



Benefits of an Ecology-Based Nature Education Program: An Evaluation on the Basis of Participants' Experiences *

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Abstract

In the current study, it is aimed to investigate the opinions of the social studies teachers participating in the project on the activities conducted within the context of an ecology-based nature education program and thus to determine the extent to which the project achieved its objectives. To this end, the case study design, one of the qualitative research methods was used in the study. The participants of the study are social studies teachers selected by using the criterion sampling method and participating in the project on a volunteer basis. The data of the study were collected through the pre-interview and post-interview forms qualitatively developed by the researchers and participant diaries. Moreover, in order to elicit more detailed information about environmental awareness and sensitivity, two quantitative scales were used as pre- and post-tests to measure the participants' motivation for taking part in activities and basic views of environment and environmental problems. As a result of the applied education program, the participants' motivation to take part in activities to be conducted in natural environment and their ecocentric mindset was strengthened. In addition, the participants think that at the end of the program, they better understood human-environment interaction and developed their awareness of sustainable environment. In addition, the participants stated that they received the information from its source and in an interdisciplinary manner, developed different perspectives, and developed scientific, social and entrepreneurial skills. Finally, it was determined that the participants thought that they gained experience and motivation in order to use the knowledge and skills they had gained through the activities within the context of the program in formal and informal educational settings.

Keywords

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Introduction

Educational activities are carried out most intensively in schools through teachers. According to Tonga (2017), students gain various knowledge, skills and values in order to meet their life needs with the lessons delivered by teachers. With social studies, which is one of the leading school subjects that prepare students for social life, students acquire knowledge from many areas related to “people and society” because social studies have a multidisciplinary structure that includes many disciplines.

The programs carried out in line with a structure determined by curriculums serve as a guide for teachers. It is of great importance for teachers to constantly renew themselves and to attain knowledge about their field by observing and actively participating because teachers convey not only their knowledge but also their experiences to their students. We can say that teachers gain experience during their undergraduate education, in-service training and sometimes with different activities and daily lives. Undoubtedly, teachers gain new experiences with the scientific activities and meetings they attend and transfer these to their students in one way or another. Undoubtedly, one of these activities is projects for teachers. Projects have different contents according to the subject areas of teachers and are carried out in environments that provide rich content. When considered in terms of providing rich content in a project to be carried out with social studies teachers, Afyonkarahisar is an ideal city in terms of natural and cultural attractions.

The first natural attraction that comes to mind in Afyonkarahisar is thermal resources and thermal tourism that develops accordingly. In addition, the plateaus, fairy chimneys, streams, lakes and caves in the province also constitute other natural attractions (Kervankıran, 2011; Özdemir & Kervankıran, 2012). The same diversity can also be seen in cultural attractions. The first of these is the Phrygian Valley. The Phrygian valley (Phrygian Culture and Thermal Tourism Development Zone) is a unique cultural heritage area formed by the addition of Roman and Byzantine works to the cultural values built by the Phrygian Civilization in the region where Afyonkarahisar-Eskişehir-Kütahya provinces intersect. There are many cultural values in the area such as rock settlements, castles, churches, chapels, monumental rocks, and rock tombs. Other cultural attractions in Afyonkarahisar include the Commander-in-Chief Historical National Park, Afyonkarahisar Historical Houses, Karahisar Castle, Mevlevi Lodges, mosques, museums, caravanserais, festivals, handicrafts and gastronomic elements (Bozdağ, 2009; İlgar, 2001a, 2001b; İlgar & Karazeybek, 2001; Kargıoğlu, Cenkci, & Dayan, 2007; Koca, 2016; Özdemir & Kervankıran, 2012; Özdemir & Şenkul, 2006; Sel, 2001; Taş, 2012; Uyan, 2001; Üyümez & Kaya, 2001; Yazıcı, Koca, Ekiz, & Akpınar, 2017; Yılmaz, 2001a, 2001b)

The fact that these rich natural and cultural features of Afyonkarahisar are gathered within a relatively small area has made Afyonkarahisar an important centre for projects with both natural and cultural content. One of these projects is the “Culture and Ecology Based Nature School Project in Afyonkarahisar, the Capital of Victory and Thermal” within the scope of TÜBİTAK 4004-Nature Education and Science Schools program.

4004-Nature Education and Science Schools, as a sub-program of TÜBİTAK-Science and Society Projects, aims to encourage participants to actively use the scientific method, to make them love science through interactive observations and practices, to positively change individuals’ perspective of science, to create and reinforce self-confidence in scientific thinking and to improve the entrepreneurial and creativity characteristics of participants. 4004-Nature Education and Science Schools require the reflection of natural and cultural phenomena in our environment to the participants with an interdisciplinary approach in order to achieve this goal (TÜBİTAK, 2017).

The “Culture and Ecology Based Nature School Project in Afyonkarahisar, the Capital of Victory and Thermal” is a project that was finalized within the scope of the TÜBİTAK Science and Society Projects Support Program (TÜBİTAK Project No: 4004 / 118B371), which was carried out under the leadership of Afyon Kocatepe University. Within the framework of this project, it was aimed to enable

the cooperation of social studies teachers and faculty members from different universities of our country with different fields of expertise, to lay the groundwork for new interdisciplinary cooperation opportunities, and to enable participants to reach knowledge and skills in a wide variety of fields through interactive applications in the spaces within the scope of the project.

In addition, the main objectives of the project also include the development of the observation, research and inquiry skills of social studies teachers through applied activities that will allow them to observe the current development and the tourism potential of thermal facilities, the Commander-in-Chief National Park and the Phrygian Valley within the scope of the project, and to improve their entrepreneurship skills because social studies is a curriculum that takes its basic knowledge from social sciences. With this characteristic, it is a subject area having an interdisciplinary approach. Furthermore, social studies makes use of not only social sciences, but also the knowledge, skills and research methods of science and mathematics, as well as arts and literature (NCSS, 1990). This interdisciplinary approach has been further strengthened with the creation of competency areas and innovations in skills in the 2018 Social Studies curriculum prepared by the Ministry of National Education (MoNE) (MoNE, 2018). The interdisciplinary approach in education is a learning approach that helps learners to combine knowledge from different disciplines and focuses on developing higher-order thinking skills such as analysis and synthesis, and is more suitable for students' natural learning process and the way they perceive the world (Aybek, 2001; Harrel, 2010). Teaching through this approach ensures that students' learning experiences are made compatible with real life experiences (Flint, McCarter, & Bonniwell, 2000) and a curriculum created with an interdisciplinary approach has a positive effect on understanding and knowledge of the nature of science (Yeşilpınar Uyar, Demirel, & Doğanay, 2018). The needs of today's world require accessing information from different sources and synthesizing this information effectively, which further increases the importance of interdisciplinary approach in education (Turna & Bolat, 2015; Yıldırım, 1996).

The main objective of social studies as a curriculum is to train "effective citizens" (Savage & Armstrong, 1987). According to Nelson and Kerr (2006), individuals should be able to participate more effectively in decision-making processes and be aware of their responsibilities in the society. The ability of individuals to recognize and fulfil this responsibility depends on their ability to acquire some skills, that is, to be effective citizens. The concept of effective citizen here refers to the individual who has developed democratic values and attitudes and gained the skills of questioning, accessing information from the source (research-analysis), creative thinking, problem solving, decision making and communication (Kaltsounis, 1987). In addition to these characteristics, environmental awareness and sensitivity, ability to cooperate for a purpose and entrepreneurship have taken their place among the characteristics of effective citizens (Ersoy, 2014; Hoskins & Deakin Crick, 2010; Keser, Akar, & Yıldırım, 2011). In the 2005 social studies curriculum, these effective citizen characteristics are clearly emphasized (MoNE, 2005). It is seen that these characteristics that social studies tries to impart to individuals also coincide with the objectives of the TÜBİTAK 4004 program. On the other hand, giving citizenship education in the context of rights and responsibilities in the social sciences course in a passive and value-weighted manner is insufficient in training effective citizens since it does not develop thinking and participation skills (Ersoy, 2014; Sim, 2008). Fostering active citizenship is only possible in learning environments where the learner is active (Annette, 2014) and where higher order thinking skills such as problem solving, critical thinking, and creative thinking are promoted (Hoskins & Deakin Crick, 2010).

