Journal of Teacher Education and Lifelong Learning (TELL)

Volume: 4 Number: 2 Year: 2022 | Research Article | ISSN: 2687-5713

Preschool Pre-service Teachers' Metaphoric Perceptions of the Concept of "Environment": A Longitudinal Study

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Article Info

Article History
Received: 22/08/2022
Accepted: 11/11/2022
Published: 31/12/2022

Keywords:
Preschool pre-service teacher, Environment, Environmental educattion, Longitudinal study, Teacher education.

ABSTRACT

The study attempts to identify the perceptions of preschool pre-service teachers who take the environmental education in early childhood course about the concept of the environment through metaphor analysis. A phenomenological design, one of the most common qualitative designs, was employed in the study. The study group consists of 70 pre-service teachers in the first measurement and 49 pre-service teachers in the final measurement, who took the environmental education in early childhood course in the third year of the education faculty of a public university in the Turkey in the 2021-2022 academic year. The study was designed as a longitudinal study since the data was administrated to the participants in two stages: before they began the early childhood environmental education course (first measurement) and after they completed it (second measurement). To assess the participants' metaphors for the concept of "environment", participants were asked to complete the sentence "I think the environment is like….., because.....". Content analysis, one of the qualitative research methods, was used to analyze the data. As a result of the research, it was determined that pre-school pre-service teacher produced 48 metaphors in the first measurement and 34 metaphors in the second measurement for the concept of "environment". In the research, it was determined that the metaphors produced in the first measurement and the second measurement formed 19 categories and 12 of them were common. In the second measurement, different from the first measurement, the new categories created are 7 categories: obscurity, valuable, sensitivity, inclusive, coordination, guidance and responsibility.

Citation: Gülay Ogelman, H., Güngör, H., Sarı, B. & Durkan, N. (2022). Preschool pre-service teachers' metaphoric perceptions of the concept of "environment": a longitudinal study. *Journal of Teacher Education and Lifelong Learning*, *4*(2), 196-211.

INTRODUCTION

The environment is made up of interconnected ecosystems. In addition to that, there is a dynamic relationship between the environment and people in the context of change, transformation, and sustainability (Schultz, 2002). While the human life is shaped by environmental factors, the environment is also influenced by human behaviors. The sustained overuse of natural systems is closely related to the waste of natural resources and human-made waste production. This situation has resulted in many environmental challenges.

With the rise of environmental issues, one of the topics that has risen to the top of the international agenda more frequently since the early 1970s is environmental education (see, IUCN 1970; UN; 1972; UNESCO 1976; 1977; 1987). This is because environmental education encompasses a concept that can leverage national and global environmental awareness, consciousness, attitudes, and actions. In the Final Report of the International Working Meeting on Environmental Education in the School Curriculum (IUCN, 1970), published by the International Union for Conservation of Nature and Natural Resources, environmental education is defined as "a process during which values are discovered and concepts are explained in order to develop skills and attitudes pertaining to an appreciation of the relationship between man, his culture, and his biophysical environment." (p.11). Erten (2004) stipulated that environmental education along with its cognitive, psychomotor, and affective learning dimensions allows individuals to develop their environmental attitudes, whereby they also transform their attitudes into behaviors in line with the transfer of ecological knowledge. Environmental education is fundamental to addressing the social, economic, and environmental problems that are having a profound effect on us (Potter, 2009). Environmental education is as a specific skill and a way to understand the relationship between man and the living environment, which belongs not only to him, but also to plants and animals (Sabo, 2010). Environmental education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution (Stapp et al., 1969).

The first intergovernmental Conference on Environmental Education, held in Tbilisi in 1977 under the auspices of UNESCO and attended by 66 member countries, provided a crucial framework for the global development of environmental education by presenting various suggestions regarding the quality, goals, guiding principles, and fundamentals of environmental education (Palmer & Neal, 1994, p.13). In this respect, the goals of environmental education are to foster clear awareness of, and concern about, economic, social, political, and ecological interdependence in urban and rural areas; to provide every person with opportunities to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment; and to create new patterns of behavior of individuals, groups, and society as a whole towards the environment (UNESCO, 1977). As a result, the categories of environmental education objectives were identified as awareness, knowledge, attitudes, skills, and participation (Hungerford, Peyton & Wilke, 1980; Hungerford & Volk, 1990). Further, it was noted that environmental education should be a continuous lifelong process; be interdisciplinary and holistic in its approach; versatile and multi-dimensional; relate environmental sensitivity, knowledge, and problem-solving skills; and examine major environmental issues from regional and international points of view (UNESCO, 1977).

