

## An Action Research on Improving Environmental Sensitivity of Fourth Grade Primary School Students: What Happens in the School Garden?

Fatma Betül Demir\*, Meryem Kayış, Dilan Aksoy, Ramazan Kaya, Emirhan Kaya

Bartın University, Turkey

\*Corresponding author: Fatma Betül Demir, E-mail: bdemir@bartin.edu.tr

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### ABSTRACT

School gardens, which play an important role in environmental education, provide an opportunity for students to develop environmental awareness and gain environmental responsibility. In this study, which draws attention to this, it is aimed to reveal the applicability of the workshops prepared in the school garden in order to improve the environmental sensitivity of the students. The research was carried out with 10 female and 10 male 4<sup>th</sup> grade students in a public primary school in the city center of Bartın in the 2021-2022 academic year. The research was carried out with the action research design, one of the qualitative research methods. The data of the research were obtained through a scale developed by Peker (2020) and a semi-structured interview form prepared by the researchers. Quantitative data obtained using descriptive statistics and dependent group t-test statistical procedures; qualitative data were analyzed with content analysis technique. As a result of the research, it has been determined that environmental education workshops are effective in increasing students' environmental awareness. Students stated that environmental education activities are fun, useful and instructive. As a result, it is seen that the workshops applied in the school garden increase the environmental awareness of the 4<sup>th</sup> grade students and the process has a positive effect on them. As a result of the research, it can be suggested that environmental awareness should be brought to students through school gardens and reflected in educational environments by organizing various activities that encourage positive attitudes.

**Key words:** Environmental awareness, Action Research, Primary School

### INTRODUCTION

In the 21<sup>st</sup> century, as a result of increasing industrialization, urbanization and technological developments, nature and nature consciousness have lost their importance in the society that has lost its sociality (Koyuer, 2017). Therefore, while people reach the level of welfare rapidly, the natural environment is rapidly being destroyed. Thus, the harmony between man and nature has been disrupted (Macun, 2018). The intense air pollution that emerged in London in 1952 and the death of thousands of people is the first indication of the deterioration of this harmony. It was reminded again that with the COVID-19 epidemic that started at the end of 2019, the dangers increased as a result of people's negative attitudes and behaviors towards nature, and this harmony was disrupted. Within the framework of this deteriorating relationship between humans and the natural environment, researchers in many countries and in different fields have started to look at the environmental world from an ecological perspective, re-examine the thoughts and behaviors of humanity, and work to solve environmental problems (Ha et al., 2021).

Changes in the environment due to both the lack of knowledge and wrong behaviors of individuals cause some

problems and destruction. In order to eliminate these negativities, first of all, individuals should be instilled with a sense of responsibility for the environment and sensitivity should be raised. These gains can be given to individuals through education. Therefore, it is possible to change the behavior and attitudes of individuals with an effective and comprehensive environmental education. Individuals can be made to comprehend the factors that destroy nature. Thus, individuals can abandon their negative attitudes and behaviors, acquire sustainable behaviors towards the environment, develop common sense and raise awareness about the environment (Çabuk, 2019; Febriani et al., 2020; Kanat, 2020; Ozer & Yıldırım, 2021; Yıldız et al., 2009). As a matter of fact, it is emphasized how important and necessary environmental education is in order to increase the crises experienced in nature in recent years and not to destroy the society we live in (Kanat, 2020). It is also stated that permanent environmental knowledge is a priority in environmental education in all areas of life (Abduganiev & Abdurakhmanov, 2020).

In order to protect and improve the environment, individuals should be provided with the necessary knowledge,

values, attitudes and skills (UNESCO, 2002). With environmental education, it is aimed to develop positive environmental attitudes in individuals, to transform these attitudes into behavior and to reflect these behaviors in making effective decisions about the environment (Özgün, 2018). Therefore, “Environmental literacy” is used in the environmental education literature, which has a scientific knowledge base, in order to cope with environmental crises (Demir & Kocoglu, 2023). With environmental literacy, individuals become aware of how to protect and maintain the environment by knowing how the world works (Cutter & Smith, 2001). For this reason, if individuals’ knowledge about the environment increases, their positive attitudes and behaviors will increase and their environmental damage will be reduced. Environmental literacy ranges from scientific knowledge to addressing environmental concerns. Therefore, it is emphasized that the environment-friendly character education given within the scope of environmental literacy and the realization of expectations for the environment, and the maintenance of a harmonious and balanced life can be gained from an early age (Deniş-Çeliker & Akar, 2015; Daudi, 2008; Febriani et al., 2020; Irianto et al., 2020).

