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The examination of preschool children's environmental attitudes and awareness

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ABSTRACT

This study aims to examine the impact on environmental attitudes and awareness of kindergarten pupils of an intensive education programme based on basic science process skills including the 'reduce, reuse and recycle (3Rs)' paradigm for preschool children. A quasi-experimental pattern with non-equivalent pretest-posttest and with a control group was used. The study was carried out with kindergarten pupils a district located in the Aegean region. The study was conducted with a total of 38 children in four classes, two of them in the experimental group and the remaining two in the control group due to the pandemic conditions. The "Environmental Awareness and Attitude Scale for Preschool Children" was utilised in the study. According to the results obtained in the study, there is a significant difference between the mean scores of the pretest and posttest of the experimental group. In addition, it was found that the mean of posttest scores of the experimental group was significantly higher than the mean of posttest scores of the control group.

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Introduction

The causes and consequences of environmental problems which cause alarm danger bells to ring and which pose great risks to human beings have become discussion topics all over the world. Stakeholders such as schools and universities should be involved in remediation of environmental disasters (Wiyatmi, Suryaman, Sari and Dewi, 2023). The raising of generations who sensitively handle ecological problems and are sensitive towards the environment may bring about a more liveable world. This can be achieved with a strong, efficient and systematic education.

All the efforts and activities that people make to live a healthy life, to better know and protect the environment in which they live are imparted by environmental education or education for the environment (Koçak, n.d.). Observation of environmental conditions and local cultures contributes to a better understanding of science concepts, environmental protection and increased environmental awareness (Khusniati, Heriyanti, Aryani, Fariz and Harjunowibowo, 2023). Environmental science is the field of science that investigates the interactions of living things with their environment and each other (Uşak, 2015). Environmental education is based on protecting and improving nature, natural resources and the entire environment (Koçak, n.d.). In addition to taking measures to protect the

environment, it is a necessity to educate people to become environmentally conscious and knowledgeable about environmental subjects (Balkan Kıyıcı, 2009). The effect of environmental education given in the early periods may last for a lifetime (Onur, Çağlar and Salman, 2016). The necessity of providing environmental education in the preschool period is emphasised by various researchers (Essa and Young, 2003; Ahi and Alisinanoğlu, 2016; Vadala, Bixler and James, 2007; Buldur and Ömeroğlu, 2021).

Sabo (2010) stated that environmental education given in early childhood has prospective gains and affects individuals' attitudes towards the environment in adulthood. The environmental education given to children at an early age:

- allows children to have positive experiences about nature (Erol, 2016);
- supports aesthetic development areas by strengthening the development of children in all aspects (Erol, 2016);
- contributes to the development of awareness, sensitivity (Erol, 2016) and attitude of children (Erten, 2004; Erol, 2016) about the environment;
- enables children to become environmentally responsible and respectful citizens (Erol, 2016).
- supports the moral development of children along with cognitive, affective, psychomotor, social and self-care development areas (Erten, 2004);
- develops children's problem solving, critical thinking and decision-making skills (Louv, 2012).

The general purpose of environmental education is to provide individuals with the necessary knowledge and skills to protect and improve the environment by shaping their understanding and beliefs about the environment (Moseley, Desjean-Perrotta and Utley, 2010). In the Belgrade charter (1975), the purpose of environmental education is stated as follows: “The aim of environmental education is to constitute a world population, which is aware of environmental and environmental problems, and is worried about the environment, and that has the knowledge, skills, attitude, commitment, and motivation to work individually and collectively toward solutions of existing problems and the prevention of new ones.” (UNESCO, 1975, p 3).

It has been stated that children need learning experiences that they can experience on their own, which will improve their sensory development with science activities appropriate for their age and development (Tasdemir and Yildiz, 2024). With environmental education, children's ability to perceive and understand their environment, as well as their sensory development, will be enhanced. It has been stated that that the attitudes and beliefs of children who receive education at an early age are necessary for them to lead a better life (Sabo, 2010). It is clear that the teacher has an important role in early environmental education. It is recommended that environmental education be integrated into multiple disciplines, that building environmental consciousness in individuals be prioritised, and that teachers should develop environmental awareness as well (Yüzüak and Erten, 2022). According to Ormancı and Çepni (2019), teachers play a crucial role in providing efficient science education during preschool. This is also the case for environmental education.

