



IETC 2014

## Science and nature perception in the images and pictures of the children

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### Abstract

The aim of this research is to search the perception of elementary school fourth grade students related to science and nature concept in artistic statements based on written descriptions related to their pictures and only pictures. The pictorial and literal statements of the students related to science and nature have been examined based on this aim. The research has been realized at Diyarbakır, Kayapınar province Hantepe Eğitim Şehitleri Elementary School and Ankara, Çankaya Province Sokullu Mehmet Paşa Elementary School in 2013-2014 semestr of educational period. 32 of students are having education in Diyarbakır, 28 of students are having education in Ankara. The data of the research which has been figured by qualitative research method has been collected in the from of written ideas related to the pictures and the ones explained in the pictures, the taken findings have been commented by analyzing them with descriptive analysis. The research has been realized by using phenomonologic research figure from qualitative research figures. At the end of the research, whereas the students describe science concept with “population, research environment, invention and life field” concepts, they stated nature concept with “environment, living area and environmental change” concepts.

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Peer-review under responsibility of the Sakarya University.

*Keywords: Science and nature, child pictures, perception*

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## 1. Introduction

Elementary education includes a period when emotional, cognitive and psychomotor attainments are achieved and the child expresses himself democratically and explains his thoughts and emotions without feeling any pressure on him. The figurative situations can be more realistic and reflect the emotional world of the child. Because of this reason, examination of the figurative pictures and reflecting realistic situation of the students related to their emotional world can be accepted as very important.

Arts have an important place in mental development and richness of the figures of the children. Arts is a psychological action born out of the aim of stating their emotions and ideas of the people against the nature with an individualistic point of view in a beautiful and effective style with the instruments such as line, color, shape, word and rhythm (Artut, 2002). The painting has an important place in the perception and description of the objects in the nature by the person and describing himself. Painting and child has been a continuously changing fact which complete each other and take place in the most important and effective elements of communication (Artut, 2007).

The paintings shed light on the inner world of the children, provide opportunity discussing their ideas and emotions of them with a different point of view. Their paintings have the duty of a window in reflecting their ideas and emotions reflect their dreams freely (Crook, 1985, Thomas & Silk, 1990, Faroki & Hashemi, 2011). It can be understood by the way of drawings how the children have emotions related to the people or objects (Burkitt, 2004).

The painting process requires the child to arrange and choose colors, shapes and lines by analyzing many components such as content, style, shape and composition to transfer an idea, emotion, event or observation (Malchiodi, 2005). The children hate answering the questions which have been directly asked to them. They state their emotions more easily, enjoyable and quickly with drawings (Lewis ve Greene, 1983). Because of this reason, as painting has been accepted as an indicator of the child's perception of outer world, it helps to communicate with the child and helps adults to solve the problems they met with the children (Artut, 2002). Also, critical thinking and understanding of the children can be increased by painting and developing the required skills opportunity can be presented to them to include those individual conversations and commenting the images (Uysal, 2011).

Another way to increase the students' understanding of what pictorial statements mean is to listen their speech on the paintings (Malchiodi, 2005). Because the children have a tendency to draw "what they know" more than "what they see" (Toomela, 2006). In this context, the best way to understand the message in the children's picture is to speak about their paintings or images.

Science and technology education is existent in close environment of the student. All colors, lights, taste attract the child, because of this reason the child is interested with the world. Science and technology education is the education of this amusing and attractive richness and it tries to transform abstract information which the child needs to learn to concrete information (Soysal ve Afacan, 2012). Especially its close relationship with the nature makes this information more important. In this context, nature perception of the individual is related with how he defines man-nature relationship and perceived beliefs, environment and ideas (Kutru ve Soran, 2012). This perception effects attitudes and beliefs related to many views such as accepting style of nature, sensitivity to nature and having environmental consciousness. Detailed information related to the nature is given in Science courses. Especially formation of perceptions related to science and nature on the children is provided by the way of Science courses.