Two main approaches of social studies teaching; social studies teaching as a social science and social studies teaching as reflective examination, aim to impart the skills of inquiry, research and accessing information from the source to learners by having them encounter real life events and problems and use scientific methods (Safran, 2011). "Field study" is one of the teaching techniques that are carried out outside the school and enable the use of scientific methods for the acquisition of these basic skills of the 21st century by students. In fact, using research methods and techniques of any science

in teaching the knowledge and skills of this science is considered to be the best teaching method. Therefore, field studies (McEwen, 1996), which are used as an effective teaching technique especially in the teaching of earth and environmental sciences, can be defined as the pedagogical evaluation of the scientific research methods of both social sciences and natural sciences (Pawson & Teather, 2002). According to Job (2000), Doğanay (2002) and Nalçacı (2006), field studies are the application of the methods that academically form the basis of geographical research to the teaching environment, and since geography educators give the greatest importance to field studies as a teaching technique, most of the research in the literature is on geography teaching. In the educational literature, names such as trip, travel observation, research trip and field trip are given to this teaching technique. But the field study, which pedagogically exploits scientific research methods, is not a simple visit or entertainment, but a teaching activity. Students' embracing the purpose of the study and understanding its importance enable the field study to achieve the desired results (Doğanay, 2002; Hurley, 2006; Saban, 2000).

The features that make the field study an effective teaching activity can be listed as follows according to Arı (2019): allowing active learning through real experiences, using the fragmented information set as a meaningful whole and transforming the knowledge into practice, imparting skills specific to the studied subject, making higher quality learning possible by increasing cooperative learning and social interaction and creating enjoyable learning environments.

Besides these invaluable features of field studies, they have also very strong limitations. The structuring of lessons by using such teaching activities is restricted due to many reasons such as high cost, security risk, bureaucratic procedures, time and effort required by the preparation and implementation stages, and reluctance of administrators in educational institutions (Bellan & Scehurman, 1998; Doğanay, 2002; Foskett, 1997; Lai, 1999; Mazman, 2007; Sibley, 2003; Sidaway, 2002; Smedley & Higgins, 2005; Smith & Bradley, 1994; Tuthill & Klemm, 2002). As in elementary and secondary levels of education, in tertiary education, the use of instructional activities supporting the use of scientific methods is gradually decreasing for similar reasons. Moreover, the majority of the current practices conducted under the name of field study consist of moving teacher-centred lessons from inside to outside of the classroom (Arı, 2019). Therefore, the search for an alternative to eliminate these limitations is an issue that educators have been interested in for a long time. Today, digital technologies offer new and quite impressive opportunities in this regard. However, it should not be forgotten that none of the alternatives of the field study can fully reflect the characteristics of the field study, and these alternatives have limitations that are very similar to those of the real field study (Hofstein & Rosenfeld, 1996; Tuthill & Klemm, 2002). These limitations of the alternatives of the field study can be listed as not providing a real research experience, not reaching the cognitive and affective intensity of the real field study, and not being sufficient in developing basic skills such as social learning and communication. Recent literature supports these judgments. It is stated that field studies foster socialization between students and between students and teachers and is very important in acquiring general skills specific to the field (Çalışkan, 2011; Koca, 2014; Lai, 1999; Tuthill & Klemm, 2002).

It is of great importance that social studies teachers should have these characteristics for them to make young people love science and understand scientific thinking and scientific method and develop research skills. In this context, there is a need for education programs that will enable social studies teachers to acquire these characteristics during their pre-service and in-service training. In this connection, the purpose of the current study is to determine the extent to which the project "Culture and Ecology Based Nature School Project in Afyonkarahisar, the Capital of Victory and Thermal" built on field studies prepared in an inter-disciplinary manner for social studies teachers on the basis of the experiences of the participants.

The sub-problems of the study were determined in line with these experiences as follows:

1. What are the reasons for the social studies teachers' participation in the ecology-based nature education program?
2. What are the opinions of the social studies teachers about where and how they will use the outcomes to be obtained during the ecology-based nature program before the implementation of the program?
3. What are the opinions of the social studies teachers participating in the ecology-based education program about the process?
4. What are the gains of the social studies teachers at the end of the ecology-based nature program?
5. What are the opinions of the social studies teachers about where and how they will use the outcomes at the end of the ecology-based nature program after the implementation of the program?
6. What are the problems encountered by the social studies teachers during the ecology-based nature education program and their solution suggestions?
7. What is the social studies teachers' level of satisfaction with the ecology-based nature education program?
8. Did the ecology-based education program nature walks result in a significant difference in their level of motivation?
9. Did the ecology-based nature education program cause a significant difference in their approaches to environment-human interaction?

Method

Research Model

In the current study, it was aimed to determine the experiences of the project participants about scientific activities conducted within the context of the "Culture and Ecology Based Nature School Project in Afyonkarahisar, the Capital of Victory and Thermal" and thus to evaluate the extent to which the project has achieved its objectives. To this end, qualitative data were collected by using the interview technique before and after the implementation of the project and by using the participant diaries during the project. TÜBİTAK 4004 program puts great emphasis on the accomplishment of many objectives by participants such as environmental awareness and sensitivity, sustainability, love for science and use of scientific methods and acquisition of entrepreneurship skills through an interdisciplinary education program. In the "Culture and Ecology Based Nature School Project in Afyonkarahisar, the Capital of Victory and Thermal", which is a TÜBİTAK 4004 project, it was aimed to enable the project participants to achieve the objectives of the project through an interdisciplinary approach. The focus of the interdisciplinary approach used in the project is to ensure that the education provided to the participants can make them able to use the methods of social sciences and natural sciences together and to introduce the scientific method to them. Since the most suitable subject within the scope of the project to achieve this goal is environment and environmental problems, quantitative data as well as qualitative data were tried to be obtained in order to gain more detailed insights into the participants' evaluations on these issues. In this regard, the model of the study was determined to be case study, one of the qualitative research methods. Case study is a research strategy that enables a detailed study of an individual, event, activity or program over a period of time using various data collection techniques (Akkaş Baysal, & Hocaoğlu, 2019). In the literature on research methods, case study is classified as qualitative research (Ozan Leymun, Odabaşı, & Kabakçı Yurdakul, 2017). However, in case studies, it is necessary to reach more details about the situation examined, so different data collection techniques are needed (Creswell, 2012). Therefore, although data collection techniques such as observation and

interview are mostly used in case studies, quantitative data can be used as well as qualitative data when needed, but care should be taken that the weight of the quantitative data in the research is not more than or close to the qualitative data (Ozan Leymun et al., 2017; Yin, 2003). Case study is an effective research method especially in evaluating an implemented training program (Aytaçlı, 2012; Ozan Leymun et al., 2017; Subaşı & Okumuş, 2017).

Study Group

The project, in which we are trying to determine the extent to which its objectives have been achieved on the basis of the opinions of the participants, is for social studies teachers who are still working in schools affiliated to the Ministry of National Education. Participation in the project was on a volunteer basis. In addition, as the criteria such as working in state schools, having not participated in such a project before, and obtaining diversity in terms of age, gender, marital status and characteristics of the place of residence were taken into consideration, the study group of the current research consisted of 22 social studies teachers selected by the criterion sampling method. In case studies, conducting the study with a small sample is a more ideal situation as it is desired to obtain as much detailed information as possible (Aytaçlı, 2012; Yıldırım & Şimşek, 2018). Some characteristics of the participants in the study group are seen in Table 1. Of the participants, 12 are females and 10 are males. While 16 of the social studies teachers participating in the project are single, 6 are married. In addition, among the participants, there are social studies teachers who studied or are studying at all the three levels of tertiary education (undergraduate 15, master's 6 and doctorate 1). Of the participants, 9 are working in schools located in big cities, 3 are working in schools located in cities and 10 are working in schools located in rural areas. The mean age of the participating teachers is 31.9; the youngest one is 24 and the oldest one is 50 years old. Thus, it can be said that there is a great diversity of gender, age, marital status, education level and characteristics of place of residence.

Table 1. Characteristics of the social studies teachers participating in the study

		f	%
Gender	Female	12	54.5
	Male	10	45.5
Marital status	Single	16	27.3
	Married	6	27.7
Education level	Undergraduate	15	68.2
	Master's	6	27.3
	Doctoral	1	4.5
Place of residence	Big city	9	40.9
	City	3	13.6
	Rural area	10	45.5
Mean age	\bar{X}	31.95	6.58
	Min.		Max.
Age range		24	50

The General Characteristics of the Program Implemented

The activities in the education program planned to last for 7 days can be summarized as follows:

1st day: Investigation of the infrastructure and environmental problems of the city of Afyonkarahisar (especially seismicity, unplanned urbanization, air pollution and industrial facilities) from the urban forest observation point. Introducing the cultural heritage elements (Karahisar Castle, Ottoman mosques, Mevlevihane, bazaar, historical Afyonkarahisar houses) which constitute the core of the settlement in Afyonkarahisar,

and the surrounding cultural heritage elements; good examples of the protection of cultural heritage. The training given on the first day was carried out mainly by geography, history and biology experts on the basis of inquiry skills, and the participants received information from the source people.