Attitude towards the environment is defined as the sum of negative thoughts such as fear, anger, and anxiety caused by environmental problems and positive thoughts such as value judgments and environmentally friendly actions such as readiness to solve environmental problems (Erten, 2004). Environmental knowledge and attitudes towards the environment begin to take shape at the preschool age (Taşkın and Şahin, 2008). Erol and Ogelman (2021) stated that the positive attitudes and behaviours acquired about the environment in the preschool age are also maintained in the later stages and that these attitudes guide the behaviour of people. Similarly, Robertson (2008) stated that environmentally sensitive people who are aware of their environment from an early age and display protective behaviours towards the environment maintain these attitudes and behaviours in the future periods of their lives. DeVille et al. (2021) stated that the total time spent in nature provides connectedness to nature and, as a result, leads to better environmental attitudes and behaviours. Better environmental behaviours is important in preventing environmental problems. Sabo (2010) stated that most of the children have an innate love and interest towards nature. This is a phenomenon that helps to deal with environmental problems. The most effective way to deal with

environmental problems is to raise awareness of their causes and consequences and to create a positive attitude towards the environment (Gürbüz, Kışoğlu and Erkol, 2007).

Environmental pollution has occurred as a result of the negative behaviours of people towards the environment for many years, and as a result of this situation, the concept of environmental awareness has begun to be promoted (Gülay and Önder, 2011). Başal (2015) has expressed environmental awareness as avoiding behaviours that will harm nature, realising that human beings are a part of nature. Dindar (2021), defines ecological awareness as being aware of the impact of human behaviour on the environment. Individuals with ecological awareness avoid harmful behaviour. However, there may be various reasons why environmental awareness is not reflected in attitudes and behaviours (Cappellaro, 2011). The transformation into positive attitudes and behaviour of environmental awareness is possible with systematic environmental education given at an early stage. Teaching materials should focus on the problems that learners face in everyday life (Lutfauziah, Al Muhdhar and Rohman, 2023). The issue of environmental pollution has now become a problem that children face very often in their lives.

Decisions such as creating new behaviour patterns towards the environment for society and raising environmental awareness involve a learning process that should be realised at all levels of education and continue throughout life. (Thor and Karlsudd, 2020). While transferring information about the environment, it is also aimed to transform them into attitudes and behaviours (Geçmiş and Salı, 2014). Raising individuals with environmental awareness along with environmental protection behaviours is among the main objectives of environmental education (Erol, 2016; Erol and Ogelman, 2019).

Başal (2015) stated that scientific thinking skills of the children will be supported as a result of learning by doing and experiencing about environmental subjects and having direct experiences with the environment. Buhan (2006) stated that observing and classification skills, which are among the basic science process skills, are gained by children in an entertaining way through environmental subjects. The environmental education activities in the pre-school period should accordingly be planned and conducted in a way that will attract children's attention, develop their communication skills, enable them to learn by doing and experiencing and gain them basic science process skills.

Literature Review

There are studies examining the effects of different educational interventions on environmental attitudes and awareness in the literature. Masykuroh, Yetti, Nurani, and Rahmawati (2024) examined the effects of the Sasami Program on environmental literacy, environmental awareness and attitude in early childhood education in their study. In the study, it was concluded that the implementation of the Sasami Programme, which includes ecological literacy such as sorting garbage, "reduction, reuse, recycling" (3Rs), gardening, animal love, teaches environmental literacy, environmental knowledge, environmental awareness and attitude value. Christidi and Christopoulou (2022) aimed to raise the environmental awareness of kindergarten pupils who were involved in educational robotics and STEAM education activities. The research revealed that young children developed and acquired knowledge of programming and algorithmic thinking in a playful way through the use of the educational robot and managed to develop their cognitive, environmental awareness and communication skills. Küpeli (2023) investigated the effect of the quality of preschool outdoor education environments on the environmental attitudes and awareness of 60–66-month-old children and their levels of affinity to nature (biophilia). It was concluded that the quality of outdoor educational environments has a significant effect on children's environmental awareness and attitudes and their affinity to nature. Tan and Güler (2024) investigated how practical recycling activities in preschool (60-72 months) affected children's recycling and environmental awareness. As a result of the research, it was observed that children's environmental awareness changed positively and they especially paid attention to the integrity of nature with living beings. Vukadin (2022) investigated to what extent theme-based outdoor activities can improve the environmental awareness of kindergarten

pupils. According to the results, theme-based outdoor activities proved to be an effective approach to developing environmental awareness. There are also studies in the literature that handle the environment from different perspectives. Kang, Ko, and Park (2012) achieved positive results in the sub-dimensions of environmental life attitude, resource recycling, attitude towards environmental protection, and awareness in the experimental group in which they applied the nature-friendly environmental education programme. Kabadayi and Altınsoy (2018) concluded that there was a significant increase in the environmental pollution awareness post-test scores of the group to which science and nature activities were applied. Ruiz-Mallen, Barraza, Bodenhorn and Reyes-García (2009) concluded in their study that the environmental protection awareness of the children in the group in which they applied the environmental education program designed for forestry increased. It is seen in these studies in the literature that positive results are obtained in groups where different educational interventions are applied.

