European Journal of Education Studies
ISSN: 2501 - 1111
ISSN-L: 2501 - 1111
Available on-line at: www.oapub.org/edu

DOI: 10.46827/ejes.v8i4.3706 Volume 8 | Issue 4 | 2021

IMPACT OF ECOLOGY-BASED NATURE EDUCATION ON THE BEHAVIOR OF SECONDARY SCHOOL STUDENTS[i]

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Abstract:
Urbanization decreased natural habitats and technological developments cause children to become more and more disconnected from nature (Kahyaoğlu & Yetişir, 2015). This disconnection has increased interest in ecology-based nature education in many countries. Ecology-based nature education is an out-of-school education program that enables to develop awareness of nature and environment in individuals, protect living and inanimate beings in nature, and better understand human-nature relations. It covers a wide range of people from preschool, primary, secondary, undergraduate, graduate and teachers. Accordingly, it is seen that there has been an increase in studies on ecology-based nature education in recent years (Keçeci, Kırbağ-Zengin & Alan, 2019; Özgel, Aydoğdu & Yıldırım, 2018; Kınık-Topalsan, Türk & Güler, 2019; Temiz & Karaarslan-Semiz, 2019). However, when the articles on this field are examined, it is seen that the studies on the role and effect of ecology-based nature education on the behavior of students connecting to nature are not enough. The aim of this research is to examine the

[i] This study includes the data obtained from the "Don't Say Goat, Don't Give Up Science and Art" project, supported by the project number 118B339, within the scope of TÜBİTAK 4004 Nature Education and Science Schools Support Program.
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impact of ecology-based nature education on the behavior of secondary school students towards nature within the framework of Bowlby's theory of attachment and to present their views on ecology-based nature education applied. In this context, the research was carried out with a mixed method research pattern. The working group of the study consists of 40 students, who participated in the training with the principle of volunteerism, in a province located in Southeastern Anatolia Region of Turkey. All activities of this training were carried out within the borders of the province. Quantitative data of the study were obtained by "Nature Commitment Scale" and qualitative data were obtained by semi-structured interview form. Quantitative data of the study were analyzed by independently related sample t-test and qualitative data were analyzed by content analysis. In the study, it was determined that ecology-based nature education had a statistically significant effect on the connection behavior of secondary school students to nature. In addition, it was determined that secondary school students who participated in ecology-based nature education with some expectations such as, raising awareness, doing activities, gaining experience and communicating. After the training, it was determined that the expectations of the students were met.

Keywords: bonding, nature, ecology-based nature education, secondary students

1. Introduction

Children who do not have an emotional connection with nature are unlikely to perceive nature, understand human-nature relations and exhibit nature protection behaviors. Urbanization decreased natural habitats and technological developments are causing children to become more and more disconnected from nature (Kahyaoğlu & Yetişir, 2015). This has increased interest in ecology-based nature education in many countries (Erdoğan, 2011). Ecology-based nature education is an out-of-school education program that improves awareness of nature and the environment in individuals, protects living and inanimate beings in nature, and provides better perception of human-nature relations. Its aim is to develop behaviors aimed at better understanding and protecting nature and the environment by students. Within this framework, The Scientific and Technological Research Council of Turkey (TUBITAK) has been supporting ecology-based nature education programs under the call code 4004 since 1999. Ecology-based nature education is programs that enable nature and humans to learn by living outside the classroom environment by experiencing their relationships with each other in a hands-on way with real life. These educational programs cover a wide range of preschool, elementary, secondary, undergraduate, graduate and teachers. Therefore, there has been an increase in studies on ecology-based nature education in recent years (Keçeci, Kırbağ-Zengin & Alan, 2019; Özgel, Aydoğdu & Yıldırım, 2018; Kınık-Topalsan, Türk & Güler, 2019; Temiz & Karaarslan-Semiz, 2019). However, when the articles on this field are examined, it is seen that the studies on the role and effect of ecology-based nature education on the behavior of students connecting to nature are not enough. For this

reason, it is thought that the findings obtained from the research will contribute to both the education programmers who will design a science education programs and the teachers who will gain nature-related behaviors in the students.

