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Sibel Açışlı Çelik
Artvin Çoruh University, Turkey

İsmet Ergin
Education Manager and Teacher Training School, Turkey

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Evaluation of the "Artvin gets Color with Science and Robotics 2" Project

Sibel Açışlı Çelik, İsmet Ergin

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Abstract

This research was supported within the scope of TÜBİTAK-4004 Nature Education and Science Schools Program with Project number 121B899. In this research, it is aimed to evaluate the "Artvin gets Color with Science and Robotics 2" project, which was carried out with 30 secondary school 6th and 7th grade students between 2-8 August 2021 within the scope of TÜBİTAK 4004– Nature Education and Science Schools Projects. Science, robotics, artificial intelligence, astronomy and nature education activities were carried out in the project that was aimed to be evaluated. In the research, the end-of-day activity evaluation form, reflective pictures and semi-structured interview form were used to evaluate the project and the activities carried out in the project by the students who participated in the project as data collection tools. The research was carried out in the qualitative research method and the students' diaries, reflective pictures and the end of the project views were analyzed by content analysis. Almost all of the project participants stated that they found most of the activities instructive and entertaining, they enjoyed all the activities, they liked the environment in which the project was held, they would like to participate in the project again and would recommend the project to their friends. With this project, it is seen that students' interest in science, nature and robotics increased and they realized how important it is to protect nature. In addition, the majority of the students stated that they were interested in robotics. The students who participated in the project stated that they learned more permanently because they did all the activities by doing it themselves and they found the project useful.

Introduction

The 4004-Nature Education and Science Schools program, funded by the Scientific and Technological Research Council of Turkey (TUBITAK), aims to share knowledge and encourages participants' willingness to research and learn as much as possible through interactive activities (TÜBİTAK, 2021). The idea of organizing the scientific activities in these projects in such a way that students can learn by 'doing-experiencing' and putting active learning at the center has emerged in this context (Akay, 2013). These projects offer significant opportunities in terms of conveying information to society in an understandable manner by supporting it with interactive applications and visualizing it as much as possible, demonstrating how scientific facts and concepts in various fields such as science, social, natural, and astronomical sciences are related to daily life, ensuring that

scientific occupations can be enjoyable and fun, and showing the integration of nature-friendly individuals into society is accountable (Avcı et al., 2015). Raise nature-friendly individuals with the education given at an early age is one of the steps to be taken to protect nature and keep a livable world to future generations, to protect plant and animal species living in nature, and to prevent emerging environmental problems and reduce their impacts (Mansuroğlu et al., 2021).

The 4004 - Nature Education and Science Schools program, which was initiated in 2007 within the framework of Science and Society Support Programs of TÜBİTAK, opens a call once a year and supports science schools and camps. Of the 10,200 individuals from nine different target groups participating in the 4004 - Nature Education and Science Schools projects supported between 2017 and 2019, 51% were secondary school students (*TÜBİTAK*, 2019). When the studies on the effects of the projects carried out with secondary school students within the scope of TÜBİTAK 4004-Nature Education and Science Schools Program are analyzed, the followings were stated: Participation of secondary school students in the 'I am Doing and Learning Summer Science School' project helped them develop positive attitudes towards science and scientific knowledge, as they learned by 'doing-experiencing' and enjoying in active learning environments (Akay, 2013); participation of primary school students in the summer camp entitled 'Examination of the Effects of a Summer Science Camp Based on Active Learning on Students' led to positive changes in their perspectives on science, scientific knowledge and the scientific environment (Tekbıyık et al., 2013); participation of primary school students in the project entitled 'Assessment of a Science Camp Implementation: Fun Discovery of the Mysterious World' increased their attitudes towards learning and science and technology lessons (Birinci Konur et al., 2011); the participants of the project entitled '6thand 7th-Grade Students' Opinions on Science Activities: The Little Scientists are in Discovery Project' stated that the project activities were more fun and useful than the activities they did at school, and they gained new information (Yıldırım et al., 2016); the students participated in the project entitled 'Evaluation of the Science - Mathematics Themed Science Camp for 8th Grade Students: Let us Meet Each other; Let us Make Science and Mathematics Fun!' increased the number of concepts produced in mind maps for the concept of science (Abdioğlu et al., 2020).

