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The Evaluation of Pre-service Preschool Teachers' Knowledge about the Concept of Environment

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Abstract: The purpose of the research is to evaluate pre-service preschool teachers' knowledge about environment by analyzing their drawings about it. 70 first grade, 99 second grade, 56 third grade and 44 fourth grade, with a total of 269 students have been evaluated in this research. This qualitative research was made with social structuralism vision. The data used in this research were gathered by draw and tell conversation technique, where pre-service teachers were asked to draw the first thing when they think about environment and explain it. When analyzing the data, both qualitative and quantitative techniques were used. After analyzing collected data, it is seen that most used object in drawings are tree, human, house and sun, respectively. 4 themes and 12 sub-categories under these themes are detected by pre-service teachers' drawings. The most drawn theme by pre-service teachers is Theme 3: a place which affected/designed by third persons, while the least drawn is Theme 4: a place where humans, animals and plants lives together. 10 categories have seen after analyzing explanations of the drawing. Most explanation seen in the places that supports human life category. Independent variables of the research (sex and grade level) and themes and explanations of the drawings are statically and meaningfully related to each other. The most significant result of this research is that pre-service preschool teachers have human-centric system of thought about environment.

Keywords: *Environment, preschool education, drawing, knowledge, pre-service preschool teacher*

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Introduction

After the Industrial Revolution, humanity started spending more natural resource and making more damage to the nature. After seeing the unreturnable consequences of natural damage, international organizations stepped in. Especially, United Nations emphasized that views against the nature has to change by the support of governments (UNESCO, 1975). At the end of the Belgrade Workshop which took place in 1975 with the lead of United Nations, importance of the education was emphasized and target of the environmental education was declared as : "The goal of environmental education is to develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones." (UNESCO, 1975:15) Intergovernmental Conference on Environmental Education in Tbilisi emphasized that environmental education should be applied on every stage of education. Also, the purpose of environmental education is defined in five categories: awareness, attitude, information, skill and participation (UNESCO, 1977). At the same conference, informational aspect of the environmental education was declared as: "to help social groups and individuals gain a variety of experience in, and acquire a basic understanding of, the environment and its associated problems." (UNESCO, 1977; 15)

Constructivist theory defines learning as an active process where learning outcomes depend on experience and what individuals already know (Driver and Bell, 1986). Piaget (1970) defined knowledge as an active process; and knowing as transforming reality by mental and physical manipulation of objects based on lifetime experience. Whereas, Ausubel (2000) defined knowledge as a cognitive product that is produced at the end of psychological process by including logical views based on rationality and its interaction with learned information. Culture and the social interaction between members of society are also important in this process (Vygotsky, 1986). Because of this, determining individuals' knowledge and mentality about environment in environmental education is important (Shepardson, 2005). Understanding opinions of individuals is important to define potential obstacles of learning process, planning and designing the structure of syllabus and making efficient survey (Ausubel, 2000; Shepardson, 2005). Revealing individuals opinions is a complicated process which involves a multidisciplinary approach. Drawing, which came into prominence lately while already being used widely in other disciplines, is a mental tool that ensures getting more information about cognitive phenomena and has been used for

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nearly 50 years in cognitive researches (Bland, 2012; Moseley, Perrotta and Utley, 2010).

Drawings are powerful than words for explaining individual's knowledge, feeling, mentality, belief and attitude (Diem-Wille, 2001). In his topographic theory, Freud (1916) insisted that graphical objects can supply important information for understanding the individual, images lying in conscious and subconscious can be extracted by examining drawings. Individual's conscious can be seen by looking at the drawings and the theme around shows subconscious. (Schäfer, 2012; Türkcan, 2013). Drawing is a visual method. Visual methods not only supply rich data for researches (Yuen, 2004), but also shows individual's thought, mentality, feelings and insights. (Coates, 2002; Yavuzer, 2010). By dint of drawings, information about individual's daily life concepts can be identified by defining it in a graphical structure (Einarsdottir, Dockett and Perry, 2009; Schäfer, 2012). Drawing lets participants to show their opinions comfortably and without effect from researchers thoughts (Yuen, 2004). While drawings make an easy way to get data from individuals that have problems about explaining themselves (Rennie and Jarvis, 1995), they also make more relaxing data collecting environment than methods like surveys, criterions etc. (Lewis and Greene, 1983). More than one connection can be made about different fields just by one drawing (Cox, 2005). One of the reason for this is drawing is a process that have less borders than surveys and criterions (White and Gunstone, 2000). Because of this, drawings are more successful than written and oral methods for revealing complex modality of the individuals. (Young and Barrett, 2011).