2nd day: Investigation of geological formations in Afyonkarahisar. Examination of İscehisar fairy chimneys, marble formations, their economic potential and environmental effects. Examination of the historical development of marble mining and the current traces of cultural heritage in the Afyonkarahisar Ethnography Museum. On the second day, the training, observation and meetings with the source people were mainly carried out by geology, geography, history and archaeology experts.

3rd day: Wetlands of Afyonkarahisar. "Akarçay Basin Field Study and Laboratory Application" was carried out on Akarçay and Eber Lake closed basin ecosystem and environmental problems. This application includes observation and laboratory work based on questioning skills. The laboratory part of this application was carried out in Afyon Kocatepe University Faculty of Education Science Laboratory. Observations took place in three separate points of Akarçay (before entering the city, in the city, in the industrial zone) and in Lake Eber, samples were taken from the observation points and the level of water pollution, its location within the basin, pollution sources (geothermal wastes, urban wastes, industry wastes) were determined under the guidance of biology and geography experts.

4th day: Evaluating the battlefields of the Great Attack and the Commander-in-Chief Battlefields in the Commander-in-Chief Historical National Park from historical, cultural, educational and economic (victory tourism) perspectives; examining the importance of national parks in terms of nature conservation. Observations and expert interviews were mainly carried out by experts from the fields of history, geography and biology.

5th day: Investigation of terrestrial ecosystem in Afyonkarahisar. Obtaining information about the diversity of plant species in the region through expert interviews at the Centre for Medicinal and Herbal Plants. Observation of this information in the Commander-in-Chief Historical National Park (Çiğiltepe Martyrdom) and Akdağ Nature Park. Cultural and environmental effects of wars as a human impact, and economic usage areas of geothermal resources in Sandıklı district were observed. Observation and expert interviews were mainly carried out by education, biology, geography history and geology experts.

6th day: Examination of the elements of natural and cultural heritage in the Phrygian Valley (Ayazini underground settlement, Azdavay Castle, King's Road, Emre Lake) and conducting observations and meetings with the source person regarding the destructions caused by human effects on these elements and their prevention. Today's training was carried out in the presence of geography, biology and history experts.

7th day: Participants received a seminar on how to apply the scientific applications they carried out within the project to the 2018 Social Studies Curriculum, project-based education and TÜBİTAK Secondary School Students Research Projects. Finally, the data obtained through the interviews with the participants during the project and the data obtained from the participants' diaries were shared with the participants.

Throughout the project, 11 instructors who are experts in biology, geology, physics, geography, history, archaeology, social studies teaching and instruction and curriculum guided the participants. Two basic criteria were taken into account in the selection of the instructors. The first is that the instructors should be experts in the subject area, and the second is that they have done academic studies in their field of expertise in the project area.

Participants used data collection methods such as observation, interview and sample taking in the natural and human environment in the presence of field experts, and carried out laboratory studies. At the end of each day, the studies done that day were evaluated together with the instructor.

Data Collection Tools and Data Analysis

Data collection process was carried out using qualitative and quantitative measurement tools at the beginning and end of the project, while the project activities continued within the scope of process evaluation. Qualitative measurement tools used were the "Pre-interview with Teachers Form", "Post-interview with Teachers Form" prepared by the researchers, and the "Project Participant Diary" for the participants to evaluate the activities performed in the project on a daily basis. In order to ensure the validity and reliability of the study, different data collection tools were created, data collection tools were checked by two experts before the application and the necessary corrections for a better fit to the purpose and linguistic corrections were made, the collected data were checked together with the participants and the reporting of the findings was supported with direct quotations from the participants. The themes were created and tabulated by analyzing the qualitative data obtained in the study process with the descriptive method. The qualitative part was analyzed by two observers, one being the researcher and the other an instructor, and according to Miles-Huberman's agreement-disagreement formula, the reliability was found to be 92%.

The studied program has an interdisciplinary approach and this approach is applied by using the research methods of natural and social sciences as teaching activities. In order to evaluate the program from this perspective in more detail, the opinions of the participants on environmental awareness and sustainability within the scope of the program were analyzed with quantitative data as well as qualitative data. Environmental education focuses on training individuals who are able to become aware of environmental problems and offer solutions to them, and who have positive attitudes towards environment (Bacakoğlu & Taş, 2020; Topkaya, 2016). In achieving the goals of environmental education, it is necessary to develop environmental awareness on the basis of sustainability, and for this, learners should develop their willingness (motivation) to participate in activities in nature and develop basic perspectives on environment and environmental problems (Aytaç & Öngen, 2012; Güler, 2009; Karakaş, Baba Kaya, & Yılmaz, 2018; Özdemir, 2007). Two quantitative measurement tools were included in the study to determine the participants' willingness to participate in activities to be conducted in nature and their sustainability-based environmental thoughts before and after the implementation. The first of these is the "Nature Walks Motivation Scale" consisting of 24 items developed by Ekinci, Yenel, and Sarol (2012) to measure participants' willingness to participate in nature activities. The scale consists of five dimensions: social, health, education, time and observation. The "Environmental Paradigm Scale", which consists of 14 items and was adapted to Turkish by Aytaç and Öngen (2012), was used to evaluate the participants' general ideas about environment and environmental problems. This measurement tool can measure the environmental perspectives of the participants separately as "ecocentric" and "anthropocentric", and in the current sustainability-dominated conception of environment, the ecocentric approach should be slightly more dominant than the anthropocentric approach (Aytaç & Öngen, 2012). The analysis of the data obtained from quantitative measurement tools was done with the Wilcoxon signed rank test. The reliability of the "Nature Walks Motivation Scale" in the current study was calculated as .87 before the application and .99 after the application. The reliability coefficients calculated for the ecocentric approach dimension of the "Environmental Paradigm Scale" were found to be .70 and .90 and the reliability coefficients calculated for the anthropocentric approach dimension were found to be .76 and .79.

Results

In this section, the qualitative findings about the reasons for the participation of the social studies teachers in an ecology-based nature education program, the purposes of using the outputs obtained in the process, the opinions about the process, the outputs revealed at the end of the process and how to use them, the problems encountered and solution suggestions are presented. Following the qualitative data, findings on whether an ecology-based nature education program could make a difference in terms of the satisfaction, motivation and environment-human interaction model of social studies teachers are presented.

Reasons for the Participation of the Social Studies Teachers in an Ecology-Based Nature Education Program

The findings obtained about the reasons for the participation of the social studies teachers in an Ecology-Based Nature Education Program are given in Table 2.

Table 2. Social studies teachers' reasons for participation in the project

For personal and professional development	Personal development To contribute to the development of their students To contribute to the development of their colleagues
For getting to know the natural beauties and historical sites of Afyonkarahisar	To see the historical and natural attractions of Afyonkarahisar To gain more information about Afyonkarahisar
For satisfying curiosity	To satisfy my curiosity about thermal regions To satisfy my curiosity about Afyonkarahisar
For socialization	To meet new colleagues To get to know new people
For having a nice holiday	To travel, relax and learn To have a nice and fruitful holiday

As a result of the pre-interviews conducted with the teachers participating in the project, the social studies teachers' reasons for participating in the project were found to be collected under the following themes; for personal and professional development, for getting to know the natural beauties and historical sites of Afyonkarahisar, for satisfying curiosity, for socialization and for having a nice holiday.

Under the theme of the "For personal and professional development", the following categories were found to be subsumed; to contribute to their own personal development, to the development of their students and colleagues. Some participant opinions about these categories are given below:

Following opinions are expressed under the category of "Personal development".

1. *To make some contributions to my own development...* (Ö4)
2. *To renew my existing knowledge; to gain new information* (Ö5)
3. *...to develop myself in the fields of history, geography and sociology ...* (Ö14)

Following opinions are expressed under the category of "To contribute to the development of their students".

1. *... To be able to convey my experiences to my students...* (Ö8)
2. *... To use the knowledge I gained in my lessons ...* (Ö13)

Following opinions are expressed under the category of "To contribute to the development of their colleagues".

1. *... To exchange ideas with teachers from the same branch ...* (Ö5)

Following opinions are expressed under the theme of “For getting to know the natural beauties and historical sites of Afyonkarahisar”.