When the literature on this field is examined, it can be observed that there are many paintings and image studies related to science and science man concept (Buldu, 2006; Oğuz, 2007; Rodari, 2007; Türkmen, 2008; Ünver, 2010; Benli, Dökme & Kaya; 2011, Samaras, Bonoti & Christidou, 2012; Oktay & Eryurt, 2012; Çokadar & Demirtel, 2012; Ruiz-Mallen and Escalles, 2012; Özel, 2012; Erdoğan, 2013a; Erdoğan, 2013b). In addition to this, studies such as god concept perception (Yıldız, 2013), class environment perception (Ülker & diğerleri, 2013), learning and teaching process perception (Aykaç, 2012), internet concept perception (Ersoy & Türkkkan, 2009), popular culture concept perception (Erişti, 2010), school garden concept perception (Coronin-Jones, 2005), defining the family perception (Doğru & diğerleri, 2006) are the subjects about the children paintings. It can be told that limited studies which have been made by Yılmaz, Kobiato and Topal (2012) with Ülker (2012) on nature perception take place. It can be stated that there are not studies related to science and nature directly.

In general meaning, the studies which the pictorial perceptions of the students are being determined are based on the adaptation of "draw a science person test" developed by Chambers (1983). This situation is thought to bring a limitation in determining the point of views to perceptions and concepts with different methods. Statistical

analysis is being made in these studies; it can be told that entering the children's World directly seems to be limited. In this research, it is aimed at determining the science and nature perceptions of the children by the way of pictures and literal statements. The questions below have been tried to reply related to this aim:

- How do the elementary school students reflect their science and nature perceptions in pictures and images?
- What are the similarities and differences between the elementary school students' science and nature perception and written ideas in their pictures and images?

## 2. Method

The research has been realized by the way of Phenomenology image from qualitative research images. In this image, it is aimed at commenting and stating individualistic perceptions or point of views related to a fact (Yıldırım & Şimşek, 2005). In the examination of children pictures in phenomenology image, different meanings, connecting to different meanings and world view of the one who is making the picture is emphasized (Malchiodi, 2005). In the research, science and nature perception of the students, the pictures which the students will make on science and nature and their written ideas on these pictures have been examined.

### 2.2 Collection of data and Application

The research data has been collected in 2013-2014 semester autumn period by document analysis which has been a qualitative research data collection method. The research data has been collected Diyarbakır Center Kayapınar Province Hantepe Eğitim Şehitleri Elementary School and Ankara center Çankaya province Sokullu Mehmet paşa Elementary School. The research includes 60 students from these two schools. 32 of them have been in Diyarbakır, 28 of them have been in Ankara. All the students participating in the research are in the fourth grade. The application of the research has been realized separately by the researchers. After the required permission has been taken related to researchers from the headmaster and the teachers, the researchers went to the school and gave drawing papers to the students and requested from them to take their pencils and drawing pencils. The students have been requested to divide the paper into two and draw what they understand when they are told the picture of nature one side and picture of science on the other side of the paper. The application has been realized in nearly one course period, 40 minutes.

After the picturing had been finished, the question of "what did you want to explain in this picture?" has been asked to the students by interviewing them again at the result of the analysis made by the researchers. The students have been requested to write the answers on the pictures they made by handwriting. The written things have been read by the researchers and have been analyzed by them.

### 2.2 Data collection environment

The research data have been realized in the classrooms of the students of Diyarbakır and Ankara Center schools in Arts course. The classroom where the research has been made was in three desks. The desks have been arranged freely for every student. The drawing papers for the students had been provided by the researchers in the application process, the students brought the pencils and drawing pencils by themselves. The students have been given 40 minutes, one course period, for the application, the application has been made under the supervision of researchers and teachers.

