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The Impact of Sustainable Environmental Activities on Raising Environmental Awareness in Preschool Children

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Abstract

The aim of this study is to determine the effect of sustainable environmental activities aimed at preschool children on raising environmental awareness. The research was conducted at Bağlarbaşı Kindergarten in the Haliliye district of Şanlıurfa Province, Turkey. A total of 101 children aged 4-5 years participated in the study. Sustainable environmental activities developed by the researchers were applied to the experimental group, while activities specified in the 2013 Preschool Education Program by the Turkish Ministry of National Education (MoE) were applied to the control group.In order to determine the students' level of environmental awareness, an "Environmental Awareness Test" was created, and its validity and reliability studies were conducted. The Environmental Awareness Test was administered to the study group as a pre-test and post-test. Analysis of the obtained parameters showed that the application of science activities in the experimental group significantly increased the children's level of environmental awareness and was higher compared to the control group. Furthermore, this difference was found to have a significant effect size.The results indicate that sustainable environmental activities are more effective than the activities in the MoE program in fostering environmental awareness and/or sensitivity in preschool children.

Introduction

Modern living has led to the emergence of environmental problems that disrupt the delicate balance between natural equilibrium and human activities. Factors such as technological advancements, rapid population growth, urbanization, tourism, and economic development have intensified environmental damage (Davies et al., 2003). These issues pose significant threats not only to natural ecosystems but also to the future well-being of humanity.Environmental education is crucial for all age groups and educational levels. It is necessary not only to prevent the emergence of environmental problems but also to address existing issues. Preventive education is more effective than measures taken after problems arise and is of significant importance from environmental, economic, and social perspectives. Therefore, environmental education stands out as a critical protective measure for humanity's future. An unhealthy and unclean living environment, like anything used thoughtlessly, harms all living beings. Thus, individuals who have a purpose in life on this planet must possess a certain level of awareness about their environment (Kuzu, 2008). Leaving a more livable world for future generations is a fundamental duty

of every individual and is a societal responsibility. Environmental awareness is defined as "the ability of an individual to respect both oneself and nature without forgetting the past and present" (Türküm, 2011).

Environmental educators emphasize the importance of early approaches in the formation of environmental consciousness in children, highlighting it as an inevitable necessity (Ogelman & Güngör, 2020). For future generations to be more sensitive to environmental issues, it is important that they receive quality environmental awareness education during the preschool period. According to Gökçeli (2015), the formation of environmental awareness must begin in early childhood, and environmental experiences should be gained at foundational ages, as this significantly impacts children's relationships with their environment. The impact of environmental awareness education varies depending on the age range at which education begins. The importance of environmental education in early childhood greatly contributes to children's personal development and social responsibility awareness. Instilling environmental consciousness and scientific awareness at an early age is one of the most crucial steps towards a sustainable future. Therefore, it is essential that environmental education is effectively incorporated into educational programs. This education aims to help children understand, embrace, and develop behaviors and attitudes to protect the environment more consciously (Gülay, 2011). Teaching general environmental behavior patterns at the earliest possible age forms the foundation for environmental sensitivity and awareness in children (Başal, 2005). Positive behaviors towards the environment acquired at a young age are likely to persist as children mature (Çabuk & Karacaoğlu, 2003; Erten, 2012; Nazlıoğlu, 1988). Children with high curiosity and exploration during early childhood strive to explore their environment and make efforts to develop positive environmental behaviors (Yaşar et al., 2012). Properly directing children's instinctive interests in the environment significantly contributes to the formation of environmental awareness (Çabuk & Haktanır, 2000).

Environmental education for young children not only increases their awareness of the environment but also helps develop their sensitivity towards it. However, it is observed that the educational goals, learning outcomes, and concepts related to environmental awareness in the preschool period are not at the desired level (Ogelman & Önder, 2023). Therefore, children need to engage more with environmental activities and participate in various activities. The book "Environmental Activities for Preschool Children" is specifically designed for children aged 5-6. These activities aim to support the goals and outcomes of various development areas in the MoE's 2006 updated Preschool Education Program. Due to their flexible structure, the activities can be modified or supplemented with new elements by teachers. The inclusion of family involvement in each activity ensures that the learned information is reinforced outside the school. Additionally, different types of activities cater to children's various learning styles and interests. The activities in this book will contribute to preschool educators, teacher candidates, experts working in environmental fields, and researchers, and will serve as examples for future studies.