As can be seen from the literature review, no any study has been found that handle basic science process skills and environmental issues together in early childhood. Ormancı and Çepni (2019) stated that it is important to conduct new studies in areas that have not been studied regarding science education in the preschool period. Handling environmental education within the scope of science in the preschool period based on scientific process skills is a novelty in this context. It is also thought that the materials used and the activities applied will add innovation to the literature. The activities prepared based on basic science process skills, including reduction, reuse, recycling (3Rs) and environmental issues towards cognitive development set this study apart from other studies. All of these reveal the significance of the study. The research was carried out to examine the effect of an intensive education program on the environmental attitudes and awareness of preschool children. In line with this purpose, the research sought answers to the following questions:

1. Is there a significant difference between the environmental attitudes and awareness pretest-posttest scores of the children in the experimental and control groups?
2. Is there a significant difference between the environmental attitudes and awareness post-test scores of the children in the experimental and control groups?

Methods

The research is quantitative quasi-experimental with non-equivalent pretest-posttest and with a control group. In this model, children are not randomly assigned to groups. Since the classes were prepared in advance by the school administration, and so it was randomly decided which groups would be experimental and control groups (Özmen and Karamustafaoğlu, 2019). The prepared education programme will be briefly expressed as an intensive education programme. The intensive education program prepared by the researcher for preschool children based on basic science process skills, including the “reduction, reuse, recycling” (3Rs) environmental paradigm was applied to the experimental group. The data of the study were collected in the spring semester of the 2020-2021 academic year. "The Environmental Awareness and Attitude Scale for Preschool Children" developed by Büyüktaşkapu Soydan & Öztürk Samur (2017) was used in the study. The scale consists of two sub-dimensions: "Environmental Awareness" (12) and "Environmental Attitude" (14). The dependent variable is the "Environmental Attitudes and Awareness" of preschool children, and the independent variable whose effect is examined is the "Intensive Education Programme (IEP)" developed by the researchers. The schematic design of the research is shown in Table 1.

Table 1

Quasi-Experimental Pattern Non-Equivalent Pretest-Posttest and with a Control Group

Study of Groups	Pretest	Process	Posttest
Experimental	Environmental Awareness and Attitude Scale for Preschool Children	The Intensive Education Programme Including Activities Based on Basic Science Process Skills Covering Reduction, Reuse and Recycle (3Rs) Environmental Issues	Environmental Awareness and Attitude Scale for Preschool Children
Control	Environmental Awareness and Attitude Scale for Preschool Children	2013 the Pre-School Education Programme of Ministry of National Education (MEB)	Environmental Awareness and Attitude Scale for Preschool Children

Data Collection Tool

The scale developed by Büyüktaşkapu Soydan & Öztürk Samur (2017) consists of two sub-dimension, environmental awareness (12) and environmental attitudes (14), and a total of 26 items with pictures. In order to measure the validity of the scale, factor analysis was performed and the correlation coefficients between the subscales was determined. The correlation coefficients between the factors of the Environmental Awareness subscale were r = 0.80, 0.78 and 0.83 and for the Environmental Attitudes subscale were r = 0.70, 0.79 and 0.72 respectively. While the three factors in the environmental attitude sub-dimension explain 44.02% of the total variance, the three factors in the environmental awareness sub-dimension explain 40.94% of the total variance. Cronbach's alpha reliability coefficient for the environmental attitude sub-dimension and the Cronbach's alpha reliability coefficient for the Environmental awareness sub-dimension were found to be .73 and .66, respectively. The Cronbach alpha reliability coefficient for the entire scale was found to be .67 (Büyüktaşkapu Soydan & Öztürk Samur, 2017). In this study, the Cronbach's alpha reliability coefficient for the environmental awareness sub-dimension and the Cronbach's alpha reliability coefficient for the environmental attitude sub-dimension were found to be .68 and .80, respectively. The Cronbach alpha reliability coefficient for the entire scale was found to be .60.

Participants

The study group consists of preschool children and their teachers attending kindergarten education in a province in the Aegean region. Due to the pandemic conditions, the research was carried out with a total of 38 students in four classes, two of which were in the experimental group and the remaining two classes in the control group. There are 19 children in each of the experimental and control groups. Information about the gender of the children in the experimental and control groups is given in Table 2.

