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Examination of the Images of Science Learning Environments of the Private School and State School 4th Grade Students in by Drawing Technique

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ABSTRACT

The aim of the study is to examine 4th grade private and public-school students' images of science learning environment using their drawings. The survey was conducted in the 2017-2018 academic year and descriptive survey model was used. Participant group of this study consist of 357 4th grade students. In this study, data were collected by drawing technique. Content analysis, percentage, frequency and chi-square test of independence were used in data analysis. Regarding the results of the study, although the learning environment in both schools consist of traditional classrooms and laboratories, differences were observed in student drawings according to school type (public-private). The students in the private school use the laboratory in science lessons, whereas the students in the public school use the teacher's desk as the experiment table. Another important result of the study is that the priority of public-school students is understanding the topic, while private school students assign more importance to the materials. Regarding the results of the independence test, student behavior, teacher behavior, teacher position, and teaching method were found to differ in student images according to school type. But no significant difference was found between the place theme images of public school and private school students.

Keywords

Science, Science learning environment, Drawing, Image

1. Introduction

Science is the process of understanding the nature of science, thinking and discovering new scientific knowledge (Ayas & Akdeniz, 1993). Individuals should receive science education to understand science-related events occurring in their lives, interpret them and apply their knowledge (Solomon, 1993). Science education should not only meet the daily needs of the individual, but also enable them to adapt to the

developing and changing society. As a result of technological developments in countries, a competition in Science and technology has been emerged. It is known that countries that attach importance to science and technology aim to carry out a qualified education to be at the top (Yasin, Prima, & Sholihin, 2018). In order to achieve a qualified science education, learning environments should be organized in accordance with the skills of the individuals, including researching, questioning, producing and scientific process skills (Ersoy, Uzal & Erdem, 2010). It is also known in the literature that organizing the learning environments in this way has an impact on student achievement (Gömleksiz & Bulut, 2006; Özdemir, Yalın & Sezgin, 2008).

Learning environments should be student-centered so that students can discuss the topics, present their ideas comfortably and show their thoughts in practice in the process. (Çetin, Hamurcu & Günay, 2001; Şahin, Öztuna & Sağlamer, 2001). In addition, it has been found that learning environments that put students in the center increase the academic achievement, allow them to develop a positive attitude towards science learning and improve the image, and make the learning permanent (Çetin & Günay, 2006).

Images are the schemes that occur in the mind about an information, concept or phenomenon. Individual images, on the other hand, are individual schemas about a subject, concept or phenomenon, different from each other (Ağgül Yalçın, 2012; Yalçın & Enginer, 2012). These differences vary according to the lifestyle, prior knowledge and interests of the individuals.

It is known from the literature that the science image that individuals carry in their mind is important in science learning (Atasoy, Kadayıfçı & Akkuş, 2007; Donmez, 2017; Nuhoglu & Afacan, 2011). The ways students learn science styles their images of the science learning environment (Ulu, 2012). In addition, students' science learning environment images can affect their interests attitudes, thoughts and motivations towards

learning (Gomleksiz ve Bulut, 2006; Ozdemir, Yalin ve Sezgin, 2008; Ulu, 2012). For this reason, the image of science learning environments that individuals have should be known.

Learning the mental images of individuals about a subject is important in revealing the strengths and weaknesses of that subject (Armstrong, 2007; Ünal, Çalık, Ayas & Coll, 2006; Tezişçi, 2013). It is clear that students' image of science plays an important role in their attitude, thinking, motivation and interest towards science, and it is also very effective in learning science. (Gömleksiz & Bulut, 2006; Özdemir, Yalın & Sezgin, 2008; Ulu, 2012). Mental images in the literature about the science course have been examined from many perspectives. For example, studies available investigating the effects of the lessons taught supported by teaching method and techniques on students' mental images (Çavdar & Doymuş, 2016; Develi, 2017; Kaplan Parsa, 2016; Zheng & Spires, 2014). The common point of these studies is to determine the effect of teaching method and techniques on students' mental images. In addition to these studies, there are studies examining the mental images brought by the individual from the past are available. For example, images about scientists (Song & Kim, 1999). Images about ideal learning environment (Ozdemir & Akkaya, 2013), (Ozdemir & Akkaya, 2013), there are investigation to compare the images for science learning environments according to education systems of countries (Turkmen & Unver, 2018). In addition to current investigations Sahin Akkus (2016), compared the actual science learning environments with the ideal learning environments according to the quality of the school. As a result it has determined that students' about the ideal science learning environments include smart board, experiment tables and visuals in the mental images. This result revealed the idea of how the science learning environment images of the students studying in the private school are.

