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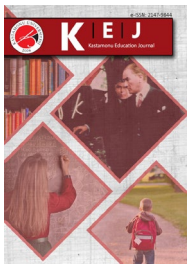

| Research Article / Araştırma Makalesi |

Exploring 7th Grade Students' Lived Experiences About Domestic Waste and Recycling After Attending a Scientific Trip

Bir Bilimsel Gezi Sonrası 7. Sınıf Öğrencilerinin Evsel Atıklar ve Geri Dönüşüme Yönelik Deneyimlerinin İncelenmesi[1]

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Keywords

1. Informal learning
2. Out of school learning
3. Field trip
4. Recycling
5. Recycling facility center

Anahtar Kelimeler

1. İnformal öğrenme
2. Okul dışı öğrenme
3. Alan gezisi
4. Geri dönüşüm
5. Geri dönüşüm tesisi

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Abstract

Purpose: This research study aims to analyze the effects of teaching the subject of domestic waste and recycling, which is included in the Science course curriculum, in informal learning environments on secondary school students' learning.

Design/Methodology/Approach: In the research, the phenomenology design, one of the qualitative research designs, is used. The phenomenology design focuses on a person's first-order experiences about a phenomenon. And, it aims to have in-depth information about the phenomenon. The study group of the investigation consists of 14 secondary school students receiving education at a public school in Aksaray, during the spring semester of the 2019-2020 academic year. The trip evaluation form and the semi-structured interview questions developed by the researcher as data collection tools are used as pre-test and post-test. The data acquired from the investigation were analyzed by content and descriptive analysis methods. Codes, categories, themes, and subthemes were built for the student's answers.

Findings: According to the results obtained from the study, the students observed that recycling is not a simple process that can be applied easily. The students remarked that the recycling facility trip creates awakening and awareness towards the environment and facilitates learning by walking through, seeing, and having fun.

Highlights: Based on this study, it is recommended to arrange field trips in different disciplines to for these trips enable students to gain interesting and catchy experiences.

Öz

Çalışmanın amacı: Araştırmada Fen bilimleri dersi öğretim programı içerisinde yer alan evsel atıklar ve geri dönüşüm konusunun informal öğrenme ortamları ile işlenmesinin ortaokul öğrencilerinin öğrenmeleri üzerine etkisini incelemek amaçlanmaktadır.

Materyal ve Yöntem: Araştırmada nitel araştırma desenlerinden olgubilim deseni tercih edilmiştir. Olgubilim deseni ile bir olgu hakkında kişinin birinci dereceden deneyimlerine odaklanılır ve söz konusu olgu hakkında derinlemesine bilgi sahibi olunması amaçlanır. Araştırmanın çalışma grubunu 2019-2020 eğitim öğretim yılı bahar döneminde Aksaray il merkezindeki bir devlet okulunda öğrenim gören 14 ortaokul öğrencisi oluşturmaktadır. Veri toplama aracı olarak araştırmacı tarafından geliştirilen gezi görüş formu ve yarı yapılandırılmış görüşme soruları ön test ve son test olarak kullanılmıştır. Araştırmadan elde edilen veriler içerik analiz yöntemleriyle çözümlenmiştir. Öğrenci cevaplarına yönelik kod, kategori, tema ve alt temalar oluşturulmuştur.

Bulgular: Araştırmadan elde edilen sonuçlara göre; öğrenciler geri dönüşümün kolaylıkla yapılan basit bir süreç olmadığını gözlemlemişlerdir. Öğrenciler geri dönüşüm tesisi gezisinin gezerek, görerek ve eğlenerek öğrenmeyi kolaylaştırdığını, çevreye yönelik bilinç ve farkındalık oluşmasını sağladığını belirtmişlerdir.

Önemli Vurgular: Yapılan araştırmadan hareketle alan gezilerinin öğrencilere ilginç deneyimler sağladığı için farklı disiplinlerde de alan gezilerinin düzenlenmesi önerilmektedir.

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INTRODUCTION

Education activities are conducted in 3 ways: formal, non-formal, and informal (Miyake, 2017; Obadiora, 2016). Learning can occur anywhere, not only in a school or classroom environment. Everything and every occasion in daily life can provide information for education (Obadiora, 2016). While formal education is conducted in a place, informal and non-formal education occurs outside of school. A place is not always necessary for learning to be achieved. Learning is achieved when it combines with an individual's active learning elements. Informal learning practices outside of school provide education for anybody, anywhere (Miyake, 2017).

It is important that individuals can configure their information for science education to be achieved effectively. When the literature is reviewed, it is also necessary to use informal learning environments and formal learning in this context. Several studies on the use of informal learning environments in science education are increasingly numerous and the positive effects of the process have been observed (Balçın & Topaloğlu, 2019; Erten & Taşçi, 2016; Türkmen, 2018). Learning outside of school has been used as a contribution to formal science education lately, becoming an important part of science teaching. While formal learning is about abstract and generalized information gain; informal learning is about gaining information on subjects that are not restricted by specific content (Edwards, 2015). Informal learning is generally defined by comparison with formal learning by many researchers (Stocklmayer, & Rennie, 2017).

Informal learning, with its instructive aspect, is an example of organizations that occur outside of school as an alternative to formal education and can be participated by many individuals from children to adults. It is also a type of learning method that is full of meaningful activities; consists of individuals' initiatives, interests, and choices instead of external demands and needs, and doesn't need any external evaluation (Rogoff, Callanan, & Gutierrez, 2016). Informal learning is not limited only to children of school age; it interests all individuals regardless of their age, culture, cognitive level, or socio-cultural background. It depends on individuals' motivations, interests, beliefs, prior knowledge, and expectations, meaning that it is performed individually (Behrendt, 2014). Informal learning practices enable students to associate what they learned in daily life and reinforce them (Kubat, 2018), it has fewer restrictions when compared to school systems. In a formal system, the focus is on trying to achieve the goals of the institution and external evaluation. Students' participation and success in informal learning activities are evaluated. Students' information and skill progress is promoted (Rogoff, et al., 2016).

