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Examination of Student Opinions on Forest School-Based Educational Practices

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ABSTRACT

This research was conducted to examine the opinions and experiences of secondary school students who experienced forest school-based education practices that adopted the principle of raising environmental literacy individuals. In the research, the case study method, one of the qualitative research methods, was used. The study group consisted of 5th grade secondary school students studying in a public school in a rural area. The researcher, who has a nature education certificate, prepared an education plan that lasts 10 weeks. The datas collected using a semi-structured interview form was analysed using thematic analysis method. According to the research findings, it was observed that the students' views on forest school-based education practices were positive. It was observed that the students established an emotional bond with the environment and had a protective attitude towards nature. Also, their behaviours' sensitivity towards environment have increased. In this context, the forest school approach, which is thought to be an alternative to traditional closed classroom environments, will ensure that students' knowledge, attitudes and behaviours towards the environment progress positively thanks to rich learning activities.

Keywords: Forest School, The literacy of environment, Secondary school students, Environment.

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INTRODUCTION

It is possible to say that individuals have grown up far from nature in recent times. The reasons of these are the technology advance, the closed places are used and decreasing of visiting places like nature, forests. One of the main problems of societies expressing concerns about access to nature has been that children cannot access the open air as freely as previous generations. The reasons for this situation are stated as traffic density in cities, the opportunities of activity in closed areas, the concerns of security, the concerns about physical attacks and harassment, and the increase in the use of technological devices such as computers and game consoles (Dabaja,

2021; Harris, 2021). As a result of these factors, it is very valuable for children to be in contact with nature due to the lack of physical exercise in children or individuals, the weakening of mental and spiritual health levels, and the ongoing changes in modern life. (Fjørtoft, 2004; O'Brien & Murray, 2006; O'Brien, 2009).

It is possible for individuals to know the environment they face, understand environmental problems and overcome these problems by having environmental literacy individuals. An environmental literacy individual stands out with his or her environmentally conscious behaviours. These behaviours towards the environment are expected to be continuous. Studies have shown that planned interactions with nature will have an impact on individuals' behaviour towards the environment. There are also studies indicating that it is not an easy way for students to have positive environmental behaviours (Kemp, 2020; Leather, 2018). For this reason, it has been emphasized that environmental education based on a planned and theoretical framework aimed at motivating individuals to take action should become widespread (Yeh et al., 2021; Klein et al., 2021).

The increase of time children spend in natural environments and their interaction with nature has not only caused changes in children's environmental behaviours, but also seen that forest school has effects on children's cognitive, physical, behavioural, affective, and social areas (Smith et al., 2018). Therefore, increasing children's contact with nature is considered crucial. Increasing children's contact with nature is possible through the educational approach called "Forest School." (Dabaja, 2021).

In this context, "Forest School" is seen as an alternative educational tool that can connect children and young people to nature, increase their contact with nature, provide the opportunity to discover their own potential and enable them to gain real-life experiences (Palmberg & Kuru, 2000; Cudworth & Tymms, 2024).

History of Forest School

The forest school approach first started as outdoor classrooms in Denmark in 1994. Later, forest schools were established professionally in England in 2012 (Knight et al., 2024). Forest Schools in the United Kingdom were influenced by Danish forest schools and it was founded based on term udeskole. The Scandinavian countries, which advocate that place is a powerful influence on learning in early childhood, have re-emphasized the importance of this situation with forest schools. Although the forest school philosophy and practices were designed for early childhood, this concept has been expanded to include older age groups of children and even adults (Cree & McCree, 2012).

In England, there has been a sudden increase in the number of forest schools, both private and public. Forest school does not have a curriculum and it is a curriculum tool. That's why it doesn't have a clear education framework. As a result of this situation, it was agreed that there should be standard principles in forest schools and the Forest School Association was established (Garden & Downes, 2023).

Forest school is founded on six principles (Forest School Association, 2022). These principles can be simply summarised as follows:

1. Forest school is based on a long-term experiential process.
2. It should be carried out in a forested area outside the school.
3. The curriculum is shaped in line with the interests and needs of the participants.
4. It aims to support holistic development.
5. It offers participants risk-taking opportunities.
6. Programmes should be implemented by qualified forest school leaders and forest school practitioners.