1. *To get to know the history and natural beauties of Afyonkarahisar... (Ö1)*
2. *To gain more information about Afyonkarahisar; to get to know and to promote the natural and historical beauties of Afyonkarahisar ... (Ö10)*
3. *To see the historical and natural beauties of Afyonkarahisar... (Ö15)*

Following opinions are expressed under the theme of “For satisfying curiosity”.

1. *...as I wonder about thermal regions ... (Ö4)*
2. *...to see new places... (Ö5)*
3. *Because of my interest in and curiosity about everything related to nature. Afyon has a geography interesting to me. (Ö6)*

Following opinions are expressed under the theme of “For socialization”.

1. *...to meet with new people... (Ö5)*
2. *...to meet with teachers from the same branch... (Ö7)*
3. *...to meet with different people, colleagues and socialize (Ö11)*

Following opinions are expressed under the theme of “For having a nice holiday”.

1. *...to have a fruitful holiday... (Ö4)*
2. *...to travel, to have fun, to learn... (Ö7)*
3. *...to have a nice holiday, to have a rest (Ö15)*

The Social Studies Teachers' Opinions about Where and How to Use the Outputs to be Obtained during the Ecology-Based Nature Education Program before the Implementation of the Program

The social studies teachers' opinions about where and how to use the outputs to be obtained during the ecology-based nature education program before the implementation of the program are given in Table 3.

Table 3. Social studies teachers' opinions about where and how to use the knowledge they will gain

Educational / At School-Formal Education	Collecting information and evidence and using them in lessons Collecting information and evidence and sharing them with their colleagues Project and field trip experience
Personal / Outside the school- Informal Education	Sharing the knowledge and skills to be gained within the scope of the project with other people/family Using them in activities to be conducted in NGOs

The social studies teachers' opinions about where and how to use the information they will gain within the scope of the project were evaluated under two themes: formal education at school and informal education outside the school. The participants expressed their opinions on these themes in great detail.

Some opinions expressed by participants about where and how they will use the information they have gained under the theme of “At School/Formal Education”:

1. *I am planning to share this information with my colleagues during the September seminar period. I am also planning to share this information visually with my students on the first week of the school. In*

addition, I am planning to use this information and visual materials especially while teaching the subjects of Ancient Civilizations, landforms in social studies classes and the History of Revolution course. (Ö5)

2. ...I think I can use the information I have learned here when I take my students to field trips. (Ö9)
3. If I think of preparing such a project later in my life, it will be an exemplary project. Also, I would like to share this experience with my colleagues and students. (Ö11)
4. I can use this information in the Unit "Either Independence or Death" in the course of the History of Reforms in the Turkish Republic in the 8th grade; in the 6th grade social studies course and in the Unit "Step by Step Turkey" in the 5th grade social studies course. In general, it will be very useful in 5th, 6th and 8th grade social studies courses. People won't forget what they have seen and touched. For example, I think it is important to say "I saw these places" while teaching Phrygians, Midas and Cybele in 6th grade. (Ö14)

Participants expressed their opinions about how they can use the information they have gained in activities to be conducted in their close circles and NGOs under the theme of "Outside the school/Informal education" as follows:

1. ... I will use this information later in my close circle. (Ö3)
2. ... With everyone around me and with WWF and TEMA where I am a volunteer (Ö8)
3. ...With my friends, ..., my family, with everyone willing to listen to me ... (Ö6)

The Opinions of the Social Studies Teachers Participating in the Ecology-Based Education Program about the Process

The findings obtained from the diaries kept during the project process by the social studies teachers participating in the ecology-based nature education program are presented below in line with the sub-problems of the study.

The findings related to the opinions of the social studies teachers participating in the ecology-based education program about the process are presented in Table 4.

Table 4. Themes derived from the participant diaries

Strengths of the project	Organization and planning Interdisciplinary education/education from the primary source Inculcation of awareness of environment and sustainability Historical awareness and culture tourism Gaining information about project-based education
Aspects of the project open to development	Better coordination Better planning

The social studies teachers participating in the project wrote evaluation diaries in which they could express their feelings and thoughts about the activities of that day at the end of each day. The findings obtained from these diaries were evaluated under two main themes as "strengths of the project" and "aspects of the project open to improvement". The strengths of the project theme were found to include the following categories; organization and planning, interdisciplinary education/education from the primary source, awareness of environment and sustainability, historical awareness and culture tourism and gaining information about project-based education while the aspects of the project open to development were found to include the categories of better planning and better coordination.

Project participants expressed their opinions about the category of "organization and planning" under the theme of "strengths of the project" as follows:

1. I was very happy about having participated in the project. No problem was experienced in such a large group; nobody's face fell. All the activities done made us very happy. At the end of the day, my satisfaction with the project increased more. (1st day, Ö1)

2. *First of all, I should point out that at the beginning of the project, I did not think I would enjoy it that much. The result was maximum satisfaction. It contributed to my knowledge accumulation. Our trip continuing with a visit to the Urban Forest was also extraordinary In my opinion, it is also a sign of how well the program has been planned because in my opinion, getting to know a city should be started from the highest point of that city. ... I am happy to add the geographic information given here (it was good after university) to my knowledge accumulation. (1st day, Ö2)*
3. *We have witnessed how much team work it is to make projects and implement them, as we did in the past days. The fact that the every detail was planned meticulously about how to travel to destinations, where to eat, where to have a break, where the bus would park in the city, and where to meet, from all of which we learned important lessons. That is, how to implement a project without having even a smallest problem. I would like to thank again for letting us live such a wonderful experience. Note: I am just telling the truth, not making any compliment to anyone. (4th day, Ö19)*

While participants were explaining their opinions about the category of “Interdisciplinary education/education from the primary source” under the theme of “Strengths of the project”, it is remarkable that they gave examples of information they obtained from scholars specialized in different disciplines, or they obtained by using different scientific methods. Some sample participant opinions are given below.

1. *I have not only observed the changes a stream undergoes along its path, but also the changes it undergoes before entering and after leaving a settlement. I found the opportunity to learn information about the subjects I don't know (plant, animal species) from the experts. (3rd day, Ö15)*
2. *Today, we made a trip to Çiğiltepe Martyrdom, Sandıklı city centre and Akdağ National Park. In this trip, we listened to and gained information from Teacher Şaban about the areas where the worst phases of the War of Independence took place in Çiğiltepe Martyrdom, which are directly related to the 8th grade subjects of social studies course. We've also seen that not only humans but also plants in the battlefields were affected. (5th day, Ö13)*
3. *We did many different types of learning activities such as experiment, observation, research, question-answer, lecture, examination and so on; I had not done laboratory work since primary school; thus, it was exciting for me. (3rd day, Ö1)*

In the dairies of the project participants, there were some opinions expressed on the category of “awareness of environment and sustainability” in the theme of “strengths of the project”.

1. *The Story of the Battery told by Teacher Mustafa was wonderful. He clearly explained us how the damage of waste batteries can adversely affect human beings. I think we can also make use of today's information and activities in creating environmental awareness in us. (4th day, Ö18)*
2. *«Akdağ National Park», which is the place where the importance of the concept of ecotourism will be understood very well, enabled me to better understand many points that I did not know enough about national parks. The activities that can and cannot be done here became clear in my mind and I understood why a place can be a national park or not. Brief information I received from the experts about the types of plant and animal species here and in Turkey allowed me to reach a conclusion about the ecotourism potential of our country and how much we are aware of that. (5th day, Ö18)*
3. *We arrived at Akdağ after long and difficult winding paths. Teacher Mustafa talked about the plant richness and biodiversity of the area. It was Kocayayla Pond that caught my attention because when this pond was a small area, it changed with the intervention of human beings (5th day, Ö10)*

Participants expressed their opinions on the category of “Historical awareness and culture tourism” in the theme of “strengths of the project” as follows:

1. *Caravanserais are one of the topics that my students are most interested in. It was great to listen from the experts. As a result, my travel-observation, curiosity and questioning skills improved a lot. I am very impatient to share what I have learned with my curious students. Maybe I will touch the hearts of my*

students with a small, similar project in my district, and leave them good memories as you did. (3rd day, Ö15)

2. *I learned the concept of "tourism of sadness" for the first time at the information meeting held at the entrance today. Having the opportunity to learn about the tourism potential of this concept, which I had known as "history tourism" before from an expert, enabled me to better understand the information I could use on tourism-related issues. (4th day, Ö2)*
3. *Our event today started with Colonel Reşat Çiğiltepe Martyrdom. We listened to Reşat Bey's sad story. We have experienced important knowledge and skills about how to use historical figures and events to develop a sense of unity and togetherness. (5th day, Ö6)*

