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DETERMINATION OF PRIMARY SCHOOL STUDENTS' PERCEPTIONS OF SUSTAINABLE ENVIRONMENT THROUGH PICTURE ANALYSIS¹

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ABSTRACT

The aim of this study is to determine primary school students' current environmental perceptions and collect drawings about the environment in their dreams after receiving sustainable environmental education. At the end of the research, it was tried to analyze the students' pictures related to environmental thirteen 4th grade students studying at a public primary school in Zeytinburnu district of İstanbul were selected by using purposive sampling method participated in the research. They were asked to draw pictures in order to reveal their current environmental perceptions. After the picture drawings were finished, they were expected to explain their drawings on the back page of the paper in accordance with the instructions. After the drawings, the students were given 'sustainable environmental education' for a certain period of time. Then, the students were asked to draw pictures again in order to reveal their imagined environmental perceptions. Picture drawings were taken as both drawing and written expression by processing like the previous data collection process. Content analysis technique was used as data analysis. Findings, show that while the pollution theme is the most dominant in the current environmental perceptions of the students, the dominant theme in the imaginary environment perceptions is the place theme. In the place theme, it is emphasized that individuals should build their lives in the natural environment and considering the concept of sustainability. In the drawing of imaginary environmental perceptions, the reflections of the sustainable environmental education are seen.

Keywords: Environmental Education, sustainability, drawings, primary school students.

¹ This study is derived from the second author's master's thesis with the same title. And a part of this study was presented as an oral presentation at the IXth International Eurasian Educational Research Congress/EJER2022, Ege University, İzmir/TURKEY (22-25 June 2022).

INTRODUCTION

Today, the increase in industrialisation, the depletion of natural resources and the excessive increase in consumption cause the emergence of the environmental problem, which is the most fundamental problem of the world. The negative effects on the environment are increasing day by day and it is important for all to comprehend environmental awareness. Education on this subject is important for individuals to be sensitive to the environment. The basics of education should be how to protect the natural environment, which elements will pose a threat, thinking for the future so that the use of natural resources does living things to be aware of this situation that concerns the whole world. Individuals are in search of solutions to environmental problems. The solution to all these problems is to raise awareness of students about this issue and to actively participate in such tasks. Environmental education is the education applied in order to develop natural resources, improve and protect the environment that includes the whole living world in the ecosystem (Ünal & Dımişki, 1999:142). Environmental education is the education given to raise individuals who can develop solutions about environmental problems, who are sensitive to the environment, and who are conscious about the protection of the environment (Külköylüoğlu, 2000). Environmental education should find its place in the programmes of related fields (Athman & Monroe, 2001:37).

The trainings given to students should be associated with sustainability. Sustainability should be made a focal point in environmental education. In this way, how the environment will be seen in the future and how to solve environmental problems depends on changing our perspective in this direction (Yüksel & Yıldız, 2019:223). Education, which struggles to spread and develop this awareness among individuals, will increase the level of knowledge and awareness. The environment should become interesting in learning-teaching settings and individuals should endeavour to create this situation (Alerby, 2000:208).

It is important to know stages of environmental education. The North American Association for Environmental Education (NAAEE) lists the stages of education for the environment as follows:

1. "Developing sensitivity, sensitivity and interest in the environment"
2. "Information about the functioning of the natural system"
3. "Establishing value judgements and priorities that ensure a positive view of the environment"
4. "Gaining the ability to actively participate and contribute to the environment"
5. "Having experience in preventing and solving environmental problems" (as cited in Ayvaz, 1998:24).

Sustainable Environmental Education

In order to provide environmental education at a much better level, it is necessary to explain the concept of a sustainable environment to students. Students taking an active role in this education can be effective in transforming their knowledge into behaviour. It is seen that sustainability, which has become the focal point of environmental education, is important in shaping personal attitudes towards consumption. In this way, there is

a strong relationship between the intensity of environmental education and students' environmental knowledge (Zsóka et al., 2013:127). Sustainability means not putting natural resources at risk by responding to the needs of both the present and future generations. Educators should also make an effort in this regard and help to create environmental and sustainability awareness in students (Erdoğan & Tuncer, 2009).

In our country, environmental education and sustainable environmental education are not given as a separate course in primary school. Acquisitions related to the environment are also included in different disciplines. Giving sustainable environmental education to students especially under this subject can be very important for the protection and continuation of our world (Effeney & Davis, 2013:40).

Child Pictures

Analysing children's drawings

Drawing is one of the forms of communication. It gives us information about the person's intelligence, attitude, anxiety and personality (Zians, 1997). Drawing is an endeavour to represent the world. Polanyi (1958) sees drawing as powerful transmitters of perception formed by knowledge and experience. Since individuals have been able to record their feelings, thoughts and information through pictures from past to present, especially children's drawings have been analysed for various purposes (Chula, 1998). From a psycho-pedagogical point of view, pictures are used to explore the inner world of the child, to measure the relationship with the immediate environment, and to obtain information about intelligence and personality traits (Yavuzer, 2018). For these reasons, children's drawings have influenced psychologists, teachers, art historians and artists for years. Halmatov (2020) states that the interpretation of children's pictures provides clues about the individual's difficulties in his/her own world and ways of coping with them.

Reflections of children's drawings

Teachers, psychologists and families use some methods to recognise children. One of these methods is the drawings. Studies show that drawings can be analysed by evaluating them through some scales. Research on children's drawings has revealed that some characteristics of children are effective on drawings (Büyükbakkal, 2019:61-62). Children's drawings can show the effect of the environment on their emotional or mental development. The environment of the child, some changes and experiences in his/her life affect his/her development and this is reflected in his/her drawings (Bati, 2012). In the analyses conducted, the feeling left by the pictures drawn by children comes to the fore. This feeling gives us the first clue about the drawings. Drawing, which is a more effective way than expressing themselves and their environment with words, is an effective tool (Artut, 2017). In their drawings, children convey their feelings, creativity, observations, close environment, inner world and dreams, many ideas related to the subject matter mentioned by educators can be obtained (Haktanır, 2007). Children's drawings can reflect the cultural and social environment around them. In this way, we can see the social environment and socialisation process of children through pictures. By depicting most of the positive or negative events in his/her environment, we can get clues about what kind of culture he/she lives in. What the child reflects in his/her paintings depends on the relationship with his/her environment (Okçay, 2008).