There are several studies in the literature supporting that such projects contribute to students' positive attitudes towards science (Acisli & Kumandaş Öztürk, 2019; Akay, 2013; Birinci Konur et al., 2011; Gibson & Chase, 2002; Tatlı & Eroğlu, 2021; Tekbıyık et al., 2013), increase their interest in science and technology (Vickers et al., 1998), elevate significantly their sensitivity to the environment and environmental pollution, and environmental awareness (Feyzioğlu et al., 2012), prove that students are happy to learn by having fun (Avcı et al., 2015; Buluş Kırıkkaya et al., 2011). All the results acquired from these studies, the positive achievements of these projects, and performing projects within the scope of TÜBİTAK 4004 - Nature Education and Science Schools revealed significantly that proposing new studies are necessary for their usefulness to the society (Avcı et al., 2015; Sezer Evcan et al., 2020). The studies using the results of these projects will become a guide to the projects to be carried out in the future. In addition, when taking into account the results of these studies, we aimed in the projects to enable students to follow current scientific technologies by nature education, robotic coding, science applications, artificial intelligence, sports, astronomy, and renewable energy resources activities via activating their sense of curiosity by the process and transferring their knowledge and experiences to new

disciplines through recognizing the environment in which they live, the plant and other living creatures, and developing a conscious perspective towards protecting nature and raising awareness on sustainable nature.

Having such studies in the literature evaluating the results of the performed projects within the scope of TÜBİTAK 4004 - Nature Education and Science Schools Program have significant importance in terms of guiding the development and regulation of other projects to be planned in the future (Sezer Evcan et al., 2020; Tekbıyık et al., 2013). In this project, we aimed to enable students to follow today's scientific technologies such as nature education, robotic coding, science, and astronomy activities via activating their sense of curiosity by the process and transferring their knowledge and experiences to new disciplines through recognizing the environment in which they live, the plant and other living creatures, and developing a conscious perspective towards protecting nature and raising awareness on a sustainable environment.

In this context, the project, in which the research was carried out, was supported with project number 121B899 within the scope of 4004-Nature Education and Science Schools, a sub-program of TÜBİTAK Science and Society Projects; the science, robotics, astronomy, and nature activities were held within the scope of the "Artvin gets Color with Science and Robotics 2" project, which was held by 30 secondary school 6th and 7th-grade students in August 2021, and determination of opinions of the participants about the project was aimed. In this direction, we sought answers to the following questions:

1) What are the opinions of the 6thand 7th-grade secondary school students about the activities performed in the project entitled "Artvin gets Color with Science and Robotics 2"
2) How do the secondary school 6th and 7th-grade students reflect the project entitled "Artvin gets Color with Science and Robotics 2on their t-shirts?

Method

In this study, to get the students' responses about the activities performed within the scope of the project, the end-of-day activity evaluation form, reflective pictures, and semi-structured interview forms were used for assessments. During the project, on a daily basis, the students filled out the end-of-day activity evaluation forms assessing the activities of that day. In these end-of-day activity evaluation forms, the students were asked to answer the following questions:

"What did you learn in this activity?",

"What did you do well?",

"Which subject did you have difficulty with? and Why?",

"Where did you need help?",

"What were the things that were supposed to happen in this activity?', and

"What were the things that you did not like about this activity?"

In addition, the following questions were also asked in the end-of-day activity evaluation form, by which they were answered "Yes", "No" and "Partly": "I participated in the event voluntarily", "I was attentive to finish the event on time", "I contributed to my group mates while preparing the draft of the product in the event", "I shared my ideas with my friends", and "I was happy to do this kind of activity".

Data Collection Tools

The end-of-day activity evaluation form, reflective pictures, and semi-structured interview forms completed by participating students were utilized as data collection tools in the research to evaluate the project and the activities performed in the project. The End-of-Day Activity Evaluation Form: The daily activities were evaluated at the end of each day during the camp to improve the project functioning and learning of the students.

Reflective Pictures: In the project, to enable students to express themselves in different ways other than measurement tools, students were asked to reflect their achievements on their t-shirts during the project, their views, feelings, and opinions about the project entitled 'The Project Through the Eyes of My T-shirt' on the last day, and the T-shirts were photographed at the end of the activity.

Interview Form: Researchers conducted semi-structured interviews with the students at the end of the project, and the students were asked to share their feelings and opinions about the project.

Analysis of Data

The End-of-Day Activity Evaluation Form: During the project, the results of the end-of-day activity evaluation forms, which assessed the activities daily, were described as frequency.

Reflective Pictures: After the 'Project Through the Eyes of My T-shirt' event, the pictures on the T-shirts, which were photographed, were analyzed and categorized by two faculty members who were experts in their field. Experts generated categories by coding according to symbols, taking into account the activity associated with the symbol representing the activities on the t-shirts. Reliability of data analysis on pictures was calculated using the following formula [Reliability = Agreement / (Agreement + Disagreement) x 100]. The reliability for this study was calculated as 0.92

Study Group

The project entitled "Artvin gets Color with Science and Robotics 2"was held in Artvin on 2-8 August 2021. During the 7-day project period, activities were held throughout the day and in the evening, and the participants and trainers were hosted in the same hotel. During the project, activities such as robotics, astronomy, science, artificial intelligence, and sports activities and as well as nature trips were organized. Within the scope of the 2020/2021 call period, which was launched in the 15th year of the TÜBİTAK and supported by 4004-Nature Education and Science Schools Support Program, 30 different activities were performed during the camp, in which the students were directly involved and learned by doing and experiencing. The study group of the research consists of 30 6th and 7th-grade of secondary school students who participated in the "Artvin gets Color with Science and Robotics 2" project. 14 of the students were 6thgrade and 16 were 7thgrade, and 16 of the students were girls and 14 were boys.

