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Research Article

The Effect of Nature Education Activities on the Attitudes and Knowledge Levels of Primary School Students towards the Environment*

Doğa Eğitimi Etkinliklerinin İlköğretim Öğrencilerinin Çevreye Yönelik Tutum ve Bilgi Düzeylerine Etkisi

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ABSTRACT

The main purpose of this study is to investigate the effects of Nature Education Activities (NEA), which are integrated into the lesson but implemented outside the classroom, on the attitudes and knowledge levels of primary school seventh grade students towards environmental education. The sample of this study, which was designed as quasi-experimental, consists of 56 students (30 girls and 26 boys) studying in two branches of a secondary school located in Tire town centre of İzmir province, selected by random sampling. In the study, Environmental Attitude Scale (EAS) and Environmental Knowledge Test (EKT) developed by the researcher were used as data collection tools. The attitude towards the environment and the average of achievement pre, post and permanence tests of the experimental group, in which the Nature Education Activities (NEA) developed by the researcher were applied, were found to be statistically significant compared to the control group.

Keywords: Environmental attitude, environment education, environment knowledge, nature education.

ÖZ

Çalışmanın temel amacı, derse entegre ancak ders dışında uygulanan Doğa Eğitimi Etkinliklerinin (DEE), ilköğretim yedinci sınıf öğrencilerinin çevre eğitimine yönelik tutum ve bilgi düzeylerine etkisini araştırmaktır. Yarı deneysel olarak kurgulanan bu çalışmanın örneklemini rastgele örnekleme yolu ile seçilen İzmir ili Tire ilçe merkezinde bulunan bir ortaokulun iki şubesinde öğrenim gören 56 öğrenci (30 kız ve 26 erkek) oluşturmaktadır. Çalışmada veri toplama araçları olarak, araştırmacı tarafından geliştirilen Çevreye Yönelik Tutum Ölçeği (ÇTÖ) ve Çevre Bilgisi Testi (ÇBT) kullanılmıştır. Araştırmacı tarafından geliştirilen Doğa Eğitimi Etkinliklerinin (DEE) uygulandığı deney grubunun çevreye yönelik tutum ile başarı ön, son ve kalıcılık testleri ortalaması kontrol grubuna göre istatistiksel olarak anlamlı bulunmuştur.

Anahtar Kelimeler: Çevreye yönelik tutum, çevre eğitimi, çevre bilgisi, doğa eğitimi.

* This study was produced from the authors' doctoral thesis titled "The effect of nature education activities on the primary school students' knowledge and attitudes towards environment".

INTRODUCTION

Environmental science is a science that examines the interactions of living things with each other and with their environment (Wilson, 2008). The main subject of environmental science is human, which is within the scope of ecological rules and definitions like other living things. And there is no living thing that affects its environment as much as humans. Therefore, the relationship between human and the environment is incomparably complex with other living things. This complex network of relations has been the subject of not only biology but also other interdisciplinary sciences such as sociology and economics. Therefore, the interaction of people both with each other and with the environment they are in has been the subject of environmental science (Kocataş, 2012). This relationship of human with the environment also highlights his sensitivity. The main purpose and reason of raising environmentally sensitive individuals also includes future obligations. Because a healthy, reliable and sustainable environment is extremely important for the protection of living spaces as well as creating the living space of future generations (Carson, 2007). Human beings, which are the primary source of environmental issues, should also be made aware of their responsibilities as they will also play an active role in solving problems. The way to do this is through an effective, impressive and permanent environmental education that can change attitudes, knowledge and behaviours towards the environment (Altın, Bacanlı & Yıldız, 2002; Artun, 2013; Erten, 2005; Keleş, Uzun & Uzun, 2010; Özbay, 2010; Veeravatnanond & Singseewo, 2010).

In many countries many types of environmental education programs have been developed and their effectiveness has been researched in order to increase awareness and consciousness of environmental issues (Ak, 2008; Hanna, 1995; Leeming & Porter, 1997; Palmberg & Kuru, 2000). According to today's universal norms, the difference of environmental education from classical education models can be defined primarily as including an approach that focuses on the student at the centre, and then develops students' understanding, perception, thinking, discussion and implementation skills (MoNE, 2007). Undoubtedly, confining the student only to the boundaries of formal education is the biggest obstacle to both cognitive and affective development and the development of implementation and alternative solution approaches (Bilton, 2010; Karpudewan et al., 2015; Özerbaş, 2011; Wilson, 2008). In these programs that support environmental education, there are environmental education activities in the classroom, completely outside the classroom or outside the classroom, but integrated with the school (Artun, 2013; Okur, 2012). For example, daily trips to get to know natural areas and centres and/or environmental education activities for natural life or urban settlement areas covering more days can be considered (Alat, Akgümüş & Cavalı, 2012).

When the studies on environmental education are examined, it is seen that the programs carried out as in-class activities are in the majority by a wide margin. However, it is stated that these activities are the least effective programs in achieving environmental education objectives (Akıllı & Yurtcan, 2009; Bilton, 2020). In addition, it is reported that out-of-class programs do not have a remarkable effect on knowledge and attitudes towards the environment, but they are slightly more beneficial when combined with in-class programs (Artun, 2013). In this context, the main pillar of the study is the idea of raising individuals who exhibit positive attitudes and behaviours towards the environment and who are adequately equipped in terms of environmental knowledge. For this purpose, it was investigated how much the activities developed by using the studies called "Nature Education Program" in the literature, which we think will be more effective in attitudes and behaviours towards the environment due to its direct interaction with nature, contribute to the students' attitudes towards the environment and environmental knowledge (Ballantyne & Packer, 2002; Carrier, 2009; Chapman & Sharma, 2001; Erentay, 2013; Güler, 2009; Kalender, 2010; Rickinson, 2001; Storksdieck, Ellenbogen & Heimlich, 2005).

1.1. Theoretical Framework

It is possible to define the concept of environment as the environment in which living and non-living beings interact with each other in the same living space (Yaşaroğlu, 2012). Environment and environmental problems have now gained an international and multifaceted global dimension. No country has the luxury of acting alone, ignoring and postponing environmental problems. A sustainable and healthy environment has many stakeholders in historical, traditional, ecological, psychological, sociological, academic, legal, economic, social, etc. fields. Undoubtedly, the most important and fundamental step of enabling future generations to live in a healthier environment than today is an effective and sustainable environmental education (Artun, 2013; DiEnno & Hilto, 2005; Okur, 2012). Global environmental problems are shaped by value judgements, lifestyles and attitudes of human beings. In the prevention of environmental problems, an educational approach that can positively change view, values and attitudes of human beings towards nature is important (Bogner, 1998; Bögeholz, 2002; Brody & Hall, 2002; Ruiz-Mallen et al., 2009; Zwick & Miller, 1996). In order to develop sensitivity towards environmental problems from a young age, curricula should also be arranged appropriately to raise individuals with environmental sensitivity (Tecer, 2007). The definition of environmental education is generally expressed as formal education continuing in schools. The aim of environmental education is to learn the information about the interaction between human and environment, to explain the related cause and effect relationships and to increase the level of interest (Erentay, 2013; Okur, 2012). Environmental education generally aims to raise individuals with environmental awareness. While environmental education provides the transfer of environmental science and ecological information in general, it aims to develop the attitudes of individuals towards the environment and to reveal behaviours towards the environment in particular. Thanks to environmental education, desired changes are aimed in the cognitive, affective and behavioural learning fields of students. Thus, environmental attitudes, value judgements, knowledge and skills are developed for the protection of the environment, and positive behaviours towards the environment are shown (Erten, 2004; Fisman, 2005; Vaske & Kobrin, 2001; Yardımcı, 2009).