In their diaries, project participants expressed their opinions on the category of "Gaining information about project-based education" in the theme of "strengths of the project" as follows:

1. *We received extensive information about TÜBİTAK 4006 projects. Learning the points to be considered in these projects will help our students a lot while we are getting our students to prepare such projects because it is really difficult to read and understand hundreds of requirements in writing, and the information I have gained here will make great contributions to my future projects in a period when TÜBİTAK projects are assigned a great importance. I am now more confident about preparing projects. (7th day, Ö14)*
2. *It was very useful to learn which of the contents of TÜBİTAK projects is more suitable for us and to learn the information necessary to conduct a TÜBİTAK project. Especially, we learned about how we can guide our students in the process of preparing projects ... this was really necessary. (7th day, Ö6)*
3. *The seminar given on TÜBİTAK projects was very useful for us. It was also important that we have knowledge about project-based teaching; project-based teaching is a really necessary method (7th day, Ö5)*

Project participants expressed their opinions about the category of "Better coordination" in the theme of "Aspects of the project open to development" as follows:

1. *I think the only problem today was waiting in the museum and wasting time. (2nd day, Ö12)*

Gains of the Social Studies Teachers at the end of the Ecology-Based Nature Education Program

The findings obtained through the post-interview form applied to the social studies teachers participating in the ecology-based nature education program are presented below in order specified by the sub-problems of the current study.

The social studies teachers' opinions about the gains they obtained from the ecology-based nature education program are presented in Table 5.

Table 5. Social studies teachers' opinions about the gains at the end of the project

Learning about the geography, culture and history of Afyonkarahisar	
Seeing human-environment relationship	
Visiting and examining different places	
Getting first-hand on-site information / receiving interdisciplinary education	
Developing different perspectives	
Developing skills	Developing cognitive process skills Developing different learning and thinking skills Gaining information about the entrepreneurship skills
Getting information about the process of preparing a project	
Socialization and cooperation	

The expectations of the social studies teachers participating in the project from the project are gathered under the themes of personal and professional development, getting to know the natural beauties and historical sites of Afyonkarahisar, satisfying curiosity, socializing and having a nice holiday. It was seen that the themes emerging from the pre-interviews were emphasized more strongly and new themes emerged in the post-interviews and that the participants gave more diverse and quality examples within these themes. This shows that the project was able to meet the expectations of the social studies teachers, and even offered more than their expectations. The themes that emerged in the post-interviews conducted with the social studies teachers about the gains obtained from the project include the following: getting to know the geography, culture and history of Afyonkarahisar, establishing human-environment relationship, visiting and examining different places, getting first-hand on-site information/receiving interdisciplinary education, developing different perspectives, developing skills, learning about the process of preparing a project and socialization.

Participants expressed their opinions about the theme of “Getting to know the geography, culture and history of Afyonkarahisar” as follows:

1. *I was able to get to closely know the natural, historical and cultural beauties of Afyonkarahisar. (Ö1)*
2. *I recognized that I hadn't seen many historical, cultural and ecological places. (Ö3)*
3. *I learned that Afyon's history goes back to 5000 BC, that it is rich in plant and animals species, that it is the thermal capital of Turkey, that there are geothermal greenhouses and that it has significant geological formations. (Ö5)*
4. *I had not known about the Fairy Chimneys in Afyon. It was nice to examine them on the spot. (Ö9)*

Participants expressed their opinions about the theme of “Seeing the human-environment relationship” as follows:

1. *I personally saw the examples of nature-human relationships... (Ö1)*
2. *I have observed the importance of looking at nature more carefully and the balanced relationship between living things in nature. (Ö2)*
3. *... I can say that I learned how humans influence nature... thanks to this project. Ö8*
4. *We were also able to see human-nature relationships in Afyon through the eyes of experts. I have learned how much humans can harm their environment and that they can also protect it and attain many benefits from these protection efforts. (Ö15)*

Participants expressed their opinions about the theme of “Visiting and examining different places” as follows:

1. *I have seen different places. All the visits were very useful; we have learned something from all. (Ö1)*
2. *I had the opportunity to observe the effects of the traces left by the culture in a city. (Ö2)*
3. *We examined many buildings such as caravanserai, mosque, social complex, Mevlevihane and castle. We saw and examined rock tombs, fairy chimneys and greenhouses. (Ö6)*
4. *The theatre tickets at the Archaeology Museum attracted my attention the most in this trip. It was also interesting to see the mud baths in the district of Sandıklı. (Ö9)*

Participants expressed their opinions about the theme of “Getting first-hand on-site information / receiving interdisciplinary education” as follows:

1. *As a social studies teacher, I acquired more concrete and sound information. (Ö2)*
2. *I am sure that the information I have learned from concrete and first-hand sources in these regions will contribute to my professional life. (Ö3)*

3. *I learned a lot (by visiting-seeing-living) about the ecosystem of the region, biodiversity, field and laboratory studies, natural-human and cultural elements, human and historical development of the city, touristic places, cultivated agricultural products, rich cuisine. (Ö7)*
4. *Each day ended with a new accumulation of knowledge. We have learned a lot at the end of the project. The biggest gain from the project was that it was very important to do what was told directly on the field in terms of making the situation concrete, grasping the information and understanding it. (Ö11)*

Participants expressed their opinions about the theme of “Developing different perspectives” as follows:

1. *... I learned to adopt different perspectives while looking at the places as a result of the discussions we held in groups. (Ö3)*
2. *Our perspective of project has changed. (Ö6)*
3. *Thanks to this project, I look at the province of Afyon from a different perspective; through the information provided by the experts in the field, I have developed a different perspective of the province of Afyon. (Ö15)*
4. *Afyon is a city more than thermal for me now. (Ö15)*

Participants expressed their opinions about the category of “Developing cognitive process skills” in the theme “Developing skills” as follows:

1. *I learned to use a microscope and to distinguish between small living species. (Ö4)*
2. *We learned how to use a microscope. We learned to examine and count the creatures in the water under the microscope. I did not have any information on this subject. (Ö6)*
3. *A detailed explanation was made using all methods such as experiment, observation, research, question-answer, lecture, and examination. (Ö6)*
4. *We used many scientific research methods such as experiments, observations and excursions. (Ö13)*

Participants expressed their opinions about the category of “Developing different learning/thinking skills” in the theme of “Developing skills” as follows:

1. *I can summarize it as follows: Information-experience-fun-active learning-Project-based learning-solution-orientedness-humour-smile are some of the contributions of this project to me. (Ö2)*
2. *We had fun while learning. (Ö6)*
3. *I have once more understood the importance of willing to learn, curiosity, criticising and taking alternative of opportunities. (Ö10)*

Participants expressed their opinions about the category of “Gaining information about entrepreneurship skills” in the theme of “Developing skills” as follows:

1. *One of the most enjoyable parts of the trip was our visit to a marble business district. It was worth listening to both the information we got about marble and the information we got about the operation process. (G9)*
2. *We saw the famous the places where famous Afyon marble is mined and were informed about them by our instructor. It was a moment I will never forget in my life. Problems related to marble mining were also mentioned. (G13)*
3. *We also learned that Afyon marble is bought by other countries and then sold at higher prices after it has been given a brand name and has been subjected to some mineral processing technologies. (Ö5)*
4. *We have obtained extensive information about thermal centres, marble quarries. (Ö6)*

5. ... I learned the concept of "tourism for sadness" for the first time. Then I found the opportunity to learn about the tourism potential of this concept, which I had known as "history tourism" before from an expert..... (Ö2)
6. ... It allowed me to reach a conclusion about the ecotourism potential of our country and how much we are aware of that. (Ö18)
7. The fact that geothermal energy can be used economically in five different areas surprised me. In addition, I saw the reasons why this energy cannot be used sufficiently and appropriately with examples. (Ö21)
8. ... The clay, combining with thermal water to form a wonderful mud cure, turning it into a complete healing resource. It was also very surprising that there are thermal greenhouses in the area and soilless agriculture in greenhouses. (Ö9)

Participants expressed their opinions about the theme of "Getting information about the process of preparing a project" as follows:

1. We have learned the contents of TÜBİTAK projects ... How to prepare a project and how to guide students. (Ö6)
2. Also, I learned what to pay attention to while conducting a project. In this way, my self-confidence in preparing projects improved. (Ö7)
3. Since our instructor who gave information about TÜBİTAK is specialized in this field, we were able to get the necessary information very well. (Ö10)

Participants expressed their opinions about the theme of "Socialization and cooperation" as follows:

1. We had the chance to know all the esteemed teachers who were responsible for the education given within the context of the project (I must sincerely say that they are all unique people). (Ö2)
2. I want you to know that this project contributed to me a lot in terms of social relationships. (Ö4)
3. I met with valuable colleagues and teachers and had the opportunity to exchange ideas with colleagues and experts. (Ö7)
4. I met with new people with whom I can collaborate. (Ö16)

Social Studies Teachers' Opinions about Where and How they will Use the Outputs Obtained during the Ecology-Based Nature Education Program after the Completion of the Program

Findings obtained about where and how they will use the information they gained in the ecology-based nature education program are given in Table 6.