Therefore¹ in this study is aimed to determine whether there is a difference between the student images of the private school science environment and the public school science learning environment. Based on this information²⁵, it is thought that this study will be important to investigate the quality of the science learning environment in students' science learning process.²⁴ Based on the information in the literature, investigating the importance of the qualities of the science learning environment is thought to be important for the students' science learning processes. In this context, the³¹ results of this study will contribute to the institutions and organizations involved in the regulation of learning environments and to researchers who want to work on this issue. The study aims to examine the images of 4th grade private and public-school students related to science learning environments using their drawings. Significant differences, if any, between students' images of science learning environment according to the type of their school (private or public) will also be revealed.²³ In this context, the main question of the study is "What is the image of science learning environment of 4th grade private and public-school students?". The following problems have been addressed as the sub-questions of the study:

What is the image of science learning environment of 4th grade public-school students?

What is the image of science learning environment of 4th grade private-school students?

Do students' images of science learning environment differ significantly⁶ according to the type of their school (public- private)?

2. Method

2.1 Research Model

In the study, it was aimed to examine the images of science learning environment of 4th grade private and public-school students using their drawings. The survey model one of the descriptive research methods, was preferred. Descriptive method is generally used to clarify a situation, an event, to make evaluations within the framework of certain rules, and to reveal the relationships between events. The main purpose of descriptive study is to provide a deep understanding of the case under investigation and to explain it. In descriptive study, the field of the research is directly presented and evaluated as it is (Çepni, 2014). Survey model serves to reveal current situation. It deals with the current state of the situation or event under investigation and the position related to the problem (Çepni, 2014). Since the existing images of the students will be revealed in this study, the survey model of the descriptive research method was preferred.

2.2 Study Group

In this study, simple random sampling method was used. The universe of the study consists of all 4th grade public and private school students in Antalya. Science course starts from the third grade in the Turkish education system. Students studying in the fourth grade have two school years science learning backgrounds. Therefore 4th grade students were included in this study. One school from each of the Konyaaltı, Kepez and Muratpaşa districts, which are the 3 central districts of Antalya, was planned to be included in the study, but permission was not granted from the schools in Muratpaşa district. Therefore, the number of schools from Kepez and Konyaaltı districts that were willing to participate in the study was increased, and the study was conducted with three schools from each of the two districts. The drawing method, which is a data collection tool, is applied as a

questionnaire, which allowed to set the number of participants as 357. Compared to other data collection methods (interview, observation), the mentioned questionnaire can be applied quickly to very large groups from different regions at a very low cost (Aiken, 1997; Wolf, 1988). So, the number of participants was kept high ²⁹ in order to get healthier and more reliable results in revealing students' images of the science learning environment.

2.3 Data Collection Tool

"Actual Science Learning Environment Drawing Test" (Şahin-Akyüz, 2016) ¹ was used as the data collection tool. The necessary permissions for the drawing test were obtained from the researchers who developed the test. The test used consists of two sections. ¹ In the first part of the test, students are asked to draw in accordance with the instructions ¹ and to answer four open-ended questions. In the second section of the test, there are 17 items about students' learning preferences. But, in this study, students' since the learning preferences has will not determine the second part of the test has not used. "Actual Science Learning Environment Drawing Test" administered on 8th graders by the developers overlap with 4th grade skills, the validity and reliability measurements of the test were not performed again. ⁹ As a result of the calculation, the reliability of the research was found to be 89%. Since the reliability values above 70% are considered as reliable (Miles & Huberman, 1994), the result obtained here indicates the reliability of the research. Science course begins from the third ¹⁰ grade in the Turkish education system. Students studying in the fourth grade have two school years science learning backgrounds. Therefore ⁴ 4th grade students were included in the study. Various methods, including drawings, word associations, analogies, and metaphors can be used to reveal the mental images that students have (Dikmenli, 2010). Collecting data through drawings allows to analyze social, emotional, cognitive and motivational dimensions and evaluate them

together. Drawings are one of the most used data collection tools (Armstrong, 1995; Armstrong, 2007; Ulu, 2012). In interviews and surveys, children may not feel comfortable due to their developmental characteristics and may fail to correctly express themselves. Therefore, drawing method is a better method for collecting data from children to identify the attitudes, interests and beliefs in the images (Armstrong, 2007: 21). In this study, since it was desired to collect data about the images of 9-10-year-old children, drawing method was preferred.