2. Literature Review

The protection of nature and the environment depends on the nature of individuals' behavior of attachment to nature rather than the organizational power of environmental protection organizations (Louv, 2010). For this reason, it is very important for human-nature relations to reveal factors that may affect the natural bonding behaviors. This research addresses this situation according to Bowlby's theory of attachment. Theory is a theory of personality development based on psychodynamic approaches (Morsünbül & Çok, 2011).

The theory of attachment is based on the assumption that relationships established in childhood affect people's ability to regulate emotions. Accordingly, attachment is an approach that explains the processes of deep emotional bonding with the need of mankind to survive (Bowlby, 1982; 1988). This theory explains the dynamics of individuals establishing close relationships with their environment and their strategies for regulating emotions (Sümer, 2006). According to this theory, attachment is a universal condition of mankind in the process of seeking intimacy and building close relationships with others. The safe or insecure relationships established by the individual in childhood affect their existing relationships positively or negatively without changing much in later life (Bowlby, 2013). It is stated that the individual feels physically and psychologically safe thanks to his attachment behaviors and thus has the opportunity to survive despite all the difficulties of life (Subaşı, 2012). In the literature, it is stated that attachment develops in the form of two basic schemes, "*affirmative*" and "*supportive*", which affect the relationships of human beings throughout their lives in the form of "*precious me*" and "*reliable her/him*" (Kesebir, Kavzoğlu & Üstündağ, 2011). In theory, it is stated that this condition, called the intrinsic working model in which human relationships affect or shape subsequent relationships, is used cognitively continuously once it is built (Bowlby, 2013). Again, according to the proponents of attachment theory, the internal working model formed in childhood affects the behavior, thought, emotion and mental structure of the individual as part of the personality (Ainsworth, 1989; Bowlby, 2013; Weiss, 1982). Again, it is stated that bonding behaviors vary and change from individual to individual (Karameşe, 2014). It also states that bonding behavior occurs in different ways, which can be formed by instant contact, emotional perception, senses, thoughts, memories and conversations (Ruppert, 2011). Again, it is stated that bonding behaviors originate from the essence of human nature (Bowlby, 2013). The behaviors of attachment to nature are the emotional bonds that man establishes with nature (Bektaş, Kural & Orçan, 2017). These bonds affect human relationships and behaviors with nature. It is closely related to behaviors such as loving nature, being with nature, being afraid of nature or moving away from nature. This condition depends on the positive or negative experiences that

individuals have with nature in childhood and turns into behaviors of attachment or distancing towards nature in the future.

3. Nature and Nature Education

The concept of nature is an open system with its own mechanisms and laws that affect, being affected, change, being changed, renew and create living and inanimate elements, processes, relationships and dynamics that are not easy to perceive (Atasoy, 2005). Therefore, it is very difficult to understand and comprehend nature. According to the Turkish Language Association (2019) dictionary, nature is defined as an environment or nature that has not undergone major changes by human hands and protects its natural structure. However, it is seen in the literature that the concept of nature is perceived in different ways in different segments. Accordingly, nature is sometimes perceived as the essence of life, the inexhaustible resources in which economic activities take place, sometimes the punishing environment that brings people to their knees with natural disasters, and a pure, clean virgin place which human hands do not touch (Atasoy, 2005). The concept of nature is explained by teachers as the living space (Köşker, 2013) and the source of life by middle school students (Deniş Celiker & Akar, 2015). Accordingly, it is seen that the concept of nature is perceived in different ways depending on the period and experience which has been experienced by mankind.

Nature education, unlike the concept of nature, is defined as education in nature (Assistant, 2009), teaching the language of nature (Ozaner, 2004), understanding nature (Erdogan, 2011), recognizing nature in its natural environment, making what nature offers easier to perceive as educational subject or material (Keleş, Long & Long, 2010). Accordingly, the purpose of nature education is to ensure that nature is perceived with all elements of nature by students, to ensure that they deeply perceive environmental values with rich learning experiences in natural environments outside of school, and to enable them to develop positive attitudes and behaviors towards living and inanimate elements in nature. In their study on primary school students, Karakaş, Kaya and Yılmaz (2018) stated that nature education contributes significantly to the psychological and social development of the students. Again, Buldur, Bursal, Yücel and Yalçın (2018) stated that an interdisciplinary nature education has a meaningful effect on the environmental awareness of middle school students.

