation, nutrition and reproduction. It breaks the harmony, balance and cycle between nature and human beings. As a matter of fact, recently more and more people, especially kids, have cared less about nature and consequently interacted less with it (Soga and Gaston, 2016). Particularly, artificial living spaces are being increased as a result of the developments in technology and engineering gradually decrease the level of interaction between individuals and nature. It is indicated that the main reason for this situation is too concreted urbanization. Urban areas are mostly made of artificial substances and it makes cities isolated from the natural systems and processes. As a result, it eliminates the chance of experiencing nature for human beings (Grimm et al., 2008). Moreover, many of today's children do not see where the basic food comes from. Children think that meat comes from the butcher, eggs come from supermarket and milk comes from either bottles or cardboard boxes (Karakaya et al., 2017). In addition to this situation, children's excessive interest in playing computer games, surfing on the Net and addiction to social media make their time of interaction with the natural decrease. Eventually, a child's bond with nature breaks down (White et al., 2018). It is unlikely that the individuals, who are not directly in contact with nature, behave responsibly towards nature. It is estimated that these individuals are expected to develop negative attitudes and behaviours towards nature (White et al., 2018). Because there is some empirical evidence showing that between direct contact with nature and individuals' attitudes and behaviours, there is a positive correlation. Additionally, an individual likes the environment where he/she is in and spends time. Therefore, it is vital that people should interact and contact with nature (Rosa and Collado, 2019). It can be only possible with the help of education, more specifically environment and nature education, helping social and environmental policies (Brody, 2005; Erdoğan, 2015).

Because of developing technology and ignoring the fact that the industrialization should be compatible with nature, people disconnected from nature and lack of knowledge over the environment cause such problems as global warming, loss of biodiversity and depleting of the ozone layer. If this situation cannot be stopped, it is thought and stated that, in the future, these problems will get more serious and life will come to an end (Yılmaz et al., 2002; Yücel Işıldar and Yıldırım, 2008). The main reason for the environmental problems is the negative behaviours. The source of the negative behaviours is the attitude towards the environment and environmental knowledge (Bradley et al., 1999). In Turkey, researches about individuals' environmental attitudes and knowledge shows that the level of knowledge and attitudes of individuals is insufficient (Atasoy and Ertürk, 2008; Gök and Afyon, 2015; Ökesli, 2008; Sönmez and Yerlikaya, 2017; Varoğlu et al., 2018; Topçu and Atabey, 2016). Because of this, to make individuals interact with nature again, stop the ecological imbalance and prevent the environmental problems, individuals' negative attitudes and behaviours and environmental knowledge must be transformed into positive ones. If individuals are properly told how important nature is for living creatures, they are active in solving environmental problems and the time they spend in nature increases, a huge step is taken for a sustainable environment (Özgel et al., 2018).

Development of environmentalist emotions and behaviours among people can be supported with exposing to the out and natural areas. Environmental education programme increases the interaction of individuals with nature, as a result, it helps people learn the environment, directly interact with it and perceive the different aspects of it (Cheeseman and Wright, 2018; Ernst and Theimer, 2011; Thomas, 2005). Also, linking knowledge with the real-life and environment and nature education in the process of applied education have a vital role. Nature education helps people develop awareness, attitude, values and responsible behaviours towards nature (Palmerg and Kuru, 2000). There are studies stating that nature education enhances individuals' attitude and behaviours towards the environment positively (Erdoğan, 2015; Genc et al., 2017; Rosa and Collado, 2019; Keleş et al., 2010; Sarışan Tungaç et al, 2017). Besides, the more the researchers know about the efficiency of nature education programmes, the more they can develop their programmes. Hence, this study examines the effects of nature education TUBITAK project "Mikroalemden Makroaleme Doğayı Keşfederek Öğreniyorum" (From Microuniverse To Macro Universe: Learn the Environment by Discovering) on students' knowledge and attitudes towards the environment, which held in the Mount Ilgaz National Park. In this context, the questions below are sought.

1) Is there a significant difference between environmental knowledge pretests and posttests of the group conducted nature education?

2) Is there a significant difference between environmental attitude pretests and posttests of the group conducted nature education?