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2.4 Data Collection Process

Data collection process of the study took place in May-June of the 2017-2018 academic year. In the process, participants filled the actual science learning environment drawing test with their drawings and answered as “What are you doing yourself in this drawing? Explain” “What is your science teacher doing in this drawing? Explain” “What are your friends doing in this drawing? Explain” “What are the most important things for you in your science learning environment?” four questions just below the drawing area prepared for the researcher to better understand the drawing.

2.5 Data Analysis

¹ Content analysis method was used for the analysis of the data. Content analysis is a method that allows to work indirectly to determine human nature and behavior; it is a repeatable and systematic method in which some parts of an entity are divided into smaller units and summarized by coding according to certain rules. The ²⁸ main purpose of content analysis is to explain the collected data. For this purpose, similar information is grouped under certain concepts and themes (Yıldırım & Şimşek, 2005). Regarding the above information, it is clearly seen that the most appropriate method ²¹ to be used in analyzing the data collected in ⁷ this study is content analysis. Whether there is a significant

difference between the mental images of the science learning environment between private school and public school students has determined by the Chi - Square test. Therefore ¹ SPSS 21 package program was used in the analysis. The drawing tests of the students' and the analysis of four open - ended questions has carried out together with an expert in science education.

3. Findings

The results of the sub-problems related to science learning environments of 4th grade public and ⁸ private school students are included in this section.

⁸ 3.1 Findings on the comparison of public and private school students' images of the science learning environment

The result⁸ of the sub-problems related to science learning environments of 4th grade public and private school students are included in this section.

Table 1. Findings about the place and student behavior public and private school students

Theme	Sub-Theme	Public School	
		f	%
Public Place	Formal	206	96.3
	Informal	6	2.8
Public School Student Behavior	Academic	46	21.5
	Active	145	67.8
	Visual spatial	98	45.8
	Using technology	3	1.4
	Indifferent-passive	3	1.4
Private Place	Formal	134	93,7
	Informal	1	0,7
Private School Student Behavior	Academic	23	16,1
	Active	102	71,3
	Visual spatial	33	23,1
	Using technology	0	0
	Indifferent-passive	3	2,1

Note: A drawing may have more than one sub-theme.

Regarding Table 1, the drawings of almost all 4th grade public school students (96.3%) fall under the formal sub-theme in terms of the place. A very small portion of the students (2.8%) drew an informal environment. Regarding the theme of student behaviour, the drawings of 21.5% of 4th grade public school students belongs to the academic sub-theme, 67.8%, which constitute the majority, to the active sub-theme, 45.8%, which constitutes almost half of them, to the visual spatial sub-theme, whereas very few

students' drawings fall in the sub-themes of Using technology (1.4%) and indifferent - passive (1.4%). Regarding Table 1, almost all 4th grade private school students (93.7%) drew the formal environment for place sub-theme. Only one student (0.7%) drew an. Regarding the theme of student behavior, the drawings of 16.1% of 4th grade private school students belongs to the academic sub-theme, the majority of the students (71.3%) to the active sub-theme, 23.1% to the visual spatial sub-theme, 2.1% to the indifferent-passive sub-theme, whereas none of them drew a student using technology. Table 6 presents the findings of the 4th grade private school students about teacher behavior, teacher's position, and teaching method sub-themes. Table 2 presents the findings of the 4th grade public and private school students about teacher behaviour, teacher's position, and teaching method sub-themes.

Table 2. Findings about teacher behavior, teacher's position and teaching method public and private school students

Theme	Sub-Theme	f	%
	Interactive person	64	29.9
	Presenting the topic	82	38.3
	Driving learning	36	16.8
	Keeping record	1	0.5
	No teacher	21	9.8
	Watching /monitoring	28	13.1
Public school teacher's position	Away from students	76	35.5
	Inside the students	93	43.5
Public school teaching method	Student-centered	143	66.8
	Teacher-centered	66	30.8
Private school teacher behavior	Interactive person	40	28.0
	Presenting the topic	43	30.1
	Driving learning	30	21.0
	Keeping record	1	0.7
	No teacher	3	2.1
Private school teacher's position	Watching /monitoring	21	14.7
	Away from students	68	47.6
Private school teaching method	Inside the students	51	35.5
	Student-centered	110	76.9
	Teacher-centered	26	18.2

Note: A drawing may have more than one sub-theme.