Table 2

Information on the Gender of Experimental and Control Children

Gender	n	%
Female	12	13
Male	7	6
Total	19	19

Intensive Educational Programme

The intensive education programme used in the study aimed to raise awareness and develop positive attitudes in children about the environment, as well as to develop their basic science process skills. There are activities prepared based on basic science process skills, including the 'reduction, reuse, recycling (3Rs)' paradigm and environmental issues. The activities require children to use basic science process skills, including observing, measuring, inferring, predicting, classifying, data recording and communicating, and to interact with various materials. During the activities in the program are used waste paper, pulp, fruit kernels, liquid soap container, empty container, spoon, tongue stick, used solid soap pieces, branch-wood pieces, waste materials, grater, funnel, etc. materials. Cognitive development gains and indicators of the intensive education program were adapted according to the literature research (Büyüktaşkapu, 2010) and 2013 preschool education programme. There are a total of 27 activity plans in the intensive educational programme. Activities include issues such as environmental pollution, energy efficiency, love of nature, preventing unnecessary consumption of resources, efficient use of resources, environmental awareness, thrift, waste and climate change. There are a total of 27 activity plans integrating with activity such as drama, art, music, mathematics, Turkish literacy preparation, science and play.

The activities were vetted by five experts working in pre-school education, science education and the environment, and were revised in accordance with the feedback from the experts.

Educational Activities Applied to the Control Group

Control group teachers implemented the activities prepared according to the acquisitions in the Ministry of National Education Preschool Education Programme updated and implemented in 2013. This is a developmental programme prepared for children aged 36-72 months. When planning learning processes, achievement and indicators appropriate to children's developmental levels are taken into account (MEB, 2013). The preschool education programme is flexible and is suitable for adaptation and individualisation according to the changing characteristics of the child, family and physical environment (MEB, 2013). The programme gives freedom to the teacher (MEB, 2013) which is why the activities implemented in kindergartens vary. The activities to be implemented in the control groups were examined weekly by the researcher. On the days when the activities were to be carried out, the researcher and the classroom teachers came together and reviewed the day's activities together prior to implementation. When the activities implemented in the control group during the implementation period (Nine weeks) were examined, it was seen that environmental activities were treated within the scope of special days and weeks (Energy Thrift Week, Forest Week, World Water Day). In addition, there are activities that are also handled within the scope of preschool values education (an activity for environmental cleaning, an activity for thrift and wasting, an activity for nature love). An activity related to recycling was also implemented.

Experimental Procedure

Three of the 27 activity plans included in the intensive education programme were randomly selected and applied by skipping a day for a week in a different classroom where the experimental

and control group students were not included. The school administration, classroom teachers, and parents were informed about the research. Parent consent forms were obtained from families for the research. The activities were applied to the experimental group three days a week for nine weeks (Monday, Wednesday, Friday). Information about the intensive training programme is given in Table 3. On other days when the intensive education programme was not implemented, the activities of the Ministry of National Education Preschool Education Programme (2013) were implemented by their own classroom teachers. During this process, the activities of the official curriculum were continued in the control group, and no experimental procedures were applied. Before starting the program implementation, the "Environmental Awareness and Attitude Scale for Preschool Children" was applied as a pretest to the children in the experimental and control groups. After the applications were completed, the "Environmental Awareness and Attitude Scale for Preschool Children" was applied as a posttest to the experimental and control groups.

Table 3

Distribution of Reduction, Reuse and Recycling and Basic Science Process Skills in Activities

Activity	Distribution of Basic Science Process Skills in Activities	3Rs (Reduce, Reuse and Recycle) Environmental Issues in Activities	Duration of the Activity (The duration of an activity is 50 minutes)	Activities weeks
1. Activity	Classifying, Predicting, Data Recording and Communicating	Recycle	Two activity hours	First week
2. Activity	Classifying, Inferring, Predicting, Measuring, Data Recording and Communicating	Recycle	Two activity hours	First week
3. Activity	Inferring, Data Recording and Communicating, Classifying, Predicting	Reduce	Two activity hours	First week
4.Activity	Inferring, Classifying, Predicting, Data Recording and Communicating	Reuse	Two activity hours	Second week
5. Activity	Classifying, Predicting, Data Recording and Communicating	Recycle	Two activity hours	Second week
6. Activity	Inferring, Predicting	Reuse	Two activity hours	Second week
7. Activity	Inferring, Classifying, Predicting	Reuse	Two activity hours	Third week
8. Activity	Observing, Classifying, Predicting, Measuring, Data Recording and Communicating	Reuse	Two activity hours	Third week
9. Activity	Observing, Classifying, Measuring, Data Recording and Communicating	Reuse	Two activity hours	Third week
10. Activity	Observing, Predicting, Inferring, Classifying, Data Recording and Communicating	Recycle	Two activity hours	Fourth week
11. Activity	Predicting, Inferring, Classifying, Measuring, Data Recording and Communicating	Reduce	Two activity hours	Fourth week
12. Activity	Observing, Predicting, Inferring, Classifying, Data Recording and Communicating	Reuse	Two activity hours	Fourth week
13. Activity	Inferring, Predicting, Data Recording and Communicating	Recycle	Two activity hours	Fifth week
14. Activity	Inferring, Predicting	Recycle	Two activity hours	Fifth week
15. Activity	Inferring, Classifying, Measuring, Data Recording and Communicating	Reduce	Two activity hours	Fifth week
16. Activity	Inferring, Predicting, Data Recording and Communicating	Reuse	Two activity hours	Sixth week