With the increase in the population in the city centers, the decrease in the number of children who can reach the wooded areas and safe natural playgrounds, children spend most of their time at school. Due to the gradual increase in the negative effects of technology and the decrease in social relations, a generation that has moved away from natural life and lived disconnected from nature has begun to grow. As a matter of fact, the children of the 21<sup>st</sup> century mostly play computer games and individual games at home because they are thought to be easy and safe. But when children learn the language and terminology of nature to satisfy their curiosity, no computer program can meet the opportunities nature offers to arouse their interest. Because nature can provide many benefits for children to ask questions and dialogue with their teachers and peers about their observations (Demir, 2021; Koyuer, 2017; Köklü & Eraslan, 2020; MacEachren, 2013; Sonmez, 2020). Due to the decrease in play in natural and open environments, the role of environmental education is gradually increasing in children’s learning and being intertwined with nature (Harris, 2017).

Children’s play in the open air provides them with various learning opportunities, and they are in communication and interaction with each other, their environment and objects during the game. Thus, children are in direct contact with nature and their peers in open spaces (Köklü & Eraslan, 2020). In addition, strengthening the respect and love for nature can be achieved with time spent learning outside. In this context, environmental activities can bring different emotions and experiences to children (Köklü & Eraslan, 2020; MacEachren, 2013). As a matter of fact, real life shows that teaching the environmental subject in a traditional way does not give the expected result. Therefore, it is stated that children’s awareness of sensitivity to the natural environment is not at the desired level. For this reason, different activities should be offered to children in order to increase environmental awareness and ecological culture (Abduganiev & Abdurakhmanov, 2020).

On the other hand, children can become friends with nature by adopting the idea of a balanced development in their lives, through activities such as taking environmental responsibility, separating waste, conserving water and energy (Hanim et al., 2021). In addition, when alternative approaches and activities are used, it can be seen that there are positive changes in students’ perceptions, skills, participation and experiences regarding nature and the environment (Ridgers et al., 2012). Learning individuals can be placed at the center of the learning-teaching process by organizing extracurricular trainings, extracurricular activities, nature, production trips and trips to scientific laboratories with children at school (Ezer & Ulukaya Öteleş, 2020; Abduganiev & Abdurakhmanov, 2020). Thus, it can be ensured that the environmental learning process of the students is personally meaningful and interactive with their peers and the natural environment. As a matter of fact, environmental education given with this interaction can be given through the lessons taught in schools.

Environmental education in Turkey is carried out within the scope of life studies, social studies and science courses taught in primary and secondary schools. It is stated that environmental education is given sufficient importance in curricula, but it cannot reach the desired goal due to the deficiencies and inadequacies in the practices (Meydan, 2014). It is seen that environmental education given in schools has cognitive and affective dimensions about the environment, but cannot exhibit behavioral characteristics in this regard (Demir, 2021). Environmental education, especially in primary and secondary schools, should be transferred from the school building to the outside areas (Mitchell & Mueller, 2011). School gardens have an important role as an educational environment in order for children to be environmentally sensitive individuals (Karatekin & Cetinkaya, 2013). Environmental and nature protection education can be given importance in school gardens for children who will fulfill the duty and responsibility of protecting nature (Yucel, 1999). School gardens are complementary to the implementation of the curriculum. In addition, by understanding the ecological system of children, environmental awareness can be raised with a local approach to global environmental problems and solutions (Bowker & Tearle, 2007). As a matter of fact, workshops held in school gardens have an important role in acquiring new knowledge and skills in the environmental education process. With workshops that include elements such as plants, animals, water, air, and soil, children can more easily apply the knowledge they have learned to their lives (Başal, 2005).