Importance of the Research

Individuals need to learn about the environment, communicate with nature, get closer to nature, and exhibit positive attitudes and behaviours for the environment. Unfortunately, individuals are the primary factor causing most natural disasters and environmental problems in the environment. All these situations are related to individuals' perspectives on the environment (Toska, 2013:97). Environmental education offers different perspectives to individuals. Although some activities carried out in schools are supportive, the implementation of activity plans prepared with the contribution of experts shows that this subject will be more effective. The continuation of unconscious behaviours, the deterioration of the natural balance of the environment and the danger to the living conditions of all living things are the signals that environmental problems should be prevented. The most effective measure against environmental problems is environmental education (Kabaş, 2004:99). At the meeting of the International Union for the Conservation of Wildlife and Natural Resources (IUCN) in Paris in 1948, the term environmental education was used for the first time. Four years later, in 1952, it was announced that environmental education should be given as a discipline in schools (Zhao, 2003:78-79).

Some of the views guiding environmental education, the content of the curriculum in the related courses and the course activity processes require a different perspective on this education. Environmental education is handled with some learning approaches. There is a wide range of educational approaches such as ecological, based on eco pedagogy, learning for the environment, education in and about the environment. These educational approaches can be integrated into each other or can be handled in a single dimension. Environmental education can be more inclusive and effective thanks to these approaches. The proverb "We did not inherit the world from our ancestors, on the contrary, we borrowed it from our children", which is expressed for the continuation of life in our world, could be the inspiration of sustainability (Özdemir, 2017:9).

Some outcomes given in formal courses may overlap with environmental education. The number of outcomes expressed with the sustainability approach is quite low. In the primary school 3rd and 4th grade science and 1st, 2nd and 3rd grade life science curriculum, the term 'sustainable environment' is not explicitly mentioned. It is thought that the environmental perceptions of primary school students are in this direction. It is foreseen that they lack both theoretical and practical knowledge about sustainable environment. The research is valuable in terms of providing sustainable environmental education to primary school students.

Purpose of the Study

The aim of the research is to conduct a case study on primary school students' drawings about their current environmental perceptions and their drawings about the environment they imagined after receiving sustainable environmental education. In the research, it is tried to analyse how students currently see the environment and how they want to see it in the future. It is aimed to determine what the reflections of the sustainable environmental education given on student drawings are or are not. For these purposes, answers to the research questions were sought. The written expressions of the students' drawings together with their drawings are also supportive in seeking answers to the questions.

In line with the aim of the research, answers to the following questions were sought:

1. How are the drawings of primary school 4th grade students before and after sustainable environmental education?
2. How did primary school 4th grade students explain their drawings before and after sustainable environment education?

Related Studies

National literature review on the subject

The studies related to students' environmental perceptions in the literature are presented in Table 1 below.

Table 1. National literature review related to the subject

Author-Year	Name of the study
Sibel ÖZSOY, Berat AHI (2014)	<i>"Determination of primary school students' perceptions of the environment for the future through their drawings"</i>
Gülçen ÇETİN , Neşe BADEM (2015)	<i>"Primary school students' views on clean and dirty environment"</i>
Emre PINAR, Mehmet YAKIŞAN (2018)	<i>"Analysis of primary school students' drawings related to environmental concepts"</i>
Ayşe Hilal KIVRAK, Gökhan UYANIK (2020)	<i>"Determination of primary school fourth grade students' mental models of environmental pollution"</i>
Derya SÖNMEZ (2020)	<i>"Investigation of primary school first grade students' drawings related to the concept of "zero waste""</i>

Review of International Literature on the Subject

The studies related to students' environmental perceptions in the literature are presented in Table 2 below.

Table 2. International literature review on the subject

Author-Year	Name of the study
Maria Jeanne McNaughton (2004)	<i>"Educational drama in the teaching of education for sustainability. environmental education research"</i>
Daniel P. Shepardson, Bryan Wee, Michelle Priddy, Jon Harbor (2006)	<i>"Students' mental models of the environment"</i>
MalgorzataGrodzińska-Jurczak, Anna Stepska, KatarzynaNieszporek, GrzegorzBryda (2006)	<i>"Perception of environmental problems among pre-school children in Poland"</i>
Hye-Eun Chu, Eun Ah Lee, HeeRyungKo, Dong Hee Shin , Moon Nam Lee, BeyongMee Min, Kyung Hee Kang (2007)	<i>"Korean year 3 children's environmental literacy: a prerequisite for Korean environmental education curriculum"</i>
Eva Alerby (2000)	<i>"A way of visualising children's and young people's thoughts about the environment: A study of drawings"</i>
Dimitrios Stokas, Elena Strezou, George Malandrakis, Penelope Papadopoulou(2016)	<i>"Greek primary school children's representations of the urban environment as seen through their drawings"</i>
ElfiaSukma,S Ramadhan, V Indriyani (2020)	<i>"Integration of environmental education in elementary schools"</i>

It is seen in the studies that students' perceptions about the environment remain superficial and they do not have detailed environmental knowledge. It is noteworthy that their solutions to environmental problems are inadequate and that environmental problems are often associated with the concept of 'rubbish'. Pollution, which indicates environmental problems, is also generally emphasised. The age of the students can be effective in their environmental perceptions. While students' perceptions of the environment are more positive at younger ages, they can think critically and multidimensionally as they get older. The environment in which students live affects their environmental perceptions. It is noteworthy that the source of environmental problems is individuals in general. In order for students to gain knowledge, skills and attitudes about the environment, there is a need for environmental education in schools. In connection with these situations, it was deemed appropriate to give the activities related to the environment during the academic year together with the acquisitions in the course curriculum.