17. Activity	Predicting, Inferring, Classifying, Measuring, Data Recording and Communicating	Recycle, Reuse	Two activity hours	Sixth week
18. Activity	Observing, Predicting, Inferring, Classifying, Data Recording and Communicating	Reduce	Two activity hours	Sixth week
19. Activity	Inferring, Observing, Predicting, Classifying, Data Recording and Communicating	Reduce	Two activity hours	Seventh week
20. Activity	Inferring, Observing, Classifying, Predicting	Reuse	Two activity hours	Seventh week
21. Activity	Observing, Inferring, Predicting, Data Recording and Communicating	Reduce	Two activity hours	Seventh week
22. Activity	Inferring, Data Recording and Communicating, Predicting	Reuse	Two activity hours	Eighth week
23. Activity	Observing, Inferring, Data Recording and Communicating, Predicting	Reduce	Two activity hours	Eighth week
24. Activity	Inferring, Classifying, Measuring	Reduce, Reuse	Two activity hours	Eighth week
25. Activity	Inferring, Data Recording and Communicating, Predicting	Reduce	Two activity hours	Ninth week
26. Activity	Observing, Inferring, Data Recording and Communicating, Classifying, Predicting, Measuring	Recycle	Two activity hours	Ninth week
27. Activity	Observing, Inferring, Data Recording and Communicating, Classifying, Predicting	Recycle	Two activity hours	Ninth week

Data Analysis

In the study, skewness and kurtosis coefficients were examined for the normality condition. The fact that the skewness and kurtosis coefficients are between + 2 and - 2 indicates that the data are normally distributed (George & Mallery, 2010). According to skewness/kurtosis values, it was seen that the scores obtained from the sub-dimensions of the scale and the whole scale showed a normal distribution. Therefore, parametric tests were used for statistical computations. In the study were used the *t-test* for independent samples, the *t-test* for the dependent sample, and covariance statistical analysis methods.

Findings

The Skewness and Kurtosis coefficients for the experimental group were -0.479 and 0.406, respectively. In the control group, these coefficients were found to be 0.377 and -0.412, respectively. When the data were normally distributed, dependent sample t-test was used from statistical analysis. According to the t-test results, it was determined that the difference between the pre-test scores of the scale of the experimental and control groups was not significant $t(36) = -1.711$, $p>0.05$.

Findings Regarding the First Research Question of the Study

Is there a significant difference between the environmental attitudes and awareness pretest-posttest scores of the children in the experimental and control groups?

Experimental Group

The post-test Skewness and Kurtosis coefficients of the experimental group were found at -0.743 and 0.193, respectively. The dependent sample t-test, which is one of the statistical analyses, was used in the study. According to the dependent sample t test, it was found that the scale pretest mean score of the experimental group was 1.44, the posttest mean score was 1.70, and the t value was -5.725. Therefore, the difference between the environmental awareness and attitude pretest and posttest mean scores of the experimental group was found to be significant in favour of the posttest ($p<0.05$).
The results of the dependent sample t-test related to the differentiation of the experimental group environmental attitude sub-dimension pre-posttest score mean were computed. Accordingly, the environmental attitude sub-dimension pretest mean score of the experimental group was 1.60, the posttest mean score was 1.71, and the t value was -1,714. Although the posttest mean scores of the experimental group are higher than the pretest mean scores of the experimental group, the difference between the pretest and posttest scores of the environmental attitude sub-dimension of the experimental group are not statistically significant ($p>0.05$). During the application, the experimental group children stated that they choose other answers due to the disease, although they found appropriate answers in some questions related to the environmental attitude sub-dimension questions. (for example; when asked whether they would pick up the rubbish they saw on the ground and throw it in the rubbish bin, the children stated that they could not touch the rubbish because there was an epidemic).

The results of the dependent sample t-test related to the differentiation of the experimental group environmental awareness sub-dimension pre-posttest mean scores were computed. Accordingly, the environmental awareness sub-dimension pretest mean score of the experimental group was 1.23, the posttest mean score was 1.70, and the t value was -8.688. The difference between the environmental awareness sub-dimension pre-posttest mean scores of the experimental group was found to be significant in favour of the posttest ($p<0.05$).

Control Group

The post-test Skewness and Kurtosis values for the control group were found 0.42 and -1.522, respectively. Since the data were distributed normally, the dependent sample t-test, which is one of the parametric tests for the differentiation of the pre-posttest mean scores of the control group, was used. According to the dependent sample t test, it was found that the scale pretest mean score of the control group was 1.53, the posttest mean score was 1.49, and the t value was 0.883. According to the dependent sample t test results, no significant difference between the pre-posttest mean scores of the control group arose ($p > 0.05$).