In recent years, a lot of research has been done about giving environmental education, which is a popular field of study, in school gardens. Research on the subject was conducted with preschool (Tepebag & Aktas Arnas, 2017; Wilson, 1996), primary school (Ozdemir & Yılmaz, 2009; Tandogan, 2016), secondary school (Öznacar et al., 2010) students. Montessori states that school gardens increase the sense of patience and responsibility, improve moral education and understanding and interest in nature (Bowker & Tearle, 2007). Wilson (1996) stated that children who receive environmental education in nature develop a positive

attitude towards nature through curiosity, interest and admiration. In line with the literature, it shows that the activities in the school garden used in environmental education play an important role in children's awareness of the natural environment, protection of nature and positive communication with nature. Therefore, it is necessary to create meaningful learning environments in order to enable children to interact effectively with the environment. These learning environments can be supported by different activities for students in order to increase environmental awareness and ecological culture. Thus, an increase can be achieved in students' perception, skills, participation and experience regarding nature and the environment. Especially in primary schools, environmental education can be given by transferring it from the school building to the outdoors. In this research, unlike the studies in the literature, it is focused on the environmental awareness of the students with various workshops in the school gardens of environmental education.

### Objectives and Research Questions

The aim of the research is to examine the effects of the workshops held in the school garden within the scope of environmental education on the environmental sensitivity of the students and the students' views on the process. The research questions were as follows;

1. How are the environmental sensitivities of the students before and after the workshops?
2. What are the opinions of the students about the workshops held in the school gardens?

## METHOD

### Research Design

The research is a study with an action research design, one of the qualitative research methods. The action research method is individual or group research in order to understand the nature of a teaching strategy, to solve a problem, and to obtain information about an application. In addition, action research can be used in research that focuses on a subject that interests the researcher (Fraenkel & Wallen, 2003; Johnson, 2019). Action research is a research approach that enables it to be carried out with practical, planned and systematic stages to improve an existing situation when there is no problem situation (Ari & Ciftci, 2021). This research; Emphasizing that students' sensitivity to the natural environment is not at the desired level in recent studies on the subject (Abduganiev & Abdurakhmanov, 2020; Demir, 2021), contributing to the environmental awareness and ecological culture of students, preparing workshops in school gardens, which are educational environments, and out-of-class learning that develops students' environmental awareness. It was designed as an action research in order to create environments and to determine the reflections of the effective teaching-learning process on the students.

In the literature, action research is classified as "collaborative", "critical", "class" and "participatory" (Mills, 2003; Hendricks, 2006). In the research, participatory action

research was preferred because it aimed to test and evaluate an application created within the predetermined theoretical framework (Yıldırım & Simsek, 2016). Research practices were carried out by researchers under the supervision of teachers. Within the framework of the research, an environmental education, which includes workshops on environmental awareness and developing positive attitudes towards the environment, focused on the change and development of students.

### Study Group

Easily accessible case sampling and criterion sampling methods were used to determine the study group of the research. While easily accessible case sampling is defined as the selection of individuals who are close to the researcher and easy to reach by providing speed and practicality for the realization of the research, criterion sampling method is the preference of situations that meet the predetermined criteria in accordance with the purpose of the research (Patton, 2005; Yıldırım & Simsek, 2016). In this direction, the students who will participate in the study were selected from the city center of Bartın due to the proximity of the researchers to the research area (easy accessibility). In addition, the study group's education in official primary school and 4<sup>th</sup> grade, and not having participated in a similar study before, were determined as participation criteria. The research was carried out in the second semester of the 2020-2021 academic year. Of the students participating in the study group, 10 are girls and 10 are boys.

Cognitive, affective and behavioral developments of the 4<sup>th</sup> grade primary school students who constitute the research group were taken into consideration in the design of the current research, the determination of the data collection tools and the implementation of the workshops. It is emphasized that environmental awareness can be gained at an early age (Febriani et al., 2020).

### Data Collection Tools

Environmental Attitude Scale, in the study, one of the data was collected by applying the pre- and post-attitude scales to the students. Attitude scales are one of the data collection methods in action research. It provides quantitative data to quickly identify and compare information about participants' attitudes on a particular subject (Johnson, 2019). In order to determine how students' environmental sensitivities were before and after the workshops, the "Attitude Towards Environment Scale" developed by Peker (2020), whose validity and reliability was ensured by scanning the literature, was used in the first stage. It consists of 3 dimensions and 15 items, namely 'Pollution', 'Plant-Nature Love' and 'Animal Love', which were developed to determine the environmentally responsible behaviors of primary school 4<sup>th</sup> grade students. The scale, which is in three Likert-type scales, is listed as "I do not agree", "I partially disagree" and "I agree". The reliability coefficient of the scale is .871. The scale was applied to the students before and after the research in 1 lesson hour. The Cronbach alpha reliability

coefficients obtained as a result of the reliability analysis of the scale belonging to the study group; it was calculated as.78 for the pre-test and.88 for the post-test.