## 2. METHOD

The study was conducted with a single group as it was carried out within the scope of the project. The readiness of the students participating in the study, the relationship between researchers and students, and other physical conditions are difficult to keep compared to other groups. Due to the fact that there are variables that are difficult to control and the project is carried out with a single group. The one-group pre-test-post-test design (weak) among an experimental design was chosen as a research method. In this design, experimental procedure is tested via the procedure conducted to the one-sample. The sample's evaluations of dependent variants are obtained by using the same sample and assessment instrument after and before the experimental procedure (Büyüköztürk et al., 2017). The independent variable in the study is nature education and the dependent variables are environmental knowledge and attitude. In the first stage of the study, knowledge test and attitude scale on environmental issues as the pretest are applied to the students. The same tests are also applied as the posttest at the end of the education. Students' answers to the scales are analyzed statistically.

### 2.1. Experiment Group

The experiment group is determined with the help of stratified sampling method (Kılıç, 2013). In this context, 47 students of $7^{th}$ and $8^{th}$-grade in 2015-2016 academic year are selected voluntarily according to their disadvantages from 16 different schools, orphanages of Ministry of Family and Social Policies, central district and villages of central district in Kastamonu.

Table 1. Frequency and percentage of demographic aspects of experiment group.

| Demographic aspects | | Frequency | Percentage (%) |
|---|---|---|---|
| **Socio-economic level** | Low | 23 | 48.9 |
| | Mid | 19 | 40.4 |
| | Upper | 5 | 10.6 |
| **Gender** | Female | 27 | 57.4 |
| | Male | 20 | 42.6 |

According to Table 1., it can be seen that 23 of the participants are on the low, 19 of them are in the mid and 5 of them are in the upper socio-economic class. Also, 27 of them are female students and 20 of them are male students.

## 2.2. Data Collection

In this study, an environmental knowledge test prepared by the project team and including basic concepts of nature education is used. The test is prepared considering the aims of the project and the area studied on and it is reviewed and edited by 5 academics. It consists of 19 items and is prepared open-endedly not to restrict students. Cronbach Alpha ratio of the test is 0,91 for the pretest and 0,88 for the posttest. It is seen that reliability is adequate. Students are given 2 points for correct answers, 1 point for partly correct answers, 0 points for not giving any answer and -1 point for wrong answers. Environment knowledge test is applied to determine the individual's levels of knowing the environment living in and basic concepts of it. Besides, as part of the study, Primary School Students' Environmental Attitude Scale prepared by Gökçe et al., (2007) is used. Cronbach Alpha ratio of the scale is 0,89 for pretest and 0,87 for posttest. This indicates that the scale is reliable. Table 2. shows that whether the environment knowledge and attitude scale have normal distribution or not.

Table 2. Normality test results for the environment knowledge test and attitude scale

| | | $\overline{X}$ | SS | Skewness Ratio | Kurtosis |
|---|---|---|---|---|---|
| **Knowledge Test** | Pretest | 1.55 | 7.24 | 0.33 | -0.10 |
| | Posttest | 14.5 | 8.85 | 0.29 | -.062 |
| **Attitude Scale** | Pretest | 1.29 | 0.19 | 0.57 | -0.25 |
| | Posttest | 1.53 | 0.19 | 0.29 | -0.73 |

In this study, when the data set is analyzed, it is determined that there is no lost data. In the scope of the normality analysis, because Skewness and Kurtosis ratios is between -1.5 and +1.5, scales are within the normal range (Çokluk et al., 2014; Tabachnick and Fidell, 2007). Hereby, students' level of knowledge and attitude changes can be examined. Both questionary forms are applied as pretests and posttests.

## 2.3. Procedure

The project 115B352 (June 7-12, 2015) being within nature education and science schools is supported by TUBITAK 4004. Activities in the project are aimed to make the participants interact with nature actively. The study lasts for a week in Mount Ilgaz National Park, Kastamonu. The project consists of flora and wildlife field practices, birdwatching, insect awareness, first-aid practices in nature, basic astronomy and art workshops on a daily basis and assessment and evaluation activities. Activities are

implemented by academics and guides. For the project, activities on natural environment, biology, botany, zoology, wildlife, ecology, art and various drama workshops are prepared according to the level of 7th and 8th-grade students.4

### 2.4. Data Analysis

Obtained data is analyzed via SPSS. A dependent t-test is applied to Show if there is a significant difference between the group's results of pretest and posttest according to the selected variants. Also, the ratio and frequency distribution of the data is presented.