Table 6. Social studies teachers' opinions about where and how they will use the information they gained in the project

Educational / At school- Formal	I will use it in my lessons
	I will use it to raise my students' awareness
	I can give concrete and experiential samples on interdisciplinary subjects to my students
	I will share the information I gained during the project preparing process with my colleagues
	I will use it to develop different skills in my students
	I will use it in different activities I will conduct with my students
Personal / Outside the school- Informal	I will share it with my family
	I will share it with people in my close circle
	I will share it on social media
	I am planning to prepare a project
	I will use it in my daily life

The social studies teachers participating in the project stated that they would share the information they gained in the project with their students and colleagues at school and with people in their close circles and in social media outside the school. These themes derived from the post-interviews have more intense content and profundity than the themes derived from the pre-interviews.

Participants expressed their opinions about where and how they would use the information they gained in the project under the theme of “Educational/At school-Formal education” as follows:

1. *It was a great experience in terms of raising my students' awareness of their close environment. (Ö2)*
2. *Within the scope of my branch, giving concrete and experiential examples in every field of social sciences will make my lessons lively and effective... (Ö3)*
3. *To give an example, I had the opportunity to see the places where the most important stages of the War of Independence took place, namely Kocatepe, Çiğiltepe. I will ensure learning by creating a more effective learning environment in history lessons. I will have more effective materials to use about the social life in Sandıklı and traditional handicrafts in the ethnography museum. (Ö4)*
4. *I intend to show the pictures of the different points of the Akarçay basin and the images in the microscope while teaching the issue of environmental pollution. I will talk about the biomass energy (planned in Afyon) while teaching the subject of energy sources. On the subject of natural beauties, I will show the Seyildi Fairy Chimneys, different from the ones in Nevşehir-Cappadocia. While teaching the subject of mines, I will talk about how Afyon marble is sold in blocks, and how other countries put their own labels on it. On the subject of tourism, I will also talk about the concepts of sadness tourism (Afyon-Kocatepe), geo-tourism, geo-park, and health tourism. I will talk about greenhouses heated by geothermal water and tomatoes in greenhouses growing without soil while teaching subjects of agriculture. On this issue, I will talk about the properties of poppy. (Ö5)*
5. *I will give more space to experiments, observations and group works. (Ö6)*
6. *I'll share with my colleagues afterwards. (Ö10)*
7. *I will use it in different ways in my lessons. For example, by using the photographs I have taken martyrdoms such as "Kocatepe, Dumlupınar", I will help students develop different skills. (Ö13)*
8. *It will be useful in many areas such as activities, projects, homework, lessons, trips I will do with my students at my school. (Ö13)*

Participants expressed their opinions about where and how they would use the information they gained in the project under the theme of “Personal/Outside the school- Informal education” as follows:

1. *... As an educator I use it all my life. (Ö1)*
2. *... I guess I'll use it all my life. (Ö2)*
3. *... Also, I am thinking of writing a project ... (Ö4)*
4. *First of all, I tell the unknown things about Afyonkarahisar in every environment I am in. (Ö6)*
5. *First of all, I will transfer the information I have learned to my family members. (Ö10)*
6. *I will share on social media in groups I am a member of. (Ö10)*
7. *I will use this information ... on social media and if I do a new project, I will use there. (Ö16)*

The Problems Encountered by the Social Studies Teachers during the Ecology-Based Nature Education Program and their Solution Suggestions

The problems encountered by the social studies teachers during the ecology-based nature education program and their solution suggestions are presented in Table 7.

Table 7. Problems encountered by the participants during the project and their solution suggestions

I haven't encountered any problems	More time can be allocated
I think that there were problems related to time	

While the great majority of the social studies teachers participating in the project stated that they did not encounter any problems during the project, and the problems stated by few teachers were found to be related to “content” and “time”.

Participants expressed their opinions within the theme of “I haven’t encountered any problems” as follows:

1. *We did not have any tangible, visible problems, because all kinds of work were programmed obviously by a professional team. Measures have been taken for potential problems. (Ö3)*
2. *I did not encounter a problem throughout the project. Each stage was very useful. Our instructors were really prominent names in their field and we benefited a lot. (Ö4)*
3. *I did not encounter any problems. Everything was above my expectation. The attention and knowledge of our teachers were very satisfying. (Ö6)*
4. *It was a smooth and enjoyable project. (Ö11)*

Participants expressed their opinions within the theme of “I have had problems with the time” as follows:

1. *.... The program was a bit intense. ... I think there was some problem in implementing the program, namely time management. We could have visited some other places which I would have liked to visit a lot. (Ö5)*
2. *The limited time during this project was the biggest problem I saw. We could not see some places such as the castle, mineral water filling facilities, new cement factory. (Ö8)*

The suggestions made by social studies teachers about the problems they encountered regarding the time of the project are given below:

1. *It would have been better, if the project had been one more day longer. It was full of activities and useful information but it was also too fast. If the time had been longer, it would have been better. (Ö4)*
2. *Since the project was comprehensive, the duration could have been extended and the number of participants could have been increased. (Ö15)*

Social Studies Teachers’ Level of Satisfaction with Ecology-Based Nature Education Program

The findings about the social studies teachers’ level of satisfaction with the ecology-based nature education program are given in Figure 1.

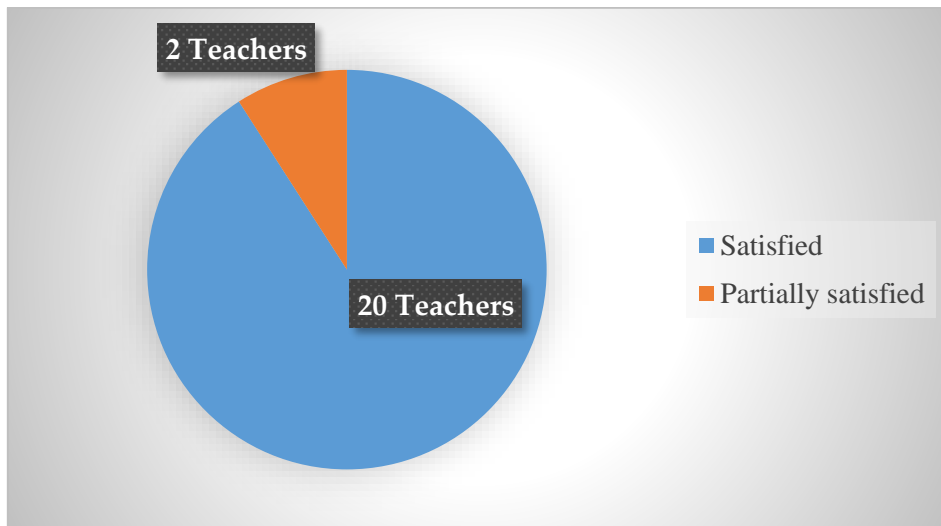


Figure 1. Participants’ Level of Satisfaction with the Project

The question asked to determine the social studies teachers’ level of satisfaction with the project was responded by 20 teachers as “satisfied” and by 2 teachers as “partially satisfied”. The fact that the project was planned effectively and efficiently by faculty members who are experts in their field and

implemented in the relevant field as an interdisciplinary project has contributed a lot to the social studies teachers, which satisfied them. There is no teacher expressing dissatisfaction with the program. On the other hand, two teachers stated that although they were pleased with the project to a great extent, they experienced some time problems and thus, they were classified as partially satisfied.

Some opinions of the participants expressing their level of satisfaction with the project as “Satisfied / very satisfied” are given below.

