ANADOLU UNIVERSITY

AUJEF
Anadolu University Journal of Education Faculty
aujef.anadolu.edu.tr

2026, 10(1), XX-XX
Print ISSN: 1300-5448
Online ISSN: 2602-2249

RESEARCH ARTICLE OPEN ACCESS

Exploring environmental perceptions through family involvement: A phenomenological inquiry with students and parents*

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*The study was conducted following ethical publication standards and was approved by the Manisa Celal Bayar University Social and Human Sciences Ethics Committee, decision dated 02/05/2023.

Article Info

DOI: 10.34056/aujef.1857350

Article History:
Received: 06/01/2026
Revised: 26/01/2026
Accepted: 16/02/2026

Keywords
Environmental education,
Family involvement,
Phenomenology,
Rural education,
Primary school.

Highlights:

- The study examines students' and parents' environmental perceptions phenomenologically.
- Family involvement supports the continuity of environmental education at home.
- Rural dynamics shape the interaction between family involvement and environmental learning.
- Children serve as catalysts for reverse socialization and intergenerational environmental dialogue.

Abstract

This phenomenological study explores how eight third-grade students and their families in a rural district interpret environmental phenomena and their shared educational experiences. Data were gathered through multiple qualitative instruments, including word association tests, student and researcher diaries, semi-structured interviews, and observations to capture the depth of these perceptions. Findings reveal that participants define the environment as an integrated system of living beings within both natural and artificial contexts, viewing it as a shared home for people, animals, and plants. Participants notably pointed to pollution, drought, and climate change as primary environmental problems while emphasizing the influential role of human factors and their consumption habits. They proposed concrete strategies to prevent these issues, focusing on waste repurposing, recycling, and social warnings. The intentional practice-based design of this study enabled children to act as effective catalysts for intergenerational learning. Participants characterized this process as a meaningful lived experience that fostered positive emotions and interactive dialogue. This process enabled reverse socialization, in which children influenced parental habits and strengthened family bonds through quality time. Pedagogically, the study suggests reconceptualizing family participation as a learning ecosystem that bridges the gap between formal schooling and daily life. By transforming routines into a conscious environmental mindset, this synergy fosters a lasting culture of sustainability at home.

Citation: Yaman, Ö., & Ateş, Ö. (2026). Exploring environmental perceptions through family involvement: A phenomenological inquiry with students and parents. *Anadolu University Journal of Education Faculty, 10*(1), e202601. https://doi.org/10.34056/aujef.1857350

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1. Introduction

The growing population driven by industrialization, combined with the unsustainable use of agricultural lands, deforestation, and the rapid depletion and pollution of natural resources, is causing irreversible environmental damage. This situation has developed into a global ecological crisis that endangers not only human life but also all living beings (Kıvrak & Uyanık, 2020; Lawrence et al., 2022). In this context, increasing individuals' environmental awareness is seen as a crucial step in effectively addressing these global problems.

Environmental education is a discipline focused on increasing individual awareness and promoting responsible behavior to address environmental issues, while also protecting nature and natural resources (Havlick & Hourdequin, 2005; Pooley & O'Connor, 2000). High-quality programs enhance ecological knowledge and foster positive attitudes and environmentally responsible actions (Altuntaş & Turan, 2016). However, for these attitudes and behaviors to become ingrained, the timing of the intervention is key. Because of its experiential nature, it's essential to start environmental education early in life (Khajanchi et al., 2024). For this reason, environmental awareness, especially when learned during early childhood, plays a vital role in shaping individuals who respect nature and understand environmental responsibility (Ardoin & Bowers, 2020; Ernst & Burcak, 2019). Therefore, primary school years are a critical period for such growth. Ardoin and Bowers (2020) stress that environmental education in this stage should aim beyond simple knowledge transfer to truly help students internalize sustainability through their thoughts, feelings, and actions. Reaching students at this age is crucial because, as Otto et al. (2019) show, pro-environmental tendencies increase between ages seven and ten, providing a prime opportunity for engagement before these tendencies stabilize and decline during adolescence.

While environmental awareness ideally starts in the earliest years of childhood, the third-grade level serves as a key official entry point within the formal education system in Türkiye. At this stage, the Science Curriculum (MoNE, 2018) officially introduces environmental themes, highlighting concepts such as cleanliness, conservation of natural resources, recycling, and responsibility. This period is especially strategic for strengthening environmental foundations, as children at this age are cognitively prepared and receptive to learning through observation and experience (Šonrytė & Pakalniškienė, 2021). However, the influence of school education extends into the home, where family interactions play a crucial role in either reinforcing or reshaping the knowledge children acquire in class.

Beyond the formal classroom setting, families represent another critical context for development, characterized by a reciprocal influence between parents and children. (Aghayeeabianeh & Talebi, 2020). This dynamic is known as "intergenerational learning," where knowledge is shared through two-way interaction rather than belonging to a single age group. In this process, children are not passive recipients; they act as agents of change by transferring values and behaviours back to their parents, a phenomenon called "reverse socialization" (Damerell et al., 2013; Vassiloudis, 2026). Within this framework, the quality of the parent-child relationship and the depth of family dialogue play a key role in the transmission of environmental values (Vassiloudis, 2026). Studies show that while parents' motivation and guidance shape children's practices (Grønhøj & Thøgersen, 2012; Pratt et al., 2013), children can also act as catalysts, positively influencing their parents' environmental behaviours (Vaughan et al., 2003). This reciprocal interaction highlights the need to actively involve families in environmental education. The primary reason is that children are more likely to adopt environmental values when parents demonstrate them through consistent actions rather than relying only on verbal explanations (Aghayeeabianeh & Talebi, 2020).