Informal learning can be provided by field trips, zoos, museums, community centers, the internet, or TV (Stocklmayer, & Rennie, 2017). It is aimed to increase students' access to informal learning environments with various programs (Whitesell, 2016). Today, innovative schools, after-school programs, institutions like science centers, and museums can be given as examples of informal learning organizations (Rogoff, et al., 2016). Educational studies about informal learning environments like museums, science centers, zoos, and aquariums have been conducted for over 40 years (Dick, 2014). Informal learning can be provided via field trips, zoos, museums, community centers, the internet, or TV (Stocklmayer, & Rennie, 2017).

Field trips which are among the most important practices of informal learning are valuable educational and social experiences (Achen, Warren, Fazzari, Jorich, & Thorne, 2019). These trips enhance students' information and comprehension of various subjects; and rely on interaction as they require active participation (Stohlmann, 2019). Field trips are ideal education practices that are now being adopted in formal school systems; provide social interaction (Obadiora, 2016); and improve students' research and questioning skills (Patel, 2015). Infield trips, and computer and web-based learning environments can be used and these practices are described as virtual field trips (Mead, et al., 2019). Virtual field trips have been becoming an alternative to actual field trips to achieve some goals (Stohlmann, 2019).

Informal learning environments contain open-ended, learner-centered, research-based, and questioning-based practices (Stewart, & Jordan, 2016). A rich informal learning environment should consist of cognitive, emotional, physical, and social aspects of the experience. It should foster students' interest in science (Behrendt, 2014). A successful field trip should contain critical features like socio-cultural interaction, cognitive development, and effects on learning (Patrick, Matthews, & Tunnicliffe, 2013). In the formal school system, cooperative learning activities are under the supervision of a teacher. But, in outside school environments like field trips and museums; students discover new information by using cooperative learning practices in groups (Braund, & Lelliott, 2017).

In informal learning environments, students create information in a social way by engaging with friends and teachers. Informal learning environments enhance peer communication with each other. Students interact with each other via opportunities like question answers, visual interaction, and modeling (Stewart, & Jordan, 2016). Social interaction shines out in informal learning environments. Social interaction and guidance on practices are important in informal learning. Individuals obtain new information and skills by using their already existing information. Students get included in scientific and cultural practices belonging to society. Students contribute to achieving actual productive goals using individual and cooperative group activities. Informal learning environments motivate individuals to learn by their inherent, voluntary, free choice features (Rogoff, et al., 2016).

The effectiveness of field trips to informal learning environments is dependent on teachers' ability of managing trips. Teachers play a great role in students' sharing their out-of-school experiences (Dick, 2015). Activities to be done before, during, and after trips provide opportunities for students to think analytically and critically. Activities to be done before, during, and after trips should be related to each other. Teachers should be aware of classroom interaction and students' prior knowledge before trips and plan effective field trip practices by paying attention to interaction, concentration, and responses. Before a trip, learning goals are emphasized by classroom activities. Before a trip, students should be given a map of activities, an explanation about activities

should be made and information about places that students will visit should be given (Patrick, Matthews, & Tunnicliffe, 2013). Activities before field trips should contain warm-ups for students to improve their observation skills (Richardson, 2011.) Infield trip practices and learning goals should be determined; student assessment and risk calculations along with trip plans should be made (Patel, 2015). If teachers visit areas before, they help students to have more effective field trips. Teachers should determine critical situations for each activity in field trips. Teachers should prepare essential items like field trip maps, student group lists, and worksheets before field trips (Scott, & Matthews, 2011). During field trips, teachers should provide meaningful cognitive and affective experiences to students. During field trips, activities should provide opportunities for students to think analytically and critically. Students improve their cooperative skills in groups by interacting with each other (Patrick, et al., 2013). On-field trips, teachers divide students into groups and ask them to perform some tasks. Students improve their communication skills together on field trips. Field trips enable schools to connect to the outside world. They make it easy for students to synthesize their information (Obadiora, 2016). Using worksheets in informal learning environments makes learning outside of school more effective. Worksheets that contain useful practices support students' cognitive learning outcomes outside of school learning environments (Dick, 2014). Post-visit activities are important for field trips. Post-visit activities help to determine the knowledge that students obtain during field trips. Not doing post-visit activities prevents linking theory and practice (Patrick, et al., 2013). Educators should be very attentive to the assessment of field trips to determine and achieve learning goals and create a link between fields and daily life (Jolley, et al., 2019). Educators should give feedback to students on activities that they have done and be aware of the epistemological effects of fields. Field trip diaries can be used when assessing students during field trips (Patel, 2015).

Informal learning environments have great benefits for students. In informal learning environments, questions to ask students provide rich learning experiences using positive social interaction (Braund, & Lelliott, 2017). In informal environments like museums and zoos, individuals perform active practices like intentional observation, reading instructions, and touching (Miyake, 2017). Students can gain information on various subjects by contacting friends, teachers, and guides in informal learning environments. At the same time, students can share information on various disciplines and experiences in groups. Sharing information helps students to configure new information (Stocklmayer, & Rennie, 2017). Informal learning programs boost students' motivation for learning by enhancing their intrinsic motivation (Salmi, et al., 2016). Besides that recent studies have shown that informal learning environments help to achieve education goals containing positive affect and social experiences, they also have given a new perspective on learning environments outside of school (Dick, 2014). Informal learning environments make learning interesting and fun (Edwards, 2015). Educational organizations outside of school have the benefits of social and personal improvement, academic success, and physical activities for students. Education outside of school provides scientific learning outcomes related to nature, an increase in physical activities, leadership, and improvement of skills related to nature (Becker, Lauterbach, Spengler, Dettweiler, & Mess, 2017). Outside of school practices other than ordinary classroom activities influence students' affective traits positively (Avcı & Gümüş, 2019). Informal learning practices provide information to students directly. They make knowledge longer-lasting (Katırcıoğlu, 2019). Learning outside of school environments are settings that enable students to associate their knowledge with daily life and consolidate it. Each student can learn according to his/her traits in informal learning environments. Such environments help students to improve their communication and self-confidence skills (Kubat, 2018).