Semi-Structured Interview Form, another data collection tool of the research is the semi-structured interview form. Semi-structured interview provides the opportunity to explain the questions posed to the participants in detail (Çepni, 2014). In order to determine the demographic information of the students, a personal information form was prepared by the researchers. In this part, the students were asked about their gender and their status of watching nature documentaries in the last month. After the process of the research, a semi-structured interview form was created by the researchers in order to obtain in-depth information about the students' views on the workshops held in the school garden. In the research, semi-structured interview form was prepared in the form of open-ended questions in order to obtain rich data from the students (Agostinone Wilson, 2012).

In the preparation of the questions in the form, the workshops held in the school garden and the items in the scale were taken as basis. The prepared form was first submitted to the opinion of field experts. In line with the opinions of the experts, questions that were not clear and thought to be prepared in a similar direction were removed. The final interview form consists of 5 questions. The interviews were conducted in written form after the completion of the workshops. The interviews lasted approximately 25-30 minutes.

### Data Collection

The processing process applied in the research is presented in Figure 1.

As explained in Figure 1, the current situation was determined by scanning the relevant literature before starting the research. In order to develop environmental awareness in students, the workshops to be held in the school garden were created by the researchers. While preparing the workshops, the opinions of 2 lecturers (1 social studies, 1 geography educator) and 2 classroom teachers were taken. Workshops and their contents are explained in detail below.

1. Small landscapes are growing: Landscape architecture provides many contributions to the students, society and the environment, primarily in the studies designed by starting from the aesthetic and functional aspects of the school gardens. Green school gardens will be created thanks to the shovels and rakes distributed to the students and the saplings and flower seedlings. The love of plants will be instilled in the students and the schools will be turned into areas that the society can benefit from. Thus, the school garden will be a place where

people will integrate with nature together. In this process, while the students were adjusting the distances in the process of planting the plants; engineering on how to plant plants, architecture on visually beautifying the school garden, etc. will benefit from many areas.

2. Thinking about living things through upcycling: Upcycling draws attention to a product that has become waste by re-functionalizing it and bringing it into use. The priority here is to prevent waste, and when this is not possible, the resulting waste is reused in a different and correct way. In addition, with the forward transformation to be created, it is ensured that our little friends living in the environment benefit. Plastic water pipes that are not used to be placed in school gardens will be converted into water and food containers for animals. Students will design water pipes with lengths. Then, by placing these containers where they can see them in the school garden, awareness will be created by drawing the attention of both other students and the society. In this way, students will be aware of garbage and waste and engage in nature-friendly activities, while respecting the right of living things to live, their responsibilities to the environment and their love for animals will increase.
3. Contributing to nature with seed balls: Attention is drawn to the students' understanding of their place in the ecological cycle, the importance of soil, and their sensitivity to the natural environment. In this process, the importance of other living things other than humans is emphasized. The basic needs of living things are mentioned. The fruits (banana, plum, etc.) distributed to the students are eaten. Then the seeds and shells are separated. It is emphasized that their shells are not garbage, they are waste. These organic wastes are thrown into the pit opened in a corner of the school garden and met with the soil. In the next step, a sludge is obtained from a mixture of water and soil. They are given a round shape by putting the fruit seeds they have separated into the mud they have obtained. The seed balls made are kept in the sun. After drying, it is released to nature. Thus, what is taken from the soil will be returned to the soil. In addition, students will have done artistic activities in this process.

