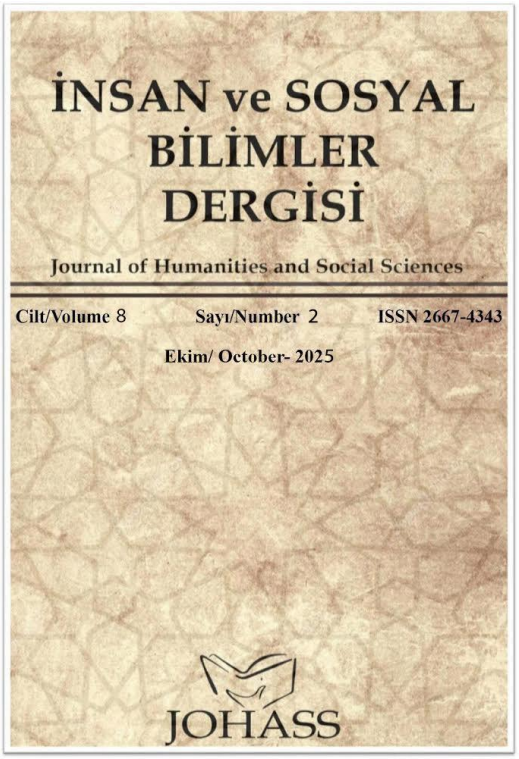
JOURNAL OF HUMAN AND SOCIAL SCIENCES (JOHASS)



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The Impact of the Eco-School Program on Preschoolers' Environmental Awareness, Responsible Behavior, and Skill Development*

**This study was derived from the thesis titled "An Investigation of the Effect of the Eco-Schools Program on Preschool Students' Responsible Behavior, Environmental Awareness, and Basic Skill Levels."*

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Article Type: Research Article
Received: 10.10.2025
Accepted: 26.10.2025
Published Online: 26.10.2025

Citation: Ocak, İ., Metin, T., & Hamiden Karaca, N. (2025). The impact of the eco-school program on preschoolers' environmental awareness, responsible behavior, and skill development. *Journal of Human and Social Sciences, 8*(2), 148-175.

The Impact of the Eco-School Program on Preschoolers' Environmental Awareness, Responsible Behavior, and Skill Development*

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Abstract

This study investigates the impact of the Eco-School program on preschoolers' environmental awareness, responsible behavior, and foundational skills. Recognizing the formative influence of early childhood education, a sequential mixed-methods design was employed, combining quantitative and qualitative approaches. The participants were 20 five-year-old children enrolled at Çay Melek Sultan Kindergarten in Afyonkarahisar, Turkey. Established scales were used to measure environmental attitudes, responsible behavior, and skill development, while qualitative insights were gathered through researcher diaries and semi-structured interviews. The intervention consisted of a 12-week program featuring interactive activities on waste recycling, water conservation, and connecting with nature. Quantitative analyses revealed significant improvements in children's environmental awareness, responsible behaviors, and skills following the program, which were further enriched by qualitative findings on children's lived experiences. The results demonstrate that early environmental education, particularly when guided by the Eco-School framework, fosters responsible decision-making and essential competencies, thereby laying a foundation for lifelong environmental stewardship. These findings offer valuable implications for educators, curriculum developers, and policymakers in strengthening early childhood environmental education practices.

Research Article

Received: 10.10.2025
Accepted: 26.10.2025
Published online: 26.10.2025

Keywords: Eco-school program, environmental awareness, preschool education, responsible behavior, basic skills development

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Introduction

Children's innate curiosity drives them to explore and learn from their surroundings, especially in their preschool years (0-6 years). This period of intense curiosity lays the foundation for their understanding of the world and fosters positive attitudes and behaviours (MEB, 2013; Yaşar et al., 2012). Scientific experts stress the importance of carefully crafted preschool education programs that cater to children's interests and needs while nurturing their natural desire to explore (Albrecht & Miller, 2004; Hirsh, 2004). During these formative years, children are particularly susceptible to both positive and negative environmental influences (Maxwell, 2007). The Eco-School programs play a crucial role in helping children develop a healthy relationship with nature. By engaging in outdoor activities, children become more sensitive to their environment and learn to form healthy social relationships (Palmberg & Kuru, 2000). Beyond these immediate benefits, nurturing ecological awareness in early childhood contributes to long-term dispositions toward sustainability and responsible citizenship.

When introduced in early childhood, environmental education significantly supports the development of scientific process skills, responsible behavior, essential competencies, and environmental awareness. Scientific process skills provide children with methods and tools that foster inquiry, reasoning, and critical thinking (Çepni et al., 1997). In parallel, basic skills refer to lifelong competencies that individuals begin developing from birth, such as noticing environmental changes, analyzing data, estimating size or quantity, interacting socially, categorizing objects and events, and predicting future outcomes. These fundamental abilities are vital for problem solving and goal achievement, and they continue to evolve throughout one’s life (Avcı, 2004; Burchfield & Gifford, 1995). Cultivating these skills during the preschool years is particularly important, as early mastery lays the groundwork for advanced cognitive development and adaptive learning in later educational stages.