Field trips as informal learning environments have certain benefits to students. During field trips, students are included in experience-based learning. Students carry out peer learning by interacting with their peers and discussing their learning outcomes. Field trips are made, learning interesting and interactive, and build a positive attitude towards trip concepts (Behrendt, 2014; Richardson, 2011). Field trips create active learning environments for students. Field trips enable students to spend more time and effort learning and improving themselves (Achen, et al., 2019; Kaewkitipong, et al., 2016). Students learn how to make systematic observations and classifications during field trips (Mead, et al., 2019). Field trips act as a bridge between theory and practice. Field trips enable students to interact with different locations, cultures, and individuals (Mead, et al., 2019; Patel, 2015). Field trips are effective learning tools that reduce academic differences between students. Field trips provide enriched educational experiences to students. It is stated that informal learning environments assist learning inside and outside of school. Field trips provide critical learning opportunities to students, especially to those disadvantaged (Whitesell, 2016). Field trips motivate students through rich experiences, interest in science and business ethics, cognitive learning outcomes like conceptual understanding and reasoning skills along with affective gains (Whitesell, 2016; Richardson, 2011). Field trips give students meaningful social interaction opportunities by providing a fun time in nature (Tal, Alon, & Morag, 2014). Field trips improve students' descriptions and interpretation skills (Whitesell, 2016). Organizing field trips to places like museums ensure achieving important educational goals (Bursztyn, 2017) and supports scientific literacy (Dick, 2014). Field trips depend on beneficial information sharing and cooperative learning. Field trips facilitate learning concepts in their context (Kaewkitipong, et al., 2016; Obadiora, 2016; Stohlmann, 2019).

Many organizations state that informal learning environments are important practices for updating and improving information and skills in the 21st century (Lai, 2018). Informal learning ensures that informal learning practices prevail in schools in the 21st century by assisting students to learn inside and outside of school (Rogoff, et al., 2016). School curriculum programs enable informal learning practices to be used in science classes. As informal learning environments provide students with opportunities to learn in different ways from usual, it is suggested that informal learning environments are used during the teaching process, in education programs (Miyake, 2017). This is a limited number of research on the design, effect, and evaluation aspects of informal learning environments in literature (Tal, Alon, & Morag, 2014). Little research has been conducted on science teaching in informal

environments when compared with science teaching in school environments (Salmi, Thuneberg, & Vainikainen, 2016). Studies that have been continuing for over 20 years emphasize learning in museums and social learning theories (Richardson, 2011). In recent years, international research has been conducted on primary and secondary education students, guardians, and the public in a broad context (Stocklmayer, & Rennie, 2017).

New generation individuals don't spend enough time in informal environments such as natural parks. Individuals spend time at home without seeing nature's beauty by isolating themselves from the world and nature (Falgoust, 2017). The time students spend outside in nature has become limited to minutes (Borsos, Borić, & Patocskai 2018). While informal learning environments provide students with significant learning opportunities, few types of research have been conducted on the importance of learning environments outside of school (Achen, Warren, Fazzari, Jorich, & Thorne, 2019). Even if field trips are an important part of the educational process, there are limits and limitations to performing them (Mead, et al., 2019). Field trips have critical importance as they increase the motivation of students, provide students with various experiences of sensing places, having an interest in career planning and changing situations. On-field trips, students can have rich interaction with their friends, field experts, and environment independently. (Jolley, et al., 2019). Today, schools can't give place to field trips in education practices because of financial difficulties and time problems. Even though students are more interested in activity-based learning practices, they have to continue performing learning practices in traditional classrooms contractedly (Stohlmann, 2019). Even though education outside of school has an undeniable effect, teachers don't include education practices outside of school sufficiently in the education process because of limitations of time and transportation (Borsos, Borić, & Patocskai 2018). Teachers don't use outside-of-school practices in the education process sufficiently because of factors like planning, responsibility, and costs (Katırcıoğlu, 2019).

Field trips are an important component of the education system. Even though field trips are important for education, few types of research have been conducted on the effects of field trips on students' academic learning (Whitesell, 2016). Many schools ignore field trips with the thought that they do not affect academic success. Yet, field trips to informal learning environments such as museums and zoos have special academic goals besides the entertaining aspect (Whitesell, 2016). Many educators and students ignore the benefits of field trips by thinking that they take too much time and are hard to organize (Kaewkitipong, Chen, & Ractham, 2016). Even though field trips are reliable methods to attract students to disciplines like geology, in practice, they are not used often. Field trips have started to take apart in education rarely because of transportation problems, decreasing financial and administrative support (Bursztyn, 2017). Moreover, educators' interest in field trips has been diminished because they require too much preparation and official procedures and because of financial problems. Many teachers don't prefer field trips because of a lack of funds and too many risks (Obadiora, 2016). It is debated that field trips cost too much, especially for students (Patel, 2015). Quantitative research on affective and cognitive learning outcomes provided by field trips is limited (Whitesell, 2016). It is not fully understood students' interactions on trips and how students' performances in informal science learning can be improved (Chen, Xin, & Chen, 2017).

When researching informal learning environments of different grades in related literature are reviewed; Dick (2014) has concluded in his research that students' debate on trips and worksheets used during trips assist cognitive and affective learning of students. Avcı and Gümüş (2019) have remarked in their research done in social studies lessons that field trips provide active and permanent learning via learning by doing and experience. Also, they state that outside-of-school activities improve students' sense of wonder, enable learning through seeing and touch and reinforce knowledge. Whitesell (2016) has determined in his research with secondary students that field trips improve students' academic success. Tal and friends (2014) in their research with secondary students have concluded that good communication between teachers and guides out outside-of-schooling environments improves the quality of trips as it increases environments in that students can interact with each other and discover by musing bling active learning and psychomotor activities.