## 3. FINDINGS

The aim of the study is to investigate the effects of nature education on 7th and 8th-grade students' environment knowledge test and their environmental attitudes. To identify the effects of nature education on students' knowledge of environment, Table 3 presents if there is a significant difference between environment knowledge pretest and posttest.

Table 3. Results of environment knowledge pretest and posttest t-test

| Group | N | $\overline{X}$ | SS | t | df | p |
|---|---|---|---|---|---|---|
| **Pretest** | 47 | 1.55 | 7.24 | -9.44 | 46 | .000* |
| **Posttest** | 47 | 14.5 | 8.85 | | | |

*p<.05

When Table 3 is analyzed, it can be seen that there is a significant difference between the students' results of pretest and posttest (t=-9.44, p<.05). It is clear that the difference is in favor of the posttest (X=14.5 and X=1.55). It indicates that nature education has a positive effect on students' knowledge of the environment.

Table 4 presents students' points of environment knowledge pretest and posttest items

Table 4. Points distribution of environment knowledge pretest and posttest item by item

| Environment Knowledge Test Items | Pretest | Posttest | Difference |
|---|---|---|---|
| 1. What is National Park? | -22 | 11 | 33 |
| 2. What is Natural Park? | 39 | 49 | 10 |
| 3. What are the protected natural areas? | 11 | 8 | -3 |
| 4. What is forest fire? | 0 | 15 | 15 |
| 5. What is ecology? | -2 | 31 | 33 |
| 6. What is wild animal? | 21 | 51 | 30 |
| 7. What is flora? | 6 | 78 | 72 |
| 8. What is fauna? | 8 | 78 | 70 |
| 9. What is endemic species? | -2 | -31 | -33 |
| 10. What is forest? | 37 | 74 | 4 |
| 11. What is coniferous forest? | -4 | 61 | 65 |
| 12. What is broad-leaved forest? | 19 | 57 | 38 |
| 13. What is tree? | -7 | 25 | 32 |
| 14. What is evergreen? | -3 | 68 | 71 |

| Environment Knowledge Test Items | Pretest | Posttest | Difference |
|---|---|---|---|
| 15. What is medical and aromatic plant? | 14 | 48 | 34 |
| 16. What is insect? | -35 | 17 | 52 |
| 17. What is pollination? | 2 | 8 | 6 |
| 18. What is insemination? | -5 | 6 | 11 |
| 19. What is recycling? | -4 | -4 | 0 |

Table 4 presents students' points of environment knowledge pretest and posttest item by item. The biggest difference is seen for the question "What is flora?". Also, there can be a big difference in the question "What is Evergreen?". However, it is seen that students do not show enough development in the questions "What is protected natural area?" and "What is recycling?". It is thought that the most important reason for this situation is misconceptions. It can be concluded that fixing an individual's misconceptions is rather difficult.

The development of students' points of environment knowledge pretest and posttest is presented at the Chart 1.