Results

A total of 30 6th and 7th-grade secondary school students, 16 girls and 14 boys, participated in the research. The findings regarding the feelings and opinions of the students participating in the "Artvin gets Color with Science and Robotics 2" project and the activities organized in the project are given in the tables below. The findings regarding the data obtained from the end-of-day activity evaluation forms in the study are given in Table 1.

Table 1. The Evaluation of Student Diaries

Activities		Voluntary participation in the activity	Paying attention to complete the activity on time	Contribution to the group	Sharing the opinions with the group	Satisfaction from the activity
Let's Make Our Own Solar System	Yes	30	26	28	29	30
	Partially	-	3	2	1	-
	No	-	1	-	-	-
I Generate My Own Mors Alphabet	Yes	29	30	29	28	30
	Partially	1	-	1	2	-
	No	-	-	-	-	-
Acquaintance with Robotic Systems	Yes	30	30	28	29	30
	Partially	-	-	2	1	-
	No	-	-	-	-	-
Plant Hunt	Yes	30	30	30	28	28
	Partially	-	-	-	2	-
	No	-	-	-	-	2
Can You Learn on Computers?	Yes	29	28	28	30	30
	Partially	1	2	2	-	-
	No	-	-	-	-	-
I Do Cleaning with My Robot Arm	Yes	30	29	30	30	30
	Partially	-	1	-	-	-
	No	-	-	-	-	-
The Adventure of Paper Recycling	Yes	29	30	30	28	30
	Partially	1	-	-	2	-
	No	-	-	-	-	-
Let us Clean Our Water	Yes	30	29	30	30	30
	Partially	-	1	-	-	-
	No	-	-	-	-	-

Basic First Aid	Yes	30	30	30	30	30
	Partially	-	-	-	-	-
	No	-	-	-	-	-
What is in the Sky?	Yes	30	30	29	30	30
	Partially	-	-	1	-	-
	No	-	-	-	-	-
I Generate Electricity with Wind Tribune	Yes	30	29	30	30	30
	Partially	-	1	-	-	-
	No	-	-	-	-	-
Journey to Mars	Yes	30	29	29	30	30
	Partially	-	1	1	-	-
	No	-	-	-	-	-
Whose Solar Car is Faster?	Yes	30	29	29	30	30
	Partially	-	1	1	-	-
	No	-	-	-	-	-
The Robot Following a Line	Yes	30	30	30	30	30
	Partially	-	-	-	-	-
	No	-	-	-	-	-
Break Dance with My Robot	Yes	30	30	30	30	30
	Partially	-	-	-	-	-
	No	-	-	-	-	-

When Table 1 is analyzed, almost all students in the project indicated that they voluntarily engaged in the organized activities in the project; and they were attentive to complete the activities on time. Although the students were generally seemed to be satisfied with the activities, only two students expressed that they were dissatisfied with the plant hunting activity. In addition, the proportion of students contributing to the group and sharing their opinions by the group decreased relatively in some activities. On the last day of the project, interviews were conducted with students to assess their overall opinions regarding the project itself and the project activities, and the analyses of the results were given in Table 2.

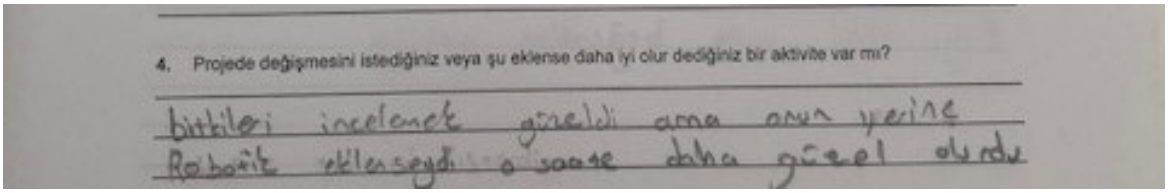
Table 2. Students' Opinions on the Project and the Project Activities

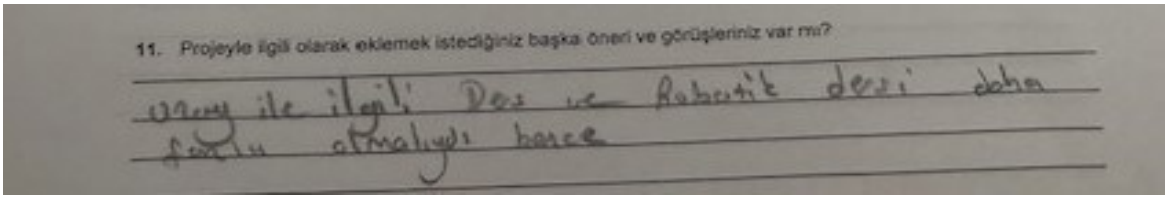
Dimension of Activities		f
Educated Activities	Astronomy Training with Stellarium	7
	Journey to Mars	10
	Basic First Aid	8