### 2.3 Analyzing and commenting of the data

The pictorial explanations and literal statements have been examined by the way of document examination from the data taken from pictorial explanations and written statements of the children, they have been analyzed by descriptive analysis method. The pictures made by the students and their replies to the written questions have been analyzed by the researchers in the analysis of the data process, and they have been presented to the idea of field experts related to which main themes belong to science and which ones belong to nature. The themes in the students' pictorial explanations and written statements based on pictorial explanations have been determined in the results of the analysis. 4 themes have been determined as "environment, research center, invention and living area" related to science element, 3 themes have been determined as "environment, living area and environmental change" related to nature element. The items in which different opinions and consensus between the experts have been determined at the result of the analysis. 4 themes as "Population, research center, invention and living field" have been determined related to science element. 3 themes as "environment, living field and environmental change" existed related to nature element. The items with divergence and consensus have been determined at the result of analysis of expert. Reliability =  $\frac{\text{Consensus}}{(\text{consensus} + \text{divergence})} * 100$  formula has been used in reliability calculation of Miles and Huberman (1994, p.64) between researchers and field experts. The reliability value is 97.2%. Pictorial drawings and written statements which do not have science and nature elements has been taken by taking ideas of the expert.

### 3. Findings

The findings taken in the research have been collected with the main theme as “Science and nature in the picture of students”. The themes which have been determined by the analysis of student studies have been collected under 2 themes.

#### 3.1. Findings related to science perception in pictorial and literal descriptions of the students.

The perceptions of the students related to literal and pictorial descriptions have been given in Table 1. When table 1 is examined, pictorial and literal perceptions of the students related to “science” concept has been collected under the themes of “environment, research center, invention and living area”. It can be stated that the students assimilated science with these 4 basic concepts. In addition to this, it can be seen that they describe these 4 concepts with subconcepts in themselves. When it is examined in general, it can be told that the students mostly assimilated science with the research based environments.

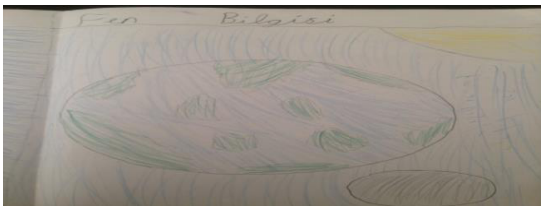
Table 1. Science themes stated in pictorial descriptions and literal statements of the students

Themes
Population
World
Alives
Animal world
Plant kingdom
Research Center Figure
Labortuar Environment
Making experiment
Cell and DNA chain
Skeleton and muscle structure
Evaporation
Leverage and buoyancy of water
Internal organs
Solid, Liquid and Gas
Invention
Scientist
Astronaut
Living environment
Environmental insensitivity
Food with GMO

#### Population

It is observed that the students assimilated science concept with “world, living creatures, animals and plants world” subtheme in population theme. It can be told that they draw living world as animals’ world and plants world, in two styles. In addition to this, it is seen that they drew science alone by assimilating it with the world. For example, Onur, a student drew science by assimilating it with the world. He used his description related to his drawing that “because science explains our world, moon, planets and the sun”. Durmuş assimilated science and living creatures’ world with “there are bees in science. Bees create a differentiation. Unless the bees are existent, there will not be living creatures. Also, the bees produce food for us.” Examples from the students’ drawing have been given in picture 1. When it is generally observed, we can say that the students see science as a part of population both in their drawings and written statements. However, they mentioned that they did not take the population as total; there are living creatures all in the world.

a



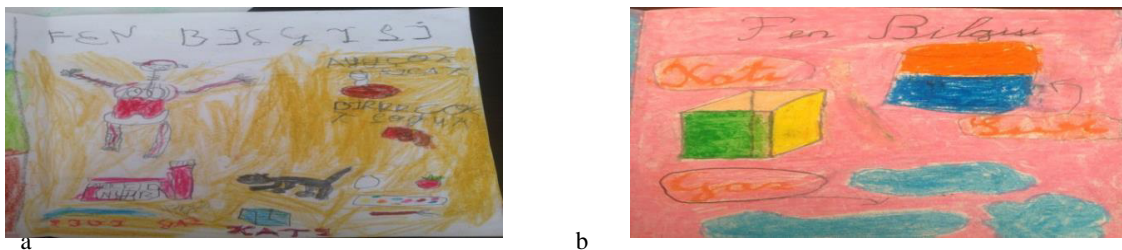
b



Picture. 1. (a) Onur’s picture; (b) Durmuş’s picture.