After the workshops and the preparation of the data collection tools, a pilot application was carried out to see the suitability of the data collection tool and the effectiveness of the workshops. Unlike the study group, which was planned to participate in the research, the pilot application was carried out with 10 4<sup>th</sup> grade students in the spring semester of the 2021-2022 academic year. According to the data

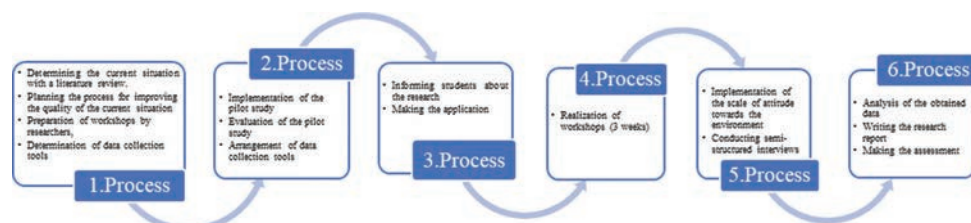


Figure 1. The Process of the research

obtained from the semi-structured interview form, it was determined that some expressions were not understood and similar answers were given to some questions, and the form was rearranged. The disruptions experienced in the applied workshops and the opportunities in the school garden were evaluated in the process, and measures were taken in the actual practice.

Before the actual implementation phase of the research, necessary permissions were obtained from the Directorate of National Education and the management of the school where the research was planned to be implemented. The 4<sup>th</sup> grade students who wanted to participate in the research voluntarily were determined by interviewing the class teachers of the school. Participation consent forms were collected from the students who participated in the research and parent consent forms were collected from the parents of the students. The researchers carried out the application themselves under the supervision of the classroom teacher.

In the first week of the research practices, the students were informed about the research process by introducing the workshops to be held in the school garden and the environment where the workshops will be held. Then, the scale of attitude towards the environment was applied. The workshops developed by the researchers were carried out in 3 weeks. After the applications, data were collected from the students with the same scale and semi-structured interview form. The researchers took part in the implementation process both as the practitioner trainers of the workshops and as the gatherers of the research data. The application of the data collection tools used in the research and the timeline of the processing process are presented in Table 1.

### Data Analysis

The obtained data were analyzed with the SPSS software program. At the beginning of the analysis of the quantitative data, the normality of the descriptive statistics of the total scores obtained from the scales was evaluated. Accordingly, the Shapiro-Wilks test was used to determine whether the data obtained from the scale of attitude towards the environment showed normal distribution. The Shapiro-Wilks test is used when the research group is below 30 (Can, 2014). This test was preferred because the study group of the current study consisted of 20 people. When the skewness coefficient of the data obtained from the scale was examined, it was seen that the distribution was normal and the significance value was  $p=.08$  ( $p<.05$ ) as a result of the Shapiro-Wilks test. Therefore, it was determined that it was appropriate to perform parametric tests in the study. The dependent group

t-test statistical procedure was used to determine whether there was a statistically significant difference between the pre-test and post-test total averages and the differences between the sub-dimensions. In the descriptive analysis of the data, frequency (f), arithmetic mean (M) standard deviation (Ss) and standard error (SD) were calculated. The level of significance in the study was determined as 0.05.

After the interviews were completed, the students were given a paper with questions (the form containing 5 questions about environmental awareness and workshop studies) and the data set was obtained from the answers they gave. The data obtained from the interview form were analyzed by content analysis. Content analysis is a qualitative data reduction and interpretation process for determining the basic consistency and meaning of qualitative data (Patton, 2014). The data obtained from the interview form were first transferred to the computer environment and documented. The data obtained were coded separately and gathered under similar categories. The frequencies and percentages of the created categories were presented in tables and interpreted within the scope of the findings. Examples of student views were included directly to support the findings. The students from whom the qualitative data were collected were coded as (M2), (F1). The letters in these encodings represent male (M) and female (F) students, the numbers in the encodings represent the student whose interview order is 2 and 1.

Validity and Reliability, the concepts of validity and reliability are important issues in terms of increasing the quality of the research and transferring the findings into practice (Gurgur, 2019). The following factors were taken into consideration in ensuring the validity and reliability of this research:

In order to ensure reliability in the coding process of the qualitative data, the reliability formula was calculated according to the coding percentage of Miles & Huberman's (1994) [Agreement/(Agreement + Disagreement)] reliability formula by reconstructing it with a field expert other than the researchers. By examining the consistency between the coders, the agreement rate was found to be 0.90. Calculation of the compliance rate above 70% can be said to be reliable in the analysis of the data (Miles & Huberman, 1994).