Environment is a complex concept which is defined differently in different cultures (Yılmaz, Timur ve Timur, 2013). The research made by Stanisstreet and Boyes (1996), ascertained that individuals describe environment in "surroundings (street, neighborhood), district, international, global, alive, inanimate, natural or synthetic, physical or social" aspects. (cited by Loughland, Reid and Petocz, 2002). On the contrary, Güler (2010, p.181) underlined that it is hard to define borders of the environment concept. Güler insisted that environment could be defined as "biological systems occurred by ecosystem upon the individual; chemical and physical biotic factors or connection between alive and lifeless beings". Because of the definitions above, it can be accepted that environment has complex and wide structures and this is why it is hard to define it. Additionally, reflection and causative relation between human action and environment, cognitive and behavioral structures like knowledge, belief, mentality, values, etc. oriented to environment need to be included in educational processes (Tuncer, Sungur, Tekkaya and Ertepınar, 2007). Environmental education concept, which become more important in 1970's, is defined by International Union for Conservation of Nature (IUCN) as "process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among humans, their culture and biophysical surroundings"(IUCN, 1970). According to Payne (1998), individuals and groups need to clearly understand what is the environmental education in order to reach educational target.

Theodore (2000) defined three fundamental categories in order to make this approach successful. One of these categories is teacher's competency. Teacher is an important factor for leading individuals to think about environment and increasing their interest about it (Tuncer, et al., 2007). Kaplowitz and Levine (2005) also emphasized that teachers have an important role in environmental education and they must have thorough environmental knowledge. Especially in late years, researchers target pre-service teachers widely in environmental education researches. While some researchers study pre-service teachers' environmental attitude (Kandır, Yurt and Cevher Kalburan, 2012); others study environmental attitudes of teachers and students (Tuncer, et al., 2007). In some descriptive researches, pre-service teachers' environmental attitudes (Özsoy, Özsoy and Kuruyer, 2011), competencies (Alisinanoğlu, İnan, Özbey and Uşak, 2012) and knowledge (Esa, 2010) have been determined. McKeown-Ice (2000) underlines importance of environmental reading in literature, competence of teaching in environmental aspects, determining attitude, beliefs and behavior about environment and defining their relations between each other, also detecting environmental knowledge level is important for him. In literature, it is seen that there are not much research about determining opinions and definitions of individuals belonging to different age and occupation groups (Loughland, et al., 2002; Shepardson, 2005; Shepardson, Wee, Priddy and Harbor, 2007; Taşkın and Şahin, 2008; Yılmaz, Timur and Timur, 2013).

Researches show that ideas and knowledge about environment are distributed in different topics. It is seen that students between ages of 9-17 are defining environment under two topics, by its relationship with an object or a concept (Loughland, et al, 2002). Every topic is separated under 3 themes and total of six themes are obtained. Themes are ordered from simple to complex. By this order, the simplest theme is Theme 1: Environment is a place. The most complicated theme is Theme 6: Environment and humanity have mutual and sustainable relation with each other. Another research was made by Shepardson (2005) in order to determine secondary school students' environmental knowledge. Similarly, Shepardson revealed different categories about environment concept. According to results of the research, students' opinions about environment gathered under five topics: place that animal lives, place that supplies for animal's needs, place where alive and non-alive objects found, nature and pollution. Beginning from another research about environment concept, Shepardson, at al. (2007)

explained students' mental models about environment. Because of this, researches aimed to find detailed information about environment concept. In this research four models have been found. This models defined as: Model 1: place where animals and plants live, Model 2: place that supports living, Model 3: place that has affected and changed by humans, Model 4: place where humans, animals and plants lives together. A research has been made with Turkish secondary school students shows that students' environment definitions can be gathered under four model. In this research, students defined environment as four model, Model 1: place where animals and plants live, Model 2: place that supports life, Model 3: place where affected and changed by humans, Model 4: place where humans, plants and animals lives together. Furthermore, while Turkish students used tree, flower and environmental description widely they used plastic, toxic gas, cloud etc. figures less.

Researches in literature have to reveal individuals' knowledge and mentality about environment (Loughland, et al., 2002). Kaplowitz and Levine (2005) also underlines this gap in literature and says that while it is needed to make more research about university students' environmental education, researchers generally don't mention this in their work. One of the most important stakeholders in environmental education is teacher. Loughland, et al. (2005) emphasized that cultural heritage of the teacher has important effect on child's consciousness. According to writers, knowledge of the teacher has a direct effect on educational quality. Also, Lang (2000) underlines that change in teacher's opinions about a topic or a concept changes every stakeholder's opinions in education. Ki-Moon (2013) describes environmental education as a process which starts from pre-school and continues lifetime. Early childhood period is the fundamental of this process. Early childhood education provides fundamental information, talent and attitude about environment (Kaga, 2008). In order to provide this education, preschool teachers must have efficient and true knowledge about environmental concepts. Environmental education surveys must focus on detecting and improving early childhood educators' knowledge and competency (Samuelsson and Kaga, 2008). Difficulties of defining environment concept in literature are determined as, scarcity of researches for revealing knowledge about environment, limited university student participation in surveys that researches about environmental education and effects of education on teachers. This research based on the information above. This research has made in order to supply more data in literature, to fill information deficiency. Purpose of the research is to understand pre-service preschool teachers' knowledge and opinion about environment concept. In this research answer for "How we can identify the knowledge of pre-service preschool teachers' about environment." question is seeking. Sub-problems of the research are aimed for determining factors affecting it. Sub-problems are:

1. Is there any reasonable connection between pre-service preschool teachers' drawing and their gender?

1. Is there any reasonable connection between pre-service preschool teachers' drawing and their current grade?

Methodology

Research Design

This qualitative research has been made in order to understand pre-service preschool teachers' knowledge about environment by using social constructivist perspective. According to social constructivist perspective, individuals try to understand environment which they have reciprocal relation. They try do give meanings to surrounding alive and inanimate. This meaning can be simple or complex, and affected by social and historical processes. Researches based on social constructivist perspective intended reveal this meanings and complex structures (Creswell, 2007).