### Research Center Figure

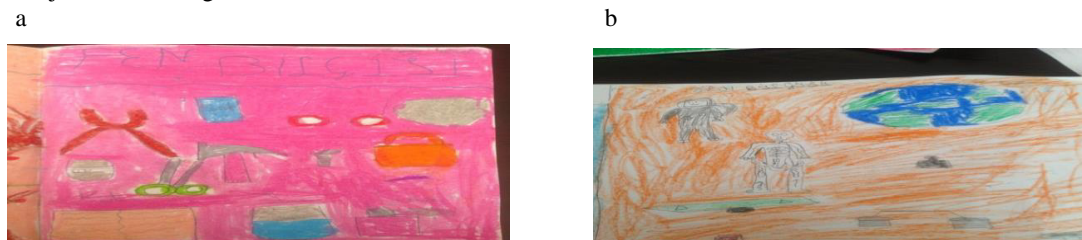
When the students' drawing related to science have been examined, "Laboatory Environment, Making experiment, Cell and DNA chain, Skeleton and muscle structure, Evaporation, Leverage and buoyancy of water, Solid, Liquid and Gas" under the title of research concept have been stated as sub-themes. It is observed that the drawings which have been made by the students by assimilating science with research environment coincided with the principle of individuals who search question, criticize, analyze and synthesize as expected for science students and relevant to science nature. It is known that learning with making in laboratory environment provides permanent learning. In this context NS states while describing science in his picture "I thought melting of ice. Freezing, melting, evaporation is the best subjects in science which I can understand. Because of this reason, I drew this picture." He assimilated science with research environment.



Picture. 2. (a) Arda's picture; (b) Zeynep's picture

### Invention

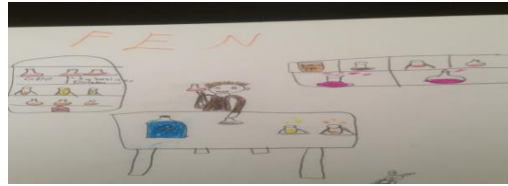
It is observed that the students describe "scientist and astronaut" concepts related to invention in their drawings related to science. It can be told that there is a situation that they assimilate science with scientist concept. The research dimension of science can be explained with this situation. Astronaut can be stated as another dimension of scientist. A student called as Gökay assimilated science and scientists as "scientists make research for us. They are always working for us in the laboratories" related to scientist figure by his statement. In the same way, Başak drew science as astronaut and told that "There are always astranouts in the science books". She explained this situation as "Because of this reason, I drew astranout". The students' assimilating scientists and astranouts with science can be explained coding them as working people to find something or as a researcher. The drawings of the students related to this subject have been given in Picture 3.



Picture.3. (a) Gökay's picture; (b) Başak's picture

### Living environment

It is observed that the students assimilate science concept with the living environment in their literal and pictorial descriptions. It can be told that they give importance to environmental sensitiveness while doing this. Because, they explained our living environment with the concepts of "environmental sensitivity and food with GMO". When it is asked the reason of this to Ayşe, it is seen that Ayşe told that "I hear that there is too much GMO in our food in the last days." This situation can be explained as this subject took attention of the students by the way of visual and written media in science courses.



Picture.4. Ayşe’s picture

As a result, it is observed that the students see science in their drawings and written statements as a piece of population and assimilate it with research centers. At the same time, they stated them as invention and living field. In this context, it is seen that the students reflect science concept in their pictorial images and written statements relevant to the content of science courses.