Katırcıoğlu (2019) in his research with secondary students has concluded that field trips support knowledge gained in the classroom and increase the use of knowledge of students. Behrendt (2014) in his research with secondary students on biology field trips has stated that interaction makes trips deeper, friends and peers are an important part of the trips, and teachers should encourage students to ask questions and answer, and support students' feedback. Achen and friends (2019) in their research have concluded that field trips with graduated students help students to get hold of content and increase their preparedness in related disciplines. Jolley and friends (2019) in their research with university students have concluded that field trips provide knowledge fundamentally, allow students to put their knowledge into practice, improve student problem-solving skills by giving them responsibilities, and help enhance student-student and student-educator interaction.

Falgoust (2017) in his he has found that university students want to spend time in informal environments. However, they don't use informal environments because of constraints such as time, material, transportation, and technology. Mertoğlu (2019) in his study, he has concluded that teacher candidates provide permanent learning by doing in out-of-school learning environments. Bostan Sarıoğlan and Küçüközer (2017) in their research have deduced that teacher candidates point out informal environments aid permanent learning. Gürsoy (2018) in his study has concluded that teacher candidates explain out-of-school learning environments contribute to students' cognitive, affective and lifelong skills. Kubat (2018) found that in his study with science teachers, they specify informal learning environments provide permanent learning with firsthand experiences, but these environments have disadvantages such as excessive legal procedures. Çiçek and Saraç (2017) in their research on science teachers said that out-of-school learning environments provide useful knowledge in daily life and this environment offers teaching

opportunities, according to individual differences, but it has disadvantages such as transportation and discipline. Doğan and his friends (2018) in their study with a science teacher concluded that field trips enable students to put knowledge into practice and also increase motivation and permanent learning. Richardson (2011) in this study with adults, they have found that field trip improves scientific curiosity and provides scientific reasoning.

It is also possible to come across studies on online trips in the literature. Chen and his friends (2017) in their research they investigated the effect of a mobile system that will increase the students' interaction with the trip. They stated that mobile systems will have great potential in informal learning environments in the future (Chen, Xin, & Chen, 2017). Lai (2018) in his study with adults found that online informal learning environments increase individuals' knowledge acquisition and development of online communication skills. Mead and his friends (2019) in research with high school students they have concluded that virtual field trips promoted with online provide active and authentic learning and he found significant differences in students' knowledge acquisition. Kaewkitipong and his friends (2016) in their study, used social media to increase field trips and they have found that social media increased students' satisfaction if field trips promote with social media, it will be more beneficial for students with less time and effort.

If we seek studies on recycling in the literature Katırcıoğlu (2019) found that field trip with recycling supports 7^{th}-grade students learning. Bakar (2013) concluded that science and arts center students have a low level of knowledge about the damage caused by plastic to the environment. Islam and his friends (2019) found that in their study waste should not be seen as a resource and we can be obtained from waste, environmental and economic benefits, reduction in CO2 emissions, and using energy will be decreased with recycling. Harman and Çelikler (2016) found that in their research with university students, although students know the meaning and purpose of recycling, s students' awareness of recycling is low. Mrema (2008) concluded that in her study students learn the importance of recycling at school or at home, attitudes, and behaviors toward recycling depend on a wide variety of factors.

Research generally focuses on the advantages and disadvantages of informal learning environments in the literature and there is limited information on how to increase the interaction of students during the trip. Moreover, how the trip affected students' consciousness and awareness of environmental concepts was not discussed in detail.

In this research, we investigate developing students' ideas about how the recycling process works, we want to figure out the environmental effects of recycling and try to answer the questions what is recycling? What can be recycled? How do clear students misconceptions about recycling? How to increase their learning? In addition, we aim to increase student learning by processing the "Domestic Waste and Recycling Unit" in the science curriculum with informal learning environments, and we will guide teachers and other researchers with this research and contribute to the literature on how science education can be carried out in informal learning environments. Furthermore, once we share research results with another researcher, it will contribute to the literature and guide future studies.

Problem Statement

What is the effect of household waste and recycling in informal learning environments on the learning of 7th-grade students?

Purpose of the study

This study aims to increase student learning by processing household waste and recycling units in the science curriculum with informal learning environments, guiding teachers and other researchers about recycling matter, and contributing it to the literature on science education in informal learning environments.

The research also aims to examine the effect of processing domestic waste and recycling in the science curriculum with informal learning environments on student learning.

The rationale of the Study

When the literature on informal learning environments is examined, it is seen that studies that draw attention to the positive and negative aspects of teaching in these environments have gained intensity. In addition, it is stated that the number of researchers performing field trips is low due to various limitations. There is limited information on research on how to increase students' learning by increasing their interaction in informal learning environments and it is not known how to create attitudes, behaviors, and consciousness in this direction in students.

Recycling center trips are considered informal learning activities. With this research, it is thought that students will learn about recycling facilities and what recycling is, what can be recycled, and how the recycling process and eliminate misconceptions and increase learning about recycling. The study, it is aimed that students to understand the environmental effects of recycling activities and increase their awareness about recycling. In addition, it is thought that it will contribute to teachers, researchers, and the literature, and will guide further studies with the results of this research.

METHOD/MATERIALS

In this part of the research, it is explained the research model, the study group of the research, data collection tools, and data analysis.

Model of the Research

In the research, it was used the phenomenology design, one of the qualitative research designs. The phenomenology design focuses on a person's first-order experiences about a phenomenon. And, it aims to have in-depth information about the phenomenon (Creswell, 2007). In this study, researchers are focusing on the students' experiences with household waste and recycling.