1. *There was no part of the project that displeased me. (Ö2)*
2. *I am really satisfied with this opportunity of getting to know Afyon in every aspect, culturally-naturally. ... Our instructors worked really hard. We were greeted with great hospitality everywhere. Our esteemed teachers enlightened us with their knowledge and they also conquered our hearts with their sincere behaviours. (Ö7)*
3. *I am generally satisfied with the project. I think that the trips were useful. Moreover, the contributions of our instructors were wonderful. They were not only knowledgeable, but also friendly and hospitable. (Ö9)*
4. *Even the name of the project at the beginning was an important reason for me to apply to the project. The project really gave what it had promised. I consider myself very lucky to have personally observed that it is really the capital of victory and thermal, and that its culture and ecology are also very important for Afyon. I was really satisfied in general. (Ö10)*
5. *I used to know that it was the centre of the thermal, but it was much more than I knew. Also, although I have been in this region for a long time, I have now clearly understood how Afyon could not break its crust. (Ö12)*

Opinions of the participants expressing their level of satisfaction with the project as “partially satisfied” are given below.

1. *As the program was very comprehensive, the time allocated to it should have been longer. As I wanted this time of great pleasure to be longer, I am partially satisfied. (Ö5)*
2. *The time of the project should have been longer; it was too intense. (Ö8)*

The Effect of the Ecology-Based Nature Education Program on the Social Studies Teachers' Level of Motivation

The findings related to the effect of the ecology-based nature education program on the social studies teachers' motivation for nature walks are given in Table 8.

Table 8. Comparison of the participants' motivation for nature walks before and after the implementation of the program

Pretest-Posttest	N	Mean Rank	Rank Sum	z	p
Negative rank	1	17.00	17.00		
Positive rank	16	8.50	136.00	-2.81*	.00**
Equal	1				

* Based of negative rank. **p<.05

The statistical results of Wilcoxon rank sum test conducted to compare the social studies teachers' levels of motivation for nature walks before and after the implementation of the program are presented in Table 2. As can be seen in Table 2, there is a significant difference between the participants' levels of motivation before and after the implementation of the program ($z = -2.81$, $p < .05$). When the mean rank and rank sum of the difference scores are evaluated, it is seen that the difference is in favour of the positive ranks; that is, in favour of the scores taken after the implementation of the program.

The Effect of the Ecology-Based Nature Education Program on Approaches towards Environment-Human Interaction

The findings related to the effect of the ecology-based nature education program on the social studies teachers' approaches towards environment-nature interaction are presented in Tables 9 and 10.

Table 9. Comparisons of the participants' levels of adopting ecocentric approach before and after the implementation of the program

Pretest-Posttest	N	Mean Rank	Rank Sum	z	p
Negative rank	4	7.50	30.00		
Positive rank	13	9.46	123.00	-2.20*	.02**
Equal	1				

* Based of negative rank. **p<.05

The statistical results of Wilcoxon rank sum test conducted to compare the social studies teachers' levels of adopting ecocentric approach before and after the implementation of the program are given in Table 9. When the mean rank and rank sum of the difference scores are evaluated, it is seen that the difference is in favour of the positive ranks; that is, in favour of the scores taken after the implementation of the program ($z = -2.20$, $p < .05$).

Table 10. Comparison of the participants' adopting anthropocentric approach before and after the implementation of the program

Pretest-Posttest	N	Mean Rank	Rank Sum	z	p
Negative rank	2	4.50	9.00		
Positive rank	15	9.60	144.00	-3.20*	.00**
Equal	1				

* Based of negative rank. **p<.05

The statistical results of Wilcoxon rank sum test conducted to compare the social studies teachers' levels of adopting anthropocentric approach before and after the implementation of the program are given in Table 10. When the mean rank and sum rank of the difference scores are evaluated, it is seen that there is a significant difference in favour of the post-implementation scores ($z = -3.20$, $p < .05$). Thus, it can be argued that the activities performed within the context of the project were influential on the participants' levels of adopting anthropocentric approach. When the changes taking place on the participants' levels of adopting ecocentric approach and anthropocentric approach were evaluated, it was concluded that as a result of the implementation of the program, the participants levels of adopting both ecocentric and anthropocentric approaches increased compared to the pretest results but that the level of adopting ecocentric approach ($\bar{x} = 4.26$; $SS = .88$) is considerably higher than the level of adopting anthropocentric approach ($\bar{x} = 3.65$; $SS = .73$).

Conclusion, Discussion and Suggestions

In today's world, the great impact of human on the environment has led to the emergence of global environmental problems that need to be solved. In the relevant literature, educational and instructional programs are seen as one of the most important factors in solving environmental problems (Powers, 2004; Poudel et al., 2005; Teksöz, Şahin, & Ertepinar, 2010). In order for education to play this role effectively, it is of primary importance to develop environmental knowledge, sensitivity and positive attitudes among learners. There are many studies that have revealed the impact of conducting environmental education with first-hand resources; that is, with real-life experiences on the development of these features (Avcı, Özenir, Kurt, & Atik, 2015; Buldur, Bursal, Yücel, & Yalçın Erik, 2018; Güler, 2009; Karakaş et al., 2018; Özdemir, 2007, 2010; Palmberg & Kuru, 2000; Sönmez, 2018). One of the focal points of the current study, in which we evaluated the "Ecology and Culture-Based School Project in Afyonkarahisar, the Capital of Victory and Thermal" based on interdisciplinary field studies on the basis of the social studies teachers' opinions, is to investigate the social studies teachers' willingness for participating in environmental activities in nature and their environmental thinking level. According to the findings in the quantitative part of the study, it was observed that the activities within the scope of the project had a positive effect on the participants' level of motivation for nature walks. It was observed that this effect was also expressed by the participants in the qualitative part. The

participants emphasized that they visited different and many natural and human environments in the project diaries and in the post-interviews, that they gained new information in these places, and that they obtained this information from primary sources. This shows that the project had a positive effect on their willingness to participate in environmental activities to be done with real experiences in nature.

In the sub-dimensions of the environmental paradigm scale, it was determined that there were positive and significant changes in the opinions of the participants after the implementation of the project. According to these findings, it was determined at the end of the project the participants adopted a higher level of ecocentric approach towards human-environment interaction. According to the findings obtained from the project diaries and post-interviews, the participants indicated that they were able to establish the human-environment relationship better and gained sustainable environmental awareness by stating that "experiencing the environment-human relationship on-the-site; utilizing different perspectives of different scientists (sciences)" and by providing samples of the positive effects of humans on the environment as well as negative effects. Given that the environmental thinking structure of the individuals should not ignore the anthropocentric approach in effectively solving environmental problems, but should have a sustainable mindset that prioritizes the ecocentric approach (Aytaç & Öngen, 2012), the program within the scope of the project can be argued to develop the participants' environmental approach in compliance with the today's sustainable environmental paradigm. In addition, examples were asked from the participants on how to use the experiences they gained from the project, and examples gathered under the themes of formal and informal education were obtained from the answers. In these examples, they stated that they planned to do scientific method-based out-of-school activities with the participation of family members and relatives as well as children. While expressing these plans, it was remarkable that they gave detailed examples of environmental problems in their environment, gave examples of practices similar to the educational activities they had experienced within the scope of the project, related the activities in the project to the learning areas suitable for them in the curriculum and made detailed explanations. The main goal of the social studies course is to train effective citizens and an important feature of effective citizens is to have environmental awareness and sensitivity (Hoskins & Deakin Crick, 2010). Moreover, environmental awareness and sensitivity are skills that need to be developed at early ages, and social studies teachers have an important role in the development of these skills (Selanik Ay, 2010; Karataş, 2013). When the fact that the participants of the project are in interaction with a very wide socio-economic environment in terms of age, education, and the settlements they work in and their responses to the formal and informal education themes are evaluated together, it can be said that the participants think that they will use the education they received within the scope of the program effectively in developing the environmental awareness and sensitivity of many different types of people.

When the pre-interview and post-interview findings were compared in the qualitative part, it was determined that the expectations of the participants from the project were exceedingly met and new themes emerged in the post-interviews. As a result of the pre-interviews held with the participants within the scope of the project, the reasons for their participation in the project were found to include; personal and professional development, getting to know the natural beauties and historical sites of Afyonkarahisar, satisfying curiosity, socializing and having a nice holiday. The themes obtained from the pre-interviews are centred on curiosity, socialization and personal and professional development. On the other hand, new themes emerged in the post-interviews, and at the same time, it was observed that the contents of the themes developed and deepened. The themes having emerged in the post-interviews include the following: learning about the geography, culture and history of Afyonkarahisar, seeing human-environment relationship on the spot, visiting and examining different places, getting first-hand on-site information / receiving interdisciplinary education, developing different perspectives, developing skills, getting information about the process of preparing a project and socialization and cooperation

In the qualitative part of the study, the participants explained that they studied Afyonkarahisar by exploring its geographical, cultural and historical characteristics, tourism and economic potential with detailed examples. In addition, they stated that they developed scientific thinking and different learning skills with various examples. Stating that they obtained the knowledge from the first source in an interdisciplinary manner, the participants also thought that they developed different perspectives towards events and people, gained social skills as well as collaboration skills, experienced project preparation and implementation processes, and increased their motivation for project-based teaching. In addition to these, the participants gave many examples about how they could use their knowledge and experience gained within the scope of the project in the accomplishment of formal and informal educational goals.