In preschool, fundamental process skills such as observation, prediction, measurement, classification, inference, comparison, and communication are particularly important to develop. The education received during this period is pivotal in acquiring these skills. Preschool aims to develop children's basic skills and prepare them for future educational endeavours. It supports healthy personality development by creating environments conducive to children's physical, spiritual, social, and emotional growth. It also helps children mature

mentally, socialize, and get ready for school by providing various opportunities (Dirim, 2006). Yıldırım and Şahin-Taşkın (2021) focused on science education in preschool, discussing how developing basic process skills positively affects children's scientific thinking and problem-solving abilities. Additionally, acquiring these skills at an early age significantly contributes to abilities such as analytical thinking and creativity in the long term. Kandır and Alpan (2008) highlighted how creative and critical thinking skills can be nurtured in preschool. They emphasized the importance of basic process skills such as observation, prediction, and measurement in this developmental process. These early experiences do not merely lay the groundwork for academic success—they ignite curiosity, foster independent thinking, and build the cognitive resilience that children carry throughout life.

Educators should be guided in raising children who develop creative problem-solving skills, especially those who research, produce, and innovate driven by their innate "sense of curiosity." One of the best ways to do this is through environmental education. Children learn about the environment through their sense of curiosity, which supports the development of logical thinking, relationship-building, and the ability to interpret and evaluate situations they encounter (Sabo, 2010). Many projects and studies have shown that environmental education positively contributes to children's development during the preschool years (Çabuk, 2001; Laçin Şimşek, 2004; Kıldan & Pektaş, 2009; Gülay et al., 2015; Coşanay, 2018; Musser & Diamond, 1999; Flogaitis et al., 2005; Bryant & Hungerford, 2010; Waters & Bateman, 2015). For example, Kıldan and Pektaş (2009) discussed how effective environmental education is in increasing children's environmental awareness and developing cognitive skills such as logical thinking and relationship-building. They stated that environmental education helps children grow into environmentally sensitive, questioning, and analytical thinking individuals. The interest and curiosity children have about the environment boost their motivation for learning, supporting their overall cognitive development. These projects and studies aim to help children develop awareness, knowledge, and sensitivity towards the environment and to encourage them to take individual responsibility for it. What is essential in these trainings is that children actively engage with environmental education. By learning through doing and experiencing, and by taking responsibility for their surroundings, children internalize these lessons in a lasting way, cultivating not only knowledge but also the habits, attitudes, and responsibility that will guide them as environmentally conscious citizens throughout their lives. Therefore, it is important to investigate how environmental education practices can effectively foster preschool children’s creativity, problem-solving, and

environmental responsibility. In this context, the present study seeks to address this gap and examine the impact of environmental education on these developmental areas.

Providing children with opportunities to develop responsibility skills ensures active participation in learning, enhances their social abilities, and creates a more productive classroom environment (Duke & Jones, 1985). Therefore, responsibility education should be a fundamental component of programs at all educational levels (Glasser, 1999). The literature highlights numerous studies on responsibility behaviour, emphasizing its importance in early education (Kepenekçi, 2003; Şahan, 2011; Sapsağlam, 2017; Açıkgöz & Güler, 2021; Thornberg, 2008; Frazer & Kornhauser, 2014; Chowdhury, 2016; Aarnio-Linnanvuori, 2019). The Eco-School program, implemented from preschool through secondary education, aims to raise environmental awareness while supporting responsible behaviour and foundational skill development (TÜRÇEV, 2022). Currently applied in 67 countries including Türkiye, it represents the world's most extensive integrated school-environment-education initiative and has been shown to have meaningful effects on both school and community environments (Bajd & Lescanec, 2011; Pauw & Petegem, 2013; Spinola, 2015; Cincera et al., 2017; Lace-Jeruma & Birzina, 2019; Düzgün, 2022; Huz, 2015). By actively engaging children in such programs, schools not only foster environmental awareness and social responsibility but also cultivate lifelong habits of conscious decision-making, critical thinking, and proactive citizenship.

The Eco-School program involves children, teachers, professionals, technical staff, parents, and local government employees. It also has environmental, socio-cultural, and economic dimensions. It aims to raise individuals who exhibit environmentally sensitive behavior, considering the permanence of habits acquired at an early age. The purpose of the program makes a significant contribution to the socio-cultural dimension as it requires sharing studies with stakeholders, and studying issues such as energy, water, and recycling (Bajd & Lescanec, 2011; Korkmaz, 2014). For this reason, the Eco-School program has a multidimensional impact on schools (Bağcı, 2020). In this sense, the Eco-School is a holistic school approach. Learning about the natural world, its place, and its responsibilities is an engaging study focus that attracts children's interest in their environment. In addition to a solid content-centred curriculum, the program allows children to look critically at environmental problems and take personal responsibility for finding solutions by asking the right questions (Eco-Schools, 2022). By fostering this combination of knowledge, responsibility, and critical thinking from an early age, the program empowers children to

become proactive, environmentally conscious, and innovative individuals capable of shaping a sustainable future.