When the publications and researches related to environmental education are examined, in general, it is seen that there are serious disconnections between theoretical knowledge and implementation on environmental education (Bolstad, 2003; Mansaray, Ajiboye & Audu, 1998). Therefore, it is stated that traditional environmental education should be supported with ecology, environment and nature education activities outside the classroom (Artun, 2013; Barker & Lynnette, 2004; Bolstad, 2003; Okur, 2012). In our country, it is seen that research on educational implementations supported by activities based on nature experience is extremely limited (Erdoğan, Uşak & Bahar, 2012). The reason for this situation is that the behavioural education approach has been dominant in education systems for many years and that knowledge transfer does not offer the opportunity to experience in an out-of-class environment (Kırbaşlar, Barış & Ünal, 2009). Based on these needs, in the research, out-of-school nature education activities, which are integrated into school education, were implemented with primary school seventh grade students who take Science and Technology lessons within the scope of the "Human and Environment" unit, which includes biological diversity and environmental problems, and as a result, its effect on the attitudes of the students towards their environment and knowledge levels were tried to be determined. It is inevitable that the programs to be developed for trainings regarding the environment and the solution of environmental problems will include more up-to-date approaches and experiences instead of lessons including memorization (Alat et al., 2012; Güler, 2009). However, the implementations made in many institutions and schools in our country to create environmental awareness are insufficient and cannot be sustainable because they cannot be moved out of the place. In addition, the idea that environmental education should have an independent curriculum as opposed to an interdisciplinary position is common in many countries (Sokoli & Doka, 2004; Duan & Fortner,

2010). Only in this way, environmental education will increase interest, ability and knowledge of students about nature conservation (Güler, 2009).

Studies show that although educators have positive thoughts about out-of-class activities, the physical conditions originating from the school garden are insufficient (Alat et al., 2012). However, there are opinions that the education given in a concrete and sheltered environment where life passes will be more effective in order for the student to understand the global concepts and basic ecological concepts of environmental education, and also to gain a sense of responsibility towards the environment (Atasoy, 2006). However, in order to raise well-equipped individuals, education needs to become more effective and efficient by moving from stereotyped implementations to more up-to-date implementations. (Balım, Pekmez Şahin, & Erdem Özaçık, 2004). Setting and implementation are necessary in order to establish a healthy relationship between knowledge regarding environment and environmental issues, and real life. The way to do this is through nature education activities where travel and implementation are intertwined (Erentay, 2013). Nature activities, which are generally carried out within the scope of science education programs, form the basis of knowledge of students about their environment and related moral values, in other words, their attitudes towards the environment (Özdemir & Uzun, 2006). It is recommended that students be taken to nature trips in a planned way in order to give them the opportunity to see what they have learned in the lesson (Sinan et al., 2014). Even if the duration of a well-planned ecology-based environmental education is limited, it also contributes to students' positive perception, attitude, sensitivity, awareness and positive values towards nature and the environment, and to their critical thinking abilities (Demirsoy, 2012; Durmuş & Yapıcıoğlu, 2014). Another importance of environmental education in natural environments is that it will improve the empathy skills of students (Atasoy, 2006).

Nowadays, more importance is given to out-of-school nature education activities, by considering the positive contribution they make to students' cognitive, affective and psychomotor learning and motivation (Bozdoğan, Ustaoğlu & Bülbül, 2015). The aim of out-of-school environmental education is to create a holistic perspective on the environment. With a holistic perspective, the individual identifies himself with the natural environment and can make sense of the natural environment. In addition, it is aimed that the individual can establish physical and psychological bonds with the natural environment through out-of-school environmental education activities (Harrison, 2010). It is emphasized that out-of-school environmental education is now a field of education on its own rather than completing environmental education in terms of experiences and internalization in the natural environment (Özdemir, 2010). In fact, it is emphasized that the success of environmental education depends on the participation of students in activities carried out in the natural environment (Gotch & Hall, 2004).

METHOD

2.1. Research Model

Different types of experimental methods are used in scientific studies. These methods are classified as; (i) full experimental method with high scientific value, (ii) experimental method which varies according to the number of variables applied and the level of variable, (iii) experimental method which varies according to the number of groups and group variables, and (iv) quasi-experimental method (Çepni, 2009). In this study, quasi-experimental design with pre-test and post-test control groups, which is one of the experimental models, was used (Balcı 2013; Karasar 2012). In the pre-test and post-test control group model, two groups are determined by random method. One of them is used as the control group and the other as the experimental group. Pre-experimental and post-experimental measurements are made in both groups (Karasar, 2012). Sometimes the subjects may not be randomly distributed to the control

and experimental groups, in which case the quasi-experimental method is used as an alternative. In the quasi-experimental method, individuals are distributed to the control and experimental groups in a way that is not random (Çepni, 2009). Within the scope of the study, within the framework of the quasi-experimental design with pre-test and post-test control group, the students in the control group at the secondary school located in Tire district of Izmir, were taught with the activities specified in the Primary School Science and Technology lesson curriculum adopted by the Decision of the Board of Education and Discipline dated 03.06.2008 and numbered 137, and while the lessons are being taught with the relevant methods and techniques by the teacher of the lesson; in the experimental group while the lessons were taught with the relevant methods and techniques by the teacher of the lesson, in addition to these, courses based on the constructivist learning approach and integrated with out-of-school Nature Education Activities (NEA) developed for the needs of the students determined as a result of pre-tests were taught. Since the probability of random distribution of students to groups is low, convenient sampling was preferred.There are 28 students in both experimental and control groups. Before starting experimental implementation, Environmental Attitude Scale (EAS), Environmental Knowledge Test (EKT) were applied to the students in the control and experimental groups as a pre-test and after the experimental implementation as a post-test and permanence test. During the experimental implementation, the group that was educated within the framework of the seventh grade curriculum of the Primary School Science and Technology lesson, which was adopted with the decision of the Board of Education and Discipline dated 03.06.2008 and numbered 137 was evaluated as the control group, and the group to which the lessons were applied that were integrated with out-of-school nature education activities and which includes activities in line with the principles of the constructivist approach was evaluated as the experimental group. Four weeks after the experimental implementation and the implementation of the final tests, the same tests applied as pre-test and post-test were applied as permanence-1 and three months after implementation as permanence-2 test (Table 1).

Table 1. Experimental Design

Group	Pre-Experiment		Experiment Process	Post Experiment
Control Group	Pre-test (T1, T2)	STCM	Post-test (T1, T2)	Permanence Test (P1, P2)
Experimental Group	Post-test (T1, T2)	STCM+NEA	Post-test (T1, T2)	Permanence Test (P1, P2)

STCM: Teaching with the methods and techniques used in the Science and Technology Curriculum; STCM+NEA: In addition to STCM, teaching according to the program integrated with Nature Education Activities with methods and techniques based on constructivist approach; T1: Environmental Attitude Scale; T2: Environmental Knowledge Test; P1: permanence-1 measuring tool for both scale and test; P2: shows the permanence-2 measuring tool for both scale and test.