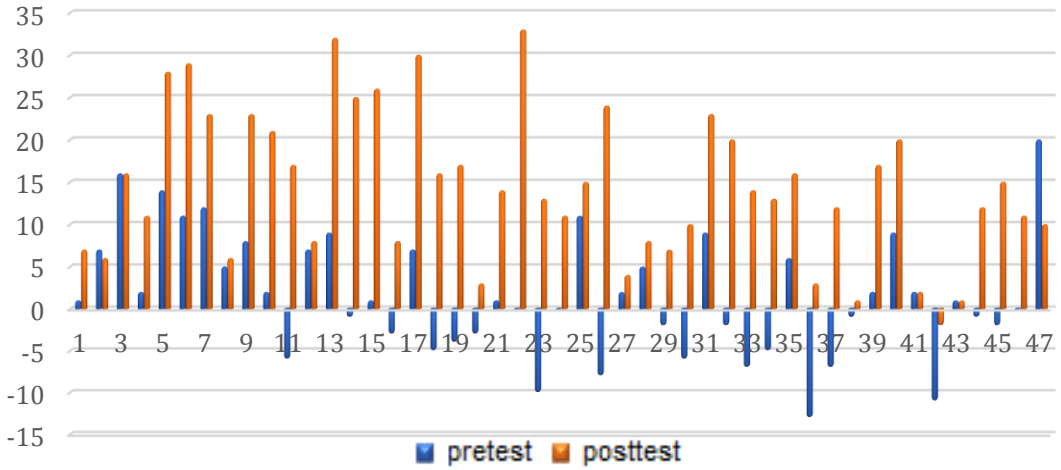


Chart 1. Development of points of environment knowledge pretest and posttest

Chart 1 shows that pretest results are negative for most students. As consequence of the experimental procedure, there are different results for the increase in success depending upon the characteristics of individuals. Although the 22nd student gets 0 point from the pretest, he/she gets 33 points from the posttest. On the other hand, the 47th student shows a negative development. The last mentioned student gets 20 points from pretest, whereas he/she gets 10 points from posttest. It can be assumed that the student has some misconceptions. Chart 2 shows the point results of students' environment knowledge pretest and posttest.

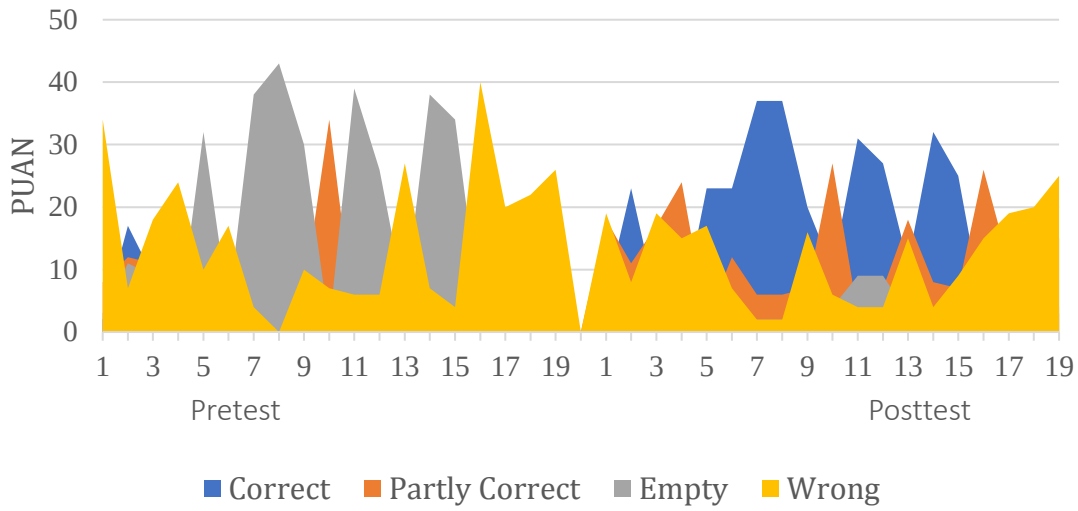


Chart 2. The point results of students' environment knowledge pretest and posttest

Chart 2 tells that more than half of the answers to the questions 1, 13, 16 and 19 are wrong. These findings indicate that students have heard those concepts before but they have not known what those concepts truly mean. Besides, it can be understood that students do not help themselves answering the questions that they do not know the concepts exactly and they are not aware that those misconceptions can lead them to the wrong answers. This is the most important result that shows that there is a misconception. Although nearly half of the students give the wrong answers to the questions 17 and 18, many students do not answer the questions at all because they are not sure or they have not heard the concept before. The vast majority of the students do not have the correct answers to the questions 5, 7, 8, 9, 11, 14 and 15. It is concluded that students do not have any idea on the concepts. The reason for this situation can be that students have not encountered the concepts or students ignore concept because it is too boring for them. It can be seen that the questions that are not given any answers in the pretest are most likely to be answered correctly in the posttest. Additionally, students are more tend to give correct answers in the posttest to the questions in the pretest they do not give any answers than the ones they give the wrong answers.

Table 5 presents the data analysis that shows if there is a significant difference between pretest and posttest conducted to determine the effects of nature education on students' environmental attitudes.

Table 5. Results of environmental attitude pretest and posttest t-test

| **Environmental attitude** | **N** | **$\bar{X}$** | **SD** | **t** | **p** |
|---|---|---|---|---|---|
| **Pretest** | 47 | 1.29 | 0.19 | 5.117 | .000* |
| **Posttest** | 47 | 1.53 | 0.19 | | |

*p<.05

According to Table 5, there is a significant difference between the results of pretest and posttest in their environmental attitudes (t=5.117, p<.05). Average point for the posttest is higher than the average point for the pretest. It can be thought that the time is too short to determine the attitude change. But it can be said that the process for attitude change has begun. Consequently, there is a significant

environmental attitude change thanks to the education and it shows that nature education has a positive effect on students' environmental attitudes.