Family-centered approach allows ecological concepts to be contextualized into daily routines such as waste separation, energy conservation, and water usage monitoring. This offers experiential learning opportunities that formal curricula may lack. Through consistent exposure and reinforcement within the household, children are more likely to develop the intrinsic motivation necessary to protect shared resources (Safira et al., 2022). Therefore, environmental education programs should expand their scope to include families, as creating a synergy between school and family contexts is essential for fostering sustainable behavioural change. Consequently, integrating parents into the process can help bridge the

gap between school knowledge and daily life, facilitating more meaningful and long-term environmental habits (Alam & Hamzah, 2025). Considering this necessity, existing studies confirm that environmental education interventions in elementary schools successfully improve students' perceptions (Ertürk, 2017; Kıvrak & Uyanık, 2020). Yet, the literature reveals a notable limitation. Although several studies incorporate elements of family involvement (Babadağ, 2022; Erol & Gülay-Ögelman, 2021; Hiramatsu et al., 2014), there is limited research focusing specifically on practice-based approaches. Addressing this gap is crucial, as family participation is key to raising awareness across generations and supporting meaningful parent-child interaction (Babadağ, 2022). However, environmental education provided in schools does not always find its way naturally into the home. Furthermore, children may not always act as automatic catalysts for change. Therefore, intentionally involving parents is essential for successful environmental learning across generations (Straub & Leahy, 2017). Even when efforts are made to involve families, this engagement can be influenced by socioeconomic factors. Conditions such as low income, busy schedules, and educational backgrounds may act as barriers to active family participation (Alam & Hamzah, 2025; Safira et al., 2022). To develop effective educational models, it is essential to understand how to successfully integrate family involvement despite these challenges.

Building on this rationale, the present study aims to examine the environmental perspectives of third-grade students and their families and to explore how these participants interpret educational experiences enriched by active family involvement. The reason for focusing on the third-grade level in a rural setting is that it marks the start of formal environmental education while children are still in direct contact with their natural surroundings. Unlike the predominant literature often situated in urban, middle-class settings, this study addresses a critical gap by focusing on a rural community where resource conservation may be rooted in economic necessity rather than solely ecological trends. By considering socioeconomic factors during data analysis, the study explores how participants in a limited-resource setting interpret and make sense of environmental issues and practices in their daily lives. While households with greater resources may adopt advanced sustainable practices, families in limited-resource settings may focus on practical, cost-saving behaviours such as reusing materials and minimizing waste (Safira et al., 2022). By documenting how families can transform these conventional habits into conscious sustainability, the study offers a model for environmental education in developing or disadvantaged regions. Consequently, this study aims to make a meaningful qualitative contribution to the existing literature by showing how children can function as change agents even in families with limited academic backgrounds. Guided by these objectives, the study is focused on a central research question that explores the participants' lived experiences, supported by four sub-questions that investigate the context of their perceptions. The research questions are structured as follows:

How do primary school students and their parents interpret and make sense of their shared experiences within a family-involved environmental education process?

1. How do participants define the concept of the environment?
2. Which environmental problems do participants identify?
3. What strategies or recommendations do participants propose to prevent environmental problems?
4. How do participants experience the family-involved process and its reflections on their daily lives?

2. Method

2.1. Research Design

This study utilized a phenomenological design to uncover the essential meanings within the participants' lived experiences of the phenomenon (Creswell & Poth, 2016). Specifically, a descriptive phenomenological strategy was adopted to uncover the essential structures of these experiences without imposing external theories (Giorgi, 1997). Since environmental education within a family context is characterized by complex reciprocal interactions and intergenerational learning (Vassiloudis, 2026), this design is suited to illuminate the participants' "lifeworld" (Sundler et al., 2019). Accordingly, the study

focused on how the environment is perceived through the thoughts and daily experiences of students and their families. In line with this methodology, the data sources consisted of individuals who had directly lived the experience and could reflect on their views (Creswell & Poth, 2016).

2.2. Participants

The study was conducted at a public school located in a rural district where the local economy is primarily driven by agriculture. To select participants, criterion sampling was utilized to identify information-rich cases (Patton, 2015). Since phenomenological research centers on lived experience, the selection focused on students and their families who could reflect upon their environmental journeys. Specifically, the criteria included the students' questioning nature, active participation, and/or expressive skills, alongside the family's willingness to engage in the shared educational process. Consequently, the participants consisted of eight third-grade students (3 boys and 5 girls) and their families, providing a shared context to explore the essence of the phenomenon.

2.3. Participant Profiles and Context

To provide a comprehensive understanding of the participants' lifeworld, their socio-demographic profiles are summarized in Table 1. Given the small sample size characteristic of phenomenological research, these profiles help clarify how individuals and families interpret their environmental experiences.

Table 1. Socio-demographic profiles of the participants

Child's Pseudonym	Gender	Mother's Pseudonym	Mother's Education	Mother's Occupation	Father's Education	Father's Occupation	Number of Children
Ali	Male	Hatice	Bachelor's	Homemaker	Associate	Officer	2
Melis	Female	Fahriye	Middle	Homemaker	Middle	Farmer	3
Zeynep	Female	Selda	Middle	Homemaker	Middle	Farmer	2
İbrahim	Male	Emine	Primary	Homemaker	Primary	Farmer	3
Hilal	Female	Sevim	Primary	Homemaker	Primary	Farmer	2
Erva	Female	Feride	Middle	Homemaker	Middle	Farmer	2
Sibel	Female	İlknur	Middle	Homemaker	Middle	Farmer	3
Eren	Male	Fatma	Primary	Homemaker	Middle	Worker	2

As shown in Table 1, the participant profiles reflect the socio-economic structure of the rural region, where life is largely governed by agricultural cycles. Except for Ali's and Eren's fathers, who work as a health officer and an industrial worker, respectively, all fathers in the study are engaged in farming. While one mother (Hatice) holds a university degree, the others have primary or secondary education, and all serve as full-time homemakers. Due to these occupational responsibilities in agriculture, a distinct pattern emerged during the study: mothers exclusively sustained attendance at school meetings and interviews, acting as the primary narrators for the household data. This demographic structure suggests that practices such as avoiding waste or conserving resources tend to be a natural part of their daily routine due to economic necessity or tradition, rather than a direct result of global ecological trends.

Despite differences in family dynamics, every mother explicitly stated that her child's environmental behaviours required further development. Among the children, Melis and Sibel exhibited high sensitivity to nature and established habits, such as caring for animals. Other young participants, including Zeynep, Erva, İbrahim, and Hilal represented those who required external motivation to stabilize their environmental behaviours, while Ali and Eren were included for their inquisitive nature and potential for active participation.

2.4. Data Collection Tools

In this study, a variety of data collection tools including researcher and student diaries, observation forms, semi-structured interviews, and word association tests (WATs) were employed to examine the multidimensional experiences of the participants within the context of family-involved environmental education. By integrating these data sources, the researchers ensured the rich description essential for phenomenological inquiry.