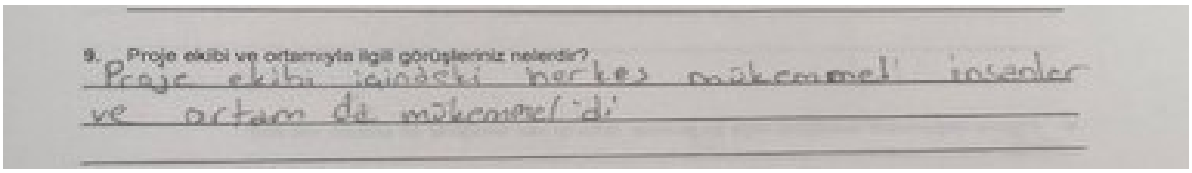
		Acquaintance with Robotic Systems	18
		The Robot Following a Line	14
		Mystic World of Germs	5
		Robot-Car Races	16
		What is in the Sky?	1
Fun Activities		Journey to Mars	8
		Break Dance with My Robot	13
		What is in the Sky?	7
		I Generate My Own Mors Alphabet	8
		I Do Cleaning with My Robot Arm	5
		Horon	4
		Robot-Car Races	12
		Whose Solar Car is Faster?	5
		I Generate Electricity with Wind Tribune	7
		The Project Through the Eyes of My T-shirt	6
		The Adventure of Paper Recycling	4
		Let us Clean Our Water	3
Not Enjoyed, Uneducated Activities		I enjoyed all activities	28
		Plant Hunt	2
Activities to add		Everything was great	27
		Robotic activities may be increased	7
		Space related activities may be increased	3
		Origami	1
		Wooden Workshop	1
Opinions about the project environment		Everything was great	23
		Everything was great, particularly the log houses we stayed and the places where activities were performed	7
Recommendations and Sustainability of the Project	Willingness to rejoin this project	Yes	30
		No	-
	Recommending the project to friends	Yes	30
		No	-
	Suggestions	It might have been longer than a week.	8

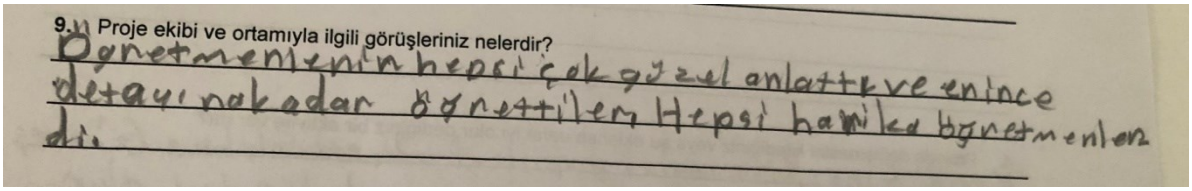
Table 2 shows that almost all project participants indicated that they found the majority of the activities instructive and entertaining, that they enjoyed all the activities, that they liked the environment in which the project was held, that they would like to participate in the project again, and that they would recommend the project to their friends. In addition, among the project participants, seven students suggested increasing the

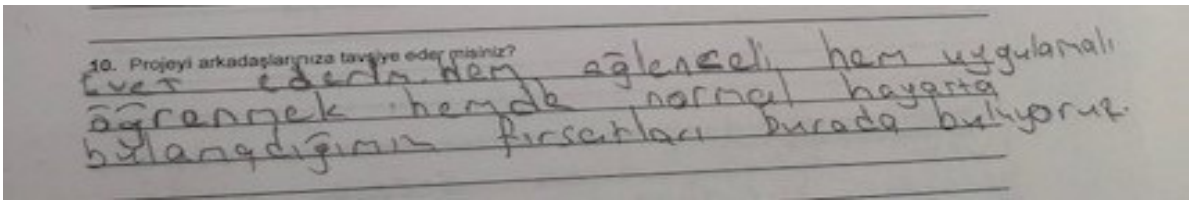
number of robotic activities, three students advised the number of space-related activities, and two students recommended adding origami and wood workshop activities to the project. Some students expressed a desire for the project to last longer than one week.











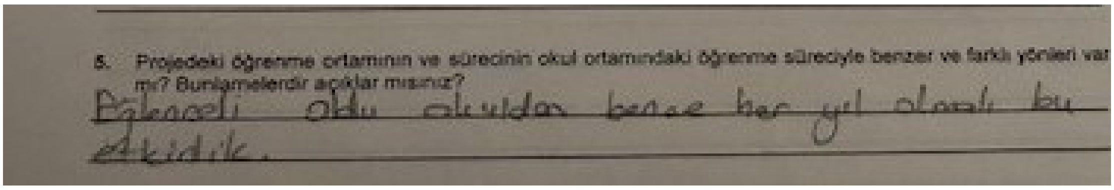
The opinions of the project participants about the similar and different aspects between the learning process in the project and learning process at the school are given in Table 3.