The gains obtained from participation in the “Culture and Ecology Based Nature School Project in Afyonkarahisar, the Capital of Victory and Thermal” can be summarized as follows;

1. Getting to know the geography, culture and history of Afyonkarahisar and gaining information about the tourism potential of Afyonkarahisar,
2. Understanding human-environment relationship better and raising the awareness of sustainable environment,
3. Getting information from its primary source in an interdisciplinary manner,
4. Developing different perspectives,
5. Developing scientific skills,
6. Developing social and entrepreneurship skills,
7. Gaining information about how to prepare a project (Yazıcı, Koca, Ekiz, & Koca, 2019),
8. Having information and skills that can be used in formal and informal education.

It can be said that these gains are the result of the interdisciplinary training activities carried out within the scope of the project. Studies in literature on interdisciplinary educational applications in the fields of social studies (Epstein & Dauber, 1995; Kakas, 2010), history (Biddle-Perry, 2005), geography (Smith Shank & Soganci, 2011), art (Akins & Akerson, 2002), environment (Güler, 2009; Rossi, 2018), in science and language teaching (Akins & Akerson, 2002) argue that these gains result from the development of higher order thinking skills through interdisciplinary education. Another feature of the project that contributed to the acquisition of these skills by the participants is that the scientific research method was used especially for educational purposes outside the school. Within the scope of the project, activities that enabled the use of the scientific method prepared on the basis of field studies as a teaching technique contributed to the acquisition of basic skills such as research, inquiry, problem solving and also helped meaningful learning to occur through explorations and experiences. This also played a role in achieving social and educational goals such as understanding the nature of science, loving science, socializing and developing communication skills (Akay, 2013; Erten, 2004; Gibson & Chase, 2002; Job, 2000; Kent & Foskett, 2002; Kent, Gilbertson, & Hunt, 1997; Lai, 1999; Lonergan & Andressen, 1988; Mazman, 2007; Özay, 2003; Pawson & Teather, 2002; Sibley, 2003; Tuthill & Klemm, 2002).

As a result, the “Culture and Ecology Based Nature School Project in Afyonkarahisar, the Capital of Victory and Thermal”, which we evaluated on the basis of the opinions of the participants, came to the fore with its three main characteristics; motivation to participate in activities in nature, developing sustainable environmental thinking, and being an example of interdisciplinary field study. These three characteristics also make important contributions to the accomplishment of social studies course’s main objective of training effective citizens (Ersoy, 2014; Hoskins & Deakin Crick, 2010; Keser et al., 2011). It is of great importance for social studies teachers to learn high quality teaching techniques through experience and exploration in activities to be carried out outside the school so that they can help their students to acquire higher order learning skills. In studies conducted in the literature on environmental problems and in other subject areas, it is suggested that scientific research method-based out-of-school activities should be carried out in the form of field studies to develop inquiry skills (Erten, 2004; Güler, 2009; Yazıcı, Kıvrak, Koca, Koca, Gökdemir, & Ekiz, 2019), that such activities should be added to the curriculums of undergraduate and teacher training programs (Arı, 2010; Yazıcı et al., 2017),

that such projects should be financed by educational institutions (Yazıcı et al., 2017) and that the field studies should be carried out under the control of the instructor but by learners themselves (Koca, Gökdemir, Kaya, & Yazıcı, 2019). Social studies teachers should be allowed to participate more in pre-service and in-service field study-based activities that will enable them to interact with the environment through direct experiences, and these trainings should be planned in an interdisciplinary manner. In in-service trainings, the nature walks and orienteering practices included in the Occupational Work Program (MoNE, 2019) prepared by the Directorate of Teacher Training and Development in 2019 can be easily transformed into interdisciplinary field studies and to this end, cooperation can be established between National Education Directorates and universities, if necessary. In pre-service education, these applications should be included in the social studies teacher training programs and should be applied in an interdisciplinary manner.

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Appendix 1. Akarçay Basin Field Study and Laboratory Report

Study Area and Observation Points

Akarçay is the most important river in the region that collects the water of the Akarçay basin and carries it to Eber Lake. It is formed by the merger of Aksu stream, which is born in the west of Sincanlı Plain, and Acıçay, which is born from İhsaniye Gazlıgöl, in the city centre of Afyonkarahisar. Akarçay is exposed to various agricultural and domestic pollutants along its flow route.

Eber Lake is fed by spring waters coming from Akarçay and Sultan mountains. For this reason, its surface area varies throughout the year. Its depth is about 8 meters. The lake area is approximately 62 km².

Water and plant samples were taken from four sampling points in these two aquatic environments (1st point: Balmahmut Bridge, 2nd point: Ömer-Gecek geothermal field, 3rd point: Gümüşkent villas and 4th point: South-west coast of Eber Lake) and were brought to the laboratory.

Eber lake, located in the Akarçay basin, is a lake that is heavily affected by urban, industrial and agricultural activities. With the trips to both lakes, comparative observation of the pollution caused by human activities and the damage to the lake ecosystem was made.

Collection and Analysis of Samples

The temperature, pH, electrical conductivity and dissolved oxygen amount of the stream water were measured at the time of sampling with the Multi 340i (WTW) device.

Plants growing in Akarçay's streambed were collected to collect epiphytic algae. By washing and scraping the sample plants under the tap water, the living organisms were collected in a beaker.

For phytoplankton samples in Eber Lake, river and lake water was taken into 0.5 L bottles and lugol was added to it. Plants growing by the lake were collected to collect epiphytic algae.

In the science laboratory, preparations were prepared from lake and stream water and examined under Nikon and Leica microscope at 400 magnification.

Results

Some Physico-Chemical Properties of Akarçay Water

Table 1. Some physical and chemical parameter values of Akarçay

Observation Points	I	II	II	IV
Temperature (°C)	21	23	23	22
pH	7.9	8.2	7.8	7.6
Electrical Conductivity (µS/cm)	438	2978	1978	968
Dissolved Oxygen (mg/L)	7.92	5.64	3.86	4.98

Water temperatures were measured close to each other at the observation points as varying between 21 and 23 (°C). The pH values were found to be ranging from 7.6 to 8.2. Electrical conductivity values were measured be high. Except for the 1st observation point, the values are high. These values are related to the pollution of the water and the increase in its conductivity. Dissolved oxygen values were measured to be low at the 2nd, 3rd and 4th observation points. The amount of dissolved oxygen is adversely affected by the heat and contamination. In Akarçay, the amount of oxygen was measured relatively low in the lower parts of the stream and in Eber Lake (table 1).

Diatoms and Phytoplankton

Cocconeisplacentula, *Cyclotellameneghiniana*, *Encyonemaminutum*, *Naviculacryptocephala* and *Ulnariaulna* were found to be dominant in the algae community in the starting part of the stream (at the 1st and 2nd observation points). In the lower part of the stream (at the 3rd observation point) *Nitzschia* *Palea* was found to be dominant in the algae community. In Eber Lake, *Cyclotellameneghiniana* and *Euglena* species were found to be dominant in the phytoplankton and epiphytic algae community.

Conclusion

The physical-chemical properties of the stream water and the dominant species in the algae community differed between the starting and ending points of Akarçay. Physical-chemical characteristics of Lake Eber, dominant species in the algae community have shown that the lake is polluted and has eutrophication. The pollution level increases as it approaches the urban area and reaches the highest level in Lake Eber. The sources of pollution detected both in Akarçay and Eber Lake where it spills are related to thermal facilities, industrial wastes and agricultural activities. Although the urban liquid wastes of Afyonkarahisar are treated, there are also illegal discharges that do not enter the treatment system. This pollution is an extremely serious threat to natural life in the Akarçay basin. At the same time, the use of contaminated water in the basin in agricultural activities seriously endangers human health. In order to solve these problems, waste water of thermal facilities and industrial facilities should be collected before mixing with Akarçay and subjected to advanced treatment processes and urban wastes should be completely controlled.



Photograph 1. Taking sample



Photograph 2. Examination and enumeration of epiphytic algae and phytoplankton under light microscope