2.2. Data Collection Tools

Environmental Attitude Scale (EAS) and Environmental Knowledge Test (EKT) were used for the purpose of collecting data in the research. Thus, the quantitative data used in the study were obtained with the help of EAS and EKT measurement instruments. The EAS, which was used in the pre-implementation of the data collection process, is a 63-item 5-point Likert-type scale and was completed within 30 minutes and in a single session. EKT, which is also used in the preliminary implementation, is a multiple-choice test with 24 questions and was completed within 30 minutes and in a single session. Pre-implementations of EAS and EKT were carried out in three primary schools during class hours. For the implementation, the necessary official permissions were obtained from the Ethics Committee of the Institute of Educational Sciences and the Provincial Directorate of National Education, the District Directorate of National Education, the relevant headmasterships were informed were informed and the implementation calendar was created by talking to the Science and Technology teachers in the relevant schools. During the implementation of scale and test, the researcher was present in the three primary schools in the sample and made and observed the implementation directly

with the relevant teachers. The EAS used in the actual implementation of the data collection process is a 30-point 5-type Likert scale and was completed within 30 minutes and in a single session. The EKT, which is also used in the preliminary implementation, is a multiple-choice test with 20 questions and was completed within 30 minutes, in a single session. The actual implementations of EAS and EKT were carried out during the class hours in the secondary school, where the implementation was made in the spring term of 2015. On the other hand, Nature Education Activities (NEA), which were carried out with the experimental group in their natural environment outside the school, were carried out simultaneously with the relevant Human and Environment unit for four weeks in accordance with the activity calendar prepared with the researcher and the lesson teacher. As a result of the control and experimental group classes and NEA implementations, the EAS and EKT post-test, the permanence-1 test at the end of the four-week waiting period, and the permanence-2 test in September 2016 were completed by the researcher in a session within 30 minutes. More detailed information about the measurement instruments is presented below.

2.2.1. Environmental Attitude Scale (EAS)

In the scale development stage, benefited from the following scale development processes: firstly, stages developed by Schwab (1980) and used by Erdemir (2007) and Cengiz (2014), and proposed by Churchill (1979), Hinkin (1995), Hinkin, Tracey & Enz, (1997) and Lewis, Templeton & Byrd (2005), and used by Çulha (2014). While developing the attitude scale, first of all, document analysis (body of literature review, environmental attitude scales in Turkish and foreign languages, textbook, curriculum, etc.) was carried out in order to determine the theoretical framework. At the next stage, after sufficient document research, an item pool of at least twice the number of items in the final form of the scale was created by experts who knew the definitions of the researched subject and the concepts of the subject. At this stage, an initial item pool consisting of 92 items was created with a group including two doctoral students and two science teachers. Afterwards, the questions of the 92-item pool were presented to the opinion of an expert group consisting of 5 faculty members and 4 science teachers, and the suitability was checked on a scale from 1 (not appropriate, omit) to 4 (completely appropriate) on a checklist for each item. At another stage, content validity tests were performed for each item on the environmental attitude scale. For this purpose, the method developed by Lawshe (1975) and used in current studies was used (Çulha, 2014; Wilson, Pan & Schumsky, 2012). The steps followed in this method are as follows: (i) arranging the expressions and answers on a Likert-type scale, (ii) forming the expert group, (iii) receiving expert opinions, (iv) calculating the content validity rate of expressions, (v) selection of expressions, (vi) calculating the content validity indices of the scale, (vii) creating the final scale form according to the content validity rates and index criteria. At another stage, the ethics committee permission required for the pre-implementation of the scale, was obtained. A pre-implementation was made with a 63-item scale form. With the pre-implementation, incomplete and incomprehensible expressions were determined, material and logical errors were corrected and similar expressions were combined. For the pre- implementation, 310 students studying in the eighth grade were selected. Since the Human and Environment unit was taught in the second semester of the seventh grade, it was decided that the appropriate sample should be eighth grade students in the pre-implementation. After this stage, in addition to the researchers who consider the sample size of 100 people sufficient for statistical tests such as factor analysis to be applied in pre-implementation, there are those who suggest that the sample size should be between 5-10 times the number of items (Clark & Watson, 1995; Hair et al., 2003; Kline 1994). Therefore, it was decided that 310 people were sufficient for pre-implementation. In the last stage, Explanatory Factor Analysis (EFA) was preferred for the structure validity of the pre-implementation data. In the event of the development of a new scale in the literature, the use of EFA is recommended on the assumption that the researcher has discovered new factor structures about the scale items and the factors under which they are collected (Byrne, 1994). Kaiser-Meyer-Olkin (KMO) test was used for sample adequacy. The Bartlett test was used to show that the variables are highly correlated and

to test the hypothesis that they have equal variance. Varimax rotation method was used from orthogonal vertical rotation methods to determine the basic components of the scale and to understand what factors the data was loaded into, as a result of the factor analysis, inappropriate items were removed from the scale and it was observed that the scale materials were collected in one factor. Finally, the reliability analysis was performed by testing the differences between the item average scores of the lower 27% and upper 27% groups based on the total scores of the test using the unrelated t-test, item-total correlation, Cronbach's Alpha internal consistency coefficient and Spearman Brown two semi-test correlations.

In the study, Bartlett sphericity test results were determined as $p<0.00$. These values indicate that the multivariate normality assumption is provided for the developed scale. As a result of the analyzes, it was decided that it would be correct to continue the study based on the single-factor results. One reason for this is that the factor in the Environmental Attitude Scale contributes to the total variance at the level of 31%. With this value, it can be said that the factor explains 30% above the total variance, which is enough for a single-factor scale (Büyüköztürk, 2014). On the other hand, the factor loading values of the items were between 0.57 and 0.75. It can be said that the factor loading values of the items are between median and excellent and are within the acceptance limits (Comrey & Lee, 2013). When the common factor variances of the items are examined, it can be stated that the obtained values are sufficient. Common factor variances ranged from 0.32 to 0.56. When the cutting limit is accepted as 0.32 (Comrey & Lee, 2013), it can be said that all common factor variances are at a sufficient level. As a result of all these analyzes, it is seen that the items are collected in a single factor for EAS. The EAS took the final application form as a new 5-point Likert-type attitude scale with 30 items.

2.2.2. The Environmental Knowledge Test (EKT)

While developing the measurement instrument,(i) determining the purpose of the test, (ii) determining the features to be measured by the test, (iii) selecting the most suitable item types for the feature to be measured and creating the item pool of the test by writing the items based on the literature, observation, interview and expert opinion, (iv) examining the suitability of the test items in terms of language with its technical supervision regarding their adequacy in measurement, (v) re-correcting the items according to expert opinions and creating the pre-implementation form, (vi) calculating the test statistics for validity and reliability analysis related to the psychometric properties of the test, and performing the item analysis and giving the final form to the test were followed (DeVellis, 2003).