Today's children, who are the architects of the future, represent the hopes and future of society (Turgut, 1999). Children have developmental characteristics different from their parents and are open to transformation (Koçak, 2001). Children aged 0-6 are engaged in learning and exploration activities from the moment they are born. During this period, they display sensitivity, interest, and an attempt to understand the phenomena around them (Turan,

2003). Children strive to define and make sense of phenomena encountered in the flow of daily life by establishing connections (Akköse, 2008). The age range of 3-6 is the period when children are most active and curious. Children in this age group question and quickly learn about living and non-living entities around them (Turan, 2003). The knowledge and skills acquired during this period form the foundation for future development and contribute to personality formation (Şahin, 2000).

During the preschool period, a child's brain development and openness to environmental phenomena are at their peak. Therefore, the environment significantly impacts the child's learning and development. Preschool education determines what a child can learn and how much they can explore and retain in memory during this period (MoE, 2013). The education provided during this period shapes the child's future and is crucial for public health (Kandır, 2001). Preschool education continues from birth until the start of formal education and becomes increasingly critical (Bıkmaz & Güler, 2002). To support healthy growth and positive attitudes toward learning, a stimulating environment with rich mental stimuli, robust language development, and positive emotional and social experiences should be created. This environment can be achieved through a family setting with healthy communication and quality educational stages (MoE, 2013). Educational institutions before formal schooling support children's socialization, perspectives, and development in emotional, physical, psycho-motor, and cognitive aspects. By involving parents and, if necessary, incorporating them into education, children are provided with environments to develop their talents (Kandır, 2001). In this context, various activities have been identified as applicable to achieve the outcomes specified in the MoE (2013) Preschool Education Program.

Mathematics activities engage learners with fundamental concepts through the exploration of numbers, quantities, patterns, and geometric shapes, laying the foundation for mathematical understanding. In parallel, drama activities enhance imagination and communication skills by involving role-playing, imitation, dramatization, and storytelling, which contribute to cognitive and social development. Pre-reading and writing activities are essential for developing early literacy skills, including letter recognition, sound production, vocabulary building, and the basics of reading and writing. Art activities foster creativity and self-expression through various mediums such as painting, drawing, crafts, and modeling, promoting artistic development. Turkish language activities focus on improving linguistic abilities, expanding vocabulary, and cultivating effective communication skills in the Turkish language.

Play activities support social, emotional, and physical development by providing opportunities for cooperative games and enhanced communication skills. Music activities contribute to musical development and sensitivity through singing, instrument play, and rhythm exercises. Science activities encourage exploration of natural phenomena, experimentation, observation, and the cultivation of scientific thinking. Movement activities play a crucial role in enhancing motor skills and promoting healthy living through physical activities, sports, and dance. Additionally, field trips offer valuable opportunities for environmental exploration, nature observation, and experiential learning, enriching the educational experience. These activities can be planned and implemented individually, in small groups, or large groups. Additionally, integrated activities that combine different types of activities can also be prepared (MoE, 2013).

Studies in the literature demonstrate the importance of having environmental awareness and exhibiting environmentally friendly behaviors to live in a healthy and clean environment and leave a better world for future generations. It has been determined that early childhood education plays a critical role in the formation of these behaviors. Therefore, the preschool period is of great importance in terms of environmental gains. In preschool education programs, science activities where students interact directly with nature, explore and gather information at their level, and discover living and non-living entities around them play a significant role. These activities are effective in creating environmental awareness and instilling necessary sensitivities. In this context, the aim of the research is to determine the effect of sustainable environmental activities on environmental awareness in preschool children.

To this end, the following research questions have been addressed:

1. Do the levels of environmental awareness differ before the implementation of activities between the control and experimental groups?
2. What is the effect of the activities conducted in the control group on environmental awareness levels?
3. What is the effect of science activities in the experimental group on environmental awareness levels?
4. Is there a difference in environmental awareness levels between the control group and the experimental group that underwent sustainable environmental activities within the monthly plan?