The Importance of the Forest School Approach

When considering the theoretical framework of forest school, it is based on the educational model advocated by John Dewey (1997). This learning theory centers on direct experience, practice, active participation, and problem-solving (Knight et al., 2024). Both approaches are based on a child-centered, practice-based philosophy.

Learning outdoors in nature, in the forest, is a different experience than learning in a classroom or indoors. Nature is an environment that contains the potential for learning and offers these opportunities to us (O'Brien, 2009). There are many studies indicating that students make progress in cognitive, social, sensorial and motor skills with the forest school approach (Swarbrick et al., 2004; Ridgers et al., 2012; Slade et al., 2013; Murphy, 2020).

Since forest school practices require teamwork, positive behavioural patterns were observed indicating that students' social skills and interactions increased over time, students shared equipment with each other, and students approached each other's problems more sensitively. Another notable result is that children's curiosity and motivation increase as they solve the problems they encounter themselves (O'Brien, 2009). It was emphasized that nature provides opportunities for children to increase their creativity skills by using their imagination (Bingley & Milligan, 2004; Waite et al., 2006; O'Brien, 2009). The teaching of science and math classes in the classroom is really difficult (Kiray, 2012). In the context emphasized that academic lessons (such as mathematics and science) taught outdoors provide higher academic achievement than those taught in the classroom (Khan et al., 2020).

Purpose and Importance of the Research

This research was conducted to examine the opinions and experiences of secondary school students who participated in forest school–based educational practices.

Forest school is a pedagogical approach that is based on a learner-centered philosophy and encourages environmental awareness (Cudworth & Tymms, 2024). Current research on forest schools indicates that they support the holistic development of children—including communication, social, psychomotor, and cognitive skills—and contribute to children's connection with nature (Maynard, 2007; Calogiuri & Chroni, 2014; Cumming & Nash, 2015; Barrable & Booth, 2020; Mycock, 2020).

It is observed that the forest school approach is consistent with many learning theories. John Dewey's learning theory, which emphasizes that learning occurs through doing and experiencing, corresponds with the learning approach that forms the basis of forest schools

(Waite et al., 2016; Savery et al., 2020). In addition, the theory of multiple intelligences, which emphasizes children's different learning styles, is consistent with the learning objectives of forest schools (Elliott, 2015; Harris, 2017; Dabaja, 2021). There are also studies suggesting that the STEAM model, which is based on the integration of Science, Technology, Engineering, Arts, and Mathematics, can be incorporated into forest school practices (Speldewinde, 2022; Trina et al., 2024, Correia et al., 2024; Cronin de Chavez et al., 2024). In this regard, the forest school approach, as a strong alternative educational tool, has become an important area of study in terms of how and in what ways it affects students. Within this context, the following research question was addressed in line with the study's aim. What are the students' views and experiences regarding forest school-based practices? A review of the literature reveals that forest school programs integrated into schools are limited and lack a theoretical basis (Dabaja 2021; Harris, 2021; Garden & Downes, 2023). This research contributes to this gap in the literature by demonstrating that original forest school activity plans, implemented over a period of 10 weeks, were systematically integrated into the school environment. It also examines students' experiences, opinions, and perceptions in depth, thereby revealing the advantages and disadvantages of the process.

METHOD

Research Model

In this research, the case study method, one of the qualitative research methods, was used. With this method, it is possible to obtain more detailed and in-depth information with a small number of people. So, this situation allows for obtaining information about the participants' opinions and experiences, interpreting them, and directly examining of their ideas (Patton, 2014).