In the Environmental Knowledge test, which was developed following the steps above and in accordance with the 8 learning outcomes of the relevant unit at the cognitive level, a total of 24 multiple-choice questions, three from each learning outcomes, were prepared to measure the students' knowledge of the environment. While preparing the test, a 40-question item pool was created with a group of two doctoral students and two science teachers, the opinion of an expert group consisting of 5 faculty members and 4 science teachers was taken and limited to 24 questions selected in accordance with the table of signs. All of these are multiple choice questions. The scores that can be obtained from the scale vary between 0 and 100. Excel 2013 program was used to calculate the difficulty and distinguishing indices of the questions using Classical Test Theory (KTK). When the values obtained are examined, it can be said that the questions show a balanced distribution in terms of difficulty levels. In other words, while some of the items in the test were very easy and some were very difficult, most of them were found to be moderate. It was determined that four of the 24 questions had unsatisfactory levels of discrimination. Of the 24 questions prepared for the pre-implementation, 4 questions were excluded from the test, including the 4th question with a distinctiveness (A) and difficulty (G) lower than expected, A/G: 0.17/0.83, A/G:0.05/0.27, A/G:0.16/0.87 question 11 and A/G:0.08/0 .85, respectively. After discrimination, it is necessary to look at the difficulty indices of the questions (Baykul, 2000). When a single question is used, the problem should be of average difficulty. The questions should be distributed in a balanced manner to each difficulty level for a

test, and the average difficulty level of the test should be around 0.50. (Şeker & Gençdoğan, 2006). The average difficulty level of the test items was found to be 0.59. When the KR-20 and KR-21 coefficients and other descriptive statistics of the whole test were examined in the preliminary study, it was determined that the skewness coefficient was -0.49 and the kurtosis coefficient was -0.60 according to the distribution of the total score. On the other hand, KR-20 value was 0.78 and KR-21 value was 0.73. As a result of all these analyses, the EKT received the final implementation form as a new environmental knowledge test with 20 questions and multiple choice.

2.3. Analysis of Data

In order to measure the effectiveness of the experimental procedure with a pre-test and post-test control group, the most appropriate technique in terms of ease of calculation and interpretation is the t-test for unrelated groups, which is used to find out whether there is a significant difference between the average scores of the pre-test and post-test difference scores of the two groups (Büyüköztürk, 2014). The data obtained from the Environmental Attitude Scale applied to the control and experimental groups as well as pre-test and post-test were analyzed using the SPSS package program. In this process, the mean scores of the students' attitudes towards the environment were calculated and comparisons were made between the control and experimental groups with t-test analysis, and the data obtained were given in tables. This test, which was developed in this study and aimed to measure the level of knowledge of primary school students on environmental issues, consists of multiple-choice questions. With the Environmental Knowledge Test to be applied as pre-test, post-test, and permanence test, the information of the students about the Human and Environmental Unit was measured. The scores that can be obtained from the scale vary between 0-100.

Experimental Group Studies: Nature Education Activities (NEA)

Within the scope of this study, in accordance with the data obtained from the pre-test results of the actual implementation, original Nature Education Activities, including the cognitive learning outcomes of the Human and Environment Unit, were designed and implemented to the experimental group students simultaneously with the processing of the relevant unit in the classroom. The activity content of the processes and operations conducted with the experimental group is presented below.

Table 2. Nature Education Activity Processes

Activity Type	Activity Name	Cognitive Outcome
Excursion	Trip to Kuşadası Dilek Peninsula National Park İzmir Metropolitan Municapility Natural Life Park Trip Belevi Wetland Trip Tire Pond trip	Knowing Conception
Let's Get to Know Official Institutions	Ministry of Environment and Urbanization Ministry of Forestry and Water Affairs Directorate General of Nature Conservation and National Park	
Non-Governmental Organizations	Let's get to know TEMA Association for the Conservation of Natural Life	Conception
Essey writing	Comparison of Natural Life Park and National Park	Conception
Vignette implementation	Reverse Tulip of Green Tire	Conception
Visual implementation	Living Environment Banner design	Conception
Drama implementation	Talking Pot	Conception
Environmentally Sensitive Enterprises	Leading Tomato Paste Factory of Tire Bozotti Chemical Factory TOSBİ Wastewater Treatment Plants TOSBİ Solar Power Field	
Learn & Teach	Tire Fatih Park Environmental Cleaning	

(Parent Activity)	Discussing Food Chains	Analysis
My Activity	Puzzle Preparation, Media Follow-up, Documentary Article Writing	
School Implementation	TOSBİ Seedling Planting	

FINDINGS

The first sub-problem of the research; the answer to the question "Is there a significant difference between the control group students in the class in which the seventh grade Human and Environment unit is traditionally given and the experimental group students in a different class supported by the out-of-school NEA applied by the researcher? was sought. To test the accuracy of this sub-problem, answers given by the students as pre-test, post-test, and permanence tests according to the scale of attitude towards the environment, which was improved, were compared statistically. According to preliminary measurements no significant difference was found between the groups ($p>0.05$). Independent sample t-test was used to determine the difference between the attitudes of the control and experimental groups towards the environment in the pre-test. Then, with the same method, it was examined whether there was a difference in the attitude towards the environment between the control and experimental groups in the post-test, permanence-1 and permanence-2 tests. ANOVA test for repetitive measurements (ANOVA) was used to reveal the change in students' attitudes towards the environment in the control group during the pre-test, post-test, permanence-1 and permanence-2 test. The Bonferroni test uses pairwise comparisons of the mean or grouping the means when the group variances are homogeneous. It is a test that mainly allows comparison with each other. With the same method, it was tried to reveal the changes in the attitudes of the students in the experimental group towards the environment during the pre-test, post-test, permanence-1 and permanence-2 test. In this context, the independent sample t-test was applied to test whether the students in the control (7A) and experimental (7B) groups constituting the sample showed statistically significant difference in terms of measurement scores regarding the Environmental Attitude Scale (EAS) before the experimental implementation. The findings obtained are presented below in order.

Table 3. t-Test Results of the Pre-Test Scores of the Environmental Attitude Scale

Sample	N	$\bar{X}$	Ss.	*t*	*p*
Experimental	28	91.07	5.71	0.49	0.62
Control	28	90.32	4.60		

When Table 3 is examined, there is no significant difference between the attitudes of the control and experimental groups towards the environment before the implementation. ($t=0.49$, $p>0.05$) In this context, an independent sample t-test was implemented to test whether the students in the control and experimental groups showed a statistically significant difference in terms of environmental attitude scores after the experimental implementation.

Table 4. t-Test Results of the Post-test Scores of the Environmental Attitude Scale

Sample	N	$\bar{X}$	Ss.	*t*	*p*
Experimental	28	93.40	5.39	-5.46	0.00
Control	28	99.57	0.59		

When Table 4 is examined, there is a statistically significant difference between the attitudes of the control and experimental groups towards the environment after the implementation ($t=-5.46$, $p<0.05$). In this context, an independent sample t-test was implemented to test whether the students in the control and experimental groups showed a statistically significant difference in terms of environmental attitude scores for the permanence-1 test regarding the continuity of the experimental implementation.

Table 5. t-Test Results of the Permanence-1 Test Scores of the Environmental Attitude Scale

Sample	N	$\bar{X}$	Ss.	*t*	*p*
Experimental	28	88.15	6.80	-4.13	0.00
Control	28	94.90	3.91		

When Table 5 is examined, there is a statistically significant difference between the attitudes of the control and experimental groups towards the environment in the permanence-1 test.(t=-4.13, $p<0.05$) In this context, an independent sample t-test was implemented to test whether the students in the control and experimental groups showed a statistically significant difference in terms of environmental attitude scores for the permanence-2 test regarding the continuity of the experimental implementation.

Table 6. t-Test Results of the Permanence-2 Test Scores of the Environmental Attitude Scale

Sample	N	$\bar{X}$	Ss.	*t*	*p*
Experimental	28	87.94	6.76	-3.98	0.00
Control	28	94.61	4.31		

When Table 6 is examined, there is a statistically significant difference between the attitudes of the control and experimental groups towards the environment in the permanence-2 test (t=-3.98, $p<0.05$). Accordingly, according to the results of the independent sample t-test, while the attitudes towards the environment of the control and experimental group students did not differ significantly in the pre-test, they showed a significant difference in the post-test, permanence-1 and permanence-2 tests. In this part of the study, ANOVA was used for repeated measurements to test whether the difference between the mean scores of the control group in the pre-test, post-test and permanence-1 and permanence-2 tests regarding the attitude towards the environment was statistically significant. With the same method, it was determined whether the difference between the averages of the experimental group in the pre-test, post-test, and permanence-1 and permanence-2 tests regarding their attitude towards the environment was statistically significant.