### 3.2. Findings related to nature perceptions of the students in their pictorial and literal explanations

Nature perceptions of the students in their pictorial and literal explanations have been given in Table 2. When Table 2 is examined, the students’ pictorial and literal perceptions related to nature have been collected under the themes of “environment, living environment and environmental change”. It can be told that the students can perceive nature concept as environment based. The students’ assimilating nature with environment concept show that they have true concepts related to nature. Because they stated nature common concepts with such as green fields, forests, mountains, valleys, living creatures’ houses in green fields in their pictures and written statements.

Table 2. “Nature” themes in pictorial and written descriptions of the students

Themes
Environment figure
Natural environment
Forests
Mountains and rivers
Sea
Sky, sun and clouds
Living environment
Livings (butterfly, insect, bee, flower etc.)
Picnic areas
Houses and people
Environmental change
Season changes

#### Environment figure

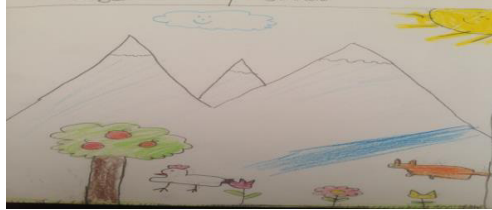
It is seen that the students conceptualize nature and environment in their pictorial and literal explanations. “natural environment, green field, forests, mountains and rivers, seas, sky, sun and clouds” are being located by the students in this concept. Green field and natural environment concepts take as common concepts in students’ pictorial drawings. The same situation can be told as the same for forests, mountains, rivers. This situation means that the nature concept take place in the minds of the students in a correct style. The student named as Hayrettin used the statement for mountains, trees and sky in his drawing as “I think that flowers, trees and animals live in the nature. Because of this reason I drew this picture.” Enes mentioned his perception related to nature with his statement in a similar picture that “I drew human beings, animals and plants in nature picture. All of these live together.” Gökçe mentioned her perception related to nature with her statement that “There are many living creatures in the nature, human beings, animals and plants live together.” The drawings of the students related to this situation have been given in Picture 5.



Picture 5. (a) Hayrettin's picture; (b) Gökçe's picture

### Living environment

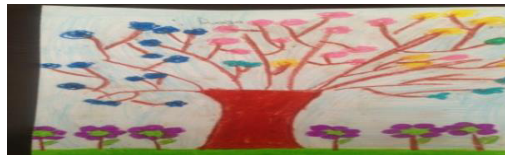
It is observed that the students state nature by assimilating it with the environment we live in in their pictural and literal explanations. The living environment is stated as "living creatures, picnic areas and houses and human beings" in their pictural and literal explanations. It can be told that the students observe the living environment they have been in and they make evaluations according to this in their explanations about the living environment with nature concept. The students' description of nature perception as green areas and an alone house means that they perceive it as quiet environment faraway from city and they drew in this way. Their stating nature as insects, bees, butterflies and flowers living in natural environment show that they perceive and code nature in a true way. For example, Durmuş related to this theme had an explanation as "I drew by thinking birds, trees, lakes, rivers in the world.". The drawings of the students related to this situation have been given in Picture 6.



Picture. 6. Durmuş's picture

### Environmental changes

The students stated that they see nature as environmental changes in their pictural and literal explanations. The environmental changes mean "seasonal changes". Every kind of change realizing in every season change such as dropping the leaves in autumn, opening of leaves in spring or greening of environment can be described as seasonal changes. It has been perceived by the students that the seasonal changes are situations which realize in itself and accepted this in this way." Şule stated her perception by telling that "As the season changes environment changes. This means the awakening of nature." The drawings of the students related to this situation have been given in Picture 7.