Study Group

Study group of research consisted of 269 pre-service preschool teachers who are studying at Kastamonu University, Faculty of Education, Department of Pre-School Teacher Education in 2013-2014 spring semester. Participation is on voluntary basis. Demographic characteristics of the participants are shown in Table 1.

Table 1. Gender and grade distribution of the pre-service preschool teacher participants

		f	%
Gender	Female	245	91.1
	Male	24	8.9
Current Grade	First Grade	70	26.0
	Second Grade	99	36.8
	Third Grade	56	20.8
	Fourth Grade	44	16.4
Total		269	100

Data Collection

In this research, data gathered by drawing method. Drawing method can be applied by asking "draw ..." or using special materials. In every what that used, drawing is an efficient and open-ended method (Gunstone and White, 2000). Researchers supplied pre-service teachers with a pre-configured paper. Top part of the paper has been classified for drawing environment picture, below, there is a space where they asked to explain why they draw that picture and why they used specific objects in drawing. By this method, written explanation about drawings gotten from pre-service teachers. It is also considered that these written explanations may increase effectiveness and credibility of research.

Procedure

Research has been made at Kastamonu University Faculty of Education in spring semester of 2013-2014. Researchers had necessary permissions in order to run the research. Then volunteers chosen from between pre-service preschool teachers. Participants asked to determine best timetable without distracting their classes. In this timetable researchers and participants met and applied the process. Each session took 40 minutes. Data gathered in five sessions.

Data Analysis

Data gathered in research have been analyzed by one of the qualitative data analysis method, descriptive analysis technique. Some indirect methods used to define and explain attitudes because human behavior generally cannot be observed directly. By descriptive analysis technique, indirect data about human behavior (drawing, writing etc.) can be summarized and identified by using themes described before (Yıldırım and Şimşek, 2008).

Data used in this research is drawings about "environment concept" drawn by pre-service preschool teachers. While analyzing data, researches used descriptive analysis technique's analysis stages. Firstly drawings have passed a general analysis. Drawing forms that did not provide enough data or filled insufficient sorted out. After data sorting process, codes in drawings have determined. In second stage drawings have been categorized with the themes defined before (Loughland, et al., 2002; Shepardson, 2005; Shepardson, et al., 2007; Yılmaz, Timur and Timur, 2012). In third stage, drawings of pre-service teachers have compared with their explanations. In this stage, when drawings and explanations overlapped, it is decided that the drawing can be categorized with specific theme. When the drawing and explanation does not overlap enough, it is separated from data analysis process. Even it is possible to grade drawings, or categorize them as correct or wrong, this type of categorizing may jeopardize the wholeness and the richness of data (Gunstone and White, 2000). Because of this, drawings have categorized under themes and analysis process finished.

Inferential analysis of the research is made by Chi-Square Test of Independence. Chi-Square Test of Independence used to determine the relation between categorical variables that have at least two sub categories, by analyzing ratio observed frequency or categorical ratio between used variables and it depends on there are no relativity between two variables (Pallant, 2011). The dependent variables of this study are themes that consist of ten sub-categories of drawings with descriptive content analysis, four themes and 12 sub-categorized environment drawings. Independent variables are two sub-categories of gender and four sub-categories of continuing grade. Because of this, researchers stated Chi-Square Test of Independence suitable for statistics and methodology. Cramer's V coefficient used to calculate dependent variable. While Odds ratio have been used in order to determine chi-square test's effect, Odds ratio method generally works better in 2X2 cross tables; it is better to use Cramer's V ratio in order to determine chi-square test's effect in bigger cross tables (Field, 2005).

Results and Discussion

Results of the research reported by dividing into groups by analysing. Findings are shared in this section.

Results Obtained by Descriptive Analysis

71 different codes detected in pre-service teachers' environment drawings. In their environment drawings, pre-service teachers have included humans and different animals, buildings like house, apartment block, factory, shopping mall, cars, busses, trucks, abiotic objects like mountain, sun, cloud, river, stream, sea and daily-life tools like axe, hammock, slide and polluting agents. Tree is the mostly used among these. %71.7 of the pre-service teachers drawn tree. Human, house and sun are the other frequently drawn objects. Following frequently drawn object are: human by %56.5, house by %38.3 and sun by %37,9. Objects drawn by participants and their usage frequency is shown in Table 2.