Table 7. ANOVA Results for Repeated Measurements of Pre-Post and Permanence Test Scores of the Environmental Attitude Scale

Sample	Test	N	$\bar{X}$	Ss.	*F*	*p*
Control Group	Pre-test	28	91.07	5.71	7.23	0.00
	Post-test	28	93.39	5.39		
	Permanence-1	28	88.15	6.80		
	Permanence-2	28	87.94	6.76		
Experimental Group	Pre-test	28	90.32	4.60	37.34	0.00
	Post-test	28	99.57	0.59		
	Permanence-1	28	94.90	3.91		
	Permanence-2	28	94.61	4.31		

When Table 7 is examined, it is seen that the difference between the mean pre-test, post-test, and permanence tests of both the control group and the experimental group's attitudes is statistically significant. ($p<0.05$) Greenhouse-Geisser correction was used in the control group to provide the sphericity assumption. ANOVA results show that there is a significant difference between the measurements. Bonferroni multiple comparison test was performed to determine which measurements were significantly different from each other. For the repetitive measurements, Anova, with the Greenhouse-Gaisser correction, has found that the attitude towards environment for the control group differs between four different measurement times.($F(2.31;50.99)=7,231$; $p<0.05$) Post hoc tests using Bonferroni correction revealed that the significant change was due to a significant improvement in the attitude towards the environment between the pre-test and post-test of the control group (from 91.07 to 93.39 increase) and a significant deterioration between the post-test and permanence-1 and permanence-2 tests (from 93.39 to 88.15 and 87.94 decrease).

ANOVA results also show that there is a significant difference at the experiment group. Bonferroni multiple comparison test was performed to determine which measurements were significantly different from each other. ANOVA for Repetitive Measurements showed that the average attitude towards the environment differed statistically significantly between the four different measurement times for the experimental group. ($F(3.66)=37.34$; $p<0.05$). Post hoc tests using Bonferroni correction showed no significant change in the attitude towards the environment between the pre-test and post-test, permanence-1 and permanence-2 tests of the experimental group (increase from 90.32 to 99.57 in the post-test, 94.90 in the permanence-1 test, and 94.61 in the permanence-2 test), and between the post-test and the permanence-1 and permanence-2 tests (decrease from 99.57 to 94.90 in the permanence-1 test and 94.61 in the permanence-2 test). Accordingly, as a result of the implementation, there is a positive increase in the attitudes of the control and experimental group students towards the environment. However, while this increase is permanent in the experimental group students, it is not permanent in the control group students. According to the data obtained, the development of attitudes towards the environment in the experimental group students is more permanent than in the control group students.

In this part of the study, the answers to the question "Is there a significant difference in terms of environmental knowledge between the control group students in the classroom where the seventh grade Human and Environment unit is traditionally taught and the experimental group students in a different class supported by the out-of-school Nature Education Activities (NEA) implemented by the researcher?" were sought. In order to test the accuracy of this sub-problem, the answers given by the students to the developed Environmental Knowledge Test as pre-test, post-test, and permanence tests were compared statistically. An Independent Sample t-test was used to determine the difference between the environmental knowledge test results of the control and experimental groups in the pre-test. ANOVA Test for Repetitive Measurements (ANOVA) was used to reveal the change in environmental knowledge of the students in the experimental group during the pre-test, post-test, permanence-1 and permanence-2 test. Then, with the same method, the differences between the control and experimental groups in terms of environmental knowledge were examined in the post-test, permanence-1, and permanence-2 tests. In this context, the independent sample t-test was implemented to test whether the students in the control (7A class) and experimental (7B class) groups constituting the sample showed a statistically significant difference in terms of EKT scores before the experimental implementation.

Table 8. Independent Sample t-Test Results of Environmental Knowledge Test Pre-test Scores

Sample	N	$\bar{X}$	Ss.	*t*	*p*
Experimental	28	67.40	14.21	0.42	0.67
Control	28	65.65	13.76		

When Table 8 is examined, there is no statistically significant difference between the successes of the control and experimental groups before the implementation. ($t=0.42$, $p> 0.05$). In this context, an independent sample t-test was implemented to test whether the students in the control and experimental groups showed a statistically significant difference in terms of environmental knowledge test scores after the experimental implementation.

Table 9. Independent Sample t-Test Results of Environmental Knowledge Test Post-test Scores

Sample	N	$\bar{X}$	Ss.	*t*	*p*
Experimental	28	76.74	13.79	-7.21	0.00
Control	28	98.04	3.28		

According to Table 9, there is a significant difference between the successes of the control and experimental groups after the implementation. ($t=-7.21$, $p<0.05$) An independent sample t-Test was implemented to test whether the students in the control and experimental

groups showed a statistically significant difference in terms of environmental knowledge test scores for the permanence-1 test regarding the continuity of the experimental implementation.

Table 10. t-Test Results of Environmental Knowledge Test Permanence-1 Test Scores

Sample	N	$\bar{X}$	Ss.	*t*	*p*
Experimental	28	73.70	16.04	-1.66	0.10
Control	28	81.74	16.76		

When Table 10 is examined, there is no statistically significant difference between the successes of the control and experimental groups before the implementation (t=-1.66, p> 0.05). In this context, an independent sample t-test was implemented to test whether the students in the control and experimental groups showed a statistically significant difference in terms of CBT scores for the permanence-2 test regarding the continuity of the experimental implementation.

Table 11. t-Test Results of Environmental Knowledge Test Permanence-2 Test Scores

Sample	N	$\bar{X}$	Ss.	*t*	*p*
Experimental	28	73.04	16.97	-0.18	0.86
Control	28	73.91	15.00		

When Table 11 is examined, there is no significant difference between the attitudes of the control and experimental groups towards the environment in the permanence-2 test (t=-0.18, p> 0.05). According to the results of the independent t-test, the environmental knowledge scores of the control and experimental group students did not differ significantly in the pre-test, permanence-1, and permanence-2 tests, but only in the post-test.

On the other hand, ANOVA was used for Repetitive Measurements in order to test whether the difference between the control group's averages in the pre, post, and permanence-1 and permanence-2 tests was statistically significant. With the same method, it was determined whether the difference between the averages of the experimental group in the pre-test, post-test, and permanence-1 and permanence-2 tests was statistically significant.