Apart from that, nature education has a positive effect on students' environmentally responsible behaviors (Erdoğan, 2011), their attitudes towards the environment (Kıyıcı, Yiğit, & Darçın, 2014), environmental literacy (Özdemir, 2010), geography education (Oğurlu, Alkan, Ünal, Ersin, & Bayrak, 2013).) and perceptions towards nature (Tekbıyık, Şeyitoğlu, Vekli, & Konur, 2013). Therefore, the necessity of ecology-based nature education is put forward more clearly in order to gain positive behaviors towards nature and the environment in students. On the other hand, the necessity of ecology-based nature education has not been sufficiently focused on the behaviors of exploration and attachment to nature, which are among the special aims of

the Ministry of National Education (2018) Science education. This research is expected to verify this situation scientifically, considering that ecology-based nature education will positively contribute to the behaviors of secondary school students' attachment to nature, and educators are expected to realize the necessity of ecology-based nature education and integrate it into science education. In this context, the aim of the research is to examine the effects of ecology-based nature education, which is supported by Scientific and Technological Research Council of Turkey (TUBITAK), on secondary school students' attachment to nature and their views within the framework of Bowlby's attachment theory. In this context, answers to the following questions for students were sought.

1) What are the expectations of students before ecology-based nature education?
2) What are the students' opinions about the gains after ecology-based nature education?
3) What is the effect of ecology-based nature education on students' attachment to nature behaviors?

3. Material and Methods

3.1 Research Pattern

Mixed method studies have been adopted in this research. The mixed method is a method in which qualitative and quantitative research approaches are handled together depending on the purpose of the research and the problem situation. Accordingly, researcher/researchers are expected to combine qualitative and quantitative methods, approaches and concepts in a study or successive studies (Creswell, 2003). The case study was used in the qualitative method of this study, and the single group pre-test/post-test experimental design method was used in the quantitative method. In the literature, it is stated that qualitative and quantitative approaches should be integrated according to timing, priority and combining factors in mixed method research (Alkan, Şimşek, & Armağan Erbil, 2019). Otherwise, mixed method studies may not be mentioned. The timing factor is determined according to the simultaneous or sequential timeliness of qualitative or quantitative approaches, the priority factor, the order of importance of qualitative and quantitative approaches in achieving the purpose of the research, and the association factor according to the relationship between the results obtained from the qualitative and quantitative approaches. Accordingly, in this study, it was ensured that qualitative and quantitative approaches were integrated simultaneously, with equal priority and the results obtained from qualitative and quantitative approaches in an embedded manner.

3.2 Study Group

The study group consists of a total of 40 secondary school students who voluntarily participated in ecology-based nature education supported by TUBITAK in a province located in southeastern Anatolia region of Turkey. 55% of the study group consists of

girls (22 students) and 45% male (18 students). The entire working group consists of students from different secondary schools in the city center. The sample of the study was determined according to the probability-based sampling method for quantitative data and the maximum variety sampling method from purposeful sampling methods for qualitative data. In this context, a pre-prepared web page was used to determine the sample. For this purpose, students who want to participate in ecology-based nature education supported by TUBITAK were introduced to the education program "before the application" and were made aware of it four weeks in advance through web pages, posters and brochures distributed to schools. Students who want to participate in the program are provided to apply by filling out a detailed form (gender, age, class, type of high school, participation in such activities before, interest, parent information, health status, blood type). Through the applications made, students with basic skills who can do ecology-based nature education activities have been determined. Accordingly, students of different types of high schools (Science high school, Anatolian high school, Anatolian imam hatip high school, Vocational high school and Sports high school) participated in the education.

3.3. Data Collection

In the research, data collection shows differences for quantitative and qualitative data. In order to collect quantitative data, the scale of "commitment to nature" developed by Mayer and Frantz (2004) and which was applied to Turkish by Bektaş, Kural and Orçan (2017) was carried out by validity and reliability study. The scale consists of eight substances and two dimensions (integration with nature and part of nature). As a result of the explanatory factor analysis of the structure validity of the scale, it was stated that the factor loads were between .46 and .90 and the total variance described was 51.53% (Bektaş, Kural & Orçan, 2017). The Cronbach alpha reliability coefficient of the scale adapted to Turkish is .81. In the study, the Cronbach alpha reliability coefficient of the scale was calculated as .91. In order to collect the qualitative data of the research, a semi-structured interview form consisting of open-ended questions about the expectations and post-application gains of pre-application ecology-based nature education was used. The final version of the form has been given shape in line with the opinions of the faculty members who are experts in the field. During the application process, students were asked to fill out these forms and what they wrote was considered as a qualitative data source of the research as a document.