Research Focus

The focus of this study is to examine the impact of the Eco-School program on preschool children's environmental awareness, responsible behavior, and development of basic process skills. Specifically, the study investigates how environmental education, implemented through the Eco-School program, shapes children's sensitivity to environmental issues, their capacity to assume responsibility for the environment, and their acquisition of foundational skills such as observation, prediction, and problem-solving.

Furthermore, the study explores the potential long-term effects of early environmental education on children's overall development. This includes its influence on scientific thinking, creativity, and the ability to engage meaningfully with the world around them. Based on this research focus, the study aims to assess both immediate and sustained outcomes of the Eco-School program on preschoolers.

Research Aim

Raising environmental awareness from an early age requires integrating environmental education into preschool curricula (Sungurtekin, 2001). In this context, preschool education seeks to foster children’s sensitivity, positive attitudes, and sense of responsibility toward the environment, alongside essential social and individual skills. Creating suitable educational environments and programs that enable children to form strong connections with nature plays a key role in achieving these objectives (Berberoğlu, 2015).

Accordingly, this study aims to investigate the potential effect of the Eco-School program on preschool children's environmental awareness, responsible behavior, and basic process skill development. By providing targeted training in environmental awareness, fundamental skills, and responsibility from an early age, the program is expected to cultivate habits and competencies that persist throughout life. Additionally, the study seeks to contribute to the field by offering insights for researchers and educators regarding effective strategies in early childhood environmental education. The findings are anticipated to inform program design and implementation, supporting the development of environmentally conscious, responsible, and skilled individuals from the preschool years onward. Based on the purpose and scope of the study, the following sub-problems were formulated:

1. To what extent does the Eco-School program affect preschool children's environmental awareness?
2. To what extent does participation in the Eco-School program influence preschool children's responsible behavior levels?
3. To what extent does the Eco-School program contribute to the development of preschool children's basic process skills (e.g., observation, prediction, classification, and problem-solving)?
4. What are the children's views and experiences regarding the Eco-School program activities in terms of environmental awareness, cooperation, creativity, and scientific process skills?
5. What challenges do children encounter during Eco-School activities, and how do they develop adaptive solutions to these challenges?

Method

Model

This study employed a sequential nested mixed-method design, which integrates both quantitative and qualitative approaches (Lieberman, 2005). This approach was chosen because it allows the strengths of one method to complement the other, providing a comprehensive understanding of the research problem. The quantitative component followed a single-group pretest-posttest experimental design, which enabled the measurement of changes in children's environmental awareness, responsible behavior, and basic process skills before and after the Eco-School program. The qualitative component utilized action research, allowing the researcher to systematically observe, document, and reflect on children's experiences and responses during the program implementation (Hocaoğlu & Akkaş-Baysal, 2019).

The study represents "individual teacher action research" as it was conducted by the researchers within their own classroom environment (Ferrance, 2000). This design was considered suitable because it provides both measurable outcomes and rich, contextualized insights into children's learning experiences, which are crucial for evaluating early childhood environmental education programs. By combining these methods, the research could capture not only quantitative improvements in skills and behaviors but also the nuanced, lived experiences of preschool children as they engaged with environmental education activities.

Participants

The study group was selected using criterion sampling, a purposeful sampling method in which participants are chosen based on specific characteristics rather than randomly (Ekiz, 2017; Yıldırım & Şimşek, 2019). This approach was employed to ensure that participants were suitable for the effective implementation of the Eco-School program, allowing for meaningful observation of children's engagement with environmental education activities.

The study included 20 children, all aged five, enrolled at Çay Melek Sultan Kindergarten in Afyonkarahisar. Selecting participants through criterion sampling ensured that the children met the developmental and age requirements necessary for meaningful participation in the program, which is crucial for the validity of both quantitative and qualitative findings.

In terms of parental education, 5% of mothers were primary school graduates, 50% high school graduates, and 45% undergraduates. Among fathers, 10% were primary school graduates, 50% high school graduates, and 40% undergraduates. Providing this demographic information offers context regarding the family backgrounds of participants, which may influence children's environmental attitudes, social skills, and readiness to engage in program activities.

Instruments and Procedures

Quantitative data were collected using three instruments: the Children's Environmental Attitudes Scale – Preschool Version**,** the Basic Skills Scale for Preschool Students**,** and the Responsible Behavior Scale**.** The Children's Environmental Attitudes Scale – Preschool Version, developed by Musser and Diamond (1999) and adapted into Turkish by Kahriman-Öztürk et al. (2010), includes 15 items on a 3-point Likert scale (0 = Never, 1 = Sometimes, 2 = Always). In this study, Cronbach's alpha was .723, indicating acceptable reliability. The Basic Skills Scale for Preschool Students, developed by Aydoğdu and Karakuş (2017), assesses observation, classification, inference, measurement, and prediction across 20 items, with strong reliability ($\alpha = .733$). The Responsible Behavior Scale, developed by Altunok Çal and Yeşil (2019), contains 44 items on a 5-point scale (1 = Very Bad, 5 = Very Good), with excellent reliability ($\alpha = .975$).