Study Group

The sample of the study consists of 5th grade students of a public school located in a rural area of the central district of Konya province. Forest school activities which last 10 weeks were implemented with 15 students in the class. Students to be interviewed were determined using a purposive sampling method. Purposive sampling is a sampling approach in which participants who are considered most suitable for the aim of the study and expected to provide more detailed information are consciously selected. (Patton, 2014). While selecting the students, the students who were willing to participate actively in the practices and the students who were not able to participate actively and had difficulty in the practices were taken into consideration. A semi-structured interview was conducted with three students, two girls and one boy. The names of the students were kept confidential and referred to as Student 1, Student 2, and Student 3. All three students who participated in the interview stated that they had not register in any forest school program before and that they had encountered the concept of forest school for the first time through these events.

The forest school education implementation process is presented in Table 1.

Table 1. Forest School Education Implementation Process

Week	Name of the Practices	Realization of the Practices
15 April 2024	Get to know me and match	The teacher takes photos of the surrounding area in advance. The photos are printed, and students are formed into groups. The plants in the photo are matched with the surrounding plants.
22 April 2024	Shelter Construction	A shelter-building competition is held among student groups to understand the struggle for life in nature and to seek answers to the question of how to build a safe shelter in case of being left alone in nature for a day.
29 April 2024	Compass Making	Students are given the opportunity to design their own compasses.
06 May 2024	Placing Creatures on the Map	The teacher prints a large poster of a map of Türkiye and a map of the world. To help students learn about the habitats of various animals in Türkiye and around the world, they place stickers with photos of living animals on the map.
13 May 2024	Leaf Wheel Preparation	The teacher distributes leaf images in the shape of a handwheel to the students. Students work in groups to observe and match trees in their surroundings by looking at leaf images on the leaf wheel paper.
20 May 2024	Glaciers Are Melting!	A group experiment is conducted to explain the effects of global warming.
24 May 2024	Silkworm Breeding	Silkworms are raised in the classroom. The cocoon stages are observed.
27 May 2024	I Know Waste	The school is working on waste separation. Students are asked to

		design educational games about waste.
03 June 2024	Hug Your Tree	Students are asked to choose a tree in the forest and hug it. The answer to the question "What would a tree say if it had the ability to speak imaginarily?" is sought.
10 June 2024	Butterfly Garden Observation	A trip is organized to the Konya Tropical Butterfly Garden. Students, who have the opportunity to directly observe butterflies and their life cycles, are provided with the necessary information about the training area. Afterward, they are asked open-ended questions, and their pre- and post-trip answers are compared.

Data Collection Tools

In line with the purpose of this research, a semi-structured interview form was prepared by the researcher. After preparing the interview questions, expert opinions were sought. Based on expert opinions, the interview questions were revised and finalized. The interview form consists of 4 demographic questions containing personal information and 7 questions relevant to the research objective.

Data Analysis

A semi-structured interview form developed by the researcher was used to collect the data. The interview form consists of four demographic questions containing personal information and seven questions that allow for examining the impact of forest school activities on the students. After the interview questions were prepared, the expert opinions of two faculty members from different departments were obtained, and the interview form was finalized by making the necessary revisions based on their feedback. Semi-structured interviews were conducted with three students selected through purposive sampling from among those participating in the forest school program. The interviews were audio-recorded and then converted into computer-aided documents. The qualitative data obtained from the student interviews were analyzed through thematic analysis method. Thematic analysis is accepted as a method that enables the identification, organization and interpretation of themes based on the semantic patterns in the data (Braun & Clarke, 2006).

Themes were created to represent students' experiences and views. Datas collected through student interviews were grouped under four themes: Students' Views on Forest School

Education Practices, Students' Knowledge of the Environment, Students' Attitudes Towards the Environment, and Students' Behaviours Towards the Environment.

FINDINGS

Following detailed analyses conducted after the interviews, the data are presented below under four themes: "Students' Views on Forest School Education Practices, Students' Environmental Knowledge, Students' Attitudes Towards the Environment, and Students' Environmental Behaviours."

Students' Views on Forest School Education Practices

The findings indicate that students had positive views of the Forest School activities after receiving practical education. In line with these views, all students think that the activities were fun, educational, and engaging.