METHOD

Research Design

In order to get answers to the research question, qualitative research design was used in this study. Qualitative research is used to conduct in-depth interviews with individuals, observe them and record their thoughts, experiences and actions by using documents and other communication tools (Fraenkelet.al., 2011:425). The aim of qualitative research is to try to reveal individuals' perceptions or how they evaluate social events (Kurt, 2013:9).

In this research case study, one of the qualitative research methods, was applied for the purpose of the problem. Case study design is the in-depth examination of one or more events, environment, situation, individual, group and the whole system in relation to each other. In case study, it is aimed to see the details in the process, to develop and evaluate possible ideas about the events (Büyüköztürk et al., 2020:268). The phenomenon under study should be described in depth in a realistic, descriptive and holistic way (Merriam, 2013: 40-44). In this research, a case study was applied since the current and possible examination of student drawings according to a situation will be made.

Participant Group

A total of thirteen 4th grade students (female=7, male=6) from a public primary school affiliated to the Ministry of National Education in Zeytinburnu district of Istanbul participated in this study voluntarily. While selecting the students, informal interviews were made with the 4th grade teachers and information was obtained about the students who had high academic achievement, who were willing to learn, who were not absent except for compulsory situations, and who could speak Turkish, and students were selected accordingly. Purposive sampling method was used by selecting the students from the school's academically achievement, entrepreneurial and social students. Purposive sampling enables in-depth and detailed research by selecting situations that are

equipped in terms of information in accordance with the purpose of the problem. It is preferred when it is desired to work in special situations with certain characteristics (Büyüköztürk et al., 2020:92).

Data Collection Tool and Process

In this study, drawings were used as data collection tool. Drawing activity is a tool used to make sense of the dimensions of students' perceptions, but it is also used to interpret social events and some scientific concepts from their own perspectives (Kabapınar, 2004:88). So, A4 size paper was used for the picture drawings. An instruction question was asked before the students made their drawings. After the drawings were made, they were asked to answer the question written on the back of the page in detail in writing. It is important to note that drawing is not enough to analyse the picture and children should also be asked to explain their drawings (Ersoy & Türkkan, 2010:99). Therefore, the data collection process was carried out in the same way as drawing and written expression both before and after sustainable environment education. While preparing the data collection tool, the literature was reviewed, the opinions of an expert lecturer, a Turkish Language teacher and a classroom teacher were obtained, and it was prepared in a way to support the students' drawings and expressions. It was concluded that the prepared data collection tool was appropriate. After the data collection tool was prepared, it was submitted to the ethics committee for approval and finalised after receiving positive feedback.

In this study, students were asked to draw a picture and express the picture they drew through written expression as a data collection tool, and a total of 1 hour (30 minutes + 30 minutes) was given for this. Before the drawing started, the students were asked "*Can you convey your thoughts about the environment by drawing? You can add small expressions to the picture to define your drawings.*" instructions were presented. After drawing the picture, the instructions written on the back of the picture "*What kind of environment did you depict in your drawing? Can you evaluate the picture you drew holistically?*", a written answer was sought. While the students were making their drawings, no guidance was given and it was ensured that their drawings and written expressions were made in an original way.

The study continued with 'sustainable environmental education' after the students' drawings about their current environmental perceptions were taken. 'Sustainable environmental education' was implemented for five weeks in a semester, two lesson hours per week. The education was planned by evaluating the acquisitions in the science and life science curricula, reviewing the literature and taking expert opinions. The activity plans of sustainable environmental education consist of achievements designed in a way that students can take an active role and in accordance with their developmental characteristics. After the training, "*Can you convey your imaginary thoughts about the environment by drawing? You can add small expressions to the picture in order to describe your drawings.*" The students were asked to draw the environment they imagined and to write on the back of the paper "*What kind of environment did you depict in your drawing? Can you evaluate the picture you*

drew holistically?" on the back of the paper. After the data collection process, the drawings and written narratives were analysed and evaluated.

Data Analysis and Interpretation

Content analysis was used as data analysis since the analysis will be made by considering the students' drawings and written expressions. Content analysis is an approach that allows written, visual and other materials to be analysed systematically (Tavşancıl & Aslan, 2001). It is the identification of themes, subjects and phenomena in visual and written materials (Giarelli & Tulman, 2003). In this study, student drawings were analysed and data were analysed in terms of environment and sustainable environment. The researcher's training on analysing children's drawings was supportive in data analysis. During data analysis, coding and categorisation methods were used to analyse and understand the pictures (Merriam, 2013:170-171). During coding, meaningful codes were written to the parts of the data. Codes actually constitute a list of main concepts. A list of concepts was created in this way with codes. While creating the list of codes, the code in a picture can be the same or similar to the codes in other pictures. The notes that the students added to their pictures and the details they drew helped them to create the codes. After noting the codes, the similar ones were grouped under the same category (theme). The codes in the category were related and related to each other. After the categories were formed, the naming process started. Category naming was created in a way to answer the research question. The findings obtained from the categories were transformed into numerical data and tabulated. During the data analyses, the researcher worked simultaneously with an expert lecturer. A common opinion was reached during coding and categorisation. To calculate the reliability in the study, the consistency between two coders was calculated as 90% according to Miles and Huberman's (1994) reliability formula.

While analysing the data in the study, in addition to the original category classification, classification was also made with the modelling previously used in the literature by Shepardson et al. (2006). In this category, there are main headings such as Model 1, where animals and plants live, Model 2, the environment where life continues, Model 3, the environment that changes with human influence, and Model 4, the environment where animals, plants and humans live together. The content of the readymade titles of the models was created with appropriate codes. The model was interpreted in these four classifications. In this way, both data analyses were able to present findings in a way to support each other.

FINDINGS

Findings Related to the First Research Question

"How are the drawings of primary school 4th grade students before and after sustainable environmental education?" The findings are presented in Table 3. The findings are presented by considering the drawings.