Table 2. Codes included in drawings by participant pre-service teachers

Codes	First Grade		Second Grade		Third Grade		Fourth Grade	
	f	%	*f*	%	*f*	%	*f*	%
Human	32	45.7	64	64.6	31	55.4	25	56.8
Animal								
Bird	20	28.6	23	23.2	14	25.0	10	22.7
Fish	4	5.7	4	4.0	5	8.9	4	9.1
Butterfly	1	1.4	7	7.1	4	7.1	3	6.8
Bee	0	0	1	1.0	2	3.6	0	0
Dog	8	11.4	7	7.1	5	8.9	1	2.3
Rabbit	2	2.9	4	4.0	1	1.8	1	2.3
Chicken	1	1.4	0	0	0	0	1	2.3
Sheep	0	0	1	1.0	1	1.8	0	0

Cat	8	11.4	5	5.1	1	1.8	0	0
Cow	1	1.4	0	0	0	0	0	0
Duck	0	0	4	4.0	0	0	0	0
Snake	0	0	1	1.0	2	3.6	0	0
Tortoise	0	0	3	3.0	1	1.8	0	0
Frog	0	0	1	1.0	0	0	0	0
Mole	0	0	1	1.0	0	0	0	0
Bug	0	0	1	1.0	4	7.1	2	4.5
Worm	1	1.4	0	0	0	0	0	0
Octopus	0	0	0	0	0	0	1	2.3
Sea Shell	1	1.4	1	1.0	0	0	0	0
Moss	1	1.4	1	1.0	1	1.8	0	0
Coral	1	1.4	0	0	0	0	0	0
Fungus	1	1.4	1	1.0	2	3.6	0	0
Microorganisms	1	1.4	0	0	0	0	0	0
Plant								
Tree	60	85.7	75	75.7	40	71.4	19	43.2
Dead Wood	2	2.9	0	0	2	3.6	0	0
Dead Herb	1	1.4	1	1.0	0	0	0	0
Flower	32	45.7	31	31.3	20	35.7	11	25.0
Grass	32	45.7	28	28.3	19	33.9	12	27.3
Jungle	4	5.7	4	4.0	8	14.3	30	9.3
Fruit	3	4.3	9	9.1	5	8.9	1	2.3
Abiotic Objects								
Mountain	12	17.1	15	15.2	8	14.3	5	11.4
Cloud	21	30.0	42	42.4	13	23.2	10	22.7
Sun	26	37.1	48	48.5	20	35.7	8	18.2
Earth	0	0	2	2.0	0	0	3	6.8
Moon	1	1.4	0	0	1	1.8	0	0
Sun	1	1.4	0	0	1	1.8	0	0
River	4	5.7	2	2.0	3	5.4	3	6.8
Sea	12	17.1	11	11.1	6	10.7	5	11.4
Lake	2	2.9	4	4.0	3	5.4	1	2.3
Stream	10	14.3	19	19.2	5	8.9	5	11.4
Field	1	1.4	0	0	0	0	1	2.3
Beach	2	2.9	2	2.0	1	1.8	0	0
Waterfall	1	1.4	0	0	1	1.8	2	4.5
Soil	1	1.4	2	2.0	1	1.8	0	0
Air	0	0	0	0	9	16.1	5	11.4
Buildings								
House	29	41.4	44	44.4	20	35.7	10	22.7
Apartment	23	32.8	29	29.3	7	12.5	12	27.3
Factory	5	7.1	2	2.0	3	5.4	1	2.3
Shopping Mall	7	10.0	5	5.1	1	1.8	4	9.1
School	3	4.3	9	9.1	5	8.9	8	18.2
Hospital	0	0	1	1.0	1	1.8	1	2.3
Playground	14	20.0	15	15.2	4	7.1	2	4.5
Garden	1	1.4	0	0	0	0	1	2.3
Bridge	1	1.4	8	8.1	3	5.4	2	4.5
Vehicles								
Car	25	35.7	27	27.3	11	19.6	8	18.2
Bus	0	0	3	3.0	0	0	1	2.3
Plane	0	0	2	2.0	0	0	0	0
Ship	1	1.4	0	0	0	0	0	0
Boat	7	10.0	1	1.0	1	1.8	2	4.5
Bicycle	0	0	1	1.0	1	1.8	0	0
Road	27	38.6	35	35.4	10	17.9	6	13.6

Polluting Agents								
Smoke	8	11.4	8	8.1	7	12.5	4	9.1
Solid Waste	17	24.3	16	16.2	11	19.6	5	11.4
Solid Bin	19	27.1	18	18.2	8	14.3	7	15.9
Exhaust Gas	3	4.3	3	3.0	4	7.1	2	4.5
Objects								
Axe	1	1.4	0	0	0	0	0	0
Fishing Rood	2	2.9	0	0	0	0	0	0
Hammock	6	8.6	5	5.1	4	7.1	2	4.5
Slide	4	5.7	3	3.0	3	5.4	2	4.5
Fence	3	4.3	1	1.0	3	5.4	1	2.3
Seesaw	1	1.4	0	0	0	0	0	0

In Table 3, themes and category distribution of drawings are shown.