3.4 Ecology Based Nature Education Activities

The ecology-based nature education program covers a total period of 7 days. The activities implemented within the framework of the training were carried out as two groups in June and September. Each of these activities has been prepared and implemented by faculty members who are experts in their fields. Within this framework, the following activities have been implemented within the scope of the program (the sample activity is provided in Annex-1).

- Let's get to know our goats,
- Ecosystem and goat,
- I eat every weed the goat eats,
- In pursuit of new inventions,
- Ecological traces on our clothes,
- The role of microorganisms from milk to yogurt and cheese,
- Akabe road trekking,
- On the trails in the footsteps of goats,
- Goats meeting with art,
- Goat and genome project.

3.5 Analysis of Data

Within the scope of the research, arithmetic mean, standard deviation and dependent sample t test analyses were used in the analysis of quantitative data. In this context, SPSS 18 program was used. Content analysis was used in the analysis of qualitative data. In this context, the data in the qualitative data collection tool has been transferred to the computer environment. Then, a framework was created for data analysis based on research questions and conceptual framework, data were processed according to the thematic framework, findings were defined and made sense and interpreted as stated in the literature (Yıldırım & Şimşek, 2013). The reliability of the research is important to show the consistency of the research. For this purpose, the data coded separately by the researchers around a certain common theme were reanalyzed by a faculty member who is experienced in qualitative research outside the scope of the research and ensured that the research was carried out with a holistic approach. However, the sampling of the research, the data collection process, the method applied, the data collection tools, the analysis processes and the conceptual framework are presented clearly and in detail. In addition, expert opinions and field writing studies were examined in detail when preparing research questions to ensure the validity of the research. However, the students quoted directly from were coded as S1, S2, S3, S4... to fully demonstrate the current situation.

4. Results

In this section, the findings of ecology-based nature education of the secondary school students who participated in the research are presented.

4.1 Expectations of Secondary School Students (Preliminary interview)

Findings on the expectations of students for ecology-based nature education are presented in Table 1.

Table 1: Findings on ecology-based nature education expectations

Main Theme	Sub-theme	Code
Cognitive Expectations	Awareness	Research Getting information Awareness Getting to know nature Exploring
	Raising awareness	Knowing its value
Activity Expectations	Joining activity	Seeing nature Being with nature
	Gaining experience	Getting to know animals Benefitting from nature
Environment Expectations	Communicating	Being with friends Having fun Knowing each other Getting social Getting closer with each other

When Table 1 was examined, it was determined that the expectations of students regarding ecology-based nature education consisted of three main themes and five sub-themes. The student statements for the main themes and codes in Table 1 are given below.

The expressions of the main theme of cognitive expectation are as follows:

"In order to know nature more closely and to be informed." (S1)

"I joined because I am curious towards nature and I want to have knowledge about nature." (S3)

"*I am curious about the project and I think the project will teach me useful new information."* (S4)

"*The idea of getting to know nature more closely, learning what it's like to be a veterinarian"* (S6)

"*I am curious about the adaptation of animals to the environment."* (S12)

"*Learning about my responsibilities towards nature, knowing the damaging factors and learning new information about nature."* (S20)

The expressions for the main theme of event expectation are as follows:

"I have curiosity about animals, and I want to overcome my fears about animals." (S8)

"Eliminating my prejudices about animals and being in touch with nature." (S9)

"I love living things and want to get to know them." (S10)

"Because I was curious about where we were going." (S14)

The expressions for the main theme of environment expectation are as follows:

"Our teacher advised us to join and also I joined to be with friends and have fun." (S2)

"Meeting new people" (S5)

"Engaging in a social event." (S6)

"Making new friends." (S8)

"Because I believe that such projects increase my cultural and sociological relations." (S15)

When the expectations of the students regarding the ecology-based nature education program are evaluated; The codes of research, getting information, awareness, getting to know nature, exploring constitute the sub-theme of awareness of students. The code of knowing its value constitutes sub-theme of raising awareness. The codes of seeing nature and being with nature constitute the sub-theme of joining activity. The codes of getting to know animals, benefiting from nature constitute sub-theme of gaining experience. The codes of being with friends, having fun, knowing each other, getting social, getting closer with each other constitute sub-theme of communicating. Students' views on the achievements of the ecology-based nature education program after the implementation process are presented in Table 2.