Table 3. Findings related to the drawings of the participant group

Student	Preliminary Drawings Related Codes	Final Drawings Related Codes	Student	Preliminary Drawings Related Codes	Final Drawings Related Code
S1	High-rise apartment blocks Buildings Chimney fumes Unhappy clouds Narrow playground Birds People with anxious facial expressions	Trees Lawns Bees Birds Dogs Rabbits Large playground Recycling robot Happy people Deep blue sky Shining sun	S8	Buildings Apartment buildings Litter on the ground	Fewer buildings Bird nesting in a tree Trees Sustainable energy sources (Windmills, Solar energy) Recycling bins Clean environment Pink rabbit Pink sun
S2	Noise pollution Rubbish from disposable products Rubbish thrown on the ground High-rise apartment blocks Flowers Butterflies Carbon fuels	Trees Flowers Apartment Deep blue sky Sustainable energy sources (windmills)	S9	Litter on the ground Food waste Plastic waste Paper waste Cut tree Harmful gases	Prevention work to avoid felling trees Nature conservation work Caring for nature
S3	Mountain Cable Car Snow People Trees	Trees Clear clouds Birds Cats Recycling robot rubbish bin Designs that clean the air and generate energy	S10	Harmful gases Buildings Tree	Environmentally sensitive person Green space Trees Shining sun
S4	Buildings Litter on the ground Toxic gases Smoke	Trees Butterflies Bird Recyclable vehicle Rechargeable car Pink clouds Shining sun Sustainable energy sources (windmills) Happy people	S11	Streets Buildings Restaurants Some grass Harmful gases	Nature River Trees Rabbits Butterflies Recycling bin Sustainable energy sources (windmills)
S5	Buildings Tree Neighbourhood Car Noise pollution	Happy clouds Sustainable energy sources (Windmills, Solar energy) Building No exhaust and cigarette smoke	S12	Buildings Market Place Flower Friends	Sustainable energy sources (Windmills, Solar energy, Geothermal energy) Trees Planting area Bear Sheep Birds Children playing games Fresh air Lush green nature
Ö6	Tree Soil (No green area) Flag Litter on the ground Child throwing rubbish on the ground Failure to listen to warning signs for	Green space Child eating fruit from a tree Children playing games Plants growing in the garden Birds nesting in a tree Deep blue sky Shining sun	S13	Marine pollution Vehicles Exhaust fumes	Sustainable energy sources (Windmills, Solar energy) Recycling bin Trees Butterflies Birds Rabbit Clear blue sky

	environmental cleanliness	
S7	Sad sun Harmful gases Exhaust, cigarette smoke	Renewable environment Tree planting campaign

Table 3. presents the codes reflected in the first and last drawings of each student. In the table, it is seen that the codes in the first drawings of 13 students were generally pollution, garbage, waste and artificial environments, while in their last drawings, this situation turned into codes related to natural environment, a clean environment and sustainability. In the light of the information obtained from the codes in the students' drawings, four types of modelling were made in Table 4.

Table 4. Modelling related to the drawings of the participant group

Models		Number of Codes Related to Preliminary Drawings (f)	Percentages (%)	Total	Code Numbers Related to Final Drawings (f)	Percentages (%)	Total
<i>Model 1</i>	Places where animals and plants live						
	Living in the natural environment	1	1.88		8	10.95	
	Living in an artificial environment	7	13.20	8 (%15.08)	4	5.47	12 (%16.42)
<i>Model 2</i>	Living Environment						
	Green space The environment in which the trees are located	4	7.54		11	15.06	
		5	9.43	14 (%26.40)	12	16.43	28 (%38.33)
	Happy people	5	9.43		5	6.84	
<i>Model 3</i>	Human Influenced Changing Environment						
	Buildings/apartments	9	16.98	3	4.10	0	
	Environmental pollution	12	22.64		0	0	
	Renewable energy sources	0	0	30 (%56.60)	7	9.58	29 (%39.68)
	Rubbish	6	11.32	1	1.36		
	Recycling	0	0	6	8.21		
	Clear skies	3	5.66	12	16.43		
<i>Model 4</i>	An environment where animals, plants and humans live together						
	Animal, plant and human together	1	1.88	1	4	5.47	4 (%1.88)
Total		53	%100	53 (%100)	73	%100	73 (%100)
							(%5.47)

In the light of the information in Table 4., the environment where animals and plants live in Model 1 was categorised as artificial and natural. The total frequency is 8 (15.08%) in the first drawings and 12 (16.42%) in the last drawings. While the number of animals and plants living in natural environment increased from the first to the last drawings, the number of animals and plants living in artificial environment decreased. In Model 2., humans were included in the environment with green areas and trees in the theme of the environment where life continues. In Model 3, the total frequency is 30 (56.60%) in the first drawings and 29 (39.68%) in the last drawings. In Model 3., buildings, apartment buildings and environmental pollution caused by human impact in the changing environment decreased from the first drawing to the last drawing, while clean sky, recycling area, sustainable energy sources increased from the first drawing to the last drawing. Model 4 is similar to Model 1., but here there is a human being as a part of the environment.

In Table 5., the first drawings taken from the students were analysed in more detail. Some themes were formed based on these data.

Table 5. Themes formed as a result of the analysis of the first drawings received from the students

Theme Concepts	Code	Number(f)	Percentages (%)	Total
<i>Human</i>	Anxious person	2	1.83	14
	Playing games	3	2.75	
	Throwing rubbish on the ground	3	2.75	
	Animal damage	1	0.91	(%8.38)
	Happy person	5	4.58	
<i>Animal</i>	Bird	2	1.83	3
	Butterfly	1	0.91	(%2.75)
<i>Plant</i>	Flower	1	0.91	
	Tree Grass	5	4.58	7 (%6.42)
		1	0.91	
<i>Pollution</i>	Noise pollution	2	1.83	
	Marine pollution	1	0.91	
	Toxic gases	4	6.52	
	Litter on the ground	6	5.50	
	Rubbish from disposable products	1	0.91	
	Exhaust fumes	2	1.83	28
	Cigarette smoke	1	0.91	(%25.68)
	Smoke from house and factory chimneys	4	6.52	
	Food waste	1	0.91	
	Plastic waste	3	2.75	
	Paper waste	2	1.83	
Carbon Fuels	1	0.91		
<i>Structure</i>	Apartment	3	2.75	
	Building	8	7.33	
	Factory	2	1.83	17
	Restaurant	1	0.91	(%15.59)
	Cable Car	1	0.91	