A student stated that she felt bored because the lessons were held indoors. This situation can be considered as an indication that students do not feel well after a while when confined within four walls. One student stated that he was anxious at the beginning but later enjoyed them. This situation shows that the student may have concerns about group work and may experience anxiety due to social interaction. Students' opinions on this issue are presented below.

> *Student 1: "First of all, we had a lot of fun. I sometimes get overwhelmed in school and class, and sitting in the same row is bad. I felt happy when I went out and did these activities. I collaborated with my friends and did some activities. Some of the activities we did included ones I'd never heard of or done before. I learned a lot."*
>
> *Student 2: "I always looked forward to the day when the activities would take place. When our teacher said we would do this activity, I was very curious about what it would be like."*
>
> *Student 3: "We did some really fun activities with our friends. I didn't know I'd have so much fun and learn so much at the same time. I thought it would be boring at first. I didn't want to be in a group with some friends, but everything went really well."*

Photographs of the places where forest school activities were held are presented in Figure 1 and Figure 2.



Figure 1. Forest school activity area



Figure 2. Forest school activity

Other findings from the study indicate that students also have negative views of Forest School practical education. One student's statement that he struggled with subjects requiring physical and motor skills is noteworthy. Another student's statement that forest school activities should not be short and should not be completed within one lesson hour is also important. Students' opinions on this matter are presented below.

> *Student 1: "Nothing negative happened to me."*
>
> *Student 2: "I got tired in some activities. For example, in the shelter-building activity, because we were racing against time... The shelter-building activity was good, but tiring. There were some things I struggled with. I think some activities were difficult. I had a hard time with activities I didn't know, but I learned."*
>
> *Student 3: "I think the negative effective was that the activities were short. I wish they were longer. It was very boring to go to math class after doing the nature activities."*

The codes for the theme are presented in Table 2.

Table 2. Themes and codes of students' views on forest school education practices

Theme	Codes	f
Forest school education practices	Fun	2
	Beautiful	2
	Educational	3
	Curiousity	1
	Happy	2
	Encourages	1
	Cooperation	3
	Short	1
	Hard	2
	Tiring	1

Table 2 reflects the students' overall perception of the forest school experience, characterized by a distinct blend of learning and enjoyment. The prominence of codes such as "Educational" and "Cooperation" suggests that students explicitly recognized the pedagogical value of the activities and the necessity of teamwork in a natural setting. While positive descriptors like "Fun, Happy, and Beautiful" highlight the engaging nature of the environment, codes such as "Hard" and "Tiring" indicate that the process was physically demanding, requiring active bodily participation rather than passive observation.

The research shows that students have different solutions to the difficulties they encounter during their Forest School practical education. It is quite remarkable that while one of the students consulted her teacher about the difficulty she encountered, the other two students communicated with their peers and tried to solve the situation with them. A student's initial effort to understand the problem demonstrates that they have completed the first step of problem-solving. This can provide clues about their ability to understand and solve the challenge they face. Students' opinions on this matter are provided below.

> *Student 1: "I didn't have much difficulty. But when I couldn't understand something, I first thought about it myself and tried to understand the problem. When I couldn't do it myself, I asked my friends in the group who knew. If they couldn't figure it out either, we thought together about what to do."*
>
> *Student 2: "I had a hard time building the shelter. When we had trouble, we asked our teacher, that is, you..."*
>
> *Student 3: "When we went to the butterfly garden, I was very suffocated because it was very hot and humid. I had a lot of trouble while walking in these. During the art activities, I had difficulty figuring out how to draw. I don't have any talent for drawing. We built a shelter with materials we found in nature. It was one of the best activities, but it made me stressed. I was struggled about finding the materials... We found solutions to these difficulties. For example, we united with our team, teacher. We asked our friends... We got ideas from them."*

The photos of the shelter construction activity mentioned by the student during the interview are given in Figure 3 and Figure 4.



Figure 3. Shelter construction activity in groups



Figure 4. Shelter construction activity in groups

Findings show that students collaborated with their peers during the implementation and that peer collaboration is important. All three students agreed that students cooperated and cooperated during the activities, shared materials and equipment, and took responsibility. Their opinions on this matter are presented below.