Regarding Table 2, 29.9% of 4th grade public school students drew the teacher as an interactive person, 38.3% as a person presenting the topic, 16.8% as a person directing the learning, 0.5% as a record keeper, 13.1% as a person watching/monitoring whereas 9.8% did not draw a teacher. 35.5% of 4th grade public school students drew the teacher as away from students whereas approximately half of them (43.5%) drew him/her inside the students. 66.8% of the students drew a student-centered teaching method, whereas 30.8% drew a teacher-centered method. Regarding Table 2, 28.0% of 4th grade private school students drew the teacher as an interactive person, 30.1% as a person presenting the topic, 21.0% as a person directing the learning, 0.7% as a record keeper, 14.7% as a person watching/monitoring and 2.1% did not draw a teacher. 47.6% of 4th grade private school students drew the teacher as away from students whereas 35.5% drew him/her inside the students. Most of the students (76.9%) drew the teaching method as student-centered and 18.2% as teacher-centered. Table 3 presents the findings of the 4th grade private school students about the elements of teaching environment sub-themes. Table 3

presents the findings of the 4th grade public and private school students about the elements of teaching environment sub-themes.

Table 3. Findings about the elements of teaching environment public and private school students

Theme	Sub-Theme	f	%
Public school the elements of teaching environment	Tools suitable for the topic	197	92.1
	Technological equipment	5	2.3
	Classic student desk	57	26.6
	Group table	1	0.5
	Experiment table	149	69.6
	Positive experience	157	73.4
	Negative experience	0	0.0
	Laboratory material	37	17.3
Private school The elements of teaching environment	Tools suitable for the topic	123	86.0
	Technological equipment	20	14.4
	Classic student desk	12	8.4
	Group table	54	37.8
	Experiment table	114	79.7
	Positive experience	87	60.8
	Negative experience	1	0.7
	Laboratory material	92	64.3

Note: A drawing may have more than one sub-theme.

Regarding Table 3, almost all 4th grade public school students (92.1%) drew tools suitable for the topic, very few students (2.3%) drew technological equipment, 26.6% drew classic student desk, more than half (69.6%) drew experiment table, more than half (73.4%) drew positive experience, and 17.3% drew laboratory material whereas none of the students drew negative experience. Regarding Table 3, the majority of 4th grade private school students (86.0%) drew tools suitable for the topic, 14.4% drew technological equipment, 8.4% drew classic student desk, 37.8% drew experiment table, the majority (79.7%) drew positive experience, and 64.3% drew laboratory material whereas only one student drew negative experience (0.7%). Table 4 presents the findings of the 4th grade public and private school students about the elements of the learning environment that are important to the students.

Table 4. Findings about the elements of the learning environment that are important to the students public and private school students

Theme	Sub-Theme	f	%
Public school the elements of the learning environment that are important to the students	Cleanness	22	10.3
	Having a laboratory	6	2.8
	Materials	35	16.4
	Security	3	1.4
	Learning/understanding the topic	49	22.9
	The topic itself	32	15.0
	Quiet place	29	13.6
	Being careful/doing it right	10	4.7
	Listening	8	3.7
	Interaction with the teacher	15	7.0
	Undertaking a task	6	2.8
	Interaction with friends	17	7.9
	Having fun	1	0.5
	Explanation of the station	7	3.3

Private school the elements of the learning environment that are important to the students	Experimenting	25	11.7
	Everything	1	0.5
	My existence	5	2.3
	Seeing the experiment	5	2.3
	Health	0	0.0
	To be successful in the lesson	8	3.7
	Cleanness	2	1.4
	Having a laboratory	1	0.7
	Materials	44	30.8
	Security	12	8.4
	Learning/understanding the topic	27	18.9
	The topic itself	6	4.2
	Peace/silence	5	3.5
	Being careful/doing it right	13	9.1
	Listening	6	4.2
	Interaction with the teacher	10	7.0
	Undertaking a task	0	0.0
	Interaction with friends	9	6.3
	Having fun	5	3.5
	Getting an explanation	1	0.7
	Experimenting	22	15.4
	Everything	3	2.1
	Itself	3	2.1
	Seeing the experiment	3	2.1
	Health	6	4.2
	Being successful	4	2.8

Note: A drawing may have more than one sub-theme.