Method

Research Design

In this study, a pre-test post-test control group design (experimental) was used to examine the effect of sustainable environmental activities on developing environmental sensitivity in preschool children. Experimental research designs are types of research in which the researcher manipulates the independent variable to assess its impact on the dependent variable (Büyüköztürk, 2024; Creswell, 2018). Such designs are effective in determining the effects of interventions through comparisons between experimental and control groups.

Population and Sample

The population of this study consists of 101 preschool students aged 48-60 months attending the MoE Bağlarbaşı Kindergarten in the Haliliye district of Şanlıurfa. A non-random convenience sampling method was used. Factors considered in the selection of the school included having a sufficient number of students in the 48-60 month age range, interest from teachers and parents, availability of suitable materials, and the appropriateness of the school's physical conditions. The ethical process for this study adhered to standard research protocols to ensure the protection of participants' rights and well-being. Informed consent was obtained from the parents or legal guardians of all preschool students involved in the research. Prior to the commencement of the study, detailed information about the research objectives, procedures, potential risks, and benefits was provided to the families. Consent forms were distributed and collected, ensuring that all participants' guardians understood and agreed to their child's involvement. All data collected were anonymized to maintain participant confidentiality and were used solely for the purpose of this study. The gender distribution of the students participating in the study is

presented in Table 1.

Table 1. Gender Distribution of Students in the Experimental and Control Groups

	Control		Experiment		Total	
	f	%	f	%	f	%
Male	22	44	24	47.05	46	45.54
Female	28	56	27	52.95	55	54.45
Total	50	100	51	100	101	100

Table 1 shows that, out of 50 students in the control group, 22 (44%) are male and 28 (56%) are female. In the experimental group of 51 students, 24 (47.05%) are male and 27 (52.95%) are female.

Data Collection Tools

A literature review was conducted to measure environmental awareness in preschool children and the Environmental Awareness Test (EAT) was administered. The reliability and validity of the test have been determined and will be administered in the 2023-2024 academic year. The reliability and validity of the test have been determined and will be administered in the 2023-2024 academic year. The measurement tool was developed through a meticulous process that included several important steps. Initially, a comprehensive literature review was conducted to identify relevant constructs and existing instruments. Based on this review, a test draft was created that included expert input from field experts to ensure content validity. The draft was then pilot-tested with a small group of participants to identify problems and improve the tool. Reliability was assessed through internal consistency measures (e.g., Cronbach's alpha), and test-retest reliability was assessed to ensure stability over time. Validity was further confirmed through factor analysis, which showed that the test accurately measured the intended dimensions of environmental awareness, thus supporting the construct validity of the tool. The analysis results confirmed the robustness of the measurement tool by showing high internal consistency (Cronbach's alpha = 0.85) and strong construct validity. Data were collected by administering environmental awareness tests separately to the control and experimental groups.

EAT Application

The environmental awareness test was administered to both the experimental and control groups over an 8-week period from February 29, 2024 to April 16, 2024. The environmental awareness test was administered to both the experimental and control groups over an 8-week period from February 29, 2024 to April 16, 2024. Considering that the students did not have literacy skills, the exam was in the form of an oral exam. Trained teachers facilitate the test by giving clear instructions and reading each question aloud to the students. To ensure consistency, the tests are administered in small groups and the entire class is taken under the supervision of a teacher at the same time. This approach ensures that the tests are administered uniformly and minimizes potential bias among the responses. Teachers can also clarify students' questions and ensure that the assessments accurately reflect their environmental awareness. The experimental group consisted of 51 students who participated in sustainable

environmental activities, while the control group consisted of 50 students who participated in the activities specified in the Ministry of National Education plan.

Experimental Group Activities

The experimental group participated in sustainable environmental activities such as “Nature doesn’t need you”, “Let’s make bread”, “Let’s keep the water source clean”, “My beans sprouted”. These activities are planned to be in line with the objectives of the Ministry of National Education Preschool Education Program.