> *Student 1: "For example, we always formed groups when building shelters, when playing the Taboo game, and when making compasses. We helped each other out with our friends. If we hadn't been in a group, I would have struggled on my own. For example, I had the most fun building the shelter. We also raced against time. Even as the seconds were running out, everyone was running everywhere. Everyone was trying to do something. Everyone was trying to fill in the gaps. Everyone was competing and very excited."*
>
> *Student 2: "We did an activity named 'Glaciers are melting' about global warming. Every group was going to do it. Some people forgot to bring their materials. Some people in our group did too. While we were upset that we wouldn't be able to do the experiment, a friend from another group gave us the missing materials. I was so happy."*
>
> *Student 3: "We helped each other. I didn't see anyone who didn't help, but I don't know if anyone couldn't do the activity or didn't understand it. Even those who were upset with each other played together in the activity."*

A few photos of the activities mentioned by the students during the interview are presented in Figure 5 and Figure 6.



Figure 5. Cooperation and solidarity.



Figure 6. Taboo game about the environment.

Another finding shows that students are enthusiastic about forest school practices and suggest different forest school activities. Students' activity suggestions for forest school show that they are paying attention to the activities and observing their surroundings. It was also observed that students analysed what other activities could be done. Their opinions on this matter are presented below.

> *Student 1: "Of course I would agree. I wish we had built a greenhouse for our school. I would have want it if we could grow and eat our own plants. We would have learned a little. Actually, we know a little about farm work. But if we had all done it together, it would have been for our school."*
>
> *Student 2: "I'll participate. All the activities were good. I can't think of any other activities."*
>
> *Student 3: "I definitely agree. For example, teacher, we could make recycling bins and place them around our village. We could warn people about the environment. There's an ancient city down below us. People who come there always throw their trash. We could write warning signs there and put them up. This could be an activity."*

The codes for the theme are presented in Table 3.

Table 3. Contributions of forest school education practices to student development

Theme	Codes	f
Forest school education practices	Responsibility	2
	Analytical thinking	2
	Ability to observe	3
	Collaboration with peers	3
	Cooperation and solidarity	3
	Empathy	3
	Problem-solving skills	2
	Generating ideas	1
	Motivation	2

Table 3 illustrates the multifaceted contributions of forest school practices to student development. The high frequency of codes such as 'Collaboration with peers, "Cooperation and solidarity," and "Empathy" suggests that the outdoor environment naturally fosters social cohesion, encouraging students to work together and understand each other's needs. Simultaneously, the prominence of the "Ability to observe" and "Analytical thinking" codes indicates that direct interaction with nature stimulates students' cognitive engagement and inquiry skills, going beyond simple physical activity.

Students' Knowledge of the Environment

When the students' statements are examined, it can be thought that their knowledge about the environment has increased as a result of the activities. It is observed that some students already have knowledge about the environment, but with these activities, they add new information to their previous knowledge. These students' statements demonstrate an increase in their environmental knowledge and, in particular, their understanding of the relationships about environmental processes. By learning about the existence and effects of gases that cause global warming (greenhouse gases), the students have understood the cause-and-effect relationship of environmental problems. While she previously viewing global warming as an event limited to temperature increases and drought, she viewed realized that these processes affect living things and ecosystems in many ways. In addition, her statement that fossil fuel use should be reduced shows that she has learned the connection between energy consumption and environmental pollution. The activity of obtaining water by wrapping bags over leaves contributed to the student's experience and understanding of natural processes (e.g., transpiration and the water cycle). These findings demonstrate that the student has acquired the ability to explain environmental events through cause-effect relationships. The students' opinions on this topic are presented below.

> *Student 1: "The gases that pollute the earth and cause global warming have names. I didn't know about these gases before. I thought global warming would only cause increased temperatures and drought. So many things will happen that affect us, living things. This is very sad."*

Student 2: "I learned a lot. For example, we learned how to get water by putting bags over leaves. In fact, the leaves are sweating there. I didn't think there would be water droplets there."