Researcher and Student Diaries: The researcher's diary functioned as a platform for self-reflection and recording developing insights from the beginning of the study. Student diaries, provided as personal notebooks, documented the children's spontaneous reflections and experiences during the implementation. These diaries provided a longitudinal view of how participants' internal dialogues evolved over the four-week period.

Observations: Since the researcher was also the participants' classroom teacher, this process was not restricted to formal lessons but extended across various school settings and breaks. This continuous approach allowed for the capture of authentic environmental practices and interactions within the students' natural social environment. Classroom-situated practices were documented through the researcher's field notes and photography. The observation process was further enriched by monitoring family-involved activities through real-time photographs and videos shared via mobile communication applications.

WATs: The WAT was used to reveal the cognitive structures of both students and their families regarding the environment. Administered separately to students and families before the implementation, participants were given one minute per key concept to provide spontaneous associations, offering a window into their prior environmental schemas.

Semi-Structured Interviews: Serving as the heart of the phenomenological data, these interviews were conducted before, during, and after the implementation. The flexible nature of these sessions allowed families to share deep, narrative descriptions of their environmental journeys, illustrating how they interpreted the experience.

Supporting Artifacts and Visual Expression: Family-involved projects and classroom artifacts acted as tangible evidence of the children's environmental engagement. Additionally, student drawings were specifically used to elicit environmental definitions, as drawing encourages children to express significant events and concepts that they might find difficult to articulate verbally.

2.5. Procedure

The study was conducted over a four-week period. Figure 1 presents a weekly overview of the activities, illustrating how the implementation integrated school and home settings through a series of collaborative tasks. Week 1 involved analysing family photographs to compare historical and current environmental issues. In Week 2, students and parents created posters of natural landmarks, followed by a school tour to distinguish between natural and artificial environments. Week 3 focused on practical waste management, including the establishment of home recycling corners and classroom modelling using waste materials. The program concluded in Week 4 with an analysis of national pollution news and a collaborative "Zero Waste Picnic" prioritizing the use of reusable materials.

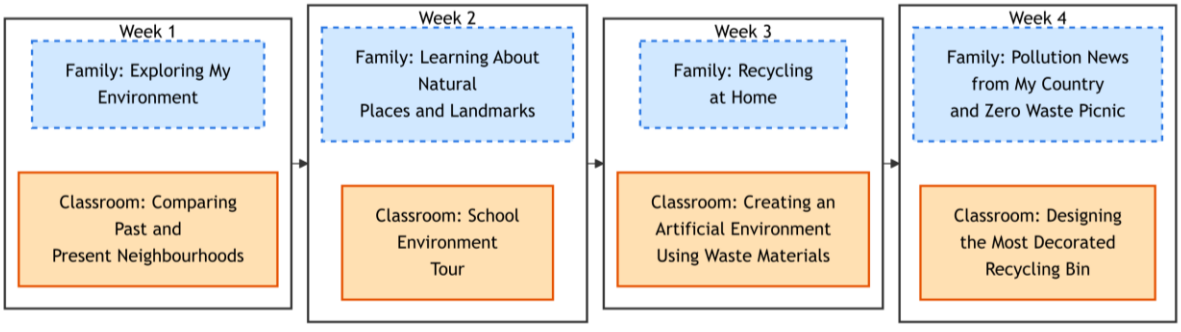


Figure 1. Overview of the family-involved environmental education program

This four-week duration was designed to capture the initial reflective shifts in participants' environmental awareness. A key aspect of this timeframe was the integration of school-based tasks, outdoor exploration, and ongoing activities at home, facilitated by the active involvement of mothers and the supportive role of fathers within their rural daily routines. This period provided a suitable window to observe the emerging signs of environmental practices as children engaged with environmental concepts.

While four weeks is not intended to represent permanent habit formation, it allowed for the collection of qualitative insights necessary to understand the essence of the family-involved environmental journey within this specific context.

2.6. Trustworthiness of the Study

In qualitative research, several strategies are employed to ensure the trustworthiness of the study, including credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985). Credibility was strengthened through data triangulation, which involved synthesizing interviews, observations, and diaries kept by both the researcher and students. Additionally, home-based activities were documented via photos and videos to enrich the data, while peer debriefing and member checks with families verified the accuracy of the findings. Transferability was addressed by employing criterion sampling and providing detailed context descriptions. To ensure dependability, consistency was maintained across all data sources, including both written and verbal student responses. Finally, confirmability was achieved by preserving researcher self-reflection through detailed process notes and supporting the results with direct participant quotations.

2.7. Data Analysis

The qualitative data obtained from semi-structured interviews, WATs, student and researcher diaries, and observations were analysed using thematic analysis within a descriptive phenomenological framework (Chang & Wang, 2021; Sundler et al., 2019). This approach was adopted to capture the essential meanings of the participants' lived experiences. Adopting a reflective attitude, the researchers ensured that the analysis relied exclusively on participants' descriptions rather than personal assumptions (Giorgi, 1997). The process followed three interrelated phases. First, all textual data were read repeatedly to gain a sense of the whole and achieve familiarity. Second, significant statements regarding the environmental phenomenon were identified as meaning units. In this phase, WAT responses were evaluated qualitatively to reveal cognitive structures and/or used to triangulate interview narratives. Third, these meaning units were then clustered into patterns and synthesized into a comprehensive structure describing the essence of the phenomenon.

To enhance the transparency of this process, Table 2 illustrates an example of the transition from raw data to themes. For instance, a mother's statement about children being influenced by parental behaviour was identified as the code of "Parental Guidance," which was then categorized under the sub-theme of "Role Modelling" and consequently contributed to the theme of "Suggestions." Similarly, statements regarding excessive purchasing and irresponsible behaviour were coded as "Waste" and "Irresponsibility" under the "Consumption Patterns" sub-theme, reflecting the comprehensive theme of "Environmental Challenges."