Table 3. Theme and category distribution of pre-service teachers' drawings

Themes	**Categories**	***f***	**%**
Theme 1			
Animal/Plant Environment, Nature	Animal/Plant Habitat	26	9.7
	Nature	37	13.8
	Alive and non-alive objects (Daily environment)	56	20.8
	Material Cycle	2	0.7
Theme 2			
Place that supports life	Place that supports animal life	1	0.4
	Place that supports human and animal/plant life	8	3.0
	Place that supports human life	16	5.9
	Place that supports animal/plant life	1	0.4
	Place that supports human and animal life	4	1.5
Theme 3			
Place where designed and affected by humanity	Place where only humans live (constructed environment)	51	19.0
	Polluted Environment	39	14.5
Theme 4			
Human, animal and plant habitat place	Human, animal and plant habitat	28	10.4

Drawings of participant's have gathered under four themes. Themes divided into subcategories. Significant amount of participants (%20.8) have drawn alive and non-alive everyday objects. Only %19 of participants has drawn concrete environments where people live, and %14.5 drawn polluted environment. Least drawn environments are where supports animal/plant life and places where only animal life supported.

Sample drawings that represent the themes are included below.

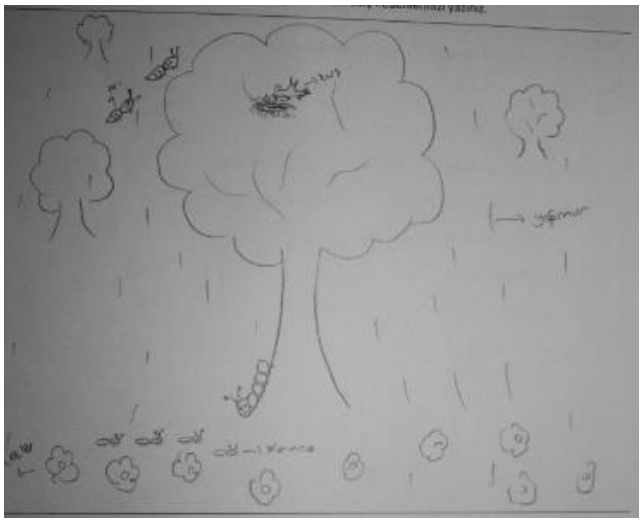

Figure 1. Sample drawing from Theme 1: Animal/Plant Environment, Nature

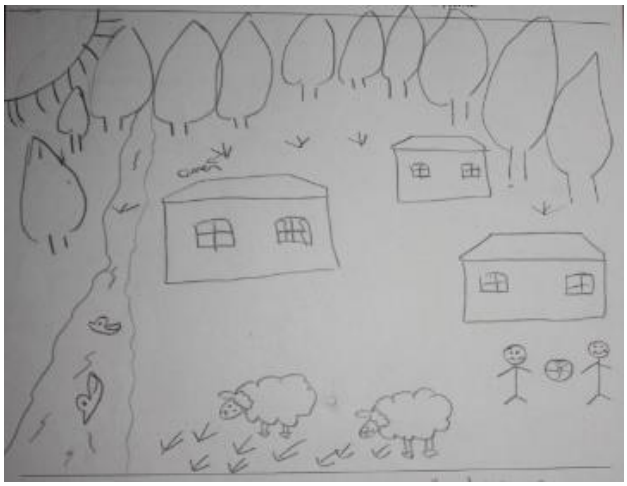

Figure 2. Sample drawing from Theme 2: Place that Supports Life

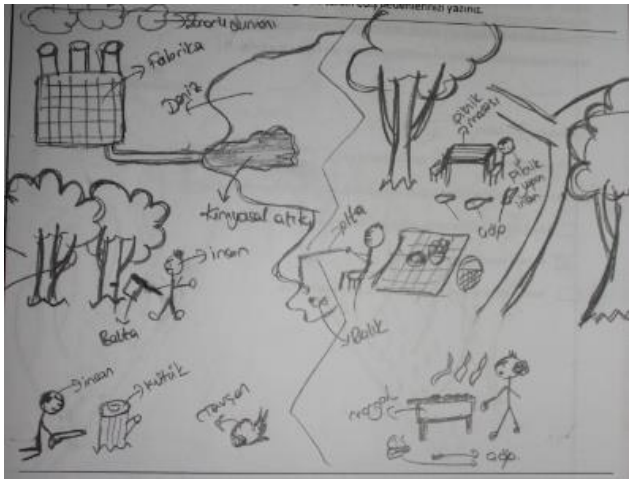

Figure 3. Sample drawing from Theme 3: Place where designed and affected by humanity

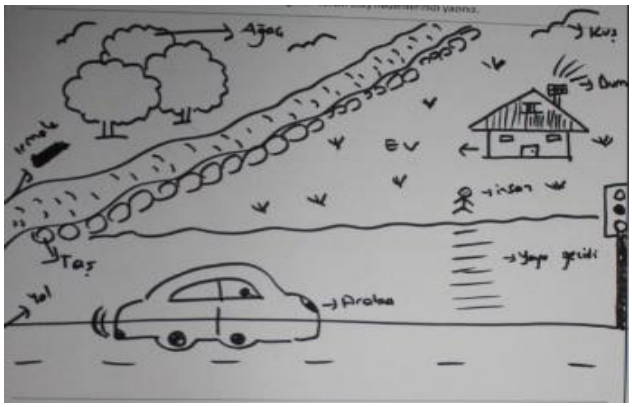

Figure 4. Sample drawing from Theme 4: Human, animal and plant habitat

Another result has found in this research by using pre-service teachers' explanations about drawings. With the descriptive analysis, participant explanations gathered under on different category. Pre-service teachers generally defined environment as a place that supports human life (%25.3). Additionally, another significant portion of participants (%23.8) defined environment as place where they are interacting in daily life. %19 of the participants have included pollution in their explanation (%19). While analysing in grade perspective, most of the first grade students (%37.1) defined environment as daily life area. In second grade, environment mostly described as a place that supports human life (%28.3), in third grade, it is mostly described as pollution (%23.2), and in fourth grade it is mostly described as a place that supports human life (%25.0). Rest of the explanation's categories and participants' grades are shown in Table 4.