	Neighbourhood/Avenue	2	1.83	
<i>Environment</i>	Narrow playground	1	0.91	
	Market Place	1	0.91	
	Mountain	1	0.91	
	Non-green area	8	7.33	
	Polluted environment	12	11.00	27 (%24.77)
	Cut tree	2	1.83	
	Soil area	2	1.83	
<i>Protection</i>	Warning sign for environmental cleanliness	3	2.75	5 (%4.58)
	Garbage collection vehicle	2	1.83	
<i>Asset</i>	Cloud	3	2.75	
	Sun Car	2	1.83	8 (%7.33)
		2	1.83	
	Flag	1	0.91	
Total		109	%100	109 (%100)

According to Table 5., 8 themes related to the environment reflected in the students' first drawings were formed as "human, animal, plant, pollution, structure, environment, protection and existence".

Table 6. Themes formed as a result of the analysis of the final drawings received from the students

Theme	Concepts	Number of Codes(f)	Percentages (%)	Total
<i>Human</i>	Happy people	5	2.99	
	Child eating fruit from a tree	2	1.19	21
	Child playing a game	5	2.99	(%12.57)
	Environmentally sensitive person	9	5.38	
<i>Animal</i>	Bird	6	3.59	
	Bird nesting in a tree	2	1.19	
	Butterfly	4	2.39	
	Rabbit	5	2.99	
	Dog	2	1.19	24
	Cat	1	0.59	(%14.37)
	Bear	1	0.59	
	Bee	2	1.19	
	Sheep	1	0.59	
<i>Plant</i>	Grass	11	6.58	
	Flower	3	1.79	28
	Tree	12	7.18	(%17.07)
	Garden plants	2	1.19	
<i>Environment</i>	Large playground	8	4.79	
	Green space	11	6.58	
	Nature	7	4.19	
	River	1	0.59	54
	Clean environment	13	7.78	(%32.33)
	Planting area	2	1.19	
	Clear sky/air	12	7.18	
<i>Structure</i>	Building	2	1.19	3

	Apartment	1	0.59	(%1.79)
<i>Renewable Energy Source</i>	Solar energy	4	2.39	
	Windmills	7	4.19	12
	Geothermal energy	1	0.59	(%7.18)
<i>Asset</i>	Cloud	2	1.19	
	Sun	7	4.19	
	Recycling robot	3	1.79	
	Recycling bin	3	1.79	17
	Rechargeable car	1	0.59	(%10.17)
	Designs that clean the air and generate energy	1	0.59	
<i>Protection</i>	Tree planting campaign	2	1.19	
	Carbon footprint study	1	0.59	
	Prevention of felling of trees	2	1.19	8
	Nature conservation work	2	1.19	(%4.79)
	Penalty for throwing rubbish	1	0.59	
Total		167	%100	167 (%100)

According to Table 6., 8 themes related to the environment reflected in the students' final drawings were formed as "human, animal, plant, environment, structure, renewable energy source, protection and existence". Unlike their first drawings, the theme of pollution was not formed. In the last drawings, the theme of renewable energy source was formed. In the human theme, the codes of happy people, children eating fruit from trees, children playing games, environmentally sensitive people were formed and the total frequency was 21 (12.57%). In this case, according to the first drawings, the codes of people who pollute the environment were not formed, but rather the codes of sensitive people and children eating fruit from trees and playing games were included.

Findings Related to the Second Research Question

Analysing the written expression in students' drawings

Analyses of the students' first drawings according to the question "What kind of environment did you depict in your drawing? Can you evaluate the picture you drew holistically?" The analysis of their written expressions according to the question is presented in Table 8.

Table 7. Themes formed as a result of the analysis of the written explanations of the first drawings received from the students

Theme	Concepts	Number of Codes(f)	Percentages (%)	Total
<i>Pollution</i>	Smoke	4	8.69	14 (%30.43)
	Environmental pollution	2	4.34	
	Air pollution	3	6.52	
	Rubbish	5	10.86	
<i>Environment</i>	Crowd	4	8.69	8 (%17.39)
	Street/neighbourhood	2	6.52	
<i>Animal</i>	Traffic accident tBird	11	22.1717	1 (%2.17)
<i>Plant</i>	Flower Forest	1	2.17	2 (%4.34)

		1	2.17	
Structure	Building/house/apartment	6	13.03	8 (%17.39)
	Cable Car	1	2.17	
Waste	School Waste	12	24.1734	4 (%8.69)
	Felling of trees	2	4.34	
Asset	Rubbish bin	1	2.17	9 (%19.56)
	Recycling bin	2	4.34	
	Cigarette	1	2.17	
	Glass bottle	1	2.17	
	Sun	1	2.17	
Total		46	%100	46 (%100)

According to Table 7, 7 themes related to the environment reflected in the students' final drawings were formed as "pollution, environment, animal, plant, structure, waste and existence". In the pollution theme, smoke, rubbish, environment and air pollution codes were formed. Total frequency is 14 (30.43%).

Analyses of the students' final drawings according to the question "What kind of environment did you depict in your drawing? Can you evaluate the picture you drew holistically?" The analysis of their written expressions according to the question is presented in Table 8.