Table 2. Examples of the qualitative coding process

Theme	Sub-theme	Codes	Representative Quotes (Raw Data)
Suggestions	Role Modelling	-Parental Guidance	"Children are influenced by us... To set a good example, we must become conscious. One who cannot change themselves cannot change their environment." (Selda)
Environmental Challenges	Consumption Patterns	-Irresponsibility -Waste	"Environmental problems occur as a result of irresponsible behaviour... people should be conscious." (Hatice) "...We buy too much, consumption is too high, we waste too much... I realize I could have done without certain items." (Selda)

To ensure consistency, the data were examined by an external expert with a PhD in environmental education, with a focus on family-involved action research. The analysis continued until a consensus was reached on the themes, sub-themes, and categories. Direct quotations were also presented to support the results.

2.8. Roles of the Researchers

The study was conducted in the classroom of the first author, who has nine years of experience as a primary school teacher. In this study, the first author acted as a teacher-researcher, actively planning

the process, implementing the activities, and collecting data within her own classroom. Being the classroom teacher allowed her to be intimately acquainted with the students, their families, and the context. The second author, on the other hand, served as the research supervisor, guiding the methodological design and data analysis processes. Although the second author did not participate in the classroom implementation, she ensured the trustworthiness of the study by examining the raw data (diaries, videos, photographs, etc.) and providing an objective external perspective during the interpretation of findings.

2.9. Ethical Considerations

Prior to data collection, necessary ethical approval was obtained from the [Name of the University] Social and Human Sciences Ethics Committee (Date: XX.XX.20XX, Decision No: XX). During the research process, the purpose of the study was explained clearly to all students and parents. Written permission was obtained from the parents for their own participation and on behalf of their children. Additionally, the students verbally agreed to join the study. All participants were informed that they could withdraw from the study at any time without giving a reason. To ensure confidentiality and anonymity, real names were replaced with pseudonyms throughout the study.

3. Results

This section presents the findings derived from the study process and their interpretations, supported by themes and direct quotations. Upon analysing the data in relation to the study's aim and sub-problems, five main themes were identified: "Components," "Perceptions," "Environmental Challenges," "Suggestions," and "Environmental Education Experience." The resulting themes and sub-themes are illustrated in Figure 2.

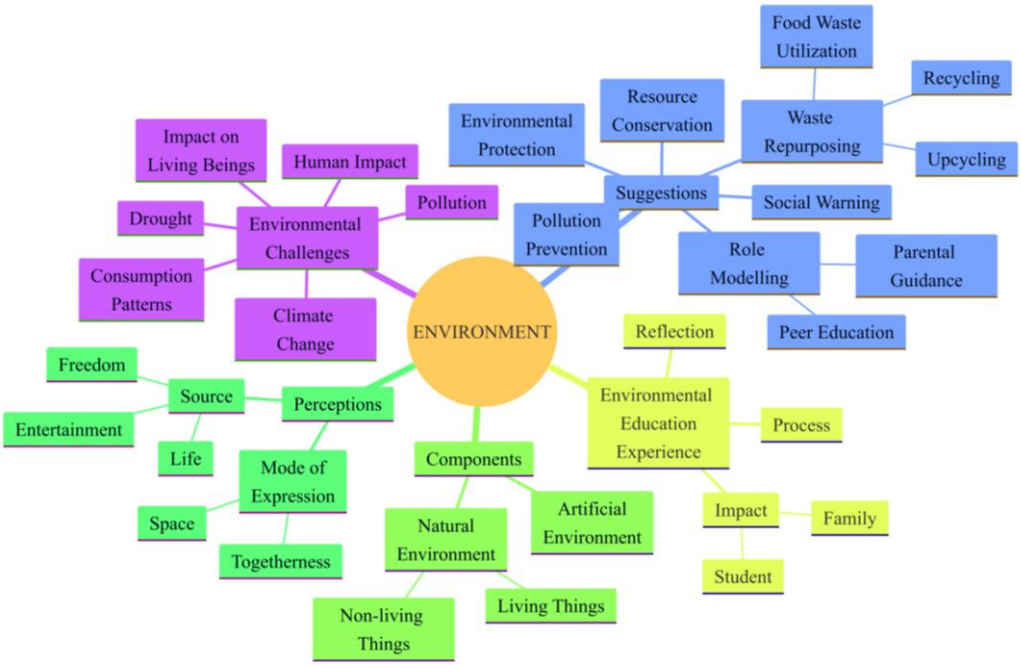


Figure 2. Thematic structure of the findings

3.1. Defining the Environment: Components and Perceptions

Regarding how participants conceptualize and define the environment, the analysis revealed two main themes: "Components" and "Perceptions." Within the Components theme, the environment was further categorized into two sub-themes: natural environment and artificial environment. Students primarily defined the environment through living things (e.g., trees, animals, children), while some also incorporated non-living elements (e.g., mountains, lakes). For instance, Hilal emphasized living elements, stating, "When I think of the environment, butterflies fluttering, children playing, and trees come to my

mind." In contrast, Eren included non-living entities alongside living ones: "In my opinion, the environment consists of nature ... there are mountains and lakes." Families similarly associated the environment mostly with natural elements. The WAT analysis yielded consistent results; students most frequently associated the environment with living things (trees, butterflies, flowers) and non-living natural elements (lakes, mountains). However, the WAT also revealed links to the artificial environment, which became more apparent when compared with student drawings (Figure 3).



(a) (b) (c) (d)

Figure 3. Students' visual representations of natural and artificial environments (a) Melis, (b) Hilal, (c) Zeynep, and (d) Eren.

Student drawings consistently mirrored their verbal and cognitive definitions. While Melis (Figure 3a) and Hilal (Figure 3b) focused on nature-centric views dominated by living things, Zeynep (Figure 3c) and Eren (Figure 3d) integrated artificial elements. Specifically, in her drawing and interview responses, Zeynep blended natural features with public spaces like schools and parks, whereas Eren emphasized urban structures such as cars and markets. These visual representations were highly consistent with their interview and WAT responses, highlighting a spectrum of perceptions ranging from natural to artificial environments.

Analysis of the WAT responses regarding the theme of Perceptions revealed two primary categories: Source and Mode of Expression. In the Source category, participants associated the environment with concepts of entertainment, freedom, and life. In the Mode of Expression category, the environment was linked to elements of space and togetherness. These results indicate that the sampled participants perceive the environment both as a functional provider and a social setting.