Table 12. ANOVA Results of Environmental Knowledge Test Pre-Post and Permanence Test Scores for Repeated Measurements

Sample	Test	N	$\bar{X}$	Ss.	*F*	*p*
Control Group	Pre-test	28	67.40	14.21	2.84	0.04
	Post-test	28	76.74	13.79		
	Permanence-1	28	73.70	16.04		
	Permanence-2	28	73.04	16.97		
Experimental Group	Pre-test	28	65.65	13.76	36.59	0.00
	Post-test	28	88.25	3.28		
	Permanence-1	28	81.74	16.76		
	Permanence-2	28	77.91	15.00		

When Table 12 was examined, the difference between the pre, post, and permanence test averages of both the control group and the experimental group was found to be statistically significant (p<0.05). ANOVA results show that there is a significant difference between the environmental knowledge measurements of the control group. Bonferroni multiple comparison test was performed to determine which measurements were significantly different from each other. For Repeated Measurements, ANOVA showed that environmental knowledge differed statistically significantly between the four different measurement times for the control group. (F(3.06)=2.84; p<0.05). Post hoc tests using Bonferroni correction revealed that the significant change was due to a significant improvement in environmental knowledge between the pre-test and post-test of the control group (increasing from 67.40 to 76.74) and a significant deterioration between the post-test and permanence-1 and permanence-2 tests (falling from 76.74 to 73.70 and 73.04). ANOVA results in the experimental group indicate that there is a significant difference between the measurements. Bonferroni multiple comparison test was

performed to determine which measurements were significantly different from each other. For Repeated Measurements, ANOVA showed that the average environmental knowledge differed statistically significantly between the four different measurement times for the experimental group. ($F(3.66)=36.591$; $p<0.05$) At the same time, post-hoc tests using Bonferroni correction revealed that the significant change was due to a significant improvement in environmental knowledge between the pre-test and post-test, permanence-1 and permanence-2 tests of the experimental group (from 65.65 to 88.25 in the post-test, 81.24 in the permanence-1 test, and 77.91 in the permanence-2 test). At the same time, it was also revealed that there was a significant deterioration between the post-test and permanence-1 and permanence-2 tests (from 88.25 to 81.24 in the permanence-1 test and 77.91 in the permanence-2 test). Accordingly, as a result of the implementation, there is an increase in the environmental knowledge of the control and experimental group students. According to the results obtained from the data, the increase in knowledge in the experimental group students is higher than the control group students. This increase was not permanent in either the control group or the experimental group. However, the environmental knowledge levels of the experimental group were still significantly higher than the pre-test in the permanence tests.

CONCLUSSION, DISCUSSION AND RECOMMENDATIONS

In this study, the effect of out-of-school Nature Education Activities integrated into school education on the attitudes and knowledge levels of seventh grade students towards their environment was investigated. According to the findings obtained from the study, the difference between the mean pre-test, post-test, and permanence tests of the attitudes of both the control group and the experimental group was found to be statistically significant. At the end of the implementation, it was determined that there was a positive increase in the attitudes of the control and experimental group students towards the environment. However, while this increase is determined to be permanent in the experimental group students, it is not permanent in the control group students. According to the findings obtained from the data, the development of environmental attitudes in the experimental group students was more permanent than in the control group students. These findings also coincide with the results of similar studies in the literature. For example, in the study conducted by Hanna (1995), it was determined that out-of-class school education positively increased students' attitudes towards the environment and contributed to the development of their attitudes towards the environment. Similarly, in the study conducted by Leeming and Porter (1997), it was determined that environmental education activities had an effect on children's attitudes towards the environment and their parents' behaviours towards the environment, while environmental education programs improved students' attitudes towards the environment. In addition, in the camping activity applied by Palmberg and Kuru (2000) to 11-12 age group students in Finland, the development of environmental awareness and personal self-efficacy of the participants were examined, and as a result of the study, an increase in students' attitudes, knowledge and awareness of the environment was determined. This study is in line with the results of the study conducted in terms of both the similarity of the study group and the fact that environmental education programs show that students improve their attitudes towards the environment.

On the other hand, in the studies in the literature addressing environmental education within an independent program, it has been determined that environmental education programs integrated into courses contribute significantly to the development of students' attitudes towards the environment. Ballantyne & Packer, 2002; Carrier, 2009; Chapman & Sharma, 2001; DiEnno & Hilto, 2005; Lieberman, Hoody & Lieberman, 2000; Rickinson, 2001; Storksdieck et al., 2005). Studies on environmental education in Turkey have also found overlapping findings with the studies conducted. The development of the environmental knowledge and attitudes towards the environment of students studying in the departments of biology and science teaching

programs in universities were investigated by Engin. One of the remarkable findings of the study is that undergraduate programs do not affect the development of attitudes towards the environment. Therefore, the importance of nature education activities, which are particularly emphasized in the study, in terms of environmental education is better understood. In this context, it can be said that out-of-school effects have positive effects on both environmental education and attitude. As a matter of fact, bringing a new education for the education of the environment to primary schools and its effectiveness were discussed in the study conducted by Veeravatnanond and Singseewo (2010). As a result of the implementation of the developed education program, an increase in students' attitudes towards the environment was determined. This study also supports the results of the study conducted in terms of showing that environmental education programs improve students' attitudes towards the environment and in terms of ıt was conducted with primary school students. Similarly, as a result of the out-of-class activity carried out by Özbay (2010) with eighth grade students, the positive effects of the activities on students' attitudes towards the environment and their academic achievement were determined. One of the strongest evidences of this situation is the nature education project carried out by Keleş et al. (2010) for ten days in 2009 with the support of TUBITAK. As a result of the nature education activities, it was determined that the attitudes and behaviours of the students towards the environment were positively and permanently affected, and their level of awareness of the environment increased.

The findings obtained from the study revealed that out-of-class activities had positive effects on students' attitudes towards the environment. According to Okur (2012), the effectiveness of the out-of-class environmental education program positively affects students' environmental attitudes and awareness. In addition, course modules and activities designed outside the classroom can positively increase students' attitudes towards the environment. In the study conducted by Artun (2013), the effect of the activities designed for environmental education on the modular curriculum was discussed, and at the end of the study, it was determined that the modular curriculum of environmental education increased conceptual understanding and academic success and positively changed attitudes towards the environment. Another study that is similar to the results of the study was conducted by Erentay (2013). At the end of the study, it was concluded that the teaching approach supported by out-of-school nature practices in the learning process of the environment positively improved students' knowledge of science and scientific process skills as well as their attitudes towards the environment. The findings of this study also overlap with and support the findings of the study conducted.

One of the remarkable findings of the study was obtained from the pre, post, and permanence-1 and permanence-2 tests of the environmental knowledge test of the control and experimental groups. According to the findings, the difference between the pre, post, and permanence test averages of both the control group and the experimental group was found to be statistically significant. Accordingly, the increase in knowledge in the experimental group students was found to be higher than in the control group students. This increase was not permanent in either the control group or the experimental group. However, the environmental information levels of the experimental group were still found to be significantly higher than the pre-test in the permanence tests. This finding is similar to the results of some studies in the literature. For example, in the study conducted by Zwick and Miller (1996), it was determined that the science course achievements of the students engaged in out-of-school nature education activities were much higher than the science course achievements of the students who received traditional education. This supports the results of this study. Similarly, in the study conducted by Leeming and Porter (1997), it is consistent with the findings of the study to determine that although there is no increase in the environmental knowledge of the children participating in the environmental education program, it has positive effects on their attitudes towards the environment. In addition, in the literature, it is found that the out-of-school environmental education program increases students' knowledge of the environment, positively affects actions against the environment, positively affects the shaping of their knowledge and perceptions of

the environment, raises awareness of environmental problems and positively affects actions against the environment. Bogner, 1998; Bögeholz, 2002; Brody & Hall, 2002; Chapman & Sharma, 2001; Vaske & Kobrin, 2001). In this respect, it can be said that out-of-school nature activities improve students' knowledge levels positively and increase their awareness of the environment. According to Engin (2003), who drew attention to this situation, it is emphasized that courses enriched and supported by nature education activities should be taught in order to improve students' level of attitude towards the environment and environmental knowledge. According to Fisma (2005), the nature observations and experiences of children in their immediate environment increase their awareness and knowledge of the environment.