Table 8. Themes formed as a result of the analysis of the written explanations of the final drawings received from the students

Theme	Concepts	Number of Codes(f)	Percentages (%)	Total
Environment	Natural environment	4	5.26	22 (%28.94)
	Safe environment	3	3.94	
	Green space	5	6.57	
	Deep blue sky	3	3.94	
	Vibrant colours	2	2.63	
		2	2.63	
Animal	Butterfly	2	2.63	5 (%6.57)
	Bird	2	2.63	
	Insect	1	1.39	
Plant	Plant	1	1.39	18 (%28.63)
	Tree	8	10.52	
	Flower	3	3.94	
	Plant cycle	2	2.63	
	Forest	2	2.63	
Structure	Building/home	3	3.94	3 (%3.94)
Asset	Air purifying machine	1	1.39	10 (%13.15)
	Recycling robot/box	1	1.39	
	Sun	2	2.63	
	Cloud	4	5.26	
		3	3.94	
Renewable sources	Solar energy	3	3.94	7 (%9.21)
	Wind energy	4	5.26	
Protection	Protecting the environment	3	3.94	6 (%7.89)
	Organising for the environment	1	1.39	
	Savings	1	1.39	
	Carbon footprint	1	1.39	
Human	Happy person	2	2.63	5 (%6.57)
	Good person	2	2.63	
Total	Child playing a	176	1%100.39	76 (%100)

According to Table 8., 8 themes related to the environment reflected in the students' final drawings were formed as "environment, animals, plants, structures, assets, renewable energy sources, protection and people".

The highest number of codes formed as a result of the analysis of the written expressions of the final drawings was in the tree in the plant theme. Environment and plant themes stand out in terms of the number of codes. The themes of pollution and waste in the analysis of the written narratives of the first drawings did not emerge in this analysis. These themes were replaced by the themes of protection, renewable energy sources and people.

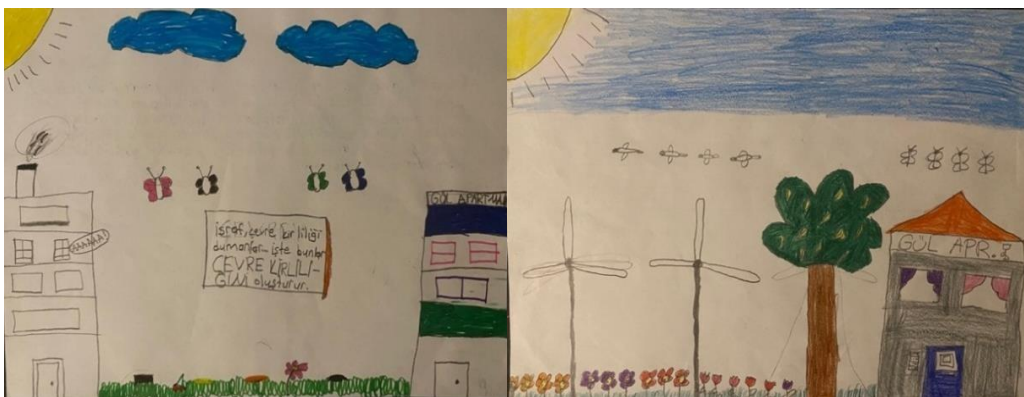
Reflections on students' drawings and written expression



The first drawing drawn by S1

the last drawing drawn by S1

S1 explained his first drawing as follows: "The picture I drew is actually imaginary, but it is also real. I mean, drawing a building is real but drawing birds talking to me is imaginary. My drawing is half imaginary and half real. Because I realised that if there is no imagination in all the paintings, then it is not a painting. In my picture there are buildings and smoke is coming out. My friends and I are playing ball between two buildings. The colourful building in the middle is my house." S1 explained his last drawing as follows: "I don't like rudeness, but I like places that are safe and 100% natural. Because I feel happier there, I like animals and trustworthy people. That's why I drew such a picture."



S2's First Drawing

S2's Last Drawing

S2 explained his first drawing as follows: "I used beautiful objects in my drawing and I wanted to draw some rubbish that would pollute the environment. I decided to draw this picture because living creatures throw this

rubbish on the ground instead of throwing it into the rubbish bin or recycling. What is explained in this picture is that please people should protect and beautify nature and finally I would like to add that living creatures do bad things by causing noise pollution." S2 explained his last drawing as follows: "I used a lot of colours in my drawing. I will mention the following about my drawing: I used things that look like wind roses to create wind energy in the picture. I also chose a tree and grass as greenery. My tree is a banana tree. And to add colour to the painting, I drew and painted a blue sky without white spaces instead of clouds. And never missing flowers, I drew lots of flowers and an apartment building. The apartment even has a name: I drew a rose next to the rose apartment... That's it..."

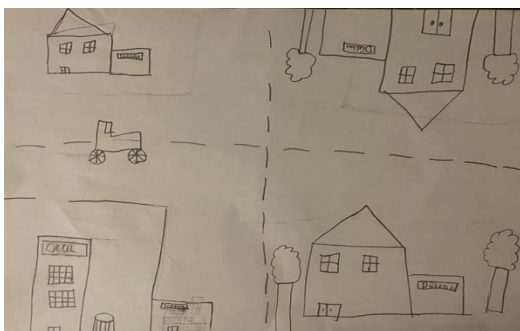


First drawing drawn by S4



Last drawing drawn by S4

S4 explained his first drawing as follows: "The doodle in the picture is actually poisonous gases and the things on the ground are rubbish, although they are recyclable, they throw them on the ground. The squares and rectangles are houses because I wanted to draw this picture from a bird's eye view. The other small squares are chimneys and the grey things coming out of them are smoke." S4 explained his last drawing as follows: "The first thing I want to show in this drawing is how different the picture of waste and environmental pollution and my imagination are. Throw 1 rubbish into the thing you see in my picture with the word recycling on it and type its old form on the keyboard and it will come back in its old form again. In this picture butterflies and birds are flying and having fun. Cars get energy by charging and this energy is wind energy. The sun always rusts and rises bright yellow. The people living here are filled with happiness. Trees are always green. Sometimes they shed leaves. This is how life goes on here."