Table 4. Pre-service teachers' drawings and their grades

Categories	**Current Grade**									
	First Grade		**Second Grade**		**Third Grade**		**Fourth Grade**		**Total**	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%
Animal habitat	1	1.4	2	2.0	9	16.1	5	11.4	17	6.3
Place that supports animal life	0	0	2	2.0	1	1.8	0	0	3	1.1
Alive and non-alive objects (daily environment)	26	37.1	22	22.2	8	14.3	8	18.2	64	23.8
Nature	8	11.4	12	12.1	5	8.9	7	15.9	32	11.9
Pollution	10	14.3	18	18.2	13	23.2	10	22.7	51	19.0
Place that supports human life	20	28.6	28	28.3	9	16.1	11	25.0	68	25.3
Human, plant and animal habitat	5	7.1	14	14.1	7	12.5	2	4.5	28	10.4
Human and plant habitat	0	0	1	1.0	2	3.6	1	2.3	4	1.5
Human and animal habitat	0	0	0	0	1	1.8	0	0	1	0.4
Plant and animal habitat	0	0	0	0	1	1.8	0	0	1	0.4
Total	70	100.0	99	100.0	56	100.0	44	100.0	269	100.0

Written explanation about the drawings are: explanation about animal habitat "When talking about environment, I thought about animals first. Because, I think environment is their home. (P.174). Another explanation is about animal habitat " Environment is a place where animal lives together. Life chance of the

animals depends on environment." (P.154). In the alive/non-alive category, one of the explanations is "Environment is everything we saw around in our daily life. (...) cannot explain drawing environment picture itself. Also, human picture cannot explain environment itself. From rocks to human, everything is environment." (P. 188). In natural area/nature category, one of the explanations is: "For me, environment is nature itself. Beside nature, there is not environment at all. It is human made." (P. 48). One of the sample explanations for pollution category is: "For me, environment is pollution. Humanity is polluting what they have and preparing their own demise." (P.33). One of the explanations under the place that support human life is: "Environment, has been granted us in order to continue our lives in it. (...). (P.205). An example in environment is human, animal and plant habitat category is: "Environment contains humans, animals, plants, microorganisms and human made buildings like house, car, and factory" (P70).

Results Obtained by Inferential Analysis

Chi-square test used in order to determine differences between participant pre-service teachers' current grade and gender, environmental drawings' themes and explanations and categories. And results of chi-square tests' shown in Table 5, Table 6, Table 7 and Table 8 in the Appendix.

Relation between current grade and environment drawings of participants identified by analysis as $X2(36, n= 269) = 56.54$, $p = .016$. In order to calculate the effect magnitude and direction of the difference, Cramer's V test used and the coefficient calculated as 0.26. Because of this, current grades and environment themes differs in environmental drawings. With Cramer's V coefficient, current grade and environmental themes drawn are positively related by a moderately. Also, statically reasonable relation detected between environment themes and participants' gender $X2 (12, n= 269) = 40.72$, $p = .000$. Cramer's V coefficient is calculated as 0.38 for this relation. Between male and female participants, results show a relation between gender and drawings in favour of female participants. When Cramer's V coefficient interpreted, it is seen that gender affects themes of environment drawings significantly.

Obtained by environmental drawings written explanations descriptive analysis, statistically meaningful difference between current grade and categories is $X2 (27, n= 269) = 45.63$, $p = .014$. Cramer's V coefficient is calculated as 0.23. According to this findings, differences between drawings and explanations made by pre-service teachers has been noticed, when Cramer's V coefficient interpreted, grade levels are effecting drawing explanations moderately. Pre-service preschool teachers' genders are related with categories obtained from drawing explanations, that is $X2 (9, n= 269) = 18.32$, $p = .032$. Cramer's V is 0.26 for this calculation. Accordingly, genders of participants are affecting environmental drawings' written explanation moderately.

Discussion

By descriptive analysis of drawings, it is seen that pre-service preschool teachers' mostly drawn tree, human, house and sun codes. Similarly, in Shepardson's (2005) research, tree and sun have chosen mostly. He interpreted that this shows when it talking about environment, "soil area" is the first thing that comes up in mind. Also, tree is the most drawn object in the research of Yılmaz, Timur and Timur (2013). Both research shows that while participants came from different age groups, same objects come in mind when talking about environment. This can be interpreted as frequently used objects in environment concept are same even age groups vary. Pre-service preschool teachers mostly used abiotic objects in their drawings. Mostly used ones are sun, cloud, mountain, sea and stream. While abiotic objects seem diversified, their usage frequencies are low. In this research, it is seen that diversification is less while frequencies are high. Participants frequently involve apartment, house, school or even shopping malls in their drawings. According to Snaddon et al. (2008), with distance from the natural environment, variety of environmental factors in the knowledge is decreasing. Also, Miller (2007), with his research made with children, with distance from natural environment, it is seen that knowledge of alive and non-alive objects is decreasing. In this research, same result is seen. It is thought to be relevant with living away from nature as Snaddon et al. (2008) and Miller (2007) indicates. All of the participants are studying in city center. They used objects seen in daily life in their drawings. In a general aspect, participants included alive and non-alive objects in nature less than objects in their daily life. Also, Alerby (2000) underlines that in his research individuals drawn objects from their daily life more than natural objects. Results of this research are overlapping with similar researches in literature.