As a result, when the literature was examined in general, it was found that out-of-class nature education has positive effects on students' knowledge and attitudes towards the environment (Ruiz-Mallen et al., 2009). Such training not only increases the level of attitude and knowledge, but also increases the level of environmental knowledge and awareness of students in a positive way and reinforces their knowledge about the environment. (Hanna, 1995; Okur, 2012; Yardımcı, 2009). According to Palmberg and Kuru (2000), who drew attention to this situation, students' environmental development, awareness, knowledge, and attitudes change positively in activities on out-of-class or out-of-school nature education. As a matter of fact, in the study by Rickinson (2001), in which 110 different studies were examined, it was stated that environmental education studies conducted outside the classroom were effective in changing students' attitudes towards the environment and their environmental knowledge. At the same time, such activities positively affect the development of students in science lessons. In particular, it is stated that students' knowledge and scientific process skills related to the science course have improved positively. (Erentay, 2013). Similarly, it was concluded by Karpudewan et al. (2015) that out-of-school nature activities conducted with the experimental group were significantly more effective than traditional courses in improving students' environmental knowledge and attitudes towards the environment. In addition to all these expressions, the study has certain limitations. The most important limitation of the study is that it consists of seventh grade students studying in a public secondary school. Another is that the duration of the research is limited to the time and cognitive gains allocated in the program for the human and environmental unit. In light of the findings obtained from the study, some suggestions are presented below.

Suggestions

This research is one of the first studies carried out in our country in terms of developing nature education activities applied at school and/or out of class by supporting formal education at the level of environmental attitude and environmental knowledge. Based on the results of the research, the following suggestions were made regarding environmental attitude, environmental knowledge level, and school/out-of-class nature education activities:

- The Environmental Attitude Scale can be prepared for other units of Biology, Ecology, and Science courses with the same method.
- The development of customized attitude scales for a single achievement in order to reinforce cognitive gains in more depth is an important tool in ensuring that that achievement is permanent.
- Therefore, attitude scales enriched with different sub-dimensions for each age and education group can be developed in order to significantly increase attitudes towards the environment in community education.
- Environmental Information Test can be prepared for other units with the same method. In the environmental information tests to be developed, multiple-choice questions that address environmental problems in our country can also be included in order to increase awareness of environmental problems.

- In the environmental knowledge test developed in this study, the construct validity of the test was investigated according to the Classical Test Theory. If it is desired to investigate the construct validity in larger samples by developing a more comprehensive test, Item Response Theory can also be used.
- The relationship between environmental attitude and environmental knowledge level can be studied in a larger sample group.
- The effects of Nature Education Activities can be investigated not only on the level of environmental attitude and environmental knowledge, but also on behavior, emotions, and awareness. It is recommended that environmental education should be designed and implemented as a more common and unique nature education program instead of a limited content and timing.
- When preparing environmental education curricula, it should be ensured that the achievements and subjects have criteria that can be met in current life. For this reason, extracurricular Nature Education Activities for environmental education can be organized and developed according to regional and geographical conditions, making them more accessible and applicable to researchers, teachers, students, and parents all over the country.
- Qualitative studies can also be carried out by comparing the findings of the Natural Education Activities with the personal data of the students, teachers, and parents regarding the level of attitudes towards the environment and environmental knowledge to be measured.

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GENİŞLETİLMİŞ ÖZET

Giriş

Birçok ülkede, çevre konularındaki bilinç ve farkındalığı artırmak için çok sayıda çevre eğitimi programları geliştirilmiş ve etkinliği araştırılmıştır (Ak, 2008; Hanna, 1995; Leeming & Porter, 1997; Palmberg & Kuru, 2000). Günümüz evrensel normlarına göre çevre eğitiminin klasik eğitim modellerinden farkı öncelikle öğrenciyi merkeze odaklayan bir yaklaşımı içermesi sonrasında öğrencilerin anlama, düşünme, tartışma ve uygulama becerilerini geliştirmesi olarak tanımlanabilir (MoNE, 2007). Şüphesiz ki öğrenciyi sadece formal eğitim sınırlarına hapsetmek hem bilişsel ve duyuşsal gelişimin hem de alternatif çözüm yaklaşımları geliştirmesinin önündeki en büyük engeldir (Bilton, 2010; Özerbaş, 2011; Wilson, 2008). Çevre eğitimini destekleyen bu programlarda sınıf içi, tamamen sınıf dışı veya sınıf dışında fakat okula entegre biçimde gerçekleştirilen çevre eğitimi aktiviteleri yer almaktadır (Artun, 2013; Okur, 2012). Örnek olarak doğal alanları ve merkezleri tanımaya yönelik günlük geziler veya daha fazla günü kapsayan doğal yaşam ya da kentsel yerleşim alanlarına yönelik çevre eğitimi etkinlikleri düşünülebilir (Alat vd., 2012). Günümüzde öğrencilerin bilişsel, duyuşsal ayrıca psikomotor öğrenmelerine ve motivasyonlarına yaptığı olumlu katkı gözetilerek okul dışı doğa eğitimi etkinliklerine daha fazla önem verilmektedir (Bozdoğan vd., 2015). Okul dışı çevre eğitiminin amacı, çevreye yönelik bütünsel bakış açısının oluşturulmasıdır. Bütünsel bakış açısıyla birey kendini doğal ortamla özdeşleştirmekte ve anlamlandırabilmektedir. Ayrıca okul dışı çevre eğitimi etkinlikleriyle bireyin, doğal ortam ile fiziksel ve psikolojik bağlar kurabilmesi hedeflenmektedir (Harrison, 2010). Okul dışı çevre eğitiminin günümüzde artık doğal ortamda yaşanan deneyimler ve içselleştirme açısından çevre eğitimini tamamlamaktan ziyade kendi başına bir eğitim alanı olduğu vurgulanmaktadır (Özdemir, 2010).

Yöntem

Bu çalışmada deneysel modellerden ön test ve son test kontrol gruplu yarı deneysel desen kullanılmıştır. Ön test ve son test kontrol gruplu modelde, yansız atama ile oluşturulmuş iki grup belirlenir. Bunlardan birisi kontrol, diğeri ise deney grubu olarak kullanılır. Her iki grupta da deney öncesi ve deney sonrası ölçümler yapılır (Karasar, 2012). Çalışma kapsamında, bir devlet ortaokulunda ön test ve son test kontrol gruplu yarı deneysel desen çerçevesinde kontrol grubunda yer alan öğrencilerle Fen ve Teknoloji dersi öğretim programında belirtilen etkinlikler

ile öğretim yapılıp, ders öğretmeni tarafından ilgili yöntem ve tekniklerle dersler işlenirken; deney grubunda ise dersin öğretmeni tarafından ilgili yöntem ve tekniklerle dersler işlenirken bunlara ilave olarak yapılandırmacı öğrenme yaklaşımına dayalı ve öğrencilerin ön testler sonucunda belirlenen ihtiyaçlarına yönelik olarak geliştirilen okul dışı Doğa Eğitimi Etkinlikleri entegre edilmiş dersler işlenmiştir. Deneysel uygulamadan önce hem kontrol hem de deney gruplarındaki öğrencilere Çevreye Yönelik Tutum Ölçeği ile Çevre Bilgisi Testi ön test olarak ve deneysel uygulama sonrasında ise son test ve kalıcılık testi olarak uygulanmıştır.