## 4. RESULTS AND DISCUSSION

The environment is a concept that shapes the future of economy, sociology and education. Our future children start to explore nature and environment since they born. Usually, this type of behavior disappears as people get older. Therefore, nature education should be started as soon as possible according to child growth in order to reach permanent habits and behavior. The importance of nature and environment is increasing day by day and our motto is that they are not the legacy of our ancestors to us but legacy to our children (Bakar et al., 2020).

Nature education was put on the agenda by UNESCO in 1992 and from this date on it has increased in importance (Bozdoğan, 2007; Fadigan and Hammrich, 2004; O'Brien, 2007). In Turkey, it has supported the out-of-school nature education activities since 1999 with the cooperation of MEB and TUBITAK (Erentay and Erdoğan, 2009). These studies have based on national park primarily (Akbash, 2018; Sert, 2017; Soykan, 2009).

Environment knowledge and attitudes towards the environment are effective in individuals' environmental behaviors and taking action towards the environment. Classroom instructions may not sufficient in developing environmental knowledge and attitude. Nature education in an out-of-school learning environment can effective in filling these gaps and eliminating deficiencies. (Erdoğan, 2015). This study can serve as a small but good example to fill this gap and shed light on future studies. Many studies have reviewed the changes in environmental attitude and awareness. Especially, cognitive and affective changes have been taken into consideration. Out-of-school environments aim to combine basic athletic skills and science. Socially, it is clearly known that it makes a great contribution to social relations, success motivation, time management and leadership (Carrier, 2004; Cumberbatch, 1999; Halligam, 2006; Miller, 2008; Murdock, 2007; Schmitt, 2005).

Nature educations have been supported by TUBITAK for over 10 years. These educations basically provide a cognitive alteration, make individuals more sensitive to the environment and also cause some affective changes. Nature educations contain applied educations for students from kindergarten to university. The project "Mikroalemden Makroaleme Doğayı Keşfederek Öğreniyorum" (From Microuniverse To Macro Universe: Learn the Environment by Discovering) provides disadvantaged students from Kastamonu a chance to gain various skills from raising awareness to creating and improving via camping in national parks in Kastamonu.

This study aims to reveal how Kastamonu camping activity, which is an example of nature education, effects environmental knowledge and attitude. During the process, according to results of environmental knowledge pre-test results of the students were negative in many students. In addition, it was determined that some students also had lack of knowledge and hearsay knowledge and some students had misconceptions. One of the main reasons for this situation is that students spend a lot of time with electronic devices such as computers and mobile phones which is thought to be detached from nature. Another reason is that students spend a lot of time in classroom applications and stay away from nature (Yan et al., 2020). In addition, results of the pretest and posttest of knowledge scale, there is a significant difference in favour of posttest results. In other words, it is revealed that nature educations have a positive effect on both students' knowledge on environment and their environmental attitudes. This result refers to a cognitively positive change. On a cognitive basis, this study's findings are similar to the

studies in the literature (Erdoğan, 2015; Farmer et al., 2007; Kruse and Card, 2004; Yıldırım and Akamca, 2017). Besides those findings, there are studies showing that nature education makes a contribution to the environmental knowledge, though not statistically (Erdoğan, 2011).

Nature education places can be considered as open space laboratories that help integrate theory into practice. Here, students have the opportunity to observe different disciplines and interdisciplinary relationships. One of the most important aspects of nature educations is to have an impact not only on cognitive but also on the affective domain. In this study, it is exposed that nature education has a positive effect on environmental attitude. In literature, there are similar studies (Bichelmeyer et al., 2009; Erdoğan, 2015; Güler, 2009; Keçeci et al., 2019; Keleş et al., 2010). In addition, camping and outdoor activities have a high potential on the emotional development of students. This may have caused students' environmental attitude scores to change positively in a short time (Erdoğan, 2011). Those findings are similar to the many other studies' and they suggest that it is necessary to get nature education as an out-of-school learning environment (Güler, 2009; Özdemir, 2010; Keleş et al., 2010; Kıyıcı et al., 2014). Apart from those studies, Erdoğan (2011) claims that in the affective domain, there is no significant difference.