The results of the dependent sample t-test related to the differentiation of the control group environmental attitude sub-dimension pre-posttest score means were computed. Accordingly, the pretest mean score of the environmental attitude sub-dimension of the control group was 1.68, the posttest mean score was 1.64, and the t value was -.392. The difference between the environmental attitude sub-dimension pre-posttest mean scores of the control group was not significant ($p > 0.05$).
The results of the dependent sample t-test related to the differentiation of the control group environmental awareness sub-dimension pre-posttest score means were computed. Accordingly, the control group environmental awareness sub-dimension pretest mean score was 1.33, posttest mean score was 1.28, and t value was .444. The difference between the environmental awareness sub-dimension pre-posttest mean scores of the control group was not significant ($p > 0.05$).

Findings Regarding the Second Research Question of the Study

Is there a significant difference between the environmental attitudes and awareness post-test scores of the children in the experimental and control groups?

Since the covariance analysis assumptions were met and the data were normally distributed, it was decided to perform covariance analysis. Analysis of covariance was performed to determine whether there was a significant difference between the post-test scores of the experimental and control groups. For the covariance analysis were considered as a control variable (covariate) the preschool environmental awareness and attitude pretest scores.

When the posttest mean scores corrected according to the covariate are examined, there is a significant difference between the posttest scores of the experimental and control groups ($F=1.35) = 18.066$, $p = 0.000$). According to the Eta square values, it is seen that being in the experimental group explains 34.0% of the variability of the post-test scores, independent of the pre-test scores ($\eta 2 = 0.340$). When the effect of environmental attitude sub-dimension pre-test scores are controlled, there is no a significant difference between the environmental attitude sub-dimension post-test scores of the experimental group and the control group ($F=1.35) = 0.541$, $p = 0.467$). When the effect of environmental awareness sub-dimension pre-test scores are controlled, there is a significant difference between the environmental awareness sub-dimension post-test scores of the experimental group and the control group ($F=1.35) = 19.510$, $p = 0.000$). When the Eta square values are examined, it is seen that being in the experimental group explains 35.8% of the variability of the post-test scores, independently of the pre-test scores ($\eta 2 = 0.358$).

Discussion, Conclusion and Recommendations

The purpose of the research was to examine the effect of the intensive education programme on preschool children's environmental attitudes and awareness. In the study, it was determined that the difference between the environmental attitude and awareness pre-test score averages of the experimental and control group children was not significant. Therefore, at the beginning of the study, it could be stated that the children in the experimental and control groups were on a par in terms of environmental awareness and attitude.

The difference between the pre-test and post-test mean scores obtained from the scale for the experimental group was found to be significant in favour of the posttest. In addition, there was a significant difference between the pre-test and post-test mean scores for the environmental awareness sub-dimension of the experimental group in favour of the post-test. Although the post-test mean scores for the environmental attitude sub-dimension were higher than the pre-test mean scores, there was no statistical significant difference between the mean scores. In the control group, it was found that the difference between the pretest and posttest mean scores obtained from the entire scale was not significant. Also, environmental attitude and environmental awareness sub -dimensions were not found to differ significantly between pre -test and post -test mean scores. According to these results, it might be said that the experimental group activities were effective more than activities applied to the control group in developing children's attitude and awareness levels. Although the children in the experimental group knew the appropriate answers to some questions related to the environmental attitude sub-dimension, they stated that their mothers would not allow them due to the disease (Some of the children stated that their mothers told them not to touch the rubbish they saw on the ground due to the covid 19 epidemic). This may be the reason why there is no significant difference in environmental attitude sub-dimension scores. In other words, the fact that the application coincided with the epidemic period may have caused no significant difference in environmental attitude sub -dimension scores. In his study of Samur (2018) on the TEMA preschool programme, the difference between the score's environmental awareness and attitude scale for preschool children of the experimental group children was found to be meaningful in favour of the posttest. In addition, for the experimental group, while the difference between the pre-test and post-test scores in the environmental awareness sub-dimension was significant, the difference between the pre-test and post -test scores in the sub -dimension of the environmental attitude was not significant. In the study conducted by Buldur & Ömeroğlu (2021), a significant difference was found between the environmental awareness and environmental attitude pre-test and post-test scores for the