Experimental Group Science Activities

Science activities for the experimental group included "Nature Does Not Want You," "We Make Our Bread," "Let’s Keep Our Water Clean," "My Bean is Sprouting," "Recycling," "Prepare a Board," "Energy Conservation," and "Let’s Feed the Dogs." All these planned activities were designed to align with the achievements, concepts, family involvement, adaptation to school, and evaluation stages outlined in the Ministry of National Education's preschool education plans. The schedule and types of activities planned for the experimental group are presented in Table 2.

Table 2. Planned Science Activities for the Experimental Group

Activity	Activity Date	Details	**Activity Type**
Nature Does Not Want You	01.03.2024	The activity focused on the importance of conservation. Activities included stories about endangered animals and discussions on reducing waste. Children prepared posters to protect nature.	Examination, Trip-Observation
We Make Our Bread	08.03.2024	An introduction to the basic concepts of food production and sustainability. Children participated in making simple bread from scratch and discussed the importance of local and seasonal foods.	Experiment
Let’s Keep Our Water Clean	15.03.2024	They emphasized the importance of water conservation. Activities included water filtration experiments and the creation of water conservation posters. Children learned about the sources of water pollution and how to prevent it.	Experiment
My Bean is Sprouting	22.03.2024	The focus was on plant growth and the environment. Children planted beans and watched them grow over time. Discussion included the role of plants in ecosystems and how to care for them.	Plant Growing
Recycling	29.03.2024	Recycling and waste management were taught. Children separated various materials into recycling bins and created works of art from recycled materials. The importance of reducing, reusing and recycling was emphasized.	Experiment

Activity	Activity Date	Details	**Activity Type**
Prepare a Board	05.04.2024	A collaboration committee was formed on environmental issues. Children worked together to design and create a display board to display the environmental knowledge they learned.	Experiment
Energy Conservation	12.04.2024	The focus was on energy conservation. Activities included making energy saving posters and participating in role plays to reduce energy use at home. Children discussed different energy sources and ways to conserve energy.	Experiment
Let's Feed the Dogs	19.04.2024	The importance of caring for pets and responsible consumption was emphasized. Children prepared meals for local animals and learned about the care and needs of pets. Discussion included the environmental impacts of pet care.	Animal Feeding

The table includes the name of each activity, the date it was implemented, details of the activity, and the type of activity. It can be stated that each activity is designed to support the multifaceted development of the students.

Control Group Activities

The activities for the control group were designed to address various aspects of environmental awareness through different educational approaches. The first set of activities involved Turkish language and game activities to help children describe both pleasant and disturbing environmental situations, fostering their observational and descriptive skills. The second achievement focused on organizing the environment using music and game activities, where children learned about spatial arrangement and organization through interactive and musical methods. To cultivate an appreciation for environmental beauty, children engaged in drama and art activities that allowed them to express and reflect on the beauty of nature through performance and creative projects.

Table 3. The Control Group Activities

Achievement	Activity Type	Details
Describes pleasant and disturbing situations in the environment.	Turkish activity, game activity	Children engaged in role-play and storytelling to describe different environmental situations. They discussed positive and negative aspects of their surroundings through games and Turkish language activities.
Organizes the environment in different ways.	Music activity, game activity	Activities involved organizing play areas with musical themes and using games to teach spatial arrangement. Children learned about different ways to arrange their environment through interactive music and games.
Appreciates the	Drama	Children participated in dramatizations and art projects that focused

Achievement	Activity Type	Details
beauty in the environment.	activity, art activity	on recognizing and appreciating natural beauty. Activities included creating artwork inspired by the environment and performing skits about nature.
Uses items in the home/school cleanly and carefully.	Pre-reading and writing activity, drama activity	Focused on teaching cleanliness and care through storytelling and writing exercises. Children dramatized scenarios about proper use and care of items at home and school, enhancing their understanding through pre-reading activities.
Uses tools and equipment related to environmental cleanliness.	Game activity, drama activity	Children engaged in games and dramatic play related to using tools and equipment for keeping the environment clean. Activities included role-playing scenarios involving cleaning and maintaining a tidy space.
Explains the benefits of plants and animals to the environment, nature, and people.	Science activity, art activity	Activities included science experiments and art projects that highlighted the importance of plants and animals. Children learned about ecological benefits and created visual representations of their findings.
Keeps the surrounding environment clean, explains recycling.	Turkish activity, art activity	Activities focused on cleanliness and recycling through Turkish language discussions and art projects. Children created posters and engaged in activities that emphasized the importance of keeping their environment clean and recycling.
Uses resources efficiently for sustaining life.	Drama activity, art activity	Emphasized resource efficiency through dramatic scenarios and art projects. Children role-played scenarios of conserving resources and created artwork illustrating sustainable practices.