Qualitative data were gathered through researcher diaries and a semi-structured student interview form. The researcher kept 23 diaries, documenting observations, children's

questions, and notable reactions, providing comprehensive reflection on the activities (Johnson, 2019). To explore children's perspectives, a semi-structured interview form with eight open-ended items was developed and validated by seven experts in preschool education, child development, teaching, and measurement. Interviews lasted 20–25 minutes, were recorded, and transcribed. This mixed-methods approach ensured both measurable outcomes and rich contextual insights into children's learning experiences.

Implementation of the Eco-School Program

An eco-committee was established at Melek Sultan Kindergarten to oversee and coordinate the Eco-School program. The committee consisted of the school principal (who also served as the researcher), the deputy principal, and five teachers. Together, they designed an action plan aligned with the Ministry of Education's Preschool Curriculum**,** ensuring that activities met both curricular standards and developmental needs of the children. Program themes included Waste Recycling, Water Conservation, and fostering a love for nature alongside eco-friendly behaviors. To ensure the program's quality and appropriateness, it was reviewed prior to implementation by five field experts and two preschool teachers.

The research began with quantitative data collection**,** followed by the implementation of program activities over 12 weeks**,** which took place in classrooms, school gardens, and during field trips. Classroom support staff documented activities through photographs, while each activity concluded with worksheets and evaluation sessions. Children's work was compiled into product files to provide a tangible record of engagement and learning outcomes.

Permission for the research was granted by the Afyonkarahisar Provincial Directorate of National Education on 28.12.2020. Due to ongoing COVID-19 restrictions, the program commenced during the spring semester. Children participated voluntarily, following an informative meeting with their parents about the program, and parental consent was obtained via signed forms.

The implementation phase lasted from 01.03.2021 to 11.06.2021. Being part of the school staff, the researcher had the opportunity to observe children beyond scheduled activities, allowing for continuous monitoring of engagement and learning. Regular meetings throughout the 12-week period ensured smooth coordination among committee members. Activities were conducted in daily 2–3 hour sessions over a total of 21 days, while post-tests were administered over two weeks following the completion of the action plan. This

structured yet flexible implementation allowed for both rigorous assessment and authentic engagement**,** ensuring that children could meaningfully interact with the program and internalize environmental knowledge, skills, and responsible behaviors.

Data Analysis

The research data were analyzed using both quantitative and qualitative methods**,** consistent with the sequential nested mixed-method design. For the quantitative analysis, the Children's Environmental Attitudes Scale – Preschool Version**,** Basic Skills Scale for Preschool Students, and Responsible Behavior Scale were administered as pre-tests prior to the implementation of the Eco-School program and as post-tests afterward. Statistical procedures were selected based on normality assessments**,** which confirmed that the data distributions fell within acceptable skewness and kurtosis ranges (-1.5 to +1.5), ensuring the appropriateness of parametric tests for evaluating program effects.

For qualitative analysis, data from researcher diaries and semi-structured student interviews were continuously examined, organized, described, and interpreted in alignment with the research questions. Researcher diaries, maintained and digitized throughout the study, were validated by two preschool teachers to ensure accuracy, completeness, and consistency. Content analysis was employed to systematically examine both interview and diary data, involving stages of coding, theme development, organization, and interpretation.

Interview data were independently coded by the researcher and a qualified faculty member, achieving an 87% inter-coder agreement**,** which exceeds the 70% threshold commonly accepted for qualitative research reliability and thereby ensures the trustworthiness of findings. All coded data were labeled sequentially (C1, C2, C3…C30) to maintain anonymity and confidentiality.

The findings presented in the results section include frequency (f) and percentage (%) analyses of codes and themes derived from children's perspectives on Eco-School program activities. This combined quantitative and qualitative approach allowed for triangulation of data**,** providing a comprehensive understanding of how the Eco-School program influenced children’s environmental attitudes, responsible behavior, and fundamental skill development, while ensuring both rigor and validity in the study.

Ethics Committee Approval

Ethical permission was obtained for the study from the Afyon Kocatepe University Social and Human Sciences Ethics Committee on 18.12.2020 (no. 2020/247).

Findings

Findings of Quantitative Data

To evaluate the effectiveness of the Eco-School program, pre-test and post-test scores of children were analyzed using paired-sample t-tests. These tests assessed changes in environmental attitudes, basic skills, and responsible behaviors following the 12-week intervention, providing insight into how early environmental education can foster meaningful learning and development.

The results of the Children's Environmental Attitude Scale – Preschool Version are presented in Table 1. According to the analysis, there was a statistically significant increase in environmental attitude scores from pre-test (M = 20.30, SD = 2.029) to post-test (M = 25.85, SD = 1.599), t(19) = 0.583, p = .007, indicating that children developed a more positive attitude toward environmental issues after participating in the Eco-School program. This finding suggests that structured environmental education can effectively enhance young children's sensitivity to ecological issues and foster early awareness of sustainability practices.