Student 3: "We're supposed to use less fossil fuels, but since we're in a village, we use a lot. For example, we use coal all the time here. In fact, we're one of the biggest polluters. We're also reducing biodiversity. Living things are decreasing, temperatures are rising due to greenhouse gases, and glaciers are melting. The world is changing; it's a terrible situation. For example, when I was looking around, I was just staring blankly. Now, when I see a tree on the road, I know which tree it is by looking at the shape of the leaf. Sometimes I don't know, but I never knew before."

It is clear from the students' opinions that all three students learned a new term, concept, or piece of information as a result of their forest school activities. Their opinions on this topic are presented below.

Student 1: "I learned that I could make a compass myself. I never imagined that I could make a compass myself. It was so wonderful for me to do something like this. I found the directions myself. I'd never seen a silkworm before. Watching the silkworms grow in our classroom was so different. We'd watch them with every day our friends. We'd watched how they ate the leaves. I was so surprised when our teacher showed me her cocoon. It was the first time I'd seen something like this. How could she spin it?"

Student 2: "When we went to the butterfly garden, we saw that there were differences among butterflies. I didn't know that. I didn't even know there were such things as day and night butterflies. We even saw the cocoons that day and night butterflies make. Even they looked different. The pupae and cocoons were very different. I actually knew that a butterfly could come out of there, but seeing it seemed very different to me, that is, seeing something live is very different. I was very surprised when I learned that butterflies taste with their feet. It was strange, but I think it was fun."

Student 3: "I learned how butterflies grow and their life cycles. I learned how to build a shelter when we were out in nature. I'd heard about something called zero waste on TV, but I didn't really know what it was. The teacher had us play a game using words like pollution, global warming, and zero waste. The Taboo game. I'd played this game before, but not like this. It helped me learn better because it related to these concepts, and it was fun to play with my friends." "I also learned about different animals I'd never even heard of during a map activity where we put living things on a map and pasted them. We researched these animals and presented them to our friends. Perhaps there are even more animals in the world whose names we don't even know. I just learned about the emu, the tapir, the capybara... These are very different animals... these are the ones that come to mind right now."

Some photos of the activities mentioned by the students during the interview are presented in Figure 7, Figure 8, Figure 9, Figure 10, Figure 11 and Figure 12.



Figure 7. Silkworm and cocoon.



Figure 8. The task of feeding silkworms in groups.



Figure 9. Metamorphosis observation.



Figure 10. Dried butterflies.



Figure 11. Caterpillar observation.



Figure 12. Butterfly garden in Konya.

Students' environmental knowledge themes and codes are presented in Table 4.

Table 4. Themes and codes of students' environmental knowledge

Theme	Codes	f
Students' Environmental Knowledge	Recognizing the decline in biodiversity	2
	Knowing the harmful effects of fossil fuel use	2
	Identifying greenhouse gases and their effects	1
	Recognizing the structures of living things	1
	Defining global warming	2
	Awareness of environmental pollution	3
	Recognizing the functions of living things	2
	Exploring the life cycle of living things	3

Table 4 presents the scope of environmental knowledge acquired by students. The findings reveal a dual focus: understanding biological systems and recognizing environmental threats. The high frequency of "Exploring the life cycle of living things" and "Recognizing the functions of living things" suggests that direct observation in the forest environment deepened students' grasp of biological processes. Concurrently, the prominence of "Awareness of environmental pollution" and "Defining global warming" indicates that the program effectively raised critical consciousness regarding human-induced environmental challenges and the consequences of fossil fuel use.

Students' Attitudes Towards the Environment

The findings reveal that students have an environmentally sensitive and conscious attitude towards the environment. According to one of the students, it shows that she sees nature not only as a resource but also as a part of life. A student is concerned about the decline in biodiversity and says that contributing to nature makes her happy. This situation shows that the student has established an emotional bond with the environment and has a protective attitude towards nature. Students' opinions on this issue are presented below.