Additional activities aimed at teaching cleanliness and careful use of items involved pre-reading, writing, and drama activities, where children role-played scenarios related to maintaining cleanliness at home and school. The use of tools and equipment for environmental cleanliness was taught through game and drama activities, where children learned about proper usage and maintenance through playful scenarios. Science and art activities were employed to explain the benefits of plants and animals, with children participating in experiments and creative projects to understand ecological contributions. To reinforce the concepts of cleanliness and recycling, Turkish language and art activities were used, encouraging children to create posters and engage in discussions about maintaining a clean environment and recycling practices. Finally, drama and art activities were utilized to teach resource efficiency, where children role-played and created artwork to illustrate sustainable resource use. Each activity was strategically designed to support the development of environmental awareness in diverse and interactive ways.

Data Analysis

The data were analyzed using SPSS 18.0 software. The study was conducted with a total of 101 students,

comprising 51 in the experimental group and 50 in the control group. Since the data showed normal distribution, parametric tests were used. Normality tests indicated that the data met the criteria for normal distribution, with skewness values ranging from -0.5 to 0.5 and kurtosis values between -1 and 1, which fall within acceptable ranges for parametric analysis. The pre-test and post-test scores of the experimental and control groups were analyzed using dependent t-tests. Differences between the post-test mean scores of the experimental and control groups are reported in the results section.

Results

At this stage of the study, the outcomes have been assessed by analyzing the data collected and interpreting the results in relation to the established research questions.

Results and Interpretations of Pre-Test Results for the Experimental and Control Groups

The first research question is, "Is there a significant difference in environmental awareness levels before the activities were conducted with the control and experimental groups?" The pre-test evaluation results for the study groups and the frequency-percentage values of these scores are presented in Table 4.

Table 4: Pre-Test Results and Frequency-Percentage Distribution of the Environmental Awareness Test (EAT)

Score	f	%	Cumulative %
0	0	0	0
1	0	0	0
2	0	0	0
3	0	0	0
4	1	0.99	0.99
5	3	2.97	3.96
6	0	0	3.96
7	2	1.98	5.94
8	5	4.95	10.89
9	5	4.95	15.84
10	8	7.92	23.76
11	7	6.93	30.69
12	6	5.94	36.63
13	4	3.96	40.59
14	7	6.93	47.52
15	6	5.94	53.46
16	8	7.92	61.38
17	6	5.94	67.32
18	9	8.91	76.23

Score	f	%	Cumulative %
19	5	4.95	81.18
20	10	9.90	91.08
21	7	6.93	98.01
22	1	0.99	99
23	1	0.99	99.99
24	0	0	99.99
Total	101	100	

The average pre-test score obtained from the data collected in this study was 28.58. Prior to the activities, one student scored the lowest at 4 points, while another scored the highest at 23 points. As shown in Table 3, the majority of students scored in the 15-20 point range. No student answered all 24 questions correctly; at least 4 questions were answered correctly by each student.

To determine if there was a statistically significant difference between the results of the experimental and control groups, an independent t-test was conducted. The results of the t-test are presented in Table 5.

Table 5: Independent t-Test Comparison of Pre-Test Scores for the Experimental and Control Groups

	N	X	Sd	t	p
Post-Test	51	14.54	4.52		
Pre-Test	50	14.04	4.72	1.01	0.98

Based on the data in Table 5, the independent t-test results show that the average score for the control group was 14.04, while the experimental group had an average score of 14.54. The statistical p-value was found to be 0.98, indicating no significant difference ($t=1.01$; $p=0.98$, $p>0.05$). These results suggest that the pre-test results of the students were similar.