Table 1

T-Test Results for Pre-Post Tests

	Tests	**N**	**M**	**SD**	**t**	**p**
Children's Environmental Attitude Scale - Preschool Version	Pre-Test	20	20,30	2,029	,583	,007
	Post-Test	20	25,85	1,599		

(p <,05)

According to Table 1, a significant difference was detected between the pre-test and post-test scores in favour of the post-test scores (p < .05). The Basic Skills Scale for Preschool Students results are summarized in Table 2. A significant increase was observed in basic skills scores from pre-test (M = 16.70, SD = 1.809) to post-test (M = 19.10, SD = 1.210), t(19) = 0.778, p = .000. This improvement highlights the program's positive impact on core

cognitive skills such as observation, prediction, classification, and problem-solving, which are essential for lifelong learning and analytical thinking.

Table 2

T-Test Results for the Pre-Post Tests

	Tests	**N**	**M**	**SD**	**t**	**p**
Basic Skills Scale for Preschool Students	Pre-Test	20	16,70	1,809	,778	,000
	Post-Test	20	19,10	1,210		

(p <,05)

According to Table 2, a significant difference was detected between the pre-test and post-test scores of the children's basic skill levels in favor of the post-test scores (p < .05). Finally, Table 3 presents the results of the Responsible Behavior Scale**.** A significant increase was detected between pre-test (M = 180.95, SD = 22.844) and post-test scores (M = 207.95, SD = 18.360), t(19) = 0.778, p = .000. These findings indicate that the Eco-School program not only improves children's knowledge and skills but also encourages pro-social behaviors, accountability, and active engagement in their environment**.**

Table 3

T-Test Results for the Pre-Post Tests

	Tests	**N**	**M**	**SD**	**t**	**P**
Responsible Behavior Scale	Pre-Test	20	180,95	22,844	,778	,000
	Post-Test	20	207,95	18,360		

(p<,05)

According to Table 3, a significant difference was detected between the pre-test and post-test scores of the children's responsibility behaviour scale in favour of the post-test scores (p <.05). Overall, the quantitative findings strongly suggest that early environmental education, implemented through the Eco-School program, significantly enhances environmental attitudes, foundational cognitive skills, and responsible behaviors in preschool children. These results underscore the importance of integrating structured, interactive, and practice-based environmental learning experiences into early childhood education, as they provide children with the knowledge, skills, and habits necessary to become environmentally conscious and socially responsible individuals.

Findings of Qualitative Data

The qualitative findings derived from the researcher's diaries and children's interviews were organized into major themes: students' environmental awareness, cooperation and social skills, scientific process skills, creativity and product development, and challenges with solutions**.** Representative excerpts from diaries are included to illustrate the results.

1. Environmental Awareness and Attitudes

Students displayed high levels of motivation and readiness to engage in recycling and waste-related activities. They actively distinguished between "garbage" and "waste" and showed excitement about reusing materials. For instance, one child stated, *"It would be easier to throw waste paper into the trash, but if we had recycling bins in our classroom, we would use them"* (Diary 3). Activities such as composting and paper-bag making further strengthened their sense of responsibility, with children expressing enthusiasm when realizing waste would be sent to a recycling factory (Diary 6). Increased sensitivity toward living creatures was also observed, such as a student carefully moving aside for an ant instead of attempting to harm it (Diary 11).

2. Cooperation and Social Skills

Group activities enabled children to practice collaboration, empathy, and responsibility sharing. They organized tasks without the need for direct guidance, demonstrating progress in cooperative learning (Diary 5). During storytelling and drama activities, students considered each other's ideas, highlighting growing respect for peers' perspectives (Diary 17).

3. Scientific Process Skills

Children frequently employed scientific skills such as observation, classification, comparison, and measurement, particularly in activities like *"Sleepless Koala"* and *"Little Water Explorers"*. They successfully identified leaking faucets in the school and proposed solutions (Diary 14). While initially challenged by map-reading, they later improved and confidently used school maps to identify water consumption points (Diary 13).

4. Creativity and Product Development

Children demonstrated creativity through making picture boards, eco-banners, kites, and clay models. In the *"Muddy Hands"* activity, some overcame initial hesitation and produced unique designs (Diary 20). In kite-making, leftover waste materials were repurposed into functional products, underscoring students' ability to innovate despite resource constraints (Diary 12).

5. Challenges and Adaptive Solutions

Certain external factors, such as limited face-to-face hours due to the pandemic and adverse weather conditions, required flexibility in implementation. For example, composting was conducted indoors instead of outdoors, providing opportunities for critical thinking about the causes of odor (Diary 10). Time management difficulties during kite-making were mitigated by simplifying the process with teacher support (Diary 12).

Overall, the findings indicate that the activities effectively fostered environmental responsibility, cooperative behavior, scientific inquiry, and creativity among children. Despite occasional logistical challenges, the flexible design and teacher facilitation ensured successful completion of all activities, contributing positively to children's environmental awareness and skill development.

Interview Findings

In this section, the frequencies, percentage values, codes, and themes of the children's answers to the interview questions are included. Their answers to the first interview question, "What did you think about the Eco-School activities before starting the Eco-Schools Program activities?" are presented in Table 4.