Table 2: Findings on ecology-based nature education program achievements

Main Theme	**Sub-Theme**	**Code**
Cognitive Achievements	Awareness	Enlightenment Getting to know nature closely
	Raising awareness	Environmental awareness Protecting animals Interest in nature Protecting nature Learning responsibilities Strengthening relations with nature
Achievements Related to Activity	Removal of negative expectations	Being wrong about nature
	Learning physical activities	Walks Journeys Roaming
Achievements Related to Environment	Creating social environment	Friendship Group work Getting social

When Table 2 was examined, it was determined that the students' achievements consisted of three main themes and five sub-themes. The student statements for the main themes and codes in Table 2 are given below.

The expressions of the main theme of cognitive achievements are as follows:

"We realized that goats were the beginning of civilization and that people benefited from goats." (S1)

"We learned that goats are not only used in milk and meat." (S2)

"I learned new information in the laboratory by conducting many experiments." (S3)

"I learned that everything is connected, that the lack of a living creature can affect many creatures, that animals have many contributions to science, and I have seen how much damage we cause to nature." (S4)

"Goats contribute to human development. They are used in many areas. I learned how to remove harmful bacteria in raw milk and things like carpets and rug etc. are woven with goat hair." (S5)

The expressions of the main theme of achievements related to activities are as follows:

"My ideas about nature have changed, I have learned which jobs I can succeed in by doing studies on science and art." (S3)

"My prejudices have changed." (S16)

The expressions of the main theme of achievements related to environment are as follows:

"I socialized with the activities carried out in the project." (S3)

"Animals are our friends." (S11)

"We had a better friendship with environment and, most importantly, had fun." (S15)

When the students' views on ecology-based nature education achievements are evaluated: The codes of enlightenment and getting to know nature closely constitute the sub-theme of awareness. The codes of environmental awareness, protecting animals, interest in nature, protecting nature, learning responsibilities, strengthening relations with nature constitute the sub-theme of raising awareness. The code of being wrong

about nature constitute sub-theme of removal of negative expectations. The codes of walks, journeys and roaming constitute sub-theme of learning physical activities. The codes of friendship, group work and getting social constitute sub-theme of creating social environment. Findings on the effect of ecology-based nature education applied to students on the behaviors of attachment to nature are given in Table-3.

Table 3: T-test findings on nature bonding behaviors

		N	**Min - Max**	**$\bar{X}$**	**SS**	**t**
Nature Bonding Behaviors	pre-test	40	2,75 - 5,00	4,00	,53	2,648**
	post-test	40	2,63 - 5,00	4,30	,56	

**p< 0,01

The t-test was applied to students in order to examine the changes between the final test scores and the pre-test regarding the effect of ecology-based nature education on nature bonding behaviors. The primary test arithmetic average score was ($\bar{X}$=4.00) and the post-test arithmetic average score was ($\bar{X}$=4.30). Accordingly, as a result of the T-test, it was determined that this difference between the preliminary test and the final test was statistically significant (t=2,648; p<0,01).

4. Results and Discussion

In line with the aim of the research, results of preliminary interviews and final interviews with secondary school students, students' views on ecology-based nature education and the impact of ecology-based nature education on nature bonding behaviors were examined within the framework of Bowlby's theory of attachment.