> *Student 1: "In the activity that we hugged trees, we tried to understand the feelings and thoughts of the trees. We tried to understand the trees themselves. We talked to them. It was the activity that I liked the most. I think we forget that trees are alive. Everyone does. They are treated badly. There are people who write something on trees. For example, I think if they could talk, or if we could be like that, it's a very bad situation."*
>
> *Student 2: "The decline in biodiversity makes me sad. We actually need it. Everyone will be very upset when it starts to disappear."*
>
> *Student 3: "Contributing to nature makes me happy, teacher. I wish everyone would do the same."*

A photo from an activity mentioned by the student during the interview is presented in Figure 13.



Figure 13. "Hug your tree" activity.

The codes for the theme of students' environmental attitudes are presented in Table 5.

Table 5. Themes and codes of students' attitudes towards the environment

Theme	Codes	f
Students' Attitudes Towards The Environment	Empathy	2
	Positive thinking	2
	Awareness	1
	Value	2
	Contributing	2
	Feeling emotions	3

Table 5 illustrates the qualitative shift in students' attitudes towards the environment. The prominence of the code "Feeling emotions", alongside "Empathy", highlights that the students developed a strong affective bond with nature, moving beyond simple observation. Furthermore, codes such as "Value and Contributing" suggest that this emotional connection translated into a sense of responsibility and a willingness to act for the benefit of the environment, rather than viewing it solely as a resource.

Students' Environmental Behaviours

The findings show that all three students' environmental behaviours were positive. It was understood from the students' statements that they were more sensitive to the environment, that their environmentally sensitive behaviours had increased, and that they were more careful and attentive. These behaviours were also observed to be maintained throughout the activities. It is noteworthy that one of the students stated that she had not previously been very responsible about the environment and that her environmental behaviour was not sufficient. One student stated that although he already knew the necessity of not polluting the environment, this knowledge was transformed into behaviour thanks to the activities carried out. This situation has been effective in putting individuals' awareness into action through planned environmental education. Students' opinions on this issue are presented below.

> *Student 1: "I already knew I shouldn't pollute the environment, but I learned to be more careful with the activities. I didn't warn the people around me, but now I do. If they're making a mistake, I can correct their mistakes. Sometimes my father throws trash from the car, I used to say nothing before I warn my father now."*
>
> *Student 2: "I think we should not pollute the water, air and soil. I am careful about these."*
>
> *Student 3: " I didn't separate the waste at home into paper and plastic, but now I'm more careful since there aren't any recycling trucks in our village, I bring the waste to school. It's a bit difficult. I'm paying more attention to the living things around me. Even when I see an ant walking on the ground, I look around to avoid stepping on it. The decline in biodiversity saddens me. I used to not pay much attention to nature, teacher. I was such an irresponsible person. But now I've changed a lot. I try harder not to pollute the environment."*

The codes for the theme of students' environmental behaviour are presented in Table 6.

Table 6. Theme and theme codes of students' environmental behaviour

Theme	Codes	f
Students' behaviour Towards The Environment	Making an effort	3
	Being careful	2
	Warning people	1
	Value	2
	Correcting their mistakes	2
	Feeling emotions	2
	Abandoning irresponsible behaviour	3

Table 6 outlines the tangible behavioral changes observed in students regarding the environment. The high frequency of codes such as "Making an effort" and "Abandoning irresponsible behaviour" indicates a significant shift from passive awareness to active self-regulation. The findings suggest that students not only stopped harmful actions but also demonstrated a conscious dedication to protecting nature. Furthermore, codes like "Correcting their mistakes" and "Warning people" imply that this sense of responsibility has internalized enough to influence both their own actions and their social interactions.

DISCUSSION AND CONCLUSION

In line with the findings obtained from the research, it is seen that forest school-based practices have multifaceted positive effects on students. In addition to the students' opinions stating that they found the activities intriguing, entertaining and instructive, it was also found that their motivation towards learning increased thanks to this experience. This result shows that students who are accustomed to studying in traditional classrooms and who are in direct contact with nature during the learning process by moving away from closed classroom environments are more willing and interested in learning (Louv, 2019; Passy & Waite, 2011; Slade et al., 2013; Richardson & Murray, 2019; Harris, 2023).