Study Group of the Research

The study group of this research consists of 14 secondary school students studying in a public school in the city center of Aksaray in the spring term of the academic year 2019-2020. When choosing the study group, it was chosen easily accessible case sampling methods which kind purposive sampling methods. In an easily accessible situation sampling, the researcher chooses a situation that is easy to access and adds speed and practicality to the study (Yıldırım & Şimşek, 2016).

Data Collection Tools

In the research, the data were collected through a field trip opinion form and semi-structured interview questions, which were about domestic waste and recycling topics and developed by researchers, including open-ended questions. The trip opinion form was applied to the students before and after the trip. In the process of developing data collection tools, firstly was made literature review in the national and international areas and trip interview form, and semi-structured interview questions were prepared. For the content validity of the questions, expert opinion was taken from 2 experts in the field of science education. After this process, it was determined opinion form and the scope of the interview questions were. The forms were applied as a pilot to 10 middle school 7^{th}-grade students to determine whether the items in the draft form are clear and understandable. Necessary corrections were made and the final form was given to the trip interview form and semi-structured interview questions.

Field Trip Opinion Form

A trip opinion form was used which was developed by the researcher to learn the opinions of the students about the recycling facility, which is an informal learning environment. The field trip opinion form consists of 10 open-ended questions. The form was applied to the students participating in the trip as pre-test and post-test. In the form, there were questions such as “What does the recycling facility evoke for you?” and “What are your expectations from the recycling center trip?”

Semi-structured interview questions

Semi-structured interviews were conducted with the students participating in the trip to determine the effect of processing household waste and recycling in informal learning environments on student learning. Semi-structured interview questions consisting of 8 open-ended questions were prepared by the researchers. Semi-structured interview questions were presented to field experts. Corrections were made according to feedback and the interview questions were given their final form. Semi-structured interviews were carried out by the students who participated in the field trip. In semi-structured interview questions, there were questions such as “what are the benefits of teaching in out-of-school settings?”, “What interested you most about the recycling facility trip?” and “what are your thoughts on making such trips in your science classes?”

Analysis of Data

The study examined students’ answers to the semi-structured interview questions with the trip opinion form. Content and descriptive analysis were used in the analysis of students' answers. Codes, categories, themes, and sub-themes were constructed with the given answers. Firstly, notes for the trip, student answers, and audio and video recordings were made into written documents. While the content analysis process; codes, categories, themes, and sub-themes were created for student answers. Similar codes of answers are grouped in categories and themes and frequency tables of the codes were made. In the descriptive analysis part, student answers are given by quoting directly without comment. In addition, correlations were made between the themes determined in the content analysis. The analysis of the data was done by 2 researchers and compared. According to Miles and Huberman's (1994) internal consistency formula, the percentage of agreement between researchers was calculated as 85%.

Field Trip Process

We planned to learn what is recycling? What can be recycled? How do clear students misconceptions about recycling? How to increase their learning? And get cognitive acquisitions with "Domestic Waste and Recycling" 7th grade Science lesson curriculum unit in field trip about recycling. Before the trip, students were informed about the trip and necessary permissions were obtained from the parents’ students and the school administration. Before the trip, students answered questions such as what is recycling. What is recycling used for? Which materials can be recycled? In the school. A meeting was held with Aksaray Recycling Center officials before the trip and center officials were informed about the student trip 3 weeks ago.

The recycling center is located in the Aksaray city center. Some of the material can be recycled at the center. Products such as packaging waste, plastic, metal, glass, and wood can be recycled at the Recycling Center. Students can view the recycling of plastic, packaging waste collection, and separation by visiting the metal and glass recycling departments on trips. The staff of the center provided information to the students about their work by guiding the students throughout the trip. Students learn what stages waste packaging goes through in the recycling center, respectively, and which products can be recycled, what are the contributions of recycling to the country's economy? During the trip, audio and video recordings, photographs, and observer notes were used to collect information about the trip. After the trip, the form with questions about recycling was applied to the students again. Interviews were held with volunteer students so that students could share their experiences about the trip. Student interviews were recorded with the video. The data for the trip are presented in the findings section.

FINDINGS

In this part of the research, the findings regarding the answers given to the trip interview form and semi-structured interview questions are included to learn the thoughts of secondary school students about teaching the recycling facility as an informal learning environment, the subject of household waste, and recycling.

Findings of the Trip Opinion Form Pre-Test

In the research, it is included the findings of the opinions of the students on the trip before the recycling center trip. The question what do you think recycling is? Student answers were presented in Table 1.

Table 1. Findings regarding the answers given by the students about what recycling is

Answer	F
Reusing materials	4
Loving the environment	2
Not wasting	2
Investing in society	1
Economic gain	1
Environmental cleanliness	1

Students gave different answers to the question of what recycling is before the trip. Students explained recycling as reusing materials at the highest rate (f=4). Students exemplify recycling benefits such as loving the environment (f=2), not wasting (f=2), environmental cleanliness (f=1), and economic gain (f=1). Before the trip, the students mentioned the contribution of recycling in nature; they did not mention the relation of recycling with raw material. The question which materials do you think can be recycled? Student answers were presented in Table 2.

Table 2. Findings regarding the answers given by the students about which substances can be recycled

Answer	F
Paper	10
Plastic	10
Glass	10
Battery	3
Metal	3
Bottle	1
Everything	1

When table 2 was examined, students (f=10) said that paper, glass, and plastic are recyclable materials. Students (f=3) explained that batteries and metals can be recycled. Student (f=1) thinks that all materials can be recycled. They frequently answered such as paper, plastic, and glass, recyclable materials, but they seldom mentioned substances such as batteries and metals. Before the trip, the students did not agree on oil, electronic waste, and medical and chemical wastes among recyclable materials. The question which why is recycling done? Students' answers were presented in Table 3.