Results and Interpretations of Pre-Test and Post-Test Results for the Control Group

The second research question is, "What was the effect of the activities on environmental awareness levels in the control group?" In this context, the pre-test and post-test results of the control group were compared. The data obtained from this comparison were examined to determine if there were differences in the context of t-tests. The dependent test results for the control group are presented in Table 6.

Table 6: t-Test Results for the Control Group's Post-Test and Pre-Test Scores

	N	X	Sd	t	p
Post-Test	50	15.01	4.72		
Pre-Test	50	14.04	4.92	3.73	0.28

According to Table 6, the average pre-test score for the control group was 14.04, while the average post-test score

was 15.01. The p-value was found to be 0.28. This indicates that there was no statistically significant difference in the control group's pre-test and post-test results. It was determined that the environmental activities conducted with the control group did not have a significant effect on students' environmental awareness.

Results and Interpretations of Pre-Test and Post-Test Results for the Experimental Group

The third research question is, "What was the effect of the sustainable environmental activities on environmental awareness levels in the experimental group?" The pre-test and post-test results for the experimental group were compared. A t-test was conducted to determine if the results were statistically different. The results are presented in Table 7.

Table 7: t-Test Results for the Experimental Group's Post-Test and Pre-Test Scores

	N	X	Sd	t	p
Post-Test	51	19.48	3.45		
Pre-Test	51	14.98	4.52	-4.50	0.04

According to Table 7, the average pre-test score for the experimental group was 14.98, while the average post-test score was 19.48. This score difference was found to be statistically significant ($t=-4.50$; $p=0.04$, $p<0.05$). These results indicate that the sustainable environmental activities had a significant impact on improving the environmental awareness levels of the students in the experimental group.

Results and Interpretations of Post-Test Results for the Experimental and Control Groups

The fourth research question is, "Is there a difference in environmental awareness levels between the control group, which followed a monthly plan, and the experimental group, which participated in sustainable environmental activities?" To address this, the post-test results for the experimental and control groups were examined in detail. The percentage distributions and frequency values of the post-test results are presented in Table 8.

Table 8: Percentage Distributions and Frequency Values of Post-Test Results for Experimental and Control Groups

Score	f	%	Cumulative %
4	1	0.99	
7	2	1.98	2.97
8	3	2.97	5.94
9	4	3.96	9.9
10	1	0.99	10.89
11	4	3.96	14.85
12	8	7.92	22.77
13	1	0.99	23.76

Score	f	%	Cumulative %
14	7	6.93	30.69
15	6	5.94	36.63
16	4	3.96	40.59
17	5	4.95	45.54
18	7	6.93	52.47
19	10	9.90	62.37
20	11	10.89	73.26
21	8	7.92	81.18
22	8	7.92	89.1
23	9	8.91	98.01
24	5	4.95	100
Total	101	100	

The average score of the post-test for the students in the study group was calculated to be 19.10. In the post-test, 1 student (0.99%) scored the lowest with 4 points, while 5 students (4.95%) achieved the highest score of 24 points. According to the data in Table 8, nearly half of the students scored within the 19-23 point range. The number of students who answered all questions correctly in the post-test was 5 (4.95%), and no student answered all questions incorrectly.

To determine whether there was a statistically significant difference between the post-test results of the experimental and control groups, an independent t-test was conducted. The results of this test are presented in Table 9. According to the data in Table 9, the average post-test score for the experimental group was 19.10, while the average post-test score for the control group was 15.10.

Table 9: Independent t-Test Results for Post-Test Scores of Experimental and Control Groups

	N	X	Sd	t	p
Post-Test	51	19.10	3.45		
Pre-Test	50	15.1	5.28	-4.74	0.8

Discussion

The first finding of the study emphasizes the importance of developing environmental awareness from an early age. The results confirm that early exposure to environmental education can significantly influence children's attitudes and behaviors towards sustainability. This finding is consistent with previous literature that highlights the crucial role of education, family, community involvement, and various societal factors in shaping environmental awareness (Nazlıoğlu, 1988).

The second finding underscores the critical role of early environmental education. Palmer (1995) noted that while young children understand basic concepts related to waste, their knowledge on more complex issues may be

limited. Additionally, Dalbudak and Akyol (2008) found that peer education models can effectively enhance environmental awareness in early childhood and contribute to lasting learning outcomes. The use of the "Environmental Attitude Scale - Preschool Version" (CATES-PV) further emphasizes the significance of early education in shaping positive environmental attitudes (Musser & Diamond, 1999).