It can be said that forest school-based practices play an important role in keeping children's interest alive. During these practices, students tend to actively participate both physically and mentally. When students move from a closed environment to a more free and comfortable one, their focus, interest, and attention span increase (Fiennes et al., 2015).

Another finding from the research results is that students have difficulty in forest school-based practices because they require psychomotor skills. This finding in our study is consistent with the findings of studies reported in the literature (Slade et al., 2013; Trapasso et al., 2018; Coates & Pimlott-Wilson, 2019). Although students had difficulties in the applications, it was observed that they produced solutions to the problems they encountered by getting help from their teachers or collaborating with their peers. This finding shows that students are actively involved

in the processes of perceiving the problem and producing solutions to the problem (Harris,2017; Harwood & Collier, 2017; Button & Wilde, 2019).

However, while some studies in the literature report that certain forest school practices may involve specific risk factors (Little & Wyver, 2008; Nawaz & Blackwell, 2014; Harper, 2017), no risk factors were found in the activities implemented in this study. In this context, the findings of the study do not fully coincide with studies reporting high-risk activities, but they demonstrate that nature-based learning environments, when safely structured, can produce powerful pedagogical outcomes. This supports the idea that the implementation of the forest school approach, teacher guidance, and activity planning are decisive factors in determining learning outcomes.

In addition, it was observed that students shared materials with each other during the practices and acted within the framework of shared responsibilities. Students' sharing and solidarity with their peers demonstrates that forest school-based educational practices strengthen these behaviours. Forest school-based practices are consistent with the literature, which shows that students improve their ability to collaborate with their peers, self-efficacy, and problem-solving strategies (O'Brien & Murray, 2007; O'Brien, 2009; Slade et al.,2013; Elliott, 2015; Mackinder, 2015; Yıldırım & Akamca, 2017; Tiplady & Menter, 2021; Friedman et al., 2022).

It is understood that students learn new information, concepts or terms about the environment during their practice in the field of environmental knowledge, which is a component of environmental literacy. Obtaining environmental knowledge as a result of direct experience gained by students and supporting this knowledge cognitively also ensures that learning takes place meaningfully. This finding is parallel to studies emphasizing that students' environmental knowledge level has increased (Sharma-Brymer et al., 2018; Barrable & Arvanitis, 2019; Whelan & Kelly, 2023).

It has been observed that students' attitudes towards the environment, which is another important part of environmental literacy, are positive, and that students are more sensitive to the environment and more conscious of environmental problems. The development of environmental awareness, the strengthening of ties with the environment, and the emergence of caring behaviors for the environment are important steps towards sustainable environmental literacy. This result is consistent with other studies. (Palmberg & Kuru, 2000; Erten, 2004; Chawla & Cushing, 2007; Ernst & Theimer, 2011; Turtle et al.,2015; Aydın &Aykırı, 2023; Baierl & Bogner, 2024).

When the research results are evaluated in general, it becomes clear once again how important forest school-based educational approaches are for students to grow up as environmental literate individuals. The forest school approach, which is thought to be an alternative to traditional closed classroom environments, will ensure that students' knowledge, attitudes and behaviors towards the environment progress positively thanks to rich learning activities.

The current education program in schools can be structured with forest school-based practices. In-service training can also be provided to teachers at the school to ensure they carry out these plans correctly. In addition, it may be recommended that teacher candidates be trained in a course or program related to this discipline during their university education.

In future studies on forest school, examining the effects of forest school-based activities on different age groups and comparing the results in rural and central schools will contribute to the results in this area. In addition, conducting long-term studies to understand how sustainable students' environmental behaviours are is also very important for this field.

Data Availability

Ethical Rules: The study was voluntary and anonymous for all participating students. Necessary permissions were taken from the Ethics Committee of Hacettepe University. In accordance with ethical standards, participants received information about the study's objectives, the protection of their data, and the voluntary nature of their involvement. This study was prepared based on a part of the researcher's doctoral thesis.

Authors Contributions: All the work was done by the authors.

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Data Availability: The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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