Table 4

Opinions about the Eco-Schools Program Before Implementation

Answers	f
I am very excited because we will do activities with leftover materials.	7
I am thrilled that we will be doing new activities.	5
I am thrilled that we will do an activity with my friends.	3
We should do environmental activities.	2
We should do different activities.	3

According to Table 4, seven of students expressed excitement about activities involving leftover materials highlighting their enthusiasm for environmentally friendly practices. Additionally, five of students enjoyed engaging in new activities indicating that these initiatives capture children's interest and provide novel experiences. Another three mentioned their enjoyment of activities with friends from other classes. Two of students indicated a desire to explore diverse nature-related activities illustrating an increased awareness fostered by the Eco-School Program. These responses collectively demonstrate the positive impact of the program enhancing students' connection with the environment and nurturing their appreciation for nature.

Their answers to the second interview question "How did you feel during the Eco-School Program activities?" are presented in Table 5.

Table 5

Opinions on the Eco-Schools Program Activities

Answers	f
I feel thrilled to spend time in the garden.	4
When we form a team, I feel like an adventurer. It is exciting.	5
The events are very nice, and learning new things always make me happy.	4
I am afraid of insects, but I am not afraid anymore. I love them now.	4
I am never bored; I enjoy it very much.	3

According to Table 5, five of students felt like adventurers when working as a team highlighting their excitement in collaborative activities. Additionally, four expressed great happiness in spending time in the garden, overcoming fears of insects, and enjoying learning new things demonstrating how eco-school activities enhance children's understanding of nature and increase curiosity. Three of students reported never being bored and having fun indicating that the activities provide enjoyable and educational experiences. These findings underscore how the eco-school program fosters students' engagement with nature, enriches their learning experiences, and encourages teamwork and exploration.

Their answers to the third interview question "Did you notice any changes in yourself when the activities were completed? If so, what are these changes?" are presented in Table 6:

Table 6

Students' Opinions about Post-Implementation

Answers	f
I throw the waste in the trash bin. I no longer rummage through garbage and waste.	5
I am not afraid of insects anymore.	4
I am more careful. I do not waste paper or leave the water and lights on.	5
I learn how to compost at home.	2
I learn to make new items from leftover materials.	4

According to Table 6, five of students showed improved behavior by not mixing garbage and waste, indicating increased environmental awareness and more eco-friendly habits. Another four expressed a reduced fear of insects and newfound skills in crafting from waste materials highlighting closer interaction with nature and creative learning. Additionally, 10% reported learning home composting illustrating how these activities teach practical, environmentally friendly practices that students apply in their daily lives.

Their answers to the fourth interview question "What did you enjoy most about the eco-school program activities?" Their answers to the question "If so, what are these changes?" are presented in Table 18.

Table 7

Opinions on the Eco-School Program Activities

Answers	f
The events are very nice.	8
The events are inspiring and adventurous.	4
That is so fun.	4
I love the activities; I learn a lot of new things.	4

According to Table 7, eight of the students stated they were excited, and four stated they were excited and adventurous and loved and learned very much. This shows that the activities left a positive impression on the students and that they were excited to participate in the activities. The Eco-school program left students with positive emotions and experiences, and they enjoyed participating in the activities.

The answers given to the fifth interview question "What was the most difficult situation in the eco-school program activities?" are presented in Table 8.

Table 8

Opinions on the Activities That Students Have Difficulty

Answers	f
There is nothing I find challenging; the activities are elementary.	8
I have a hard time flying a kite.	6
I have difficulty waiting for the rainwater, but I wait patiently, and our container is filled.	6

According to Table 8, eight of the students said that they did not have difficulty in the activities. This shows that the students had no difficulties in the activities which were carried out quickly. 30% of the students said they had difficulty in a particular activity. Again, six of the students stated that they had difficulty waiting for rainwater, but they waited patiently. This shows that the students achieved success and had a positive experience by patiently waiting in the rainwater collection activity. These responses show that the activities allow students to experience different challenges and provide students with various skills. The difficulties experienced in the activities help students learn how to cope with obstacles and develop their self-confidence. Students' stance against different challenges and their achievements by patiently waiting to provide a significant learning experience for their future lives.

The answers given to the sixth interview question "What is the subject you think you learned the most with the eco-school program activities?" are presented in Table 9.

Table 9

Experiences with the Eco-Schools Program Activities

Answers	f
Recycling	7
Loving, Protecting and Keeping the Environment Clean	5
Loving and protecting our world	3
Protecting our water and keeping it clean	4

According to Table 9, seven of the students recycle; five love the environment, protect it and keep it clean; and four respond to protect water and keep it clean. This shows that students attach importance to recycling, understand the importance of recycling practices for reusing waste and protecting the environment, have environmental protection awareness and have developed a sensitivity to keeping the environment clean and protected. In addition, students emphasise the importance of protecting water resources and wasting water showing that they have gained awareness about using water more efficiently. All these answers

emphasise that the eco-school program instils environmental awareness in students and increases their sensitivity to environmental protection.

The answers given to the seventh interview question "Are there things that you think have changed in our school with the Eco-Schools program activities?" are presented in Table 10.