Bulgular

Elde edilen bulgulara göre hem kontrol grubunun hem de deney grubunun tutumlarına ilişkin ön, son ve kalıcılık testleri ortalamaları arasındaki farkın istatistiksel olarak anlamlı olduğu belirlenmiştir ($p<0.05$). Küresellik varsayımını sağlayabilmek için kontrol grubunda Greenhouse-Geisser düzeltmesi kullanılmıştır. ANOVA sonuçlarından elde edilen ölçümler arasında anlamlı farklılık bulunduğu belirlenmiştir. Hangi ölçümlerin anlamlı olarak birbirinden farklı olduğunu belirleyebilmek için Bonferroni çoklu karşılaştırma testi yapılmıştır. Bu doğrultuda, tekrarlı ölçümler için ANOVA ve Greenhouse-Geisser düzeltmesi ile birlikte çevreye yönelik tutum ortalamasının kontrol grubu için dört farklı ölçüm zamanı arasında önemli ölçüde farklılaştığı bulunmuştur ($F(2.31;50.99)=7,231$; $p<0.05$). Diğer yandan deney grubunda, ANOVA sonuçları ölçümleri arasında anlamlı farklılık bulunduğu belirlenmiştir. Hangi ölçümlerin anlamlı olarak birbirinden farklı olduğunu belirleyebilmek için Bonferroni çoklu karşılaştırma testi yapılmıştır. Tekrarlı Ölçümler için ANOVA, çevreye yönelik tutum ortalamasının deney grubu için dört farklı ölçüm zamanında istatistiksel açıdan önemli ölçüde farklılaştığı belirlemiştir ($F(3.66)=37.34$; $p<0.05$). Buna göre, uygulama sonucunda kontrol ve deney grubu öğrencilerinin çevreye yönelik tutumlarında olumlu yönde bir artış görülmektedir. Ancak bu artış deney grubu öğrencilerinde kalıcı olurken, kontrol grubu öğrencilerinde kalıcı olmamaktadır.

Çalışamadan elde edilen bir diğer bulguya göre hem kontrol grubunun hem de deney grubunun başarılarına ilişkin ön, son ve kalıcılık test ortalamaları arasındaki fark istatistiksel olarak anlamlı bulunmuştur ($p<0.05$). ANOVA sonuçları kontrol grubu çevre bilgisi ölçümleri arasında anlamlı farklılık bulunduğunu göstermektedir. Hangi ölçümlerin anlamlı olarak birbirinden farklı olduğunu belirleyebilmek için Bonferroni çoklu karşılaştırma testi yapılmıştır. Tekrarlı ölçümler için ANOVA, çevre bilgisi ortalamasının kontrol grubu için dört farklı ölçüm zamanında istatistiksel açıdan önemli ölçüde farklılaştığını göstermiştir ($F(3.06)=2.84$; $p<0.05$). Deney grubunda ANOVA sonuçları ölçümler arasında anlamlı farklılık bulunmuştur. Hangi ölçümlerin anlamlı olarak birbirinden farklı olduğunu belirleyebilmek için Bonferroni çoklu karşılaştırma testi yapılmıştır. Tekrarlı Ölçümler için ANOVA, çevre bilgisi ortalamasının deney grubu için dört farklı ölçüm zamanı arasında istatistiksel açıdan önemli derecede farklılaştığını göstermiştir ($F(3.66)=36.591$; $p<0.05$). Bu bulgulara göre, uygulama sonucunda kontrol ve deney grubu öğrencilerinin çevre bilgilerinde artış olduğu belirlenmiştir. Deney grubu öğrencilerindeki bilgi artışı kontrol grubu öğrencilerine göre daha fazladır.

Tartışma, Sonuç ve Öneriler

Bu araştırmada, okul eğitimine entegre edilmiş okul dışı Doğa Eğitimi Etkinliklerinin yedinci sınıf öğrencilerinin çevrelerine yönelik tutum ve bilgi düzeylerine etkisi araştırılmıştır. Çalışmadan elde edilen bulgulara göre hem kontrol grubunun hem de deney grubunun tutumlarına ilişkin ön, son ve kalıcılık test ortalama puanları arasındaki fark istatistiksel olarak anlamlı bulunmuştur. Yapılan uygulama sonunda kontrol ve deney grubu öğrencilerinin çevreye yönelik tutumlarında olumlu yönde bir artış olduğu belirlenmiştir. Ancak belirlenen bu artış deney grubu öğrencilerinde kalıcı olurken, kontrol grubu öğrencilerinde kalıcı olmamaktadır. Verilerden elde edilen bulgulara göre, deney grubu öğrencilerindeki çevreye yönelik tutumların gelişimi kontrol grubu öğrencilerine kıyasla daha kalıcı olmuştur. Bu bulgular alanyazındaki benzer çalışma sonuçlarıyla da örtüşmektedir (Ballantyne & Packer, 2002; Carrier, 2009;

Chapman & Sharma, 2001; DiEnno & Hilto, 2005; Hanna, 1995; Lieberman vd., 2000; Rickinson, 2001; Storksdieck vd., 2005).

Araştırmanın bulgularından birisi de kontrol ve deney grubunun, çevre bilgisi testine ilişkin ön, son ve kalıcılık-1 ve kalıcılık-2 testlerinden elde edilmiştir. Elde edilen bulgulara göre hem kontrol grubunun hem de deney grubunun başarılarına ilişkin ön, son ve kalıcılık test ortalamaları arasındaki fark istatistiksel olarak anlamlı bulunmuştur. Buna göre, deney grubu öğrencilerindeki bilgi artışı kontrol grubu öğrencilerine göre daha fazla bulunmuştur. Bu artış ne kontrol grubunda ne de deney grubunda kalıcı olmamıştır. Ancak deney grubunun çevre bilgileri düzeyleri kalıcılık testlerinde ön teste göre yine de anlamlı derecede yüksek bulunmuştur. Elde edilen bu bulgu alanyazında yapılan bazı çalışma sonuçlarıyla benzerlik göstermektedir (Leeming & Porter, 1997; Zwick & Miller, 1996). Alanyazında okul dışı çevre eğitimi programının öğrencilerin çevreye yönelik bilgilerini artırdığı, çevreye karşı eylemleri olumlu yönde etkilediği, çevreye yönelik bilgi ve algılarının şekillenmesini olumlu yönde etkilediği, çevre problemleriyle ilgili farkındalıkların yükseldiği ve çevreye karşı eylemleri olumlu yönde etkilediği yönünde çalışma sonuçlarına da rastlanılmaktadır (Bogner, 1998; Brody & Hall, 2002; Chapman & Sharma, 2001; Vaske & Kobrin, 2001). Bu doğrultuda, okul dışı doğa etkinliklerinin öğrencilerin bilgi düzeyleri olumlu etkileri olumlu yönde geliştirdiği ve çevreye karşı farkındalıklarını artırdığı söylenebilir. Buna göre, çevre eğitimi öğretim programları hazırlanırken kazanım ve konuların güncel yaşamda karşılığını bulabilecek kriterlere sahip olmasına dikkat edilmelidir. Bu yüzden çevre eğitimine yönelik ders dışı Doğa Eğitimi Etkinlikleri coğrafi şartlara göre düzenlenip geliştirilerek ülkenin her yanındaki araştırıcı, öğretmen, öğrenci ve ebeveynler için daha erişilebilir ve uygulanabilir hale getirilebilir.