3.2. Environmental Problems: Human Impact, Pollution, and Global Threats

The analysis of participants' views on environmental problems revealed the theme of "Environmental Challenges," which encompasses six sub-themes: Pollution, Drought, Climate Change, Human Factor, Consumption Habits, and Impact on Living Things. Pollution (air, water, soil, noise) was identified as the most significant environmental problem. Students explicitly linked these issues to human actions, particularly littering. For instance, İbrahim stated, "Pollution comes to my mind ... Some people throw their trash on the ground instead of recycling, which causes problems in our environment."

Student diaries highlighted a shift in these challenges over time. While parents recalled past infrastructure issues (e.g., sewage), students focused on modern industrial pollution such as increased factory smoke, car exhaust, and population-driven pollution. In his drawing (Figure 4), Ali illustrated the chain reaction between factory smoke and water contamination, explaining: "... smoke from factories pollutes the air, then water gets polluted, toxic wastes are thrown into the sea, and fish are poisoned."



Figure 4. Student drawing illustrating environmental pollution (Ali)

Participants also showed high awareness of soil and water pollution, particularly regarding waste batteries. Families demonstrated conscious behaviours on this issue; for example, Selda emphasized the importance of teaching her child to collect batteries to prevent long-term damage to nature. Complementing these home-based observations, classroom data further revealed that students' environmental sensitivity is integrated into their sense of citizenship. During a Life Science lesson on "Responsibilities Toward Our Country," students linked national duties to environmental protection, viewing ecological preservation as a fundamental civic responsibility (Observation Note, 08/05/2023).

Broader consequences like drought and climate change were also highlighted. Eren noted, "... air gets polluted, drought occurs ... Drought causes climate change." A consensus emerged that these problems, driven by irresponsible consumption, severely impact all living things. Feride's story about a neighbour's animal needing surgery after consuming plastic highlighted this danger. Overall, the responses of the participants suggest that while pollution is perceived as the primary concern and living things as the victims, human actions are identified as the root cause within the context of this study.

3.3. Suggestions: From Individual Actions to Social Responsibilities

The analysis of participants' views on environmental problem prevention revealed the theme of "Suggestions," which comprises six sub-themes: Environmental Protection, Social Warning, Waste Repurposing, Resource Conservation, Pollution Prevention, and Role Modelling. Participants primarily emphasized Environmental Protection and Social Warning as essential preventive measures. Families highlighted shared responsibility and the necessity of sanctions. Selda provided a deep perspective: "Every piece of trash thrown on the ground is a wound to our future ... Merciful and educated generations must be raised." Regarding enforcement, Fatma proposed that those who litter should be punished. In terms of Social Warning, participants believed individuals exhibiting negative behaviours should be cautioned. Zeynep proposed specific signs stating, "Pick up the trash on the ground, do not litter," while families noted that their children often warned others verbally regarding environmental consciousness.

Practical solutions were clustered under Waste Repurposing, Resource Conservation, and Pollution Prevention. Uniquely, students emphasized "upcycling" as a creative way to transform waste into functional items. Erva mentioned planting vegetables in broken crates, while Ali described making toys from empty bottles. İbrahim further expanded on this by describing how tin cans could be repurposed into candle holders. He also emphasized his care for living things, stating: "... I give leftover milk to cats ... We give leftover food to animals." Families consistently recommended feeding food scraps to animals and making soap from waste oil. Regarding Resource Conservation, students like Eren and Sibel criticized water waste during daily routines, a concern shared by families advocating for efficiency. In the WAT, families directly associated Pollution Prevention with "cleanliness," as Feride summarized: "If we do not litter and pollute nature, there will be cleaner living spaces."

Finally, the Role Modelling theme underscored the social dimension of the recommendations. In the WAT, families associated solutions with "unity." There was a consensus that adults must set examples for children and that peers influence each other. Selda highlighted the parents' role: "Children are influenced by us ... To set a good example, we must become conscious. One who cannot change themselves cannot change their environment." In conclusion, recommendations span from individual actions (resource conservation, upcycling) to social responsibilities (sanctions, role modelling).

3.4. Family-Involved Environmental Education Experience: Awareness, Interaction, and Transformation

Regarding how participants made sense of their family-involved environmental education experiences, three primary themes emerged: "Process," "Impact," and "Reflection" (Figure 5). This section explores the transformative journey of the participants, detailing the implementation of activities, their impact, and how these experiences reshaped daily habits.

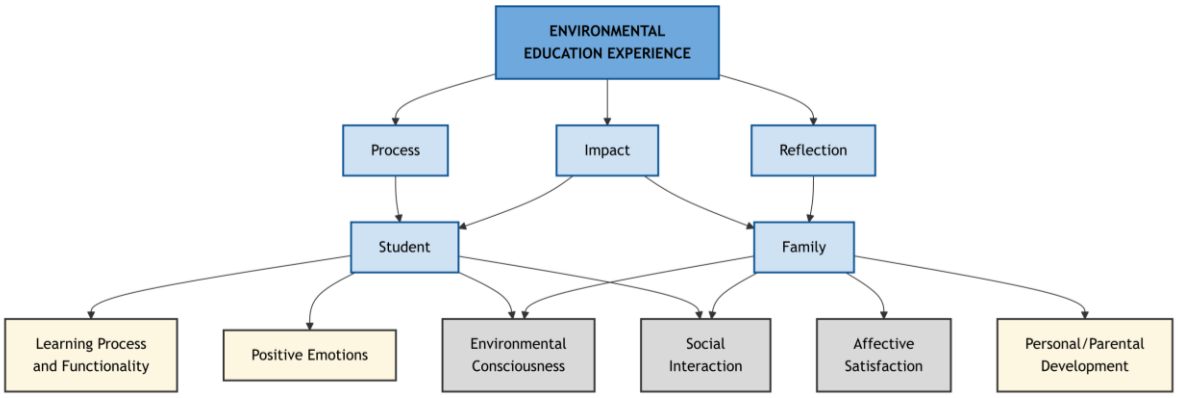


Figure 5. Thematic structure of the environmental education experience

3.4.1. The Process: From Awareness to Action

The process was structured as a four-week journey concluding with a specific event. It began with intergenerational learning; in the "Listen to Your Family" activity (Week 1), students analysed old photographs and listened to their parents' childhood memories, comparing past and present environmental conditions. This established a historical perspective on pollution and urbanization. In Week 2, the focus shifted to visual awareness. Students prepared posters on National Parks and Natural Monuments and conducted field trips to distinguish between natural and artificial environments. Weeks 3 and 4 moved towards active participation and Waste Repurposing. Families created "Recycling Corners" at home to practice waste separation and engage in "upcycling" activities to encourage creative reuse. As presented in Figure 6, students integrated these habits into their routines. For instance, Hilal and Zeynep designed distinct boxes for paper, glass, and batteries, while others transformed waste into functional items, such as Erva planting vegetables in plastic bottles or Eren making a toy car from bottle caps.