Table 10

Opinions on the Changes at Schools with Eco-School Program Activities

Answers	f
We now have recycling bins in our school and classrooms.	6
We have rainwater collection containers in our garden. Since we do not have a tap in the garden, we can use the water collected there in our games.	5
We now grow our plants in our garden.	4
Our school was very nice before but has become more environmentally friendly.	5

According to Table 10, six of the students said there were recycling bins in their schools and classrooms. Thus, thanks to the eco-school program, recycling awareness has increased, and recycling bins have become widespread. Five of the students said they could use the rainwater they collected in the garden in their games and that their schools were more environmentally friendly. Four of the students said they grew their plants in the garden. In other words, thanks to the activities, students establish a closer relationship with nature and learn environmentally friendly practices such as growing plants. All these responses show that the Eco-Schools Program contributes to adopting environmentally friendly practices in schools and their surroundings and students' active interaction with the environment.

The answers given to the eighth interview question "Would you like the eco-school program activities to continue?" Their answers to the question 'Why?' are presented in Table 11.

Table 11

Opinions on the Continuity of Eco-School Program Activities

Answers	f
Yes, I would love to. We can do adorable activities at school.	4
I would like to, yes. Then, everyone learns to protect their environment.	5
I want to because it is adorable to work with my friends.	6
I would love it because having tasks as a team was excellent.	5

According to Table 11, it can be seen that all of the students want it for various reasons. This shows that students enjoy working with their friends, understand that

cooperation is a positive experience and that environmental protection and teamwork are essential sources of motivation for students.

Table 12

Codes and Themes about the Opinions of Eco-School Program Activities

Theme	Codes
Benefits of Eco School Activities	Garbage-Waste Separation
	Overcoming Your Fear of Insects
	Saving Money
	Recycle
	Environmentally Friendly Behaviors
	Patience
Effects of Eco-School Activities at School	Recycling Materials
	Garden Planting Works
	Being Environmentally Friendly
Qualities of Eco School Activities	Beautiful
	Exciting and Adventurous
	Fun
	Instructive

Table 12 presents the codes and themes that emerged from analysing student opinions at the end of eco-school program activities. According to Table 12, the students find eco-school activities exciting, instructive and entertaining. They acquire environmentally friendly behaviours, and overcome their fear of insects and turn them into love. These themes and codes reflect various aspects and impacts of the program and show that students benefit from these activities differently. The Eco-school program offers a versatile experience to develop students' environmental awareness and social-emotional skills. While such activities teach students to interact with the environment and nature, they reinforce essential values such as teamwork, patience, excitement, and happiness.

Table 13 presents the reliability analysis results of student opinions received at the end of the eco-school program.

Table 13

Reliability Analysis

Theme	Consensus	Difference of Opinion	Average
Benefits of eco-school activities	6	1	%85
What eco-school activities make you feel	4	1	%80
Effects of eco-school activities at school	4	0	%100

Characteristics of eco-school activities	5	1	%83
Average			%87

In order to ensure the validity and reliability of the qualitative data, independent coding was done. Miles and Huberman's (1994) formula of Reliability = Consensus/ (Consensus + Disagreement) *100 was used to calculate the reliability of the study. Themes were created by taking into account common words in participant responses. As a result of the reliability analysis, an 87% consensus rate was determined. This shows that the coding and themes made in the study are mainly compatible with those of two researchers who evaluated it independently. This rate is considered acceptable reliability in qualitative research (Miles & Huberman, 1994).

Resutls and Discussion

Environmental awareness and sustainability issues are becoming more critical daily, as issues such as environmental pollution and climate change are increasing globally. The Eco-school program which aims to teach children about environmental awareness, sustainability, and the protection of natural resources has an essential place in environmental education. Thus in this research, it was aimed to examine the effect of the eco-school education program on preschool children's attitudes towards the environment, basic skills, and responsible behaviour levels.

According to the research findings, a significant difference was detected between the pre-test and post-test scores of the preschool children's attitudes towards the environment, fundamental skills, and responsible behaviour scales in favour of the post-tests. In line with this result, it has been determined that the eco-school education program affects preschool children's attitudes towards the environment, basic skills, and responsibility behaviours. This result aligns with studies showing that art-based environmental interventions can stimulate children’s creative thinking and deepen their engagement with environmental issues (Kalafati, Flogaiti, & Daskolia, 2025).

The Keep Britain Tidy Commission (2013) concluded in its research that the eco-school program created positive changes in children's environmental behaviour and thoughtful and responsible behaviour. Gezgin (2019) found that science activities gave more successful results than the program's activities in raising children's environmental awareness. Spinola (2015) observed that eco-school children were at a better level regarding knowledge, attitudes, and behaviours that indicate environmental literacy. Korkmaz (2014) stated that eco-

school practices contribute most to children gaining environmental awareness, creating environmental awareness, and saving natural resources. Yüksel (2009) concluded that the environmental attitudes and awareness levels of children who participated in the eco-school program were higher than those not included in the eco-school application. Kuhlemeier et al. (1999) stated in their study that there is a difference in the awareness, attitude, responsibility, and self-sacrifice behaviour of children attending schools that provide high standard education compared to other schools and that the reason is due to the difference in the cognitive level of the children and the difference in the education given. These results lead to changes in the children's attitudes towards the environment and increased responsible behaviour and awareness of the children reached in our research. It supports the positive impact of the eco-school program, which is a particular extra-curricular program. Moreover, the wider literature on nature-based play and outdoor learning suggests that environments rich in open-ended natural materials, extended uninterrupted time outdoors, and sensitive adult guidance are key supports for creativity, problem-solving, and cognitive development (Kiewra & Veselack, 2016).