Table 3. Findings regarding the answers given by the students regarding the purpose of recycling

Answer	F
Prevent environmental pollution	6
Not harm the environment	4
Prevention of waste	3
Prevent cutting of trees	2
Get income	1

When table 3 was analyzed, the students (f=6) stated that recycling was done to prevent environmental pollution, while students (f=4) stated that recycling was done to not harm the environment. Students (f=3) explained that recycling was done prevention of waste. Students (f=3) stated that recycling was done to prevent cuts to trees and student (f=1) recycling was done to get to income. Students explained the purpose of recycling as preventing environmental pollution and not harming nature. The question is asked students how they think recycling takes place. And student answers were presented in Table 4.

Table 4. Findings on student responses about how recycling is done

Answer	F
Collecting items one by one	5
With recycling bins	3
Through several stages	2
Physical and chemical method	2
I don't know	2

When table 4 was examined, students explained that students (f=5) think recycling was done by collecting items one by one. Students (f=3) explained that recycling of wastes was done with recycling bins. Students (f=2) stated that recycling was done through several stages and by physical and chemical methods. Students (f=2) answered this question as I don't know. Students think that recycling wastes are collected separately with recycling bins and made with certain physical and chemical processes. The question is asked to students what does the recycling, institution mean for you. And it was presented their answers in table 5.

Table 5. The findings of the concepts that the trip evokes in students

Answer	F
New products from waste	4
Factory	2
Renovation	2
Saving	1
Reuse	1
Nature	1
Change of state of matter	1
Economic development	1
Prevention of environmental pollution,	1
Sustainable development	1
Environment	1
Machinery	1

When table 5 was analyzed, it is seen that the subject of recycling evokes quite a lot of concepts in students. The students (f=4) stated that the trip to the recycling plant with make new products from waste. Students (f=2) think that the trip was related to the issue of factory and renovation. Students (f=1) explained that the trip was related to the issue of saving, reuse, nature, change of state, economic development, prevention of environmental pollution, sustainable development, environment, and machinery. Students associated recycling with concepts such as obtaining new products by reusing wastes, saving, factory and machinery. The question is asked students what their expectations from the recycling center trip are. And student answers were presented in Table 6.

Table 6. Findings regarding students' expectations from the trip

Answer	F
Get information about recycling	7
View recycling process	5
Prevent environmental pollution	1
Learn new things and	1
Distinguish substances from each other.	1

When table 6 was examined, students (f=7) explained that expectations get information with recycling center trip. Students (f=5) think they would view the recycling process. Students (f=1) stated that they hope to prevent environmental pollution, learn new things, and distinguish substances from each other. When students' answers are analyzed, it is seen that they have expectations such as obtaining information about recycling learning earning new information and viewing the recycling event more closely. The question is asked students what topics in science class they think the recycling center trip might be about. And student answers were presented in Table 7.

Table 7. Findings of the subject of the trip

Answer	F
Energy conversions	5
Environmental science	4
Sustainable development	3
Substance and industry	2
Global warming	1
Domestic waste	1
Change states of matter	1
Physics	1
Chemistry	1
Simple machines	1
Chemical reactions	1
States of matter	1

When table 7 was analyzed, it has been observed that students associate the recycling event with a large number of subjects in science. The students (f=5) stated that the recycling center trip might be about energy conversions. The students (f=4) think recycling center trips might be environmental science. Students (f=3) explained that the trip will be about sustainable development. Students (f=2) said that trips could be related to substance and industry. Students (f=1) stated that recycling center trips might be global warming, domestic waste, phase change, physics, chemistry, simple machines, chemical reactions, and states of matter.

Findings of the Trip Opinion Form Post-Test

After the trip, the trip opinion form was applied as a post-test to learn the opinions of the students about the trip after the recycling center trip. The question is asked what you think recycling is. And it is presented their answers in table 7.

Table 8. Findings of the answers given by the students about what recycling is

Answer	F
Make substances reusable	12
Recycling of waste to nature	4
Protect nature	1
Contribute to the economy	1
Providence	1
Separate substances	1

When table 8 was examined, students (f=12) said that recycling is a kind of process to make substances reusable. The students (f=4) stated that the recycling center is identified of recycle waste. Students (f=1) explained that recycling is protect nature, contributes to the economy, providence, and separates substances. When student answers were analyzed, the students defined the recycling event as providing raw materials to nature so that the materials can be reused and contribute to the economy by protecting nature. The question is asked to students what topics in science class materials do you think can be recycled. And it is presented their answers in table 9.

Table 9. Findings regarding the answers given by the students about which substances can be recycled

Answer	F
Paper	13
Plastic	13
Glass	13
Battery	10
Metal	10
Electronic waste	8
medical and chemical substances	6
Oil	6

When the students' views about substances that can be recycled were examined after the rip in table 9, students (f=13) think that paper, glass, and plastic can be recycled. The students (f=10) stated that batteries and metals can be recycled. The students (f=8) involve in electronic waste recycling too. The students (f=6) indicate that medical and chemical substances and oil can be recycled. With The trip, the students realized that they can be reused by recycling many substances that were not non-disposable

such as batteries, oil, and electronic and chemical waste. Students answered the questions for what purpose is recycling done. Students' answers were presented in table 10.

Table 10. Findings regarding the answers given by the students regarding the purpose of recycling

Answer	F
Reducing raw material use	10
Prevent environmental pollution	8
Providence	6
Reusing of waste materials	6
Contributing to The economy	6
Use country resources efficiently	5
Protect nature	5
Decrease global warming	4

When table 10 was examined; the students (f=8) stated that recycling was done to prevent environmental pollution while students (f10) stated that recycling was done to reduce the raw material. Students (f=6) stated that recycling was done for providence, reusing waste materials, and contributing to the economy. Students (f=5) think that recycling was done to use the country's resources efficiently and protect nature. Students (f=4) stated that recycling was done to decrease global warming. Students think that it is provided with recycling by reducing the use of raw materials, and efficient use of natural resources and thus, they think that it is aimed to generate an income by practicing economy. The question is asked to students how did you recycle? And it is presented their answers in table 11.