In this context, a useful perspective has been presented in terms of the current potential of ecology-based nature education supported and implemented by TUBITAK in science teaching as an out-of-school activity. In the research, it was determined that the students were very eager to participate in the education in preliminary interviews. Students participated in ecology-based nature education with the principle of volunteerism. In addition, it was observed that the students were very curious when researchers were passing information to the students about the activities to be carried out in education and it was also observed that students tried to meet each other by communicating. Again, in the preliminary interviews, it was determined that the students participated in this training in order to conduct research, to have knowledge about nature, to get to know nature more closely, to be intertwined with nature and to have fun. According to the theory of attachment, forms of attachment, which are formed in the early stages of life and are thought to be continuous, are an important factor affecting the pattern of the individual's relationship with other individuals or elements (Kesebir, Kavzoğlu & Üstündağ 2011). Therefore, students' instinctive intimacy behaviors are a kind of bonding system and affect other emotion-editing strategies necessary for development. And these activate the students' exploration system (Sümer, Oruçlular & Çapar, 2015). This situation is very important in terms of achieving the goals

of ecology-based nature education. Therefore, in order to enable the students participating in the training to discover the behaviors of bonding to nature, the behaviors of intimacy must be supported, or their expectations must be met. In the literature, it is stated that primary school students who participate in nature education are usually curious and very eager before participating in education (Karakaş, Kaya & Yılmaz, 2018). In a similar study on teachers, teachers stated that they participated in ecology-based environmental education to engage with nature, share the knowledge they have learned with others and meet new people (Güler, 2009). Accordingly, it can be said that the purpose of the students who participate in nature education is to discover nature. This may be due to the need for students to get to know nature more closely or to bond emotionally with nature. When the student expectations related to nature education applied within the scope of the research were evaluated, it was determined that they had some expectations related to cognitive, participating in activities and environment.

Cognitive expectations are to be enlightened about nature-related issues and to have awareness. Event expectations are to participate in some activities to explore nature. And in the expectations related to the environment, it has been determined that they have expectations such as meeting others, socializing and being together with others. In similar studies, Karakaş, Kaya and Yılmaz (2018) stated that primary school students participated in nature education with psychosocial expectations such as having fun, communicating, acting together, taking responsibility and feeling free, and environmental expectations. In a similar study conducted by Oğurlu (2016), teachers and teacher candidates stated that they participated in nature education to get to know nature more closely and in detail. According to the theory of attachment, the more tolerant the emotional needs of children in early childhood are met, the more empathetic and tolerant they can be in the relationships they establish in the following years (Bowlby, 2013). Accordingly, it can be said that the more accurately the students' emotional needs or expectations for nature are met, the easier it is to establish positive relationships with nature and to bond to nature. In preliminary interviews with the students, it was determined that the students participated in this program on the recommendation of the teachers and their friends. Accordingly, it can be said that their social environment is effective in participating in such out-of-school nature education. According to Bowlby's theory of attachment, family and social environment are important factors for children to create bonds (Tüzün & Sayar, 2006). Similarly, Louv (2010) stated that families have a significant influence on children's attachment to nature. Again, Karakaş, Kaya and Yilmaz (2018) stated that it should be done by families and schools to relate and to direct children to nature. In the interviews after ecology-based nature education applied to students within the scope of the research, it was determined that students' knowledge levels increased in nature-related subjects, their negative expectations changed, their social environment developed, and students learned nature more closely by doing physical activities in nature. Accordingly, it can be said that at the end of ecology-based nature education, students have some achievements related to cognitive, activity and environment, and ecology-based nature education has achieved the expected goals. In a