Figure 6. Examples of home-based recycling corners and upcycling applications

This creativity extended to the design of artificial environment models, where students repurposed pharmaceutical boxes and cardboard to construct buildings. However, their designs were not limited to the built environment since they integrated natural elements like trees, grass, and streams alongside artificial features such as pools and waterfalls. To achieve this, they employed artistic techniques including origami and painting to upcycle wastepaper into detailed environmental representations. In addition to these models, a collaborative in-class activity was conducted where students were tasked with designing "the most creative and functional recycling box" using entirely waste materials. As shown in Figure 7, which presents examples from both activities, participating students expanded their material use for the recycling boxes to include waste strings, various buttons, and plastic bottles. Through this collective effort, participants utilized diverse waste items for repurposing tasks.

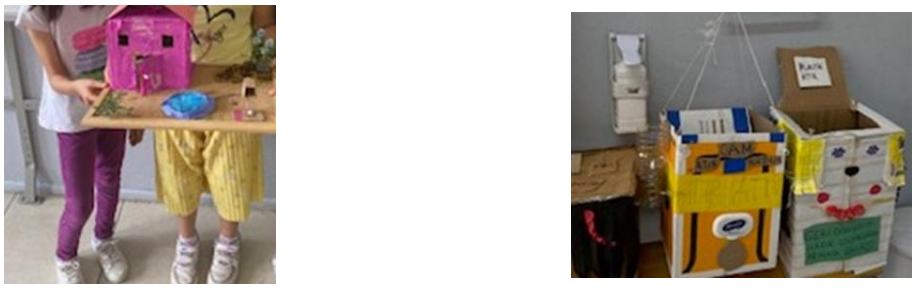


Figure 7. Artificial environment and recycling box models designed by students using waste materials

3.4.2. The Impact: Interaction, Awareness, and Enjoyment

The findings under the "Impact" sub-theme highlight the diverse effects of the program on participants, categorized into student-specific, family-specific, and shared outcomes as illustrated in Figure 5. In the student dimension, the impact was primarily observed through improvements in the learning process and the emergence of positive emotions. Students reported that the involvement of their families not only facilitated the learning process but also transformed it into a more effective experience. This collaboration was particularly evident in upcycling activities, which enhanced their functional skills and creative thinking. Sevim, a parent, observed this shift in her child's perspective, noting that he now views waste materials like old plastic and glass as resources to be recycled rather than mere trash. Apart from the cognitive benefits, the process inspired pure joy; students expressed feeling happy and entertained while working alongside their parents. As Eren remarked, the activities were both easier and more fun when done with family. Zeynep expressed a similar feeling, noting that she thoroughly enjoyed the shared experiences.

The analysis also revealed significant outcomes that connected the student and family experiences, specifically in terms of social interaction, affective satisfaction, and environmental consciousness. The interactive nature of the activities fostered quality time and strengthened family communication. Fahriye highlighted this positive interaction during the picnic, emphasizing the shared collective effort to leave no trace in nature. This collaborative process resulted in deep affective satisfaction for all participants. While students were happy to work with their families, parents like İlknur expressed fulfilment in gaining both "a clean environment and good friendships." Furthermore, both students and parents showed a growth in their environmental awareness. Zeynep began to recognize the direct impact of human actions on the environment. Similarly, Hatice observed a meaningful change in her family's daily routines, moving away from mindless habits toward more thoughtful and eco-friendly choices.

Regarding the family dimension, participants expressed that the program led to changes in their perspectives and experiences. Some parents noted that the process provided them with new insights and encouraged a more solution-oriented perspective on environmental issues. For instance, Fatma stated that she began to perceive the extent of environmental pollution much more clearly following the program.

3.4.3. Reflection: Transferring Values to Daily Life

The sub-theme of Reflection reveals how the knowledge and values gained during the process were transferred to daily life habits. For instance, Eren described turning off a running tap at home, demonstrating how environmental awareness became an immediate action. Families also observed behavioural changes; for instance, Fatma stated, "My child has started not to litter," suggesting that these values were becoming part of the children's daily routines.

Observations also highlighted instances of independent pro-environmental behaviour beyond the classroom. For example, Melis reported proactively collecting trash with her sibling during a family trip, expressing a clear disapproval of environmental pollution (Observation Note, 05/05/2023). This suggests that the study's interventions enabled students to function as environmental change agents in their local communities.

The Zero Waste Picnic was another activity where participants applied their knowledge. Sevim noted that despite the large attendance, the use of reusable dishes instead of disposables resulted in minimal waste production. Families reported that such interactive activities made the learning process more engaging. Additionally, participants stated that they had begun to reflect on these waste-reduction behaviours in their daily lives after the program.

4. Discussion

The primary aim of this phenomenological study was to explore the lived experiences of students and parents within a family-involved environmental education process. The study examined the participants' environmental perceptions, identified problems, and proposed solutions to understand how their views evolved throughout the process. Consistent with the study's goals, the discussion below highlights the importance of integrating environmental awareness into daily life during the primary school years and suggests the unique value family involvement may add to this lived experience.

4.1. Family The Concept of Environment

The results indicated that participants defined the environment as an integrated system comprising living beings situated within both natural and artificial contexts. This conceptualization of the environment as a domain of living beings aligns with findings in the literature (Atabek-Yiğit et al., 2019; Peker, 2020; Sağsöz & Doğanay, 2019; Uyanık, 2017). Specifically, Peker (2020) observed that students categorized the environment as an "expression of vitality" and a "living space," reflecting a positive attitude. Similarly, Uyanık (2017) noted a distinction in perceptions by location: while urban students included inanimate objects, rural students, similar to the participants in this study, predominantly defined the environment through living beings. The participants' tendency to define the environment through plants and animals appears to be reflected in the region's rural, agriculture-driven economy. As shown in Table 1, most fathers are engaged in farming, suggesting that for these families, the environment is not an abstract concept but a tangible, everyday reality intimately associated with their livelihood.