In conclusion, the environment and nature educations are rather vital and effective to raise awareness (Erdoğan, 2011; Cappellaro et al., 2011; Güler, 2009; Gülersoy, 2013; Karataş and Aslan, 2012; Tekbıyık et al., 2013). At the end of project, the children followed the researchers to learn seriously during the project and became more willing to approach nature, learn new information about nature and showed great interest in all the activities. This study has also contributed to the development of children's basic life skills, handmade skills, cognitive, inquiry and collaboration skills. It is aimed to raise individuals who are compatible with the cycle and balance of nature by increasing the number of these studies and expanding similar studies.

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## GENİŞLETİLMİŞ ÖZET

### Giriş ve Araştırma Sorusu & Amaç

Doğal çevre ile doğrudan temas halinde bulunmayan bireylerden doğaya karşı sorumlu davranış beklenmesi daha az olası görünmektedir. Doğadan kopuk halde yaşayan bireylerin doğaya ve çevreye karşı olumsuz tutum ve davranış sergilemesi de muhtemeldir. Çünkü insanların doğa ile doğrudan deneyimleri ile onların çevresel tutum ve davranışları arasında pozitif bir bağlantı olduğu gösteren ampirik kanıtlar vardır. Tüm bunların yanında, insan doğrudan deneyim ve etkileşim içinde olduğu ve vakit geçirdiği ortamları sevmektedir. Bu yüzden, insanların doğa ile etkileşime girmesi ve bağlantı kurması büyük önem arz etmektedir. Bunun da çeşitli sosyal ve çevresel politikalara yardımcı olan eğitim yoluyla daha da spesifik olarak çevre ve doğa eğitimi yoluyla gerçekleşebileceği düşünülmektedir.

Öğrenciler arasında çevre yanlısı duygu ve davranışların gelişimi, okul dışı ve doğal alanlara geziler yapılması veya buralarda eğitimler verilmesiyle desteklenebilir. Okul dışı çevre eğitim programları bireylerin doğa ile etkileşimini arttırır, bunun sonucu olarak doğal çevreyi öğrenme ve doğrudan doğa ile etkileşime girmesine ve doğanın farklı boyutlarını algılamasına yardımcı olur. Ayrıca bilginin gerçek yaşamla ilişkilendirilmesi, uygulamalı eğitimin gerçekleşmesi sürecinde, bu tür çevre ve doğa eğitimleri önemli bir yere sahiptir. Doğa eğitimi bireylerin çevreye yönelik farkındalık, tutum, değerler ve çevreye sorumlu davranışlar geliştirmesine katkı sağlamaktadır. Bu alanda yapılan araştırmalar incelendiğinde okul dışı doğa eğitimlerinin bireylerin çevreye yönelik tutum ve davranışları ile çevre bilgisini olumlu yönde geliştirdiğine yönelik bulgulara sıkça raslanmaktadır. Ayrıca eğitimciler okul dışı doğa eğitimi programlarının etkililiği hakkında ne kadar fazla bilgiye sahip olursa, bir o kadar kendi programlarını geliştirebilirler. Bu nedenle, bu çalışmada Ilgaz Dağı Milli Parkı'nda Mikroalemden Makroaleme Doğayı Keşfederek Öğreniyorum adlı ekoloji temelli doğa eğitimi TÜBİTAK projesinin öğrencilerin çevreye yönelik bilgi ve tutumuna olan etkisi incelenmiştir. Bu çerçevede aşağıdaki sorulara yanıt aranmıştır.

1- Doğa temelli eğitim uygulanan grubun çevre bilgi ön test-son test puanları arasında anlamlı bir fark var mıdır?

2- Doğa temelli eğitim uygulanan grubun çevreye yönelik tutum ön test-son test puanları arasında anlamlı bir fark var mıdır?

### Yöntem

Araştırma yöntemi olarak deneme modellerinden (zayıf) tek grup öntest-sontest modeli kullanılmıştır. Bu desende deneysel işlem tek grup üzerinde yapılan işlem ile test edilmektedir. Yapılan çalışmada bilgi testi ve tutum ölçeği ayrı ayrı uygulanmıştır. Çalışmanın ilk aşamasında ön test olarak öğrencilere çevre konularında bilgi testi ve tutum ölçeği uygulanmıştır. Aynı testler eğitimin sonunda son test olarak uygulanmıştır. Öğrencilerin ölçeklere verdikleri cevaplar istatistiksel olarak incelenmiştir.