First drawing drawn by S5



Last drawing drawn by S5

S5 explained his first drawing as follows: "The environment I see when I leave school on a normal day is a normal environment but it is very active. It is an environment with noise pollution, so there is a lot of noise pollution, and someone honks the horn to get people to move away because of the crowd." S5 explained his last drawing as follows: "We humans should live regularly. They should use the new natural world as it is, they should not emit exhaust, cigarette smoke or very little. They should not release factory smoke to nature. Let us live the Earth, not the Earth us. Nature is ours and we are our nature. I wish we could live life more naturally. Yes, I know that needs do not end, but resources end one day. Life offers us a chance, but we want it, but if we can make use of our first and last chance, everything will be very beautiful. I tried to make a picture that tells this."



First drawing drawn by S7

Last drawing drawn by S7

S7 explained his first drawing as follows: "In my drawing, I talked about things like environmental pollution and violence against animals, there were smoke coming from the factory and fog coming from the environment. And they throw the rubbish on the ground instead of throwing it in the rubbish bin and I feel sad that the environment is bad. And there is a sun there today." TS7 explained his last drawing as follows "In my drawing, firstly, I wanted to plant trees every month, because in this way, we can live in a greener world with cleaner oxygen, then not to throw rubbish on the ground, for the world to be clean, and in my last drawing, for everyone to look at their carbon footprint and be more economical."



First Drawing by S9

Last Drawing by S9

S9 explained his first drawing as follows: "In this drawing, I have drawn the slow pollution of our nature, air pollution, pollution of the air, cutting down trees, wasting food, but not only food. For example, we can pollute our nature by wasting materials such as water, paper, bottles, but this is no longer

sometimes, it has started to happen all the time, so we should take good care of our nature and protect it well." S9 explained his last drawing as follows "In the picture I drew, I drew the replanting of the cut trees and planting a lot of plants in the nature. We should take good care of the nature because a lot of trees are cut down even in a day, so trees should be replanted in the places of the cut trees and they should be watered regularly and they should see the sun to grow. Therefore, we should protect nature."



First drawing drawn by S10

Last drawing drawn by S10

S10 explained his first drawing as follows: "I thought I was a bird and drew what I saw, for example, our school, Galata tower, trees, people throwing rubbish, flowers, the sun and so on." S10 explained his last drawing as follows: "Hello friends, now I showed the life in my imagination in my drawing, a natural life would actually be very good, but in real life people are very cruel but people do not realise this, in fact, if we look at the environment very well, everything will be better."



First drawing drawn by S11

Last drawing drawn by S11

S11 explained his first drawing as follows: "There is a street, environment. There is some pollution." S11 explained his last drawing as follows: "I would like an environment with greenery and a deep blue nature. In other words, I drew an environment that avoids disasters such as natural disasters and wars. I would like most of the people to be Red Crescent, Green Crescent and kind-hearted people."



First drawing drawn by S12

Last drawing drawn by S12

S12 explained his last drawing as follows "The picture I drew is actually my neighbourhood, my friend Enver plays a game at school and my father picks me up at the exit and we go home, then when we get home, my mother directly says are you hungry, I say yes, then she asks if you eat a hamburger, then my brother and my cousin say yes, then my mother says dinner is ready, then we go to the kitchen, after we finish our meal, we drink our drinks, we drink our drinks. After we finish, we go to the sink, after we go to the sink, we watch TV, after watching TV, we do our homework. After we finish our homework, we go out, then we get hungry, we go home, we eat, after we eat we go to bed." S12 explained his last drawing as follows: "In this drawing, I drew the nature in my imagination. Trees, flowers, house, farm, well, clouds, sun, wind cave, wind rose, solar panel, grass...I coloured it. I animated it

To summarise, the findings obtained from all the drawings indicate that students identify the environment with pollution, but the environment in their imagination should be very different from this. In their drawings, students show that their lifestyles are important for the environment. In their first drawings, the students mentioned their concerns about the environment, and in their last drawings, they were able to provide solutions to some environmental problems. They can reflect the solutions necessary for the protection of natural resources, trees and the environment within the framework of the knowledge they have learnt. It was pointed out that natural resources should be used economically and renewable energy sources should be utilised. It is noteworthy that plants and animals are important for the environment and that such creatures are depicted in natural conditions, especially in the last drawings. Whether individuals are sensitive or insensitive is important for the sustainability of the environment. It is seen that a clean, preserved and unspoilt environment occupies a big place in students' dreams. It is seen that they want to have fewer buildings, apartments, etc. and large playgrounds for themselves. In short, while a polluted environment is the environment they see, it is the students' dream that the environment is protected and individuals benefit from the environment under the most reasonable conditions.

CONCLUSION AND DISCUSSION

Within the scope of the research framework, students' current environmental perceptions and imaginary sustainable environment perceptions were tried to be revealed through drawings. Current environmental

perceptions were reflected in the first drawing and imaginary sustainable environment perceptions were reflected in the last drawing. Some themes were revealed in the inferences made after qualitative analyses.

According to the results of the research findings, it is understood how students' environmental perceptions are after sustainable environmental education. The education provided was important in the process of evolving the existing environmental perceptions into imaginary environmental perceptions. Students had the opportunity to acquire new thoughts and concepts, to carry out studies, and to make theoretical and practical analyses about the environment. The positive contribution of sustainable environmental education to the students' imaginary environment is revealed. In addition to the acquisitions related to the subject in the course curricula, it is also important that environmental education should be given throughout the academic year. It is also important to provide environmental education activities with sustainability. In addition, it can be taken into consideration that students take an active role in these trainings, that the trainings should be student-centered, that acquisitions should be preferred by taking into account the age and developmental characteristics of the students, and if necessary, institutional cooperation in environmental activities.

As a result of the studies conducted in the literature, the themes obtained from the first drawings of the students are generally pollution, insufficiency of trees and green areas, and environmental problems. These findings are similar to the studies conducted with different participant groups in order to understand students' images and thoughts about the environment in their minds (Özsoy, 2012; Özsoy& Ahi, 2014; Çetin & Badem, 2015; Pinar & Yakışan 2018; Kıvrak & Uyanık, 2020; Sönmez, 2020; McNaughton & M.J., 2004; Grodzińska-Jurczak et al., 2006; Shepardson et al., 2006; Chu et al., 2007; Alerby, 2000; Stokas et al. ,2016). In this study, the high number of human figures and the high number of pollution themes are similar to the results of Özsoy (2012) and Alerby (2000).