A crucial aspect of this definition was the specific hierarchy of living elements. Participants most frequently associated the environment with plants and animals, and least frequently with humans. This finding parallels the work of Pizza and Kelemen (2023) and Littledyke (2004), who reported that both children and adults tend to view the environment as the world around us, consisting of nature, flora, and fauna, often separating humans from this concept. This is also consistent with the study (Yardımcı & Kılıç-Bağcı, 2010), in which children made strong associations with plants and animals but weak associations with humans. Furthermore, in addition to physical descriptions, participants characterized the environment as a source of life, freedom, and entertainment. This metaphorical understanding aligns with Şerbetçi (2022), whose study revealed that mothers similarly conceptualized the environment as a "clean living space" containing both living and non-living elements.

Consistent with Shepardson et al. (2007), the participants in the present study showed signs of all four mental models, ranging from viewing the environment as a place where mostly plants and animals live to seeing it as a separate space altered by human interventions. However, a key insight from this study's findings is that the family activities appear to have fostered a more holistic view. This perspective aligns with Shepardson et al.'s (2007) fourth model, which sees the environment as a shared home for people, animals, and plants. While they found this integrated perspective to be rare in general student populations, our observations suggest that the rural setting and family teamwork may create a natural opportunity to grow this understanding. Living close to nature and working on environmental tasks together potentially helped students to see humans not as outsiders, but as a real part of the ecosystem.

4.2. Perception of Environmental Problems

In this study, participants notably pointed to pollution, drought, and climate change as primary environmental problems, while also emphasizing the influential role of human factors, particularly consumption habits. A distinct feature of these findings was the strong emphasis on the impact on living things, particularly animals. Given the rural context of the study, this sensitivity is likely due to the

students' daily lives being close to nature, where the well-being of animals is directly observable rather than abstract.

The focus on tangible issues like pollution aligns with broader literature suggesting that children primarily perceive environmental problems through observable, local issues (Atabek-Yiğit et al., 2019; Negev et al., 2010; Yılmaz et al., 2016). However, unlike earlier research (Alerby, 2000; Pınar & Yakışan, 2018), which associated global awareness mostly with older adolescents, the findings of this study included specific references to global-scale crises such as climate change. This suggests that the increased media visibility of global environmental issues may be accelerating ecological literacy among younger children.

Furthermore, this awareness took the form of a logical chain of cause and effect rather than simple terminology. While water pollution is identified in the literature as one of the primary areas of interest for young students (Atabek-Yiğit et al., 2019), the participants in this study demonstrated sensitivity that went beyond basic definitions. This was most evident in Ali's drawing, which illustrated a clear sequence from industrial smoke to water contamination and, eventually, to poisoned fish. Such examples suggest that students can identify complex cause-and-effect relationships when given the opportunity to reflect. While some literature suggests that children may primarily perceive the environment as "green and clean" (Çal, 2019), the industrial and waste-related images in the current study suggest heightened sensitivity to industrial impacts.

Overall, these findings suggest that young students' environmental perspectives arise from a complex intersection of macro-level factors, such as media visibility, and micro-level factors, such as their immediate surroundings. While the media provides a foundation for recognizing global concepts, the rural context may help make this knowledge more concrete for these participants. These outcomes appear to be shaped by factors beyond living in a rural area. They seem to emerge from the way family interaction gives meaning to the opportunities available in the rural setting. For families who rely directly on the environment for their livelihood, environmental problems are often less abstract, as they can directly impact income and living space. This aligns with Safira et al. (2022), who suggest that in limited-resource settings, sustainability may be seen as a practical response to life's necessities rather than a global trend. In this sense, while the rural setting provides a natural foundation, family involvement appears to serve as a catalyst, helping turn daily routines into a conscious learning journey. By encouraging shared action over rote memorization, active family participation may help transform environmental knowledge into a more practical and meaningful experience for students. Reflecting the socio-demographic profiles shown in Table 1, environmental sensitivity in this context appears rooted in practical necessity rather than in global ecological trends. For families in this limited-resource rural setting, behaviours such as avoiding waste and conserving resources are often traditional cost-saving measures that, within the framework of this study, might have been transformed into conscious sustainability practices.

4.3. Environmental Suggestions

Participants proposed practical strategies to prevent environmental problems, focusing on repurposing waste, recycling, and social awareness. Consistent with Kırılmazkaya (2022) and Yalçınkaya (2013), who found that students prioritize recycling and warning those who litter, the participants of this study moved beyond passive suggestions to active upcycling practices. This practical engagement was visible in the students' transition from suggesting ideas to implementing them. While Sağsöz and Doğanay (2018) noted that students typically suggest planting trees or cleaning up, the current research identified a more creative and context-specific approach. Students transformed waste into functional items, such as turning bottles into toy cars or planters. Furthermore, the strategy of warning others became a social monitoring practice within the family. As noted in the findings, children actively warned their parents about littering, indicating that they had internalized these rules sufficiently to influence their immediate social environment.

4.4. The Family-Involved Process

Ultimately, the findings point toward family-involved environmental education as a facilitator for transformation. Participants described the interactive process as a source of increased awareness and quality time, potentially making learning more accessible and engaging. This alignment with Erol and Gülay-Ogelman's (2021) reinforces the effectiveness of family participation in fostering positive environmental attitudes. The emotional dimension of this process was as significant as the cognitive one. Consistent with Şerbetçi's (2022) findings that parental participation makes children feel safe and happy, students in the present study expressed sincere joy in working with their parents. This positive emotional climate served as a supportive framework, allowing students, especially those who initially needed external motivation, to engage more deeply and establish consistent habits.