At various stages of the research (determining the workshop studies, creating the interview form, making the coding, etc.), the quality of the research was increased by seeking expert opinion. The researchers wrote, detailing the research process and describing the data in detail. In addition, in order to increase the credibility of the research, direct quotations were included without making any changes from the data obtained in line with the students' opinions.

**Table 1.** Data collection tools application and process calendar

Data collection tools/workshops	Week 1	Week 2	Week 3	Week 4	Week 5
Environmental attitude scale	✓				✓
Semi-structured interview form					✓
Small landscapes are growing		✓			
Thinking about living things with upcycling			✓		
Contributing to nature with seed balls				✓	

Before the research, the necessary permissions were obtained from the Bartın Provincial Directorate of National Education and from the Ethics Committee (E-23688910-050.01.04-2200045736) that the research was prepared in line with ethical principles. Before the research, students were informed about the purpose and scope of the research within the framework of ethical rules. Necessary permissions were obtained from students and parents of students. It was also stated that the data obtained would be used within the scope of a scientific research and would be used in a manner that would not reveal their identities.

## FINDINGS

When Table 2 is examined, there is a significant difference between the mean scores of the pretest ( $M=36.45$ ) and the posttest score ( $M=41.35$ ) in the total of the students' attitude towards the environment scale, in favor of the posttest scores [ $t_{19}=4.95, p<.05$ ]. When the pre-test and post-tests of the students were evaluated in terms of the sub-dimensions of the scale of attitude towards the environment, pollution [ $t_{19}=7.27, p<.05$ ], love of plants and nature [ $t_{19}=5.39, p<.05$ ], love for animals [ $t_{19}=5.31, p<.05$ ] sub-dimensions were found to be significantly different. Based on these findings, it was seen that the workshops held in the school garden positively affected the attitudes of the students towards the environment. Considering the subject of the workshops held in the school garden and the expressions in the scale, it can be inferred that the students are happy to give food to the stray animals, participate in the activities to beautify the environment, have flowers and green areas in the environment they live in, and bring them back to nature instead of collecting garbage.

“What do animals and plants mean to you?” The answers of the 4<sup>th</sup> grade students regarding the question are given in Table 3.

As a result of the analysis of the data obtained from the research, 4 different themes were reached, in which the students expressed the concepts of animals and plants as love, happiness, needing care and being useful. When the categories that emerged as a result of the data analysis are examined, it is seen that the most common concepts of animals and plants are love; It was determined that they had the least thoughts about being useful. This shows that the applications made generally affect the students' perceptions of the environment positively.

“What are your thoughts on the activities held in the school garden?” The answers of the 4<sup>th</sup> grade students regarding the question are given in Table 4.

As a result of the analysis of the data obtained from the research, 4 different themes were reached in which the students expressed their thoughts that the workshops held in the school garden were fun, informative, interesting and boring. When the categories that emerged as a result of the data analysis are examined, the workshops held in the school garden not only support the perception, motor skills and coordination of the students, but also increase their sensitivity, interest and responsibilities by spending productive and qualified time (handling the soil, helping living things, contributing to the ecological balance). In particular, the fact that the workshops provide a fun learning environment and the topics covered are remarkable gave students new information. Although the children of the students expressed a positive opinion about the practices, one student made a negative comment that the activities were “boring”. The reason for thinking in this way may be that he has not faced a similar practice in his classes before and has encountered a new situation.

“How did the activities in the school garden make you feel?” The answers of the 5<sup>th</sup> grade students regarding the question are given in Table 5.

As a result of the analysis of the data obtained from the research, 3 different themes were reached in which the students expressed their thoughts that the workshops held in the school garden made them feel positive, developed and spent productive time. When the categories that emerged as a result of the data analysis were examined, the students stated that the activities in general created positive feelings especially that they made them feel happy. In addition, it was observed that the students carried out their workshops by forming groups and helping each other. In this context, it is understood that while improving the creative thinking, cooperation and communication skills of the students, it also contributes to the development of the values of cooperation, love, respect, empathy and environmental sensitivity.

“What do you think the activities you do in the school garden bring you?” The answers of the 4<sup>th</sup> grade students regarding the question are given in Table 6.