Table 3. Opinions of Students on the Learning Process

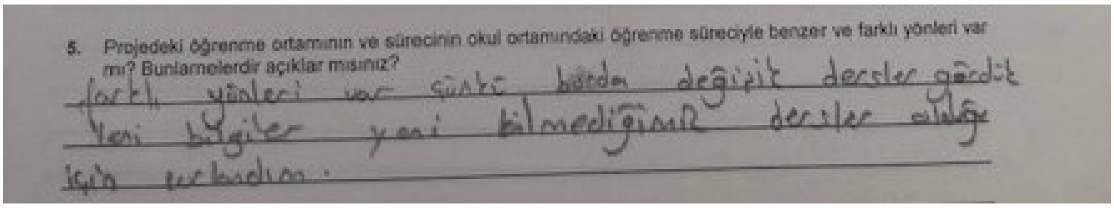
		f
Different aspects between the learning process in the project and learning process at the school	We learned more in a short period of time	22
	We learned by having fun	27
	Unlike school, we always learned by doing ourselves and having fun	26

	We performed group study	13
	We learned with living in nature	7
	We learned several new information	9
	We learned robotics with sets not available in schools	5
Similar aspects between the learning process in the project and learning process at the school	Being disciplined as in school and doing everything on time were similar aspects	1

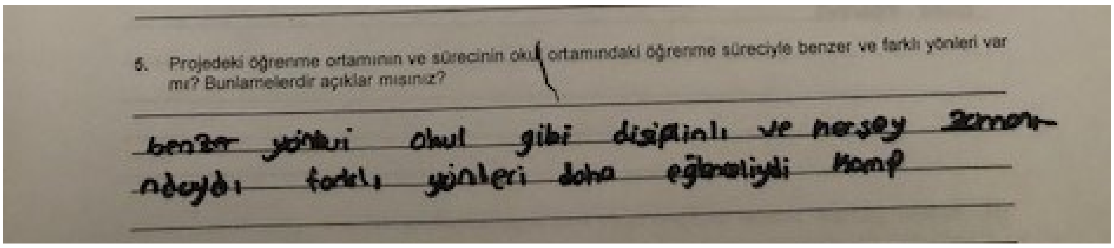
According to Table 3, when the project participants' opinions were analyzed about the different aspects between the learning process in the project and learning process at the school, students indicated that they learned more by doing the performed activities themselves in the project and had fun with nature, and they learned a lot in a short time with robotic sets that were not available in their schools since they did group work. However, some students stated that the project learning environment was as disciplined as in school, and all activities were carried out in accordance with the planned program. Some examples of the students' opinions on the similarities and differences between the learning processes in the project and learning process at the school are as follows:


5. Projedeki öğrenme ortamının ve sürecinin okul ortamındaki öğrenme süreciyle benzer ve farklı yönleri var mı? Bunlarnelerdir açıklar mısınız?

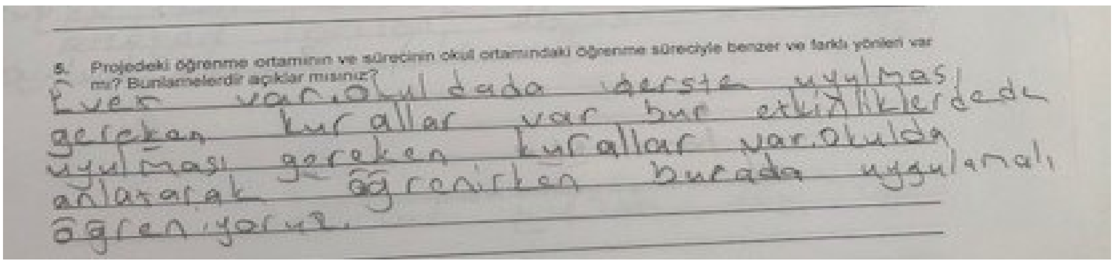
Eğlenceli oldu okuldan benzer her yer olarak bu


5. Projedeki öğrenme ortamının ve sürecinin okul ortamındaki öğrenme süreciyle benzer ve farklı yönleri var mı? Bunlarnelerdir açıklar mısınız?

farklı yönleri var çünkü burada değişik dersler gördük yeni bilgiler yani bilmediğimiz dersler olduğu için sevindim.


5. Projedeki öğrenme ortamının ve sürecinin okul ortamındaki öğrenme süreciyle benzer ve farklı yönleri var mı? Bunlarnelerdir açıklar mısınız?

benzer yönleri okul gibi disiplinli ve herşey zamanındaydı farklı yönleri daha eğlenceliydi kamp


5. Projedeki öğrenme ortamının ve sürecinin okul ortamındaki öğrenme süreciyle benzer ve farklı yönleri var mı? Bunlarnelerdir açıklar mısınız?