Human figure in the drawings is one of the objects that get attention. Nearly half of the first graders (%45.7), %64.6 of second graders, %55.4 of third graders and %56.0 of fourth graders have used human figure in their drawings. This situation is thought as pre-service teachers are considering human in environment concept and as a part of environment. But there are opposite results in literature. In researches of Shepardson (2005), Shepardson et al. (2007) and Yılmaz, Timur and Timur (2013), human figure used very less. Especially, Shepardson et al. (2007) considered this as human figure is not considered in environment concept. Common point of this three research in literature is participants of them are children. In this research, participants are teenagers and younger. Researchers think that age difference have effect on defining human in environment concept.

After analysing participants' environment drawings, four themes and 12 sub-categories related to themes

identified. Theme 1. Animal/Plant Environment, Nature is the most founded theme in drawing. 121 of 269 total participants have included this theme in their drawings. Significant amount of participant (n=90) included Theme 3 (place that affected/designed by human). Important result of this research is the least included theme is Theme 4 (place where human, animal and plant lives together). By this findings, researchers thinks that pre-service teachers interpreting environment without including humans, animals, and plants. Main reason of this may be that humanity can easily effect the nature more than any other living form (Connell, et al., 1999).

After descriptive analysis of explanations of drawings written by pre-service preschool teachers, ten categories found. Most of the explanations categorized under "place where supports human life." After that, Alive and non-alive objects (daily life) (n=64) and Pollution (n=51) categories used. There are only one explanation for each category of Place where human and animals live and Place where plants and animals live. Results are significant. Defining environment as a place that supports human lives and protects humanity's interest is the main thesis of human centered (anthropocentric) environmental mentality and it is also main paradigm of humanity (Özerkmen, 2002). In human-centric perspective, environment is places with suitable heat, pressure, air quality, light food that supports daily activities. Besides that, every ecological environment called as extraordinary (Cavicchioli, Amils, Wagner & McGenity, 2011), and every environment tagged as extraordinary must support daily life of humanity. This point of view cause consuming of places seen as extraordinary, and wasting ecological environment. In the last 50 years, the effects of Industrial Revolution threatens environment and leads people to change their point of view from human-centric to environment centric (ecocentric). In this point of view, human in ecosystem have same rights as other livings and capability of using intelligence does not change its position in nature. By this view, natural resources belong to all livings and humanity could not possess all of the resources by itself (Lee, 2008; Manoli, Johnson & Dunlap, 2007). According to Dunlap ve Liere (2008), with emerging ideas and thoughts in last years, human-centric view that can be identified as dominant social paradigm is losing its acceptance to eco-centric views. But researchers in literature (e.g. Shepardson, 2007; Yılmaz, Timur and Timur, 2013) shows that individuals still does not accept eco-centric point of view. While both research has been made in different age ranges, participants insisted on defining environment's feature as supporting human life. Also, in this research pre-service preschool teachers' views can be identified same, so it is seen that this view is not related with age or education level.

Inferential analysis of this research made by chi-square independence test. By analysing the results, a relation seen between pre-service teachers' independent variables (gender and current class) and themes of environment drawings, and a statistical relation between their independent variables and sub-categories of explanations. Gender is frequently examined variable in environmental researches. In environmental researchers, generally results are on behalf of females (attitude, environmental reading, belief, behaviour, point of view etc.). According to Lougland and his friends (2003), one of the main reasons of this is stereotype gender role. Females are more social and their life view is more relation based than males, because of this, they have more inclusive knowledge about environment. According to another opinion, difference between male and female visions is because of the measurement method. According to Bord and O'Connor (1997); scales used in environmental researches including environmental risk perception and this cause female participants to get more points. But, options as environment and economy, waste management etc. does not cause any difference between male and female participants. In this research, results related to gender variable are overlapping with results of other researchers in literature (Lougland et al.., 2003; Tuncer, Ertepınar, Tekkaya and Sungur, 2005; Özsoy, Özsoy and Kuruyer, 2011).