experimental group in favour of the post-test. In the control group, there was no significant difference between the pretest and posttest scores of both environmental attitude and environmental awareness sub-dimension. In another study conducted with preschool children (Okyay, Sayın, Güneş Demir & Özdemir, 2022), a significant difference was found between the pre-test and post-test scores in both environmental attitude and environmental awareness sub-dimensions in the application group. Although environmental attitude post-test scores increased, there are also studies in the literature in which there is no statistically significant increase (Samur, 2018; Yılmaz, Yılmaz Bolat & Gölcük, 2020). These results are similar to the study. In the literature, there are studies in which similar results to the results of this study were obtained in the sub-dimension of environmental awareness (Tanriverdi, 2012; Akbayrak & Kuru Turaşlı, 2017; Samur, 2018; Buldur & Ömeroğlu, 2021; Okyay et al., 2022; Kurt Gökçeli, 2022; Maciel, Fuentes-Guevara, da Silva Gonçalves, Mendes, de Souza & Corrêa, 2022), as well as there are also studies in which different results were obtained from this study in the sub-dimension of environmental attitude (Schneller, Johnson & Bogner, 2015; Koçak Tümer, 2015; Uslucan, 2016; Erol & Ogelman, 2021; Buldur & Ömeroğlu, 2021).

When the environmental attitude and awareness post-test mean scores of the experimental and control group children were examined, it was found that the environmental attitude and awareness post-test mean scores of the experimental group children were significant. When the post-test mean scores of the environmental awareness sub-dimension of the children in the experimental group and the control group were compared, it was seen that there was a significant difference in favour of the experimental group. In terms of environmental attitude sub-dimension post-test mean scores, the difference between the post-test mean scores of the experimental and control groups was not found to be significant. It is believed that the activities applied to the experimental group improve children's attitudes and awareness towards the environment. There are studies in the literature in which a significant difference in environmental attitude and awareness post-test scores in favour of the experimental group was obtained through the implementation of various environmental education programmes (Erol & Ogelman, 2016; Buldur & Ömeroğlu, 2021; Okyay et al., 2022). Dahl (2020) concluded that the mean scores of the children participating in the garden education programme in the environmental awareness and attitude sub-dimensions were significantly higher than the scores of the children in the control group. The results are similar to this study in that the applied educational programme led to a significant increase in the environmental awareness and attitude scores of the experimental group. Biber, Cankorur, Güler and Demir (2023) aimed to examine the environmental awareness and attitudes towards the environment of 5–6-year-old children attending nature-centred private kindergartens and public kindergartens. According to the results of the research, a significant difference was found in environmental attitudes and environmental awareness of children in nature-centred kindergartens compared to children in public kindergartens. The finding of a significant difference in environmental awareness and attitude scores in the group where the educational intervention was carried out is parallel to the results of this study. The fact that the children of the experimental group experienced environmental awareness, environmental attitude, environmental pollution, sustainability, recycling, reduction, reuse (3Rs) and environmental issues in the activities may have contributed to a significant increase in the scores. Maciel et al. (2022) carried out environmental education practices with preschool children. The study aimed to develop an environmental education project in a public school of early childhood education, through the construction of a mobile mandala garden as a pedagogical tool. The construction of a mobile mandala garden for the cultivation of vegetables was used as a pedagogical tool for the development of environmental education practices (pedagogical activities) around the vegetable garden. In the study has been stated that educational practices improve to children's environmental awareness. Data, Mahat, Hashim, and Saleh (2020) concluded that environmental education, conducted with recyclable materials provides children with knowledge about the environment and recycle issues. Being knowledgeable on these issues will hopefully contribute to the development of environmental attitudes and awareness. Environmental education carried out with children contributes to the development of their environmental awareness and attitudes.

Environmental education interventions carried out for a specific purpose can make significant contributions to preschool children. Yang, Wu, Tong, and Sun, (2022) performed a study on narrative-based environmental video education. It was found that the environmental awareness of the experimental group children that conducted narrative-based environmental education was more developed than the control group children, and this case was reflected in their environmental attitudes. Liu, Teng and Han (2020) found in their study that environmental knowledge has a positive effect on environmental attitudes and behaviours. Acquiring environmental knowledge and having experiences with the help of educational programmes and different educational environments provides for achieving the desired results. The fact that children have different experiences regarding the environment through intensive education programme activities can be stated as making positive contributions to their environmental knowledge, environmental awareness and attitudes.

Different studies on the subject can be repeated in different regions and using a decent sized sample. The study is limited to data obtained from the "Environmental Awareness and Attitude Scale for Preschool Children". Environmental attitudes and awareness of early childhood children can be examined according to different variables such as gender, age and parental education level. The study carried out under Covid 19 pandemic conditions can be repeated under normal conditions. Longitudinal studies can be conducted towards preschool children's environmental awareness and attitudes.