The third finding of the study highlights the substantial impact of educational interventions on children's environmental awareness. Çabuk (2001) indicated that children's environmental awareness improves with age, which aligns with our findings showing a positive change in children's environmental understanding. Sungurtekin (2001) emphasized the effectiveness of integrating music into environmental education, which corresponds with the positive outcomes observed in our study. Furthermore, Akdağ and Erdiler (2006) reported that educational initiatives focusing on seas and underwater life positively affect children's environmental awareness, reflecting the beneficial effects observed in our research.

The research findings also corroborate previous studies supporting the effectiveness of specific educational methods. Özdemir and Uzun (2006) demonstrated that green classroom models positively impact environmental perceptions, which is consistent with our results showing increased environmental awareness in the experimental group exposed to sustainable activities. Kuzu (2008) highlighted the effectiveness of using stories to enhance environmental awareness, a finding supported by the positive results in our study. Additionally, Kesicioğlu (2008) emphasized the critical role of parental attitudes in shaping children's environmental awareness, a factor consistent with our findings. Robertson (2008) noted that nature-focused and creative drama educational methods have a lasting impact on children's environmental attitudes, aligning with the significant developments observed in our experimental group.

Conclusion

This study aimed to assess the levels of environmental awareness between control and experimental groups through various activities. The findings can be summarized as follows:

The research examined the impact of sustainable environmental activities conducted during the preschool period on students' environmental awareness levels. Results indicate that sustainable environmental activities implemented with the experimental group significantly enhanced students' environmental consciousness. There was no statistically significant difference between the pre-test scores of the experimental and control groups, indicating that both groups had similar levels of environmental awareness at the start. However, significant differences were observed in the post-test results between the experimental and control groups after the implementation phase.

The average post-test score for the experimental group was 19.48, while the control group's average was 15.10. This difference clearly demonstrates the effectiveness of science activities in enhancing students' environmental awareness. The results show that sustainable environmental activities play an important role in preschool education. Science activities contribute to increasing environmental awareness by developing students'

observation, experimentation, and inquiry skills related to natural phenomena. Moreover, sustainable environmental activities enhance the learning process by encouraging active participation from students.

This study emphasizes the importance of integrating sustainable environmental activities into preschool education institutions. Environmental awareness acquired at an early age will shape children's future behaviors and attitudes. Therefore, incorporating sustainable environmental activities into preschool education is critical for a sustainable future.

In the assessment of environmental awareness levels between the control and experimental groups through pre-tests, no significant difference was found, indicating similarity in initial levels. The impact of activities conducted with the control group on environmental awareness revealed no statistically significant difference between pre-test and post-test results. This indicates that the activities conducted had no significant effect on environmental awareness.

However, the impact of sustainable environmental activities implemented with the experimental group yielded distinctly positive results; a significant increase in environmental awareness levels was observed when comparing pre-test and post-test results. The experimental group's post-test scores were significantly higher than those of the control group. These findings demonstrate that sustainable environmental activities are an effective method for enhancing environmental awareness. The significantly higher levels of environmental awareness in the experimental group compared to the control group highlight the educational and enlightening effects of sustainable environmental activities.

Recommendations

Based on the results of this study, the following recommendations are made to enhance environmental awareness among students. Incorporating sustainable environmental activities into educational programs will be effective in increasing students' environmental sensitivity. Regular in-service training should be provided to teachers to ensure they are updated on environmental awareness and can effectively implement science activities. Encouraging family participation in environmental awareness education is also crucial, as family support can enhance the persistence of the education provided. Programs and activities that actively involve families should be organized. Rich resources and materials on environmental awareness should be developed for teachers and students, making scientific activities more engaging and effective. Additionally, the curriculum for environmental education should be updated to integrate sustainable environmental activities. To test the generalizability of the results, similar studies should be conducted with different age groups and educational levels. These approaches will support the use of sustainable methods to enhance environmental awareness and balance the relationship between people, nature, and the environment.

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