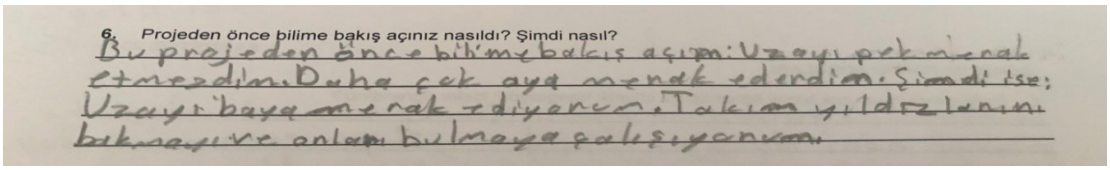
Evet var. Okulda da derste uyulması gereken kurallar var bu etkinliklerde de uyulması gereken kurallar var. Okulda anlatarak öğrenirken burada uygulamalı öğreniyoruz.

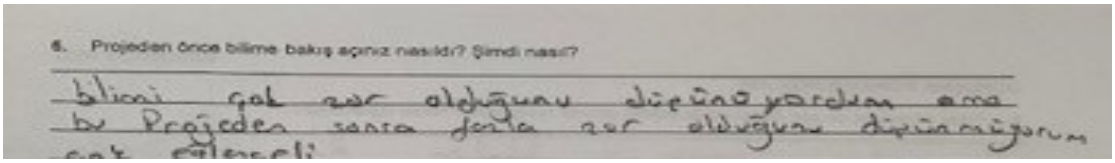
The opinions of the project participants about science, nature and robotics in the research are given in Table 4.

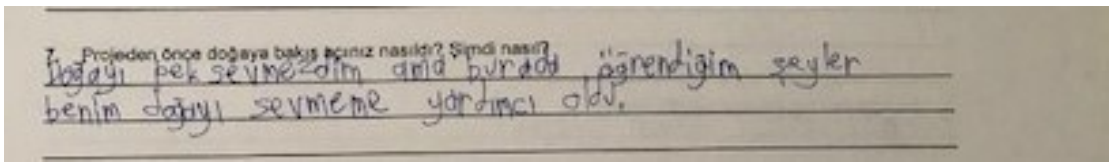
Table 4. Opinions of Students about Science, Nature and Robotic Perspectives

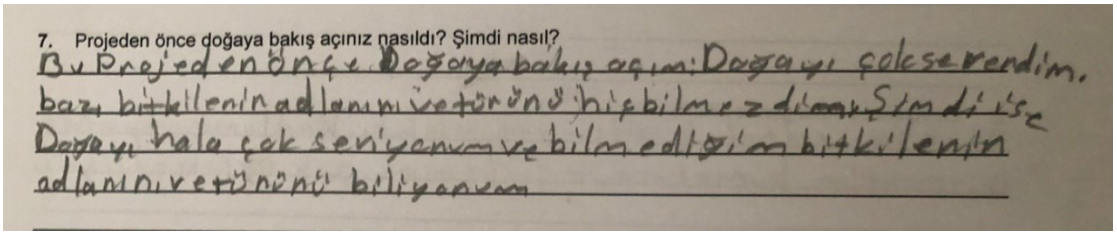
		f
The contribution of the project to the perspective of science	My interest in science increased	30
The contribution of the project to the perspective of nature	My interest in nature increased	13
	I learned how important it is to protect nature	17
The contribution of the project to the perspective of robotics	I developed an interest in robotics.	25
	Robotics activities are so much fun	18
	My interest in robotics increased	5

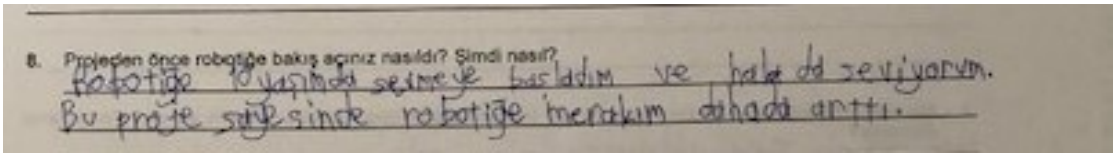
When Table 4 is examined, it was observed that the students participating in the project increased their interest in science, nature, and robotics and realized how important it was to protect nature. In addition, more than half of the project participants stated that robotic activities were fun and fluent, they did not understand how the time passed, and they developed more interest in robotics. Examples of students' opinions on science, nature and robotics are as follows:

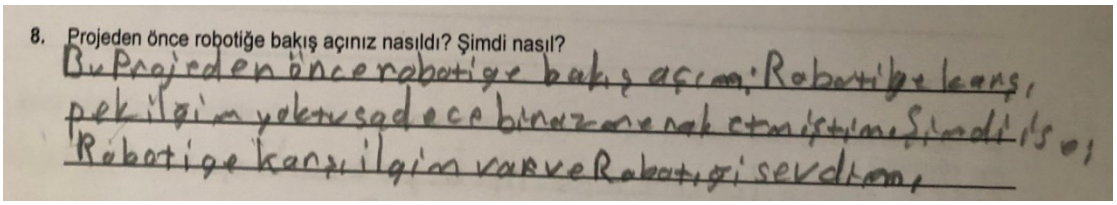












The symbols and frequencies used by the students in the pictures on their t-shirts, in which they evaluated the project, are given in Table 5. The analysis shows that when the pictures on t-shirts by the 30 secondary school students participating in the project were considered and taking into account the contents of the activities within the scope of the project, 145 drawn symbols as a result of the evaluations of the experts and in consideration the activity they evoked, the symbols were categorized under six activity groups such as robotics, astronomy, nature, science, first aid, and social events. In this context, the symbol frequencies determined under the activity categories were as follows: for the robotic category, robot (f=28), morse code (f=5), and computer connected to the robot (f=3); for the astronomy category, solar system (planet) (f=25), telescope (f=7) and star cluster (f=3); for the nature category, tree (f=16), flower (f=7), butterfly (f=4), baby bear (f=2), house (f=2), and tent (f=1); for the science category, wind rose (f=11), solar powered car (f=8), recycling (f=7), and cleaning the polluted water (f=4); for the first aid activity category, tree (f=16), wind rose (f=11), solar powered car (f=8), recycling (f=7), flower (f=7), telescope (f=7), heart radiography (f= 6) and first aid (f=1); for the social event category, ball (f=3), and horon (f=1). When these findings are examined, it was determined that there were drawn symbols of 37 robotic activities, 35 astronomy activities, 32 nature activities, 30 science activities, seven first aid activities, and four social events.

The symbols and frequencies used by the students in the pictures on their t-shirts, in which they evaluated the project, are given in Table 5.

Table 5.Symbols used by Students in Pictures

Category of Activities	Symbol used	f	Σf
Robotic activities	Robot	28	37
	Mors alphabet	5	
	Rocket (going to mars)	1	
	Computer linked with Robot	3	
Astronomy activities	Solar System (planet)	25	35
	Star cluster	3	
	Telescope	7	
Nature activities	Flower	7	32

	Tree	16	
	Butterfly	4	
	Baby bear	2	
	Tent	1	
	House	2	
Science activities	Wind rose	11	30
	Recycling	7	
	Cleaning the polluted water	4	
	Solar Powered Car	8	
First aid activities	Hearth radiograph	6	7
	First aid	1	
Social activities	Horon	1	4
	Top	3	
		Total	145

Analysis of Table 5 shows that when the pictures on t-shirts by the 30 secondary school students participating in the project were considered and taking into account the contents of the activities within the scope of the project, 145 drawn symbols as a result of the evaluations of the experts and in consideration the activity they evoked, the symbols were categorized under six activity groups such as robotics, astronomy, nature, science, first aid, and social events. In this context, the symbol frequencies determined under the activity categories were as follows: for the robotic category, robot (f=28), morse code (f=5), and computer connected to the robot (f=3); for the astronomy category, solar system (planet) (f=25), telescope (f=7) and star cluster (f=3); for the nature category, tree (f=16), flower (f=7), butterfly (f=4), baby bear (f=2), house (f=2), and tent (f=1); for the science category, wind rose (f=11), solar powered car (f=8), recycling (f=7), and cleaning the polluted water (f=4); for the first aid activity category, tree (f=16), wind rose (f=11), solar powered car (f=8), recycling (f=7), flower (f=7), telescope (f=7), heart radiography (f= 6) and first aid (f=1); for the social event category, ball (f=3), and horon (f=1). When these findings are examined, it was determined that there were drawn symbols of 37 robotic activities, 35 astronomy activities, 32 nature activities, 30 science activities, seven first aid activities, and four social events.

In this context, when the drawings of the students regarding to the project are examined in general, the reflections of the activities were observed in the project. In addition, when the symbols are analyzed, it was determined that the students mostly drew the following figures in given frequencies, respectively: robot (f=28), solar system (planet) (f=25), tree (f=16), wind rose (f=11), solar powered car (f=8), recycling (f=7), flower (f=7), telescope (f=7), heart radiography (f=6), morse code (f=5), butterfly (f=4), cleaning the polluted water (f =4), computer connected to the robot (f=3), ball (f=3), star cluster (f=3), baby bear (f=2), house (f=2), horon (f=1), first aid (f=1), tent (f=1), and rocket (going to mars) (f=1).

Examples of t-shirts on which students reflect the project are presented below.