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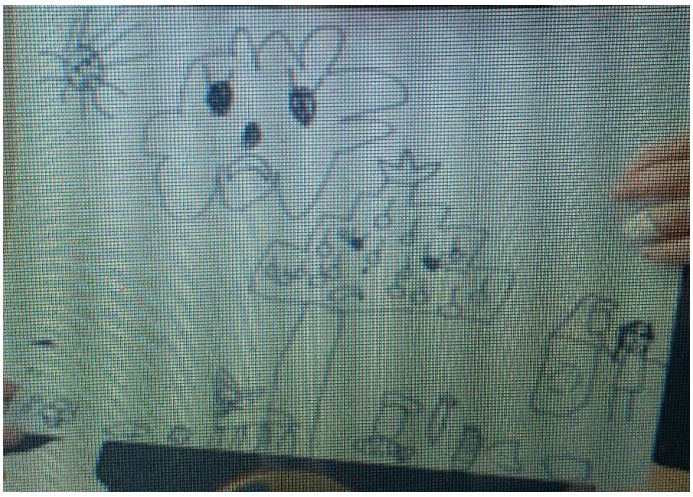
Appendix

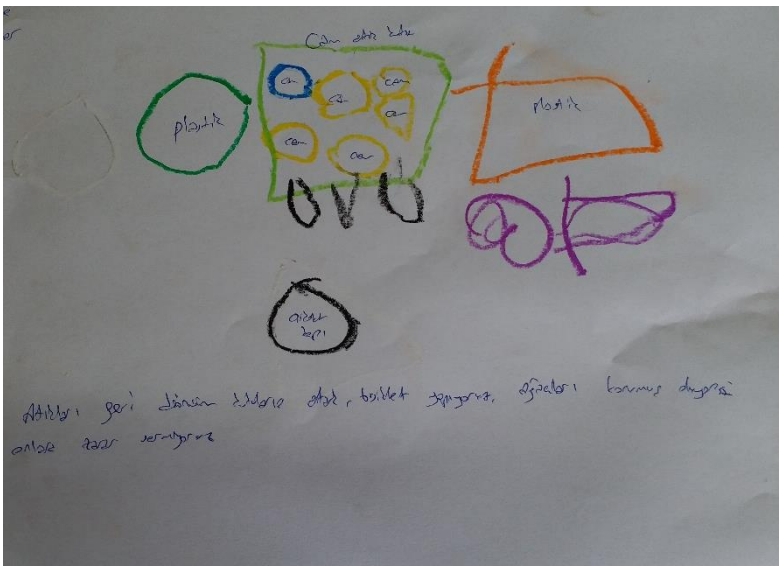
Some worksheets related to the activities carried out

Grouping paper, glass, plastic and metal wastes (Classification)



A picture explaining recycling (data saving)
Child: "Since the waste is thrown on the ground rather than in the recycling bin, the environment is polluted and the trees, clouds and sun are unhappy."

Sock Puppet: The product made regarding reuse by recycling used clothes (inferring



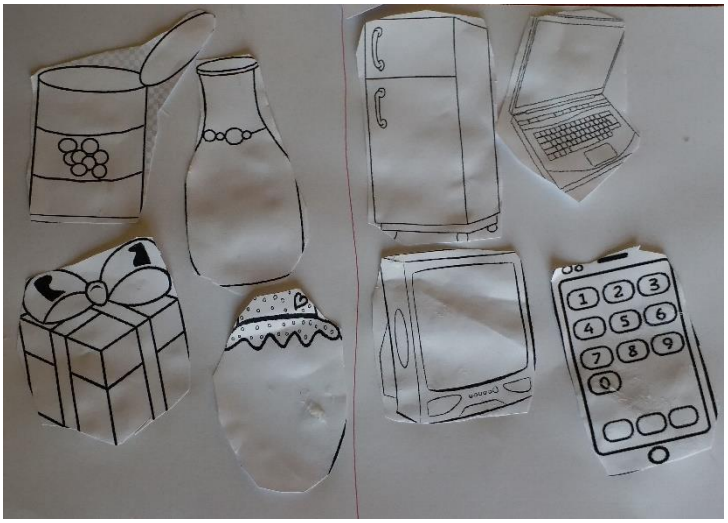
A picture of what can happen by recycling waste (predicting)
Child: "We make bicycles by recycling waste. We protect trees."

Waste collection game: Weight measurement of paper, glass, plastic and metal waste (measuring)

Geri dönüştürülebilen atık gruplarından en hafif olanı 1 kutu, biraz daha ağır olanı 2 kutu, biraz daha ağır olanı 3 kutu, en ağır olanı 4 kutu boya.

GERİ DÖNÜŞÜM CAM	GERİ DÖNÜŞÜM PLASTİK	GERİ DÖNÜŞÜM METAL	GERİ DÖNÜŞÜM KAĞIT

Table showing the weight measurement of waste collected in the waste collection game (measuring)



Distinguishing between things that can and cannot be reused / by repairing (observing)

A picture regarding plastic bag, causing nature pollution (observing)

Child: “I made a live paper bag with a smiley face. A paper bag circulating in natüre.”