similar study conducted by Kıyıcı, Yiğit and Darçın (2014), it was stated that nature education increases students' environmental literacy levels. Again, Keleş, Uzun and Uzun (2010) stated that the nature education attended by the teacher candidates had a significant impact on the environmental awareness and attitudes of the teachers. Erdogan (2011) stated in his study that ecology-based nature education positively affects the responsible behavior of students towards the environment. According to this, it can be said that ecology-based nature education is effective in discovering the nature specified in the special purposes of science teaching programs (MEB, 2018) and in understanding the relations between human and environment and connecting to nature. In this case, it can be said that out-of-school ecology-based nature education is effective in achieving the specific goals of science teaching. In the research, it was determined from the statements that after the application of ecology-based nature education, some false preliminary knowledge of the students about nature, i.e. negative opinions changed to become positive, and it was in vain to be afraid of nature. Atasoy (2005) states that all negativity in people's relations with nature is due to human perception of nature as wrong or incomplete. Therefore, ecology-based nature education to be applied by educational institutions can help solve such problems. Again, within the framework of the application, it was determined that the walks carried out in nature met the expectations of the students to engage in activities and their social circles expanded thanks to the group studies. In the study conducted by Karakaş, Kaya and Yılmaz (2018), it was stated that the students had fun in the applied nature education, were happy thanks to do activities belonging to different disciplines, had positive opinions about nature and increased their awareness of nature with the activities they had just learned. Louv (2010) stated in his book "The Last Child in the Woods" that "*one of the benefits of nature is that green spaces promote social interaction and increase social support*". This situation coincides with the work we have done. Accordingly, it can be said that ecology-based nature education supports students' behaviors of bonding with nature by improving their social environment. In similar studies, it is stated that nature education contributes significantly to the perceptions of nature (Birinci, 2013), to learning and teaching scientific phenomena related to nature (Temiz & Karaarslan-Semiz, 2019), environmental awareness (Berberoğlu, 2015) and self-sufficiency for environmental education (Tungaç, 2015). In our study on the effect of ecology-based nature education on students' behaviors of bonding with nature, it was determined that the education applied had a meaningful effect on the behaviors of students bonding with nature. In the literature, it is stated that there is a meaningful relationship between the behavior of students bonding with nature and their participation in activities in nature (Cheng & Monroe, 2010). Accordingly, it is stated that the emotional bonds established with nature are important in terms of caring about nature and initiating and maintaining nature protection behaviors (Thomashow, 1996). In this case, it can be said that activities in nature promote the behavior of attachment to nature. Therefore, it can be said that ecology-based nature education is important for secondary school students to connect to nature, to care about nature and to initiate and maintain nature protection behaviors.

6. Conclusion

1) Ecology-based nature education program positively affects the behavior of students to connect to nature. This affects students' care and appreciation of nature.
2) Students participate in the ecology-based nature education program with the effects of their social environment. Therefore, social environment is an important factor in the implementation of such programs.
3) Students participate in the ecology-based nature education program with expectations related to cognitive, activities and environment. Therefore, meeting these expectations affects the connection to nature.
4) The ecology-based nature education program in students constitutes some gains in raising awareness and enlightenment, changing negative thoughts, participating in physical activities and socializing.
5) Ecology-based nature education program supports to achieve the special goals of science courses as an out-of-class program. Therefore, educators working in public and private educational institutions can increase the efficiency of science courses by implementing ecology-based nature education programs.

Conflict of Interest Statement
The authors declare no conflicts of interest.

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Appendix 1

Activity Number: 9
Name of Activity: On the Trails in the Footsteps of Goats
Aim of the Activity: To provide information about the date of domestication of goats in the land known as the Fertile Crescent (between the Tigris and Euphrates rivers) and when and where domestication began in the history of mankind, which has lasted for three million years. Also, to understand the effect of goats on biodiversity.
Topic of Activity: The importance of domestication, Biodiversity
Materials: Block note, pen
Method: Observation, Field Studies
Implementation Plan: It is known that goats were domesticated about 12,000 years ago Southeastern Anatolian. And then, cattle and pig were domesticated in these regions in today's Anatolian geography, which is located between the Tigris and Euphrates in Southeastern Turkey and again this region hosted the start of the process of domestication with dogs 14,000 years ago. Participants will be told about the importance of domestication in nature in the form of question and answer. This process will be performed in the footsteps of Koçer (nomadic) herds located in Şirvan district about 20 km away from Siirt Province. During the event, the role of taming goats in shortening the time lost in search of food and energy for humankind to lay the foundations of civilization and the importance of domestication for society will be told to participants. In addition, with the activity of trails in the footsteps of goats, the goats' life in the natural area and their relationship with the geography will be comprehended by students observing the environment during the hike. The instructors who will carry out the event will be informed that animals feeding on grasslands, especially goats and sheep, have a biodiversity-enhancing feature in traditional animal breeding. In addition, grazing animals eliminate the pressure of dense grass and bush and create suitable transitional areas for different creatures. During the field work, participants will be told that goats prun the lower branches of trees by eating them in wooded areas. Again, participants will be informed that animals reduce the risk of fire in woodlands as a result of breaking dried grass while finding their own nutrients through grazing in nature, and that small paths formed during navigation have an effect that stops the speed of fire and prevents it from spreading to larger areas. Participants will take notes about environmental pollution observed during the trip and then talk to the instructors about this issue. In this event, participants will take photos while observing herds of goats. In this way, they will have the opportunity to observe the animals more closely.