27 According to Table 4 10.3% of the 4th grade public school students answered as cleaning, 2.8% as laboratory, 16.4% as materials, 1.4% as security, 22.9% as learning/understanding the topic, 15% as the topic itself, 13.6 as peace and silence, 4.7% as being careful/doing right, 3.7% as listening to the teacher, 7.0% as interacting with the teacher, 2.8% as undertaking a task /explaining a topic, 7.9% as communicating with friends, 0.5% (one student) as having fun, 3.3% as getting an explanation, 11.7% as doing experiments, 0.5% (one student) as everything, 2.3% as the topic itself, 2.3% as seeing the experiment, and 3.7% as to be successful; nobody mentioned health in the answer. Regarding the elements in Table 4, that are important for the students related to the learning environment, which emerged with the question "What is the most important thing for you in the learning environment?", 1.4% of the 4th grade private school students answered as cleaning, 0.7% as laboratory, 30.8% as materials, 8.4% as security, 18.9% as learning/understanding the topic, 4.2% as the topic itself, 3.5 as peace and silence, 9.1% as being careful/doing right, 4.2% as listening to the teacher, 7.0% as interacting with the teacher, 0.0% as undertaking a task, 6.3% as communicating with friends, 35.0% as having fun, 0.7% as getting an explanation, 15.4% as doing experiments, 2.1% as everything, 2.1% as the topic itself, 2.1% as seeing the experiment, 4.2% as health and 2.8% as to be successful.

3.2 Statistical findings according to the public school and private school education status

The presence of a significant difference between students' images of science learning environment was tested by the Chi-Square test. Sub-themes included in each of the determined seven themes and their significance levels were analyzed. Table 5

presents the findings of the chi-square test of independence related to 4th grade private and public-school students' image of place.

Table 5. Findings of the chi-square independence test regarding students' image of place

Theme	Sub-Theme	Public		Private		sd	Calculated Value	Critical Value
		f	%	f	%			
Place	Formal	206	96.3	134	93.7	1	1.8	3.8
	Informal	6	2.8	1	0.7			

Regarding the above Table 5, Calculated Value (1.8) < critical value (3.8), therefore there is no significant difference between public and private school students' images of place. Table 6 shows the findings of the chi-square test of independence related to 4th grade private and public-school students' image of student behavior.

Table 6. Findings of the chi-square independence test regarding student behavior

Theme	Sub-Theme	Public		Private		sd	Calculated Value	Critical Value
		f	%	f	%			
Student Behavior	Academic	46	21.5	23	16.1	4	12.0	9.4
	Active	145	67.8	102	71.3			
	Visual spatial	98	45.8	33	23.1			
	Using technology	3	1.4	0	0			
	Indifferent	3	1.4	3	2.1			

Regarding the above Table 6, Calculated Value (12.0) > critical value (9.4), therefore there is a significant difference between public and private school students' images of student behavior. Table 7 shows the findings of the chi-square test of independence related to 4th grade private and public-school students' image of teacher behavior.

Table 7. Findings of the chi-square independence test regarding teacher behavior

Theme	Sub-Theme	Public		Private		sd	Calculated value	Critical Value
		f	%	f	%			
Teacher behavior	Interactive person	64	29.9	40	28.0	5	9.4	11.0
	Presenting the topic	82	38.3	43	30.1			
	Driving learning	36	16.8	30	21.0			
	Keeping record	1	0.5	1	0.7			
	No teacher	21	9.8	3	2.1			
	Watching /monitoring	28	13.1	21	14.7			

Regarding the above Table 7, Calculated Value (9.4) < critical value (11.0), therefore there is no significant difference between public and private school students' images of teacher behavior. Table 8 shows the findings of the chi-square test of independence related to 4th grade private and public-school students' image of teacher position.

Table 8. Findings of the chi-square independence test regarding teacher's position

Theme	Sub-Theme	Public		Private		sd	Calculated value	Critical Value
		f	%	f	%			
Teacher's position	Away from students	76	35.5	68	47.6	1	4.1	3.8
	Inside the students	93	43.5	51	35.5			

Regarding the above Table 8, Calculated Value (4.1) > critical value (3.8), therefore there is a significant difference between public and private school students' images of teacher's position. Table 9 shows the findings of the chi-square test of independence related to 4th grade private and public-school students' image of teaching method.