Figure 1. T-shirt Example 1

Figure 2. T-shirt Example 2

Figure 3. T-shirt Example 3

Figure 4. T-shirt Example 4

Discussion

In this research, the opinions of the students participating in the project numbered 121B899 and entitled "Artvin gets Color with Science and Robotics 2", which was granted within the scope of the 2020/2021 call period and launched in terms of the 15th year of the TÜBİTAK 4004-Nature Education and Science Schools Support Program, were evaluated at the end of the project, and the effects of the project on them were analyzed in detail. In the research, the project participants indicated that they found most of the performed activities instructive and entertaining, they enjoyed all the activities, they liked the environment in which the project was held, and they would like to participate in the project again and would recommend the project to their friends. With this project, it was observed that students' attention to science, nature, and robotics increased, and they developed positive attitudes and realized how important it is to protect nature.

On the last day of the project, students participating in the "Artvin gets Color with Science and Robotics 2"project were asked, 'What is the contribution of the project to the perspective towards robotics?' to assess their opinions about the project and project activities. The answers given by the participant students to this question were 'I gained an interest in robotics', and 'You do not understand how the robotic activities are fun and the lesson is very fluid.' The answers by the participating students to the question 'What are the similarities and differences between the learning process in the project and the learning process at the school?' were as follows: 'Unlike school, we always learned by doing and having fun; however, we learn at school just by listening', and 'Compared to school, it was fun in here, I think these activities should be every year. The answer given to the question of 'What is the contribution of the project to the perspective of nature', by the participating students was 'I learned how important it is to protect nature'. Therefore, this proved that the current project has already achieved its goals.

This result supports the studies in the literature indicating that science schools contribute to the development of positive attitudes towards science (Akay, 2013; Gibson & Chase, 2002; Su, 2019; Tatlı & Eroğlu, 2021; Tekbıyık et al., 2013); expressing that science schools increase students interest in science and technology

Vickers, Ching, & Dean, (1998), contributing to the development of positive attitudes towards science and technology classes Birinci Konur et al., (2011), increasing their awareness on living species and increasing their sensitivity to the environment and environmental pollution Feyzioğlu et al., (2012). After the interview with the students who participated in the "Artvin gets Color with Science and Robotics 2"project, it is thought that their interest in the fields of science, robotics, and astronomy, the knowledge they gained with the project, and the positive attitude they gained will be effective in choosing their career in these fields in the future. Similarly, in their study evaluation for the TÜBİTAK 4004 - science camp project, Tatlı & Eroğlu, (2021) reported that students' positive experiences gained in science and technology activities would be effective in their career choices and would contribute to the country's achievement of the planned goals in the fields of science and technology.

In the research, a significant portion of the project participants expressed that robotic activities were fun and fluent, they did not understand how time passed, and they were interested in robotics. The students participating in the project stated that they learned more permanently by doing, experiencing and having fun with all the activities themselves and they found the project beneficial. Similarly, Buluş Kırıkkaya et al., (2011) and Marulcu et al., (2014) also reported in their studies that students learn scientific facts by having fun.

Almost all of the project participants in the research stated that they participated in the project activities voluntarily, were generally satisfied with the activities, and were attentive to completing the activities on time. In addition, some of the project participants expressed that they wanted to increase the number of robotic and space-related activities in the project and add origami and wood workshop activities to the project. Therefore, considering these issues in the future-planned projects can be beneficial in terms of developments and arrangements to be made within the project scope.

In the study, when the drawings on the t-shirts of the students in which they evaluated the project were analyzed, it was discovered that project activities have a substantial impact on students. The fact that the project activities are practical and the students learn while having fun contributed actively to the actualization of the effect desired from the project at a high level. At the same time, this demonstrates that the participants' activities in the project left an impression on participating students, and they enjoyed the project. Similarly, Avcı et al., (2015) after their projects supported by TÜBİTAK 4004-Nature Education and Science Schools, examined the writings and pictures drawn by secondary school students and stated that the activities in the project had a positive effect on the students and boosted their willingness to learn.

Conclusion

All these results approached by the data acquired from the project entitled "Artvin gets Color with Science and Robotics 2" demonstrated that the TÜBİTAK 4004-Nature Education and Science Schools program achieved its objectives of disseminating and popularizing information through interactive activities and encouraging participants' willingness to research and learn. Based on all these findings, this project, which was performed by a limited number of study groups to raise awareness among students about science, robotics, astronomy, and the

environment, is recommended to apply to students of various grade levels, with consideration given to its suitability for larger audiences with similar nature and student level. It is of great importance to disseminate such similar projects so that students in schools with limited means can receive education on subjects such as science, astronomy, robotics and coding. Furthermore, educators working in public and private institutions are recommended to make additions and revisions on the activities made in the project and then perform them with their students at school at their convenience.

Notes

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Author Information

Sibel Açışlı Çelik
https://orcid.org/0000-0002-1144-2563
Artvin Çoruh University
Artvin
Turkey
Contact e-mail: *sacisli@artvin.edu.tr*

İsmet Ergin
https://orcid.org/0000-0001-6501-0152
Education Manager and Teacher Training School
Çankaya, Ankara
Turkey