Table 11. Findings on student responses about how recycling is done

Answer	F
The materials by separating from each other	12
Heating the waste materials in the oven	10
Forming	10
Lessen with press	10
Through some process	8

When table 11 was examined; student (f=12) stated that recycling occurred the materials by separating from each other. Students (f=10) think recycling was done by heating the waste materials in the oven, melting, forming, and lessening with a press. Students (f=8) explained that recycling waste was done by going through some phrases. Students stated that in the recycling process wastes were collected separately from each other.

Table 12. Findings of the subject of the trip

Answer	F
Human and environment	10
Energy transformations	10
Sustainable development	9
Domestic wastes	8
Global warming	6

When table 12 was examined; students (f=10) associated the trip to the recycling plant with the subjects of human and environment and energy transformations in the science course. Students (f=9) think that the trip was related to the issue of sustainable development. Students (f=8) explained that the trip was related to the issue of domestic waste. Students (f=6) stated that the recycling plant trip was related to the issue of global warming. The students stated that the recycling trip was mostly about environmental issues.

While students gave limited information about what recycling was and for what purpose and did not associate the recycling event with the environment before the trip, the students explained the recycling event in detail and talked about the environmental and economic effects of the recycling event after the trip. In the pre-application of the trip opinion form, while the students were explaining that certain materials such as paper, plastic, and glass were recycled, after the trip, they stated that in addition to these items, battery, metal, medical and chemical waste, and liquid oil could be recycled. While students thought that the recycling activity was done by going through some simple stages with the recycling boxes before the trip, they explained that the recycling was done by separating the materials from each other, reducing the wastes by pressing, heating, and melting in the oven and shaping stages after the trip.

Findings Regarding Semi-Structured Interview

Semi-structured interviews were conducted with 10 students who participated in the trip to learn more about the opinions of the students after the recycling facility trip. What are your thoughts on the recycling trip you took? The students stated that they had a good day and learned new information they did not know. To this question, student A; we had a different day than the days at school. The recycling plant was a huge place. There were many machines in the facility. We were very interested in the harmonious operation of the machines, she replied. Student E; during the tour, the guide responsible for the facility accompanied us. She answered all the questions we had. She replied that she learned a lot of new information about recycling. Another student M; used to do science lessons at school by writing, reading books, and working on the smartboard. Today we went on a trip to the recycling plant. We learned by traveling, seeing, and having fun. It was seen that the student answers given to this question gained intensity in codes such as interest, fun, happiness, curiosity, and excitement, and student answers were grouped under the theme of motivation. On a different day, gaining experience, and adventure answers are classified as experience themes. The theme of learning new things, gaining knowledge, and elaborating what has been learned was determined.

It is asked to students ''did your recycling trip meet your expectations? '' while % 78.57 of the students answered yes, % 22.43 students answered no, the trip did not meet our expectations. The students explained the reasons for meeting their expectations of the trip by learning by traveling and seeing, working with employees diligently, and answering all the questions that were asked. Student B; the trip met my expectations. Because I have seen gigantic machines. I answered all the questions that came to my mind. Student D; the trip met my expectations. I learned about recycling by traveling and seeing. The students stated as the reason why the trip did not meet their expectations it should have been given more time and the trip area was small. Student F expressed that I can't say that the trip met my expectations. Because I thought there was a separate facility for each item. It is not as I thought.

Another interview question was “what interested you most about the recycling facility trip?'' The students answered genera that that plastic is a recycling process and the machines consist of a recycling facility. While student D answered that the raw material of the plastic was very interesting. This caught my attention on the trip. Then, I watched the melting of the plastic curiously. Another student A; machines separate substances from each other. This caught my attention. He/she stated that thousands of papers are turned into raw materials in machines. When the students' responses were examined, it was explained that the most interesting event of the trip was the pressing of wastes, the raw material of plastic, shaping the products, and huge machines.

The other question is '' what he t can be the benefit of this kind of extra scholastic activity?'' Students answered that the trip provided many benefits. Student I; Thanks to the trip, I learned better in the open air. I am not interested in science but now I am. Student E; the trip made it easier to learn for us. Thanks to the trip, I learned the correct form of many subjects. Student K; I learned different, detailed, and interesting information during the recycling facility trip today. Student A; I have learned that recycling is not as easy as, and waste materials go through many stages. I was conscious of recycling. I think thanks to such trips, people behave consciously. The answers given to this interview question were grouped under the themes of interest, curiosity, interesting and exciting, affective theme, easy and permanent learning, and educational theme by reinforcing what was learned and creating environmental awareness and awareness, environmental sensitivity, and environmental impact. ''What did you observe about recycling during your trip to the recycling facility?'' Student M; I observed that a recycling facility is a place where everything happens regularly. Student D; in the trip, I had the chance to examine the operation of machines that function like a factory. Student A answered that we examined the stages of recycling in detail. Recycling can be done through difficult processes. That's why we need to behave well in the environment we live in.

“Did you have the opportunity to correct your misinformation during your trip to the recycling facility? '' % 35.71 of students answered that yes, I corrected my wrong information. % 64.29 of them answered that no, the trip did not provide the opportunity to correct my misinformation. Student K; before the trip, I thought recycling was simple. However, there were many stages of recycling. Student A; stated that I didn't know how papers were separated. Thanks to the trip, I learned that.

“What are your thoughts on arranging such a trip in your science classes?'' Students expressed their satisfaction with the trip and they demanded arranging more excursions. Student F; thanks to the trip, we understood better. In other lessons, the excursions should be arranged on other subjects, especially on subjects that we did not understand. Student B; Thanks to the trip, our curiosity about the lesson increased. We reinforced what we learned easily. Student I; with the trip, we had lessons based on experiments and observation. The excursions should be arranged frequently. While the answers were grouped under the sub-themes of understanding the lesson, understanding the subject, thinking about the environmental effects of waste and mental effects in science lesson via a trip, doing an experiment and making an observation, data collection, observing the process were classified under the theme of conducting research.