Table 9. Findings of the chi-square independence test regarding teaching method

Theme	Sub-Theme	Public		Private		sd	Calculated value	Critical Value
		f	%	f	%			
Teaching method	Student-centered	143	66.8	110	76.9	1	6.5	3.8
	Teacher-centered	66	30.8	26	18.2			

Regarding the above Table 9, Calculated Value (6.5) > critical value (3.8), therefore there is a significant difference between public and private school students' images of teaching method. Table 10 shows the findings of the chi-square test of independence related to 4th grade private and public-school students' image of the elements of teaching environment.

Table 10. Findings of the chi-square independence test regarding the elements of teaching environment

Theme	Sub-Theme	Public		Private		sd	Calculated value	Critical Value
		f	%	f	%			
The elements of teaching environment	Tools suitable for the topic	197	92.1	123	86.0	7	147.8	14.0
	Technological equipment	5	2.3	20	14.4			
	Classic student desk	57	26.6	12	8.4			
	Group table	1	0.5	54	37.8			
	Experiment table	149	69.6	114	79.7			
	Positive experience	157	73.4	87	60.8			
	Negative experience	0	0.0	1	0.7			
	Laboratory material	37	17.3	92	64.3			

Regarding the above Table 10, Calculated Value (147.8) > critical value (14.0), therefore there is a significant difference between public and private school students' images of the elements of teaching environment. Table 11 shows the findings of the chi-square test of independence related to 4th grade private and public-school students' image of the elements of the learning environment that are important to the students.

Table 11. Findings of the chi-square independence test regarding the elements of the learning environment that are important to the students

	Public	Private
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Theme	Sub-Theme	f	%	f	%	sd	Calculated value	Critical Value
The elements of the learning environment that are important to the students	Cleanness	22	10.3	2	1.4	19	75.9	30.1
	Having a laboratory	6	2.8	1	0.7			
	Materials	35	16.4	44	30.8			
	Security	3	1.4	12	8.4			
	Learning/understanding the topic	49	22.9	27	18.9			
	The topic itself	32	15.0	6	4.2			
	Peace/silence	29	13.6	5	3.5			
	Being careful/doing it right	10	4.7	13	9.1			
	Listening	8	3.7	6	4.2			
	Interaction with the teacher	15	7.0	10	7.0			
	Undertaking a task	6	2.8	0	0.0			
	Interaction with friends	17	7.9	9	6.3			
	Having fun	1	0.5	5	3.5			
	Getting an explanation	7	3.3	1	0.7			
	Experimenting	25	11.7	22	15.4			
	Everything	1	0.5	3	2.1			
	Itself	5	2.3	3	2.1			
	Seeing the experiment	5	2.3	3	2.1			
	Health	0	0.0	6	4.2			
	Being successful	8	3.7	4	2.8			

Regarding the above Table 11, Calculated Value (75.9) > critical value (30.1), therefore there is a significant difference between public and private school students' images of the elements of the learning environment that are important to the students.

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Results, Discussion and Suggestions

In the study, it is aimed to examine the images of 4th grade private and public-school students related to science learning environments using their drawings. The results of the findings of the study are given in accordance with the sub-themes.

The science learning environment of 4th grade public school students consists of classrooms or laboratories. However, student drawings generally include traditional classrooms. Based on this, it can be concluded that lessons are usually instructed in traditional classrooms and informal environments are less preferred as learning places. In public schools, science learning environments are usually traditional classrooms, laboratories are seldom used, and there is no laboratory, or they are not used, which support this result (Baltürk, 2006; Tekbıyık & Akdeniz, 2008; Gunes, Sener, Topal Germi & Can, 2013). According to the drawings, students actively participate in the experiments conducted in the classroom/science learning environment, examine the experiments

performed by their friends or teachers and engaged in visual spatial behaviors. In other sub-themes it was found that teacher assumes the role of an interactive person and a person leading learning in the science learning environment. Based on this, it can be said that the position of the teacher is intertwined with the students in the public school and the lessons are student-centered. According to the students, teaching environment materials in science learning environments are suitable for the topic and the teacher's desk has been transformed into an experiment table. Another ⁶ result of the study is that public school students have positive experiences in science learning environments, and no school participating in the study have a negative experiences The elements that are important to students in the science learning environment are learning/understanding the topic, experimenting/being able to make experiments and cleaning.