Çalışma grubu tabakalı örneklem yöntemi ile belirlenmiştir. Bu kapsamda dezavantaj durumlarına göre 2015-2016 eğitim-öğretim yılında Kastamonu ilinde 16 farklı okulda çalışmaya katılmaya gönüllü olan 7. ve 8. sınıf sınıf düzeyinde öğrenim gören 47 yedinci ve sekizinci sınıf öğrencisi seçilmiştir. Çalışma bir hafta sürmüştür.

Yapılan bu çalışmada araştırmacılar tarafından hazırlanan ve doğa eğitimleri kapsamında temel oluşturan kavramları içeren ve proje ekibi tarafından hazırlanan çevre bilgi testi kullanılmıştır. Bu test projenin amaçları ve çalışılan bölge göz önüne alınarak hazırlanmış ve projede görevli beş akademisyen tarafından incelenerek uzman görüşlerine göre düzenlemeler yapılmıştır. Bilgi testi toplamda 19 madde

içermekte olup öğrencileri sınırlamamak adına açık uçlu olarak hazırlanmıştır. Testin Cronbach Alpha güvenilirlik katsayısı ön test ve son test için sırasıyla 0,91 ve 0,88 olarak tespit edilmiştir. Ayrıca çalışma kapsamında Gökçe vd. (2007) tarafından geliştirilen İlköğretim Öğrencileri Çevre Tutum (İÇTÖ) ölçeği kullanılmıştır. Ölçeğin Cronbach Alpha güvenirlik katsayısı ön test ve son test için sırasıyla 0,89 ve 0,87 olarak bulunmuştur.

Araştırmada elde edilen veriler SPSS ile analiz edilerek değerlendirilmiştir. İlişkili tek grubun belirlenen değişkenler yönünden öntest-sontest puan ortalamaları arasındaki farkın anlamlı olup olmadığını test etmek için bağımlı t-testi kullanılmıştır. Çalışmada ayrıca verilerin yüzde ve frekanslarına yönelik dağılımları da verilmiştir.

**Bulgular ve Sonuç**

Araştırmanın amacı okul dışı ekoloji temelli doğa eğitimin ilköğretim yedinci ve sekizinci sınıf öğrencilerin çevreye yönelik bilgi ve tutumuna olan etkisini araştırmaktır. Doğa eğitiminin öğrencilerin çevre bilgisine olan etkisini belirlemek için çevre bilgi ön test son test puanları arasında anlamlı fark olup olmadığı analiz edilmiştir. Süreç boyunca öğrencilerin çevre bilgisi ön test sonuçlarının birçok öğrencide negatif yönde olduğu tespit edilmiştir (11., 14., 16., 18., 19., 20., 23., 26., 29., 30., 32., 33., 34., 36., 37., 38., 42., 44., ve 45. öğrenciler). Ayrıca bazı öğrencilerin bilgi eksikliği olduğu, bazı öğrencilerin de kavram yanılgıları olduğu tespit edilmiştir. Bu durumun temel nedeni olarak öğrencilerin doğadan kopuk olması, bilgisayar ve cep telefonu gibi elektronik cihazlarla çok zaman geçirmesi olabilir. Diğer bir neden ise öğrencilerin sınıf uygulamaları ile çok zaman geçirmesi ve geri kalan zamanın doğadan uzak olması olabilir (Yan vd., 2020). Ayrıca bilgi ölçeğinin ön test ve son test sonuçlarına göre son test sonuçları lehine anlamlı farklılık olduğu tespit edilmiştir ($t=-9.44$, $p<.05$). Buna ek olarak araştırmadan elde edilen veriler incelendiğinde ön testte boş cevap verilen soruların son testte doğru cevap yönünde eğilim gösterdiği belirlenmiştir (14., 22, 24., 38., 44. ve 46. öğrenciler) Bu öğrencilerde istenilen bir değişim olduğunun göstergesidir. Yanlış cevaptan doğru cevaba doğru yönelimin boş cevaptan doğru cevaba olan yönelimden daha az olduğu söylenebilir. Bu durum bazı sorular için doğru cevaptan boş cevaba doğru yöndedir. Diğer bir deyişle, doğa eğitiminin öğrencilerin çevre bilgisi üzerine olumlu bir etkisinin olduğu ortaya çıkmıştır. Bu sonuç, bilişsel olarak olumlu bir değişime işaret etmektedir. Bilişsel açıdan bakıldığında, bu çalışmanın bulguları alanyazındaki çalışmalarla benzerlik göstermektedir (Erdoğan, 2015; Farmer vd., 2007; Kruse ve Card, 2004; Yıldırım ve Akamca, 2017). Bu bulguların yanı sıra doğa eğitiminin istatistiksel olarak olmasa da çevre bilgisine katkı sağladığını gösteren çalışmalar bulunmaktadır (Erdoğan, 2011).