Statistically meaningful relation has found between pre-service preschool teachers' current class, themes of environment drawings and categories of explanation writings. This result is overlapped with the researches in literature (Özsoy, Özsoy and Kuruyer, 2011). Lougland et al. (2003) defines relation between grade and education level and human-centric environmental point of view. Writers explain this as when the grade and the education process continue, more teacher has teach the individual and in primary school environmental education is better suited in syllabus. Also Kaplowitz and Levine (2005) determined students of faculty of education have less environmental knowledge than other faculties' students. Considering these results, researchers think that environmental education must continue in every stage of educational processes. In education, individuals'' environmental knowledge must considered seriously. It is believed that new researches and new results will help to make new educational programs easier. In this research data have gathered by using drawings and writings. This is the limit of the research. In new researches, new methods to gain data have to be used and it will help to improve data pool in literature. Also, participants in this research are pre-service preschool teachers. This can be considered as a limitation. It is believed that if students from other programs participate in researchers, it will help to extent data pool in literature. Writers believes that it is not Writers thinks that is not possible to provide enough benefit and effect without researching belief, attitude, behaviour, value, knowledge etc. about the concepts in research. Because of this, making more researches to understand environment in differing age groups, more education in

every stage and more projects will help to improve environmental knowledge in every aspect.

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Appendix

Table 5. *Chi-square table of Grade*Categories*

		Animal/Plant Habitat	Nature	Daily environment	Material Cycle	Place that supports plant life	Place that supports animal life	Place that supports human and animal/plant life	Place that supports human life	Place that supports animal/plant life	Place that supports human and animal life	Place where only humans live	Polluted Environment	Human, animal and plant habitat	Total
1. Grade	N	5	9	19	0	7	0	1	6	0	1	15	7	0	70
	%	19.2	24.3	33.9	0.0	100.0	0.0	12.5	37.5	0.0	25.0	29.4	17.9	0	26.0
2. Grade	N	6	13	21	0	0	1	3	5	0	2	23	13	12	99
	%	23.1	35.1	37.5	0.0	0	100.0	37.5	31.3	0.0	50.0	45.1	33.3	57.1	36.8
3. Grade	N	10	8	8	1	0	0	3	3	1	1	5	10	6	56
	%	38.5	21.6	14.3	50.0	0	0.0	37.5	18.8	100.0	25.0	9.8	25.6	28.6	20.8
4. Grade	N	5	7	8	1	0	0	1	2	0	0	8	9	3	44
	%	19.2	18.9	14.3	50.0	0	0.0	12.5	12.5	0.0	0.0	15.7	23.1	14.3	16.4
Total	N	26	37	56	2	7	1	8	16	1	4	51	39	21	269
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

X^2 = 56.542 sd= 36 p= .016

Table 6. *Chi-square table of Gender*Categories*

Gender		Animal/Plant Habitat	Nature	Daily environment	Material Cycle	Place that supports plant life	Place that supports animal life	Place that supports human and animal/plant life	Place that supports human life	Place that supports animal/plant life	Place that supports human and animal life	Place where only humans live	Polluted Environment	Human, animal and plant habitat	Total
Female	N	26	31	53	0	6	1	5	16	1	4	49	33	20	245
	%	100.0	83.8	94.6	0	85.7	100.0	62.5	100.0	100.0	100.0	96.1	84.6	95.2	91.1
Male	N	0	6	3	2	1	0	3	0	0	0	2	6	1	24
	%	0.0	16.2	5.4	100.0	14.3	0.0	37.5	0.0	0.0	0.0	3.9	15.4	4.8	8.9
Total	N	26	37	56	2	7	1	8	16	1	4	51	39	21	269
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

X^2 = 40.727 sd= 12 p= .000

Table 7. *Chi-square table of Grade*Drawings' explanation*

		Animal Habitat	Place that supports animal life	Daily environment	Nature	Pollution	Place that supports human life	Human, plant and animal habitat	Human and plant habitat	Human and animal habitat	Plant and animal habitat	Total
1. Grade	N	1	0	26	8	10	20	5	0	0	0	70
	%	5.9	0.0	40.6	25.0	19.6	29.4	17.9	0.0	0.0	0.0	26.0
2. Grade	N	2	2	22	12	18	28	14	1	0	0	99
	%	11.8	66.7	34.4	37.5	35.3	41.2	50.0	25.0	0.0	0.0	36.8
3. Grade	N	9	1	8	5	13	9	7	2	1	1	56
	%	52.9	33.3	12.5	15.6	25.5	13.2	25.0	50.0	100.0	100.0	20.8
4. Grade	N	5	0	8	7	10	11	2	1	0	0	44
	%	29.4	0.0	12.5	21.9	19.6	16.2	7.1	25.0	0.0	0.0	16.4
Total	N	17	3	64	32	51	68	28	4	1	1	269
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

X^2 = 45.636 sd= 27 p= .014

Table 8. *Chi-square table of Gender*Drawings' explanation*

		Animal Habitat	Place that supports animal life	Daily environment	Nature	Pollution	Place that supports human life	Human, plant and animal habitat	Human and plant habitat	Human and animal habitat	Plant and animal habitat	Total
Female	N	17	3	61	27	43	65	25	2	1	1	245
	%	100.0	100.0	95.3	84.4	84.3	95.6	89.3	50.0	100.0	100.0	91.1
Male	N	0	0	3	5	8	3	3	2	0	0	24
	%	0.0	0.0	4.7	15.6	15.7	4.4	10.7	50.0	0.0	0.0	8.9
Total	N	17	3	64	32	51	68	28	4	1	1	269
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

X^2 = 18.328 sd= 9 p= .032