As a result of the analysis of the data obtained from the research, 3 different themes were reached in which the students expressed their views on nature awareness, knowledge acquisition and success of the workshops held in the school garden. When the categories that emerged as a result of the data analysis were examined, the students generally stated that the applications contributed to them. When the data set is examined, it is understood that the courses included in the workshops are more meaningful and contribute to learning cognitively. In addition, it can be said that an environmental education with workshops plays an important role in

**Table 2.** Students' environmental sensitivity results before and after the workshops

	Sub-Dimensions	Pre-test			Post-test			SD	t	p
		n	M	Ss	n	M	Ss			
Attitude towards the environment	Pollution	20	14.30	1.17	20	16.15	0.93	19	7.27	0.05
	Plant and nature love	20	11.95	1.53	20	14.15	1.42	19	5.39	0.05
	Animal love	20	9.40	1.56	20	12.10	2.07	19	5.31	0.05
	Total	20	36.45	4.71	20	41.35	1.75	19	4.95	0.05

**Table 3.** Students' perceptions of animals and plants

Categories	Examples from student opinions
Love	Growing plants and feeding animals express love (M3). Love of animals and the beauties of plant species (F4).
Happiness	Loving animals and plants gives happiness (M5). I love animals very much. Especially cats. I have a cat and I am very happy. It relaxes me in growing plants (F3).
Their need for care	Since animals do not understand our language, we should be patient and compassionate towards innocent creatures (F4). They are also a living thing. For example, some animals may die of hunger or thirst. That's why we should help animals and plants (F6).
Their usefulness	Plants produce fragrances and oxygen for us (F11).

**Table 4.** Students' opinions on the activities in the school garden

Categories	Examples from student opinions
Enjoyable	I think the activity held in the school garden is fun (M2). I had so much fun. The last fertilizer we made was very good (F3).
Informative	Some activities were difficult. But they were good activities that I became aware of (F10) Different information was given. Teachers made the lesson enjoyable with games (M5).
Interesting	The activities were very different. It was interesting to me (M7). We haven't been doing much for a long time. The activities were very different, I liked it very much (F6).
Boring	The activities were very boring. I never did (M7).

**Table 5.** Opinions of the students regarding the feelings of the activities in the school garden

Categories	Examples from student opinions
Feeling positive	Our activities felt good (E4). I felt myself as an animal lover and a nature lover (P6).
Self-development	I was informed while doing the activities (E6). I learned different information. He improved me (K3).
Productive time	We had an effective time (P4).

learning the subjects better, realizing an effective learning process and developing environmental awareness.

“What can you suggest apart from the activities you carry out to increase the respect and love for nature?” The answers of the 4<sup>th</sup> grade students regarding the question are given in Table 7.

When Table 7 is examined, it is seen that students suggest planting trees, awareness-raising activities, maintenance

**Table 6.** Opinions of the students on what the activities they do in the schoolyard have gained them

Categories	Examples from student opinions
Nature consciousness	The activities I did raised awareness about nature (M6). When we made food bowls for cats, I felt that I was an animal lover (F6).
Getting information	I learned about how to protect nature for the future (F11). I learned to plant saplings (M1).
Be successful	I felt that I was successful because I applied what I learned.(M5) I saw that I was successful by doing the activities correctly. Thus, I felt proud (F3).

**Table 7.** Suggestions of students for increasing respect and love for nature

Categories	Examples from student opinions
Planting saplings	We can plant trees as we learned for nature (M3).  Starting with our family, we can raise awareness around us. We can prepare posters. We can call people to be sensitive (F11). Having books and magazines suitable for our age on the subject (M6).
Awareness activities	We can give water to the already planted trees and animals (F9).
Maintenance activities	I am farming. All people should be intertwined with nature as much as possible (M4). Cats can be fed in schools. It can feed the birds (M9).
Activities in touch with nature	Clubs that inform about planting saplings, planting flowers and plants should be opened (F5).
Club activities	We should collect the garbage in nature on certain days (F6).
Garbage collection	In order not to harm the environment we live in, we can apply recycling with various activities (M5).

activities, activities intertwined with nature, club activities, garbage collection, recycling activities. Students stated that apart from the activities carried out, especially the sapling planting activity was effective in changing their environmental awareness in a positive way. Therefore, it can be said that environmental activities increase students' awareness of the environment.