''What kind of suggestions do you have so that this trip can be more effective?'' Students expressed different opinions. Student B; I would like to see the recycling process of different materials apart from recycling. Student E; we should have been given more time to visit the recycling facility comfortably. Student M; during the trip, there should have been an atmosphere where students could easily ask the teacher and guide in charge of everything students sent a state that samples could be given to the students about the products formed as a result of recycling.

DISCUSSION

In the study, the effect of the recycling facility tour on the learning of secondary school students was investigated and the findings were compared with other research findings in the literature.

The student's interest and curiosity about the lesson increased with the visit to the recycling facility. The trip provided for students to easily reinforce the knowledge they learned. The students stated that they had an interesting day, they found it was more different than at school, and that they had fun on the recycling facility trip. Students want to arrange excursions in other disciplines, especially on subjects that they did not understand. It is possible to encounter studies with similar results in the literature. In the study conducted by Öner and Öztürk (2019) with teacher candidates, Students stated that they found the trip interesting, different, and fun. In the study conducted by Avcı and Gümüş (2019) primary school students in the Social Studies course, Students stated that out-of-school activities develop students' sense of curiosity, provide learning by seeing and touching, and help reinforce the learned information. Mrema (2008) stated in his/her research that recycling based on environmental activities will increase students' awareness with entertainment and motivation about recycling and its environmental effects. Richardson (2011) concluded in his study with adults that field trips increase interest in science and science and provide scientific reasoning. Becker and his friends (2017) stated that informal learning environments increase students' social and academic learning. In the study of Bostan Sarıoğlan and Küçüközer (2017), teacher candidates stated that informal learning environments increase the interest of students and increase permanent learning. Demirel and Özcan (2020) students think that the trip is interesting and helps to reinforce the knowledge learned in the lesson about the butterfly garden trip in their study.

Secondary school students defined the recycling event together with the trip as providing raw materials to nature so that they can be reused and contribute to the economy by protecting nature. After the trip, the students realized that many items such as batteries, oil, electronic and chemical wastes are not disposable but can be reused by recycling. Students think that by reducing the use of raw materials by recycling, efficient use of natural resources is ensured, and thus, it is aimed to make a profit by practicing economy. Thanks to the trip, students' cognitive learning about domestic waste and recycling increased. There are studies which similar findings in the literature. Harman and Çelikler (2016) stated teacher candidates explained the purpose of recycling as reducing the use of raw materials and preventing environmental pollution in their research. Also, students stated that wastes such as paper, plastic, plastic bottles, batteries, and glass can be recycled. In the study of Aksan (2016), students stated that recycling provides reducing the need for raw materials, protects natural resources, and practices the economy. Dick (2014) concluded that the field trip supports students' cognitive and emotional learning in his study. Whitesell (2016) concluded that field trips increased secondary school students' academic achievement. Katırcıoğlu (2019) concluded that the field trip on recycling increased secondary school students' learning. Jolley and his friends (2019) made firm that field trips increased university students' knowledge in their studies.

After the trip, the students learned that recycling is not as easy as they thought, and that waste materials go through many stages. They think that the trip has provided them with the awareness and consciousness of recycling. It is possible to encounter studies with similar results in the literature. In his study, Mrema (2008) explained that to increase the participation of students in the recycling activity, the environmental benefits of recycling should be emphasized and the students should understand the importance of taking part in the recycling event. Katırcıoğlu (2019) stated that he conducted with secondary school students on environmental behavior and awareness increased about recycling in the study. Stohlmann (2019) found that students' awareness levels increased on agriculture in his study. Behrendt (2014) concluded that secondary school students had positive attitudes and awareness toward the concepts of travel about biological parks. Bakar (2013) stated that science and arts center secondary school students do not have enough behaviors to use the recycling bin, and environmental education is important for the prevention of environmental problems, environmental awareness, and attitude in his research. Aksan (2016) stated that recycling education increased the awareness of science teacher candidates about recycling and recyclable products in her study.

CONCLUSION AND RECOMMENDATIONS

This research, it was aimed to increase student learning by processing domestic waste and recycling units with informal learning environments, and some results were obtained based on the findings.

With the field trip to the recycling facility which is an informal learning environment of the students' interest and curiosity increased in the science course? The field trip increased the interest of the students and facilitated their learning. The trip made it possible for the students to easily reinforce the knowledge they learned. Students provided permanent learning thanks to the recycling facility trip.

While the students thought that the recycling of paper, glass, and plastic products, which were commonly recycled could be done before the trip, except for paper, plastic, and glass; they realized that many other materials such as batteries, oil, electronic and chemical wastes could be recycled. The students stated that they had a different day and it was so fun for them compared to school days about the recycling facility trip. They think that the trip made them create awareness of recycling.

After the trip, the students learned that recycling is not as easy as they thought, waste materials go through many stages and become raw materials again, thanks to recycling, natural resources are used more efficiently and recycling contributes to the country's economy.

Concerning research, it is seen that informal teaching practices should be given more place informal teaching environments. To increase the frequency of field trips arranged by teachers to informal learning environments, transportation, financial limitations, and legal procedures should be eased. It is thought that arranging field trips related to different disciplines will ease students' learning. Field trips can be used to increase students' awareness of the environment.

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We hereby declare that the study has no unethical issues and that research and publication ethics have been observed.

Examples of author contribution statements

A.B. and B.C. conceived of the presented idea. A.B. developed the theory and performed the computations. C.D. and D.E. verified the analytical methods. B.C. encouraged A.B. to investigate [a specific aspect] and supervised the findings of this work. All authors discussed the results and contributed to the final manuscript.

Researchers' contribution rate

The study was conducted and reported with the equal collaboration of the researchers.

Ethics Committee Approval Information

With the decision of Aksaray University Ethics Committee dated 24.04.2020 and numbered 2020/03-08, it has been seen that the study by ethical principles.

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