Interviews conducted with the students who participated in the eco-school program activities show that the students felt excited, happy and curious before starting the eco-school activities. While carrying out the eco-school program activities, it was observed that children were happy to spend time in the garden, were excited about working as a team, were happy to learn new things, did not get bored, and some children overcame their fear of insects during the activities. In Civelek and Akamca's (2017) research, it was concluded that children enjoyed garden activities. At the end of the eco-school program, it was observed that the children stated that they were able to separate garbage and waste, overcame their fear of insects, use paper, water and electrical energy economically, learned how to compost, and learned to make new products from leftover materials. This shows that the eco-school education program contributes to students' positive learning and increased awareness. It is seen that creating healthy environmental awareness in children from preschool and teaching them environmentally friendly behaviours can contribute to the growth of individuals who can understand and respect the balance of nature. It has also been determined that the activities carried out within the scope of the eco-school program increase children's awareness of recycling, their creativity towards reproduction, and their positive relations with living things and nature. These qualitative findings resonate with research showing that natural outdoor

settings, when combined with adult scaffolding and open materials, nurture imagination, autonomy, and sustained creative play in young children (Kiewra & Veselack, 2016).

Due to its developmental process and characteristics, the preschool period is when children's curiosity levels are high, and they are willing to explore. A qualified environmental education aimed at eco-school program is critical in developing adequate knowledge, positive attitudes and behaviour in children (Cevher Kalburan, 2009). In line with the children's opinions, it was determined that the subjects they learned the most were recycling, loving the environment, protecting it, keeping it clean, loving and protecting our world, protecting our water and keeping it clean. From the children's answers, it can be concluded that the eco-school education program activities positively affect children's curiosity and desire to explore. When children were asked about the changes they observed at school due to the eco-school program activities, their answers stated that there were recycling bins in classrooms and schools, they could use the water collected in rain storage containers in their games, they could grow their plants, and while they found their schools very beautiful before, they now find them more environmentally friendly.

As a result of the research, the activities in the eco-school program help preschool children better understand their natural environment and the need to protect it. They become aware of issues such as waste management, energy saving, water use and recycling. It helps them develop skills such as observation, hypothesising, data collection and analysis, acquire the habit of exhibiting responsible behaviour, and raise awareness on issues such as separating waste correctly, protecting natural resources, saving water and saving energy. It helps them become responsible individuals for a sustainable future and take an interest in environmental issues. At the same time, it was determined that it positively contributed to the children's environmental attitudes, basic scientific process skills, and responsible behaviour levels included in our research. These reported changes suggest that children are forming emotional and cognitive connections with their environment, aligning with the concept of “nature connectedness” shown in environmental education research (Ardoin & Bowers, 2020).

In the qualitative part of the research, the analysis of the researcher's diaries showed that the eco-school action plan activities with the children attracted their attention. They felt emotions such as excitement, happiness, and curiosity, and behavioural changes were observed in the children. The observations regarding scientific process skills in the researcher's diaries stated that while the children needed help drawing maps, they did not have difficulties depicting events in their order, measuring activities, separating waste, and

observing nature and the environment. It is concluded from the researcher's diaries that children have observation, classification, comparison, measurement, and association skills through their development and that they develop these skills through activities. Additionally, the fact that some children struggled with map drawing suggests that future iterations of the program might integrate scaffolding or differentiated supports, consistent with research emphasizing the balance between child autonomy and guided support.

As a result of this research, preparing a curriculum in preschool education in which science and nature activity outcomes are supported by sustainable ecological outcomes will strengthen children's ties with nature and support their environmental awareness, sense of responsibility and scientific process skills more effectively. At the same time, it is essential to implement it not only in preschool education but also in all educational levels and schools. In order to disseminate the program to a broader audience, the number of schools included in the eco-schools program should be increased, and the program should be promoted in a way that creates more awareness. In particular, it should investigate how the impact of eco-school program continues in the long term and how the program can be applied in different cultures. Especially, future research should include follow-up measurements to test the sustainability of these gains, comparative studies across diverse cultural contexts, and attention to teacher training, infrastructure, and the design of nature-rich learning environments that provide open materials and autonomy.

This study has some limitations that should be considered when interpreting the findings. The sample size was relatively small and limited to a single preschool, which may affect the generalizability of the results. Additionally, the study relied on teacher-reported measures, which could introduce subjective bias. Future research with larger, more diverse samples and multiple data sources is recommended.

Ethics Committee Approval

Ethical permission was obtained for the study from the Afyon Kocatepe University Social and Human Sciences Ethics Committee on 18.12.2020 (no. 2020/247).

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