## DISCUSSION AND CONCLUSION

School gardens, which play an important role in environmental education, provide an opportunity for students to develop environmental awareness and gain environmental responsibility. In this context, the current research aims to reveal the effects of the workshops held in the school garden within the scope of environmental education on the environmental sensitivity of the students and the students' views on the process. In this respect, the research is important within

the framework of sustainable education. As a result of the analysis of the data obtained from the research, the following conclusions were reached.

It was determined that the posttest averages of the total scores of the students from the attitude scale towards the environment were higher than the pretest averages. It was determined that there were significant differences in the sub-dimensions of pollution, love of plants and nature, and love of animals. In this context, it can be said that the workshops held in the school garden increase the attitudes of the students towards the environment. When the findings of this study are compared with other studies in the literature (Çelikler et al., 2019; Khawaja, 2003; Peker & Ceylan, 2020; Yılmaz et al., 2004), it is seen that the results obtained are in the same direction. It also supports this result with the findings obtained from the qualitative data that the students' perceptions of animals and plants are positive. As a matter of fact, it is aimed to increase the love of plants and animals with the workshops carried out. Skelly & Bradly (2007) emphasized that teachers use school gardens in environmental education in order to develop positive attitudes towards the environment. In their study with primary school students, İbret et al. (2019) concluded that the use of alternative activities in environmental education is effective in students' awareness of the natural environment. In addition, Goodwin (2016) emphasizes that lower level students should focus on increasing their relationship with living things and establishing a bond with them.

The students stated that the workshops held in the school garden were interesting and provided a learning environment that enabled learning while having fun. In addition, the students stated that they felt positive, developed and spent productive time while implementing the activities. Wilson (1996) states that children who are intertwined with nature and receive environmental education experience improvements in their feelings of curiosity, interest, admiration, and love for the natural environment. Keskin (2017) emphasizes that workshop practices are effective in learning by having fun and using the information they learn in daily life. Therefore, the results obtained in the present study are supported by the results of the studies in the literature. In this context, it can be said that when workshops are carried out effectively, they benefit the development of students in cognitive, affective and behavioral dimensions. Another approach that supports these results is that school environmental education programs can have a significant impact not only on students but also on local communities (Ballantyne et al., 2001).

The students stated that the activities held in the school garden contributed to creating awareness of nature, obtaining information about the environment and living things, and making them feel the sense of achievement. They also suggested planting the most saplings to increase the respect and love for nature. There are research findings supporting these statements in the literature. The characteristics of individuals who know the environment well, analyze the situation of the environment and develop solutions are among the characteristics of the environmentally literate individual (Disinger & Roth, 1992). As a matter of fact, Demir (2021) states that the activities being different and fun can create positive emotions

in students. This result was obtained by Hammarsten et al. (2019), who carried out forest garden activities aimed at improving the ecological literacy of students. It bears a similarity with his study. It is stated that the activities they use in their study generate positive emotions in children. Johnson (2012) states that the practices carried out by teachers in school gardens are effective in helping students learn the importance of plants as nutrients and their relationship with biodiversity. Blair (2009) found that the reason why trees are defined as values in adulthood is the activities done in the schoolyard in childhood. İbret et al. (2019) stated in their study that photo analysis, analytic story, song, puzzle and tree planting activities are also effective in gaining the value of sensitivity to the natural environment. Therefore, it is important to provide environmental education at an early age and at all educational levels in order to create societies with high environmental awareness (Çelikler et al., 2019). In the researches, it is stated that the practices in which students are intertwined with nature increase environmental literacy and improve their perspectives on environmental problems (Ha et al., 2021).

As a result, it is seen that the workshops applied in the school garden increase the environmental awareness of the 4<sup>th</sup> grade students and the process has a positive effect on them. According to this result, it can be said that when appropriate learning environments are created, students' views on the environment will affect positively. Considering the structures of the schools, a separate study can be conducted that includes different workshops and out-of-school environmental education activities. In addition, a similar study can be carried out with larger study groups at different ages and education levels on the subject, keeping the process longer. Activities that encourage positive attitudes towards the environment can be designed and implemented in schools.

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