Moreover, the process triggered what appears to be a reverse socialization effect. Literature indicates that family-based environmental education can improve parents' behaviours (Damerell et al., 2013; Vaughan et al., 2003). The present findings offer support for this; mothers like Emine and Selda explicitly stated that they changed their own habits such as separating waste or not littering, influenced by the projects they completed with their children. The socio-demographic profiles, highlighting that most mothers in the study had a primary or middle school education, provide a critical context for these findings. Their full-time participation as homemakers appeared to facilitate their roles as the primary narrators of the shared environmental experience. This suggests that the resulting reverse socialization may be less a function of formal education levels and potentially more connected to the depth of family dialogue. Furthermore, the practical integration of environmental tasks into daily routines appears to play a more central role in this process than academic background. Thus, for these participants, the process did not only engage the child; it appeared to begin transforming the household culture, validating Erol and Gülay-Ogelman's (2021) conclusion that such interventions lead to higher environmental attitude scores for families. However, it is crucial to note that this impact was likely not accidental; as Straub and Leahy (2017) argue, school-based learning does not naturally find its way into the home. The findings suggest that the intentional, practice-based design of this study may have enabled children to act as effective catalysts for change.

4.5. Limitations of the Study

Although this study offers valuable insights into family-involved environmental education, the findings should be interpreted considering specific limitations. First, the small sample size prioritizes the depth of individual experiences over the broad transferability of the findings. This focus allows for a thorough phenomenological exploration of the specific perspectives within this group. Furthermore, the four-week implementation and the relatively short data collection period represent a limitation in terms of duration. While this timeframe was sufficient to capture initial behavioural shifts and reflective moments, it does not account for long-term habituation or the permanence of the observed behaviours. Additionally, the study was conducted in a rural setting where participants had direct and easy access to nature. This specific context likely facilitated the implementation of outdoor activities and nature-based observations. Therefore, the findings may not be fully transferable to highly urbanized or industrial settings where families might have limited connection to the natural environment. Restricted to the specific environmental and socio-economic characteristics of the study region, the findings best represent the lived experiences within this distinct local context.

5. Conclusions and Implications

This phenomenological study investigated the shared environmental journey of primary school students and their parents, revealing that family-involved processes transform static, nature-centric perceptions into a dynamic environmental consciousness. These findings imply that environmental education reaches its full potential when it extends beyond theoretical classroom instruction to incorporate experiential, home-based practices that challenge families to collectively rethink their ecological responsibilities.

The study identifies family involvement as a central mechanism in this transformation; collaborative activities, such as waste upcycling, foster a synergy that makes learning more accessible, sustainable, and emotionally engaging. Rooted in family teamwork, a positive emotional climate fosters the psychological safety needed for students to build meaningful connections with nature. In a rural setting, where nature is inherently part of daily life, environmental responsibility evolves from a school-assigned task into a shared family identity and a lived experience.

Pedagogically, these results suggest reconceptualizing family participation as an essential component of a learning ecosystem that bridges the gap between theoretical knowledge and daily practice. Through this bridge, students move beyond simple problem identification to understanding complex environmental dynamics, demonstrating active involvement through creative material reuse. Crucially, this educational process functions as a two-way journey in which environmental issues, often tied to economic survival in rural areas, amplify the impact of reverse socialization. By acting as agents of change, children influence family habits and encourage more responsible behaviours, thereby fostering a broader culture of sustainability through intergenerational learning. In conclusion, this study demonstrates that for rural families, environmental education is more effective when it bridges daily life and intentional learning. The rural context provided the necessary ground, but family interaction served as the mediator, transforming traditional habits into a modern, conscious environmental identity.

6. Recommendations

6.1. For Practitioners and Educators

Since the findings propose a strategic shift from passive homework to collaborative tasks, a redefinition of parent involvement is necessary. Rather than limiting interactions to administrative meetings, educators may invite families to actively participate in workshops and tangible production processes that utilize local, natural resources. When designing these activities, practitioners should be sensitive to the specific socioeconomic realities of rural families, ensuring that tasks align with their daily workloads. The successful implementation of such collaborative models is grounded in educators' pedagogical readiness. Therefore, professional development programs need to empower teachers with effective strategies for family engagement and communication. Schools can further support this by reimagining traditional parent-teacher meetings as “sustainability workshops” focused on building a collective intergenerational culture.

In parallel with teacher training, it is crucial to position students as active agents of change. Modules focused on social skills can foster students’ capacity for constructive dialogue. To strengthen these efforts, schools should not work alone. Partnering with local community leaders, cooperatives, and NGOs can help environmental education reach a wider audience. Such local collaborations can inspire community events that celebrate family achievements and raise public awareness within the immediate social circle. Finally, the advantages of a rural setting, where environmental education can be directly linked to family livelihoods, such as agriculture, should be the cornerstone of any practitioner’s strategy.

6.2. For Future Research

While this study is phenomenological and focused on a specific small-scale rural context, future research could use mixed methods to quantify long-term impacts of family-involved interventions across more diverse rural populations. Comparative studies are also needed to explore how cultural backgrounds, socioeconomic levels, and urban-rural settings influence family participation and environmental perceptions. Additionally, comparing these settings may reveal how nature-connectedness shapes the learning outcomes. Finally, longitudinal research should track students over extended periods. Such studies would show if initial behavioural shifts observed in this intensive small group setting lead to permanent changes in the home environment and whether the reverse socialization effect remains sustainable in the long term.

Statement of Researchers

Researchers' contribution rate statement:
ÖY: Conceptualization, methodology, investigation, data curation, writing - original draft preparation. ÖA: Supervision, methodology, data curation, formal analysis, validation, writing - review & editing.
Conflict statement:
The authors declare that they have no conflict of interest.
Data Availability Statement:
The data supporting this study's findings are available on request from the corresponding author. However, due to privacy or ethical restrictions, the data are not publicly available.
Acknowledgements: The authors would like to thank Assist. Prof. Dr. Gonca Babadağ for her valuable contribution as an external expert in examining the data and ensuring the study's trustworthiness.
Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.
Presentation(s) or Awards at a meeting: This study is derived from the first author's master's thesis, conducted under the supervision of the second author.
Ethical Considerations: The study was conducted in accordance with ethical publication standards and was approved by the Manisa Celal Bayar University Social and Human Sciences Ethics Committee, with a decision dated 02/05/2023.
The authors declare that the generative AI tool (Gemini) was used during the preparation of this work only for language editing and to improve readability. The scientific content and data analysis were developed entirely by the authors, who take full responsibility for the content of the publication.
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