Doğa eğitimi, teoriyi pratiğe entegre etmeye yardımcı olan açık alan laboratuvarları olarak düşünülebilir. Burada öğrenciler, farklı disiplinleri ve disiplinlerarası ilişkileri gözlemleme fırsatı bulmaktadır. Doğa eğitimlerinin en önemli yönlerinden biri sadece bilişsel değil aynı zamanda duyuşsal alanda da etkiye sahip olmasıdır. Doğa eğitiminin öğrencilerin çevreye yönelik tutumlarına etkisini belirlemek için çevreye yönelik tutum ön test son test puanları arasında anlamlı fark olup olmadığı analiz edilmiştir. Analiz sonucuna göre öğrencilerin uygulama öncesi ve sonrası çevreye yönelik tutum test puanları arasında anlamlı bir farkın olduğu görülmektedir ($t=5.117$, $p<.05$). Son test ortalama puanı ön test ortalama puanından daha yüksektir. Çalışmada doğa eğitiminin çevre tutumu üzerinde olumlu bir etkisi olduğu belirlenmiştir. Literatürde benzer çalışmalar bulunmaktadır (Bichelmeyer vd., 2009; Erdoğan, 2015; Güler, 2009; Keçeci vd., 2019; Keleş vd., 2010). Ek olarak, öğrencilerin çevresel tutum puanlarının kısa sürede olumlu yönde değişmesine nedeni olarak kamp ve açık hava etkinlikleri

öğrencilerin duygusal gelişimi üzerinde yüksek bir potansiyele sahip olması gösterilebilir (Erdoğan, 2011). Tutum değişimini belirlemek için bu sürecin çok kısa olduğu düşünülebilir. Fakat tutum değişimi için bir sürecin başladığı anlaşılmaktadır. Sonuç olarak yapılan eğitim sonucunda çevreye yönelik tutumda olumlu yönde bir değişim vardır. Bir başka ifade ile doğa eğitimi öğrencilerin çevreye yönelik tutum üzerinde olumlu bir etkiye sahiptir. Ayrıca doğa eğitiminin ve okul dışı öğrenme ortamının desteklenmesi ve yaygınlaştırılması gerektiğini belirten çalışmalar da mevcuttur (Güler, 2009; Özdemir, 2010; Keleş vd., 2010; Kıyıcı vd., 2014).

Proje sürecinde ve sonunda çocuklar ciddi bir şekilde öğrenmek için araştırmacıları takip ederek doğaya yaklaşmış, doğa hakkında yeni bilgiler öğrenmeye daha istekli hale gelmiş ve tüm faaliyetlere büyük ilgi göstermiştir. Aynı zamanda doğa eğitimi çocukların temel yaşam, bilişsel ve sorgulama, el yapım ve iş birliği becerilerinin gelişimini desteklemiştir.

Bu çalışmada literatürdeki benzer çalışmalar da olduğu gibi doğa eğitiminin bilişsel alanın yanında duyuşsal alanda da etkili olduğu, çevre ve doğa eğitimlerinin farkındalık yaratmada hayati derece önemli ve etkili bir araç olduğu sonucuna ulaşılmıştır (Erdoğan, 2011; Cappellaro vd., 2011; Güler, 2009; Gülersoy, 2013; Karataş ve Aslan, 2012; Tekbıyık vd., 2013). Bu ve buna benzer çalışmaların sayısı artırılarak ve yaygınlaştırılarak doğanın döngüsü ve dengesine uyumlu bireyler yetiştirilmesi hedeflenmektedir.

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