Picture. 7. Şule's picture

As a result, it has been observed that the nature concept is shaped according to a pattern in pictural and literal explanations of the students. The students assimilated nature with green fields. It can be told there is a natural environment, it has not been deformed by the people and they are perceived as virgin areas. It has been seen that there is a perception that there is green field where the living creatures live in, there is a lot of green field and people sometimes go to these places and have picnics and enjoy there.

### 4. Result and discussion

The elementary school students explained science with "population, research environment, invention and living environment" concepts in their pictural and literal statements in this research. They mentioned nature concept with "environment, living field and environmental change" concepts.

The findings in this research which "science and nature" perceptions of elementary school fourth grade students are being tried to be determined in their pictural and literal statements show that general judgments have been created related to nature and science concept. Because it is observed that they meet at common points in science and nature

concepts, it is seen that for example science is stated with generally laboratory environment and inventions, nature is explained with clean environment, green field, mountains and rivers.

Thus students assimilated science with population in general meaning. They see science as a piece of population, and related to this it has been observed that they perceive living world as a piece of whole. While explaining science with living creatures, it has been resulted that they perceived this as animal and plant world as in two dimensions. But they exclude human being from these categories. Because human beings are drawn as different figures in their pictures. This situation can be explained with the perception level of the students, meeting science firstly in fourth grade and not making a deep research. It has also been observed that the students assimilated science with research concept in their pictorial drawings and literal explanations. Laboratory environment, science man, making experiment can be shown as an example. Especially it shows a similarity with many researches on making science man figure (Çokadar ve Demirtel, 2012; Ruiz-Mallen ve Escales, 2012). This situation can be explained as the perception of science and research together has been located in students and the first figure they remember when talked about science is scientist.

It is evident that the students have close ideas on nature concept in their in their pictorial drawings and literal explanations. It can be told that they have a clear perception on nature subject. It has been seen that there is green field, water resources, mountains and sun in most of their drawings. For example, there are not any figures in their pictures showing people, houses, traffic and city life. Houses take place in some pictures but these houses are in the form of a country house and faraway from the city life. It has been observed that they drew nature a place to be relaxed and they did not talk about environmental pollution in their pictures. Especially not talking about environmental pollution can be explained as the students perceive nature as a place where people did not touch, and far and natural places.

The similarity between the drawings of student and their written statements in the research is seen as an important point. For example it is observed that they assimilate science with laboratory and research in their pictorial drawings and literal explanations. Especially pictorial and literal explanation related to nature perception show great similarities. When nature is talked about, the students state it with the same concepts. When the drawings related to nature have been observed, natural environment, mountains, green fields, rivers, mountains, lakes, sun and living creatures have been on the front size. Similar findings have been seen in the studies of Zuhail, Kuniatko and Topal (2012) and Ülker (2012). When it is thought that the study of Zuhail, Kuniatko and Topal (2012) has been realized with Czech students, the perceptions related to the nature have been global common values.

One of the most important results of the research is that the students living in different social, cultural and economic regions perceive science and nature with common concepts. Because cultural and social environment effect the individuals' fact and situation and provide the formation of judgment. But it is seen that similar situations which effect the students' perceptions realize in the research. This situation is related with course books, content of the program, teachers' point of view, audio and visual mass media which form a common perception.

When pictorial development stages and literal statement skills of the fourth grade elementary students are taken into account, it is observed that their pictorial and literal statements complete each other. Whereas pictorial statements have been more complex, literal statements include statements explaining this situation. This situation can be explained that the children feel themselves more free in their pictorial drawings, they find the opportunity of expressing themselves in the pictures, and related to this they have transferring their perceptions and observations more and deeper.

As a result, it can be told that the perceptions of the students on science have been at an expected level. Especially, it is seen that their perceptions related to nature concept include judgments. For example, natural pollution has not been perceived as nature concept and has not been drawn and stated by the students. The students should be provided about environmental sensitivity and importance of environmental pollution and the nature cannot be clean forever.

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