The view that the place where students live has an effect on their environmental perceptions is supported by the studies conducted by Özsoy and Ahi (2014), Shepardson et al. (2006), and Kıvrak and Uyanık (2020). In the study conducted by Özsoy and Ahi (2014), most of the students who drew the polluted environment consisted of primary school 5th grade students. This situation shows us that as the students get older, their perspectives towards the environment become negative. In the study conducted by Shepardson et al. (2006), it was concluded that the theme of the place where animals and plants live is generally more dominant, while the theme of the environment changing with human influence is dominant for those living in suburban and rural areas. Students' experiences about the environment could be integrated into their mental models. In the study conducted by Kıvrak and Uyanık (2020), it was found that the sociocultural environment was important in mental models of environmental pollution. The fact that students living in city centres mostly express factory fumes and wastes and throwing garbage into nature in environmental pollution; and that students living in the village mostly express animal droppings, destruction of trees and garbage by the riverside in environmental pollution shows that mental models are dependent on the environment. The view that students' behaviours towards the

environment are also related to the individuals around them should be evaluated. If there are conscious and sensitive individuals in the environment, the behaviours of the students can be affected positively.

The fact that environmental education is a need for primary school students is in line with the studies of Çetin and Badem (2015), Grodzińska-Jurczak et al. (2006), Chu et al. (2007) and Sukma et al. (2020). In the study of Çetin and Badem (2015), it was concluded that the students' views on clean and dirty environment changed according to age, and that they behaved in detail, inquisitively and their awareness of environmental problems increased as they got older. It was stated that the activities related to the environment in the course curriculum had no effect on this change. In the study of Grodzińska-Jurczak et al. (2006), it was concluded that in general terms, students and their parents had knowledge about environmental themes, but their knowledge about detailed environmental issues was insufficient. In the research, it can be concluded that there is a gap in environmental education and that planning education on the subject for this group can prevent knowledge deficiencies. Chu et al. (2007), it was observed that the students had inadequate knowledge about plants, animals, humans, ecosystem, food chain, energy resources, but they had a good command of the subjects related to environmental pollution in the course curriculum. As a result of the research, it was concluded that environmental education affects environmental literacy. In the study of Sukma et al. (2020), it was stated by teachers that the integration of environmental education into the learning process in primary schools is very important. Although factors such as time constraints are likely to arise in integration, it is suggested that this can be avoided with appropriately designed education.

The result that the theme of pollution in the study was formed by garbage is similar to the studies of Pınar and Yakışan (2018) and Sönmez (2020). In the study conducted by Pınar and Yakışan (2018), primary school students at different levels were asked to draw on environmental pollution. After the students made their drawings, they explained them. As a result of the study, students' drawings on environmental pollution reflected the view that the cause of pollution is garbage and that pollution will disappear when garbage is collected. According to this result, the students' lack of knowledge about environmental pollution and the view that protecting the environment will only happen when the garbage disappears show that they have narrow knowledge about the environment. In the study conducted by Sönmez (2020), it was revealed that students mostly included the concept of rubbish in their drawings. The reason why students include the concept of garbage so much may be the excess of garbage around them.

The view that environmental education should be student-centred is supported in the study of McNaughton and M.J. (2004). In McNaughton and M.J.'s (2004) study, it was concluded that the use of different teaching method techniques and student-centered education approach facilitated teaching in the education for sustainability study conducted with students aged 10-11 years. The reason for this situation is that the effects of a student-centered education are more positive.

The conclusion that environmental education should be integrated with sustainability is in line with the study of Stokas et al. (2016). In the study of Stokas et al. (2016), students were asked to draw two different pictures. The first picture is about the environment they see now and the second picture is about the environment they would like to have. The aim of the research was to reveal the relationship between urban environment and sustainability. As a result of the research, it was revealed that there is a big gap in the minds of the students about sustainability and that the natural environment is affected by some infrastructure problems, air pollution and waste production.

Most of the studies on students' environmental knowledge and attitudes show that their knowledge of environmental issues is inadequate and their attitudes towards the environment are negative. Students' future dreams for the environment are important in this regard. Sustainable environmental education achievements and activities are expected to serve this area. Research shows that providing environmental education to primary school children in a practical way and with material support positively affects students' perceptions towards the environment. Especially giving environmental education to primary school children with alternative methods causes much more positive results (Onur, et al. 2016). The fact that different activities are oriented towards renewable energy sources, the importance of recycling and reuse, etc. reveals the positive effects of environmental education on students (Öztaç & Bartan, 2019; Yılmaz, et al. 2020). Providing and supporting environmental education in alternative environments outside of course acquisitions positively affects students' attitudes towards the environment and their awareness (Buldur & Ömeroğlu, 2021).

RECOMMENDATIONS

Based on the results of the research, some suggestions are given below.

1. The research was conducted in a primary school in a metropolitan city such as Istanbul. Therefore, conducting the study with more participants in different regions and different types of schools in Turkey may contribute to the generalisation of the results.
2. In this study, a single group was studied. The study can be conducted by adding activities with similar content and including the control group.
3. Parents can be included in the activities to further strengthen students' attitudes towards the environment.
4. In order for environmental education to be permanent, learning environments can be organised in accordance with the learning outcomes.
5. Environmental education activities can be provided in cooperation with NGOs, Regional Directorates of Forestry, Provincial Directorates of Agriculture, etc.
6. Including trips, field studies, nature studies in the implementation of environmental education activities with students can increase the efficiency of the activity.

ETHICAL TEXT

“In this article, journal writing rules, publication principles, research and publication ethics rules, journal ethics rules have been followed. The responsibility for any violations that may arise from the article belongs to the authors. Permission was obtained from the IAU Social Sciences and Humanities Ethics Committee for this study (E-88083623-020-51966, 31.05.2022).”

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