The science learning environment of 4th grade private school students also consists of classrooms or laboratories. However, student drawings generally include laboratories. Private school students are found to be active in their lessons. Regarding the images of students about science learning environments, teachers are generally included as a person presenting the topic. Other sub-themes showed that the teacher is the person who directs the topic. The position of the teacher is generally far from the students and the lessons are student-centered. Regarding the teaching materials in science learning environments, there are real experiment tables and the tools suitable for the topic are used in the lessons. Students' experiences of science learning environments are positive. In addition, according to the students the most important factor of science learning environment is the “materials” (Table 4).

The comparison of private and public-school students' images under “place” theme, ²⁰ showed that there is no significant difference between the images. It has been determined that informal learning environments are less preferred in both school types

Outdoor space (museum, botanical garden and zoo trip, planetarium) is less preferred as a science learning environment in both school types. The reason for this may be various problems such as teachers' hastiness in teaching the topics, their reluctance to use different places, or physical impossibilities. It is also known in the literature that outdoor environments are less preferred for similar reasons (Orhan Özen, 2013; Yavuz, 2012). Regarding the images of the science learning environment, the outdoor environments are drawn more by the public-school students than the private school students. It is thought that this may be due to the insufficiency of the learning environment in public schools. ¹⁵ In the literature, it is known that out-of-school learning environments increase the permanence of the learned knowledge, these environments provide an entertaining and effective learning and are therefore frequently preferred (Sontay, Tutar & Karamustafaoglu, 2016).

A significant difference was found between the images of student behaviors according to attending a public or private school. Academic student behavior has been drawn more frequently by public school students. This may be due to the fact that in public schools, students are usually listening or taking notes. The theme of “teacher behavior” in science learning environments has similar images for both types of schools. However, “no teacher” sub-theme is used more by public school students. In both school types, the teacher is usually drawn as the person presenting the topic, which may be due to the teaching role of the teacher, as an interactive person and as the person who leads learning. In the literature, it is stated that teachers frequently use the board (Bayındır & Arıcı, 2015). However, only one student in both types of school sees the teacher as the record keeper, which may be due to the fact that even if the teacher keeps records during the lesson, it is not reflected in the student image.

A significant difference was found between public and private school students' images of the position of the teacher. Regarding the position of the teacher in science learning environments, the teacher is predominantly intertwined with the students in the drawings of public-school students, while he/she is distant from the students in the drawings of private school students. The reason for this may be that teachers in private schools keep themselves in the background, to give students more opportunities to discover and construct information on their own. The teacher is a guide in the structuring of knowledge by the student. It is the student who is active. (Acat, Karadağ & Kaplan, 2012; Mengi & Schreglman, 2013; Yılmaz & Akkoyunlu, 2006).

A significant difference was found in the images of the elements of teaching environment according to attending a private and public schools. However, most of the students' drawings include tools that are suitable for the topic in both school types. Based on this result, it can be said that teachers want to embody the subject according to the cognitive characteristics of the students in the concrete operational stage. In both school types, usually positive experiences are present in the images of students. There is no student with negative experience in public schools whereas a negative experience was encountered in the drawing of a private school student. This may be due to the negative mood of the student before drawing or having a negative attitude towards the science learning environment. A significant difference was found under “The elements of the learning environment that are important to the students” theme between the images of the two school types. Learning/understanding the topic is the most preferred element among public school students, whereas the most preferred element among private school students is the materials.

As a result; Laboratories and traditional classrooms are available in both school types. However, the drawings of the teaching environment in the public school consist of

traditional classroom, whereas in the private school they are mostly comprised of the laboratory. The elements such as laboratory and laboratory equipment were found to be almost non-existent especially in public schools. Public schools can use their financial resources by giving priority to course materials and to improve the quality of learning environments. Schools with suitable physical conditions, can organize a space, an empty classroom, room etc. as a laboratory to be used in science lessons. In the drawings of both school types, it is the teacher who presents the lesson. Students usually watch their teachers during the experiment. Based on this, it can be said that the teaching is performed in a more teacher guide. Finally, this study, which has been carried out with 4th grade primary school students using drawing method, can be carried out using different methods (analogy, metaphor, word association, only interview, etc.) in future studies.

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