The preschool period is a critical period in terms of development, learning, and behavioral acquisition. Children at this period are also more inclined to explore, discover and question the world and have a high level of intrinsic motivation to get to know the environment. In brief, it is one of the most productive times for children to develop an environmentally conscious mindset, environmental awareness, and positive attitudes and behaviors towards the environment. In this respect, raising awareness of environmental issues will be possible through qualified environmental education rooted in childhood (Akınoğlu & Sarı, 2009). One of the goals of preschool education should be to develop

conceptual knowledge about biodiversity, understand sustainability, and develop environmental attitudes (Cutter-Mackenzie et al., 2014). For this reason, qualified environmental education is a prerequisite for creating environmental consciousness and awareness among pre-service preschool teachers. The UNESCO-UNEP International Environmental Education Programme (UNESCO-UNEP 1990, p. 1) has described the preparation of teachers as "the priority of priorities" for action to improve the effectiveness of environmental education (Fien & Tilbury, 1996). Teacher training was discussed as a key component in the development of environmental education at a conference held in Moscow in 1987 and hosted jointly by UNEP (United Nations Environment Program) and UNESCO (United Nations Educational, Scientific, and Cultural Organization) (UNESCO, 1987).

One of the most important aspects of raising environmentally educated teachers is to help students develop a solid knowledge base in terms of information and content about environmental education, as well as to raise self-awareness about the subject and bring about changes in students' emotions, thoughts, and attitudes. The requirement of pre-service EE preparation cannot stand alone, but it can add to the reinforcement of teachers' beliefs that EE should be a priority in education (Plevyak, et al., 2001). This viewpoint is supported by the relevant literature on the relationship between preschool teachers' beliefs, attitudes, and classroom practices. Charlesworth et al. (1993) argued that there was a link between preschool teachers' beliefs about planning, teaching, and evaluating processes and their classroom practices. Hu et al. (2017) found a significant relationship between preschool teachers' knowledge, beliefs, and emotions and their educational practices. In addition to that, Plevyak et al. (2001) discovered differences in mandated and non-mandated EE teachers' self-confidence levels during their implementation of EE and teaching of EE concepts.

In Turkey, environmental education has been accepted as a compulsory course in the 6th semester of the Council of Higher Education (CoHE) 2018 Preschool Education Undergraduate Program under the title of Environmental Education in Early Childhood Period (spring term) (YÖK, n.d.). The course consists of three theoretical lecture hours. The catalogue content describes the environmental education course as "basic concepts about environmental education; importance of environmental education; environmental education in preschool period; planning and implementing environmental education activities for preschool children" (YÖK, n.d.). Given that education faculties are authorized by CoHE to change the curriculum (YÖK, 2020), there may be differences in universities' curricula for undergraduate preschool education. Some universities, on the other hand, continue to offer the Environmental Education in Early Childhood Education course in line with the CoHE's 2018 programme. The metaphors of preschool pre-service teachers, who took the compulsory course in the third year of the undergraduate course, about the concept of the environment were discussed with two measurements in the first and last week of the course. Given the existing literature on metaphor studies, it is seen that studies examining the metaphorical perceptions of primary, secondary, and university students about the concept of the environment have been conducted in Turkey over the last 15 years (Ateş & Karatepe, 2013; Aydın, 2011; Deniş Çeliker & Akar, 2015; Meral, Küçük & Gedik, 2016). However, no previous studies have employed a longitudinal study and more than one measurement to examine the preschool pre-service teachers' views on the concept of environment. It can thus be implied that the research is significant in terms of revealing both the perspectives of preschool pre-service teachers on the concept of the environment and the change over time using multiple measurements. It is also expected that this will help guide future studies on the subject. To recap, the study attempts to identify the perceptions of preschool pre-service teachers who take the Environmental Education in Early Childhood course about the concept of the environment through metaphor analysis. More specifically, the study sought to answer the following sub-questions:

1. Which metaphors were produced by preschool pre-service teachers regarding the concept of the environment?

2. Under which categories were the preschool pre-service teachers' metaphors classified?

3. What are the views of preschool pre-service teachers on the importance of environmental education during the early childhood period?

4. What are the views of the preschool pre-service teachers about taking another course instead of Environmental Education in the Early Childhood Period?

METHOD

Research Design

A phenomenological design, one of the most common qualitative designs, was employed in the study. The phenomenological study focuses on the everyday lived experiences of individuals within the world" (Creswell, 2018). It is intended to understand the prevalent or common experiences of people regarding the phenomenon determined in the context of the study. Understanding these experiences is critically important in terms of developing various practices and policies as well as better understanding the peculiarities of the phenomenon (Creswell, 2018). Referring to the present study, the concept of the environment was identified as a phenomenon.

The study was designed as a longitudinal study since the data was administrated to the participants in two stages: before they began the Early Childhood Environmental Education course (first measurement) and after they completed it (second measurement).

Study Group

The study group consists of 70 pre-service teachers in the first measurement and 49 pre-service teachers in the final measurement, who took the Environmental Education in Early Childhood course in the third year of the education faculty of a public university in the Turkey in the 2021-2022 academic year. The demographic data of the pre-service teachers who participated in the first measurement is detailed in Table 1, and the demographic data of the pre-service teachers who participated in the second measurement is detailed in Table 2.

Table 1. *Participant demographics in the first measurement*

Demographic data		***n***	***%***
Gender	Female	58	82.9
	Male	12	17.1
	Total	70	100.0
	18-21 years	43	61.4
	22-25 years	25	35.7
	26-33 years	2	2.9
	Total	70	100.0

From Table 1, it is seen that 82.9% of the pre-service teachers who participated in the first measurement were female (n=58) and 17.1% were male (n=12). The majority of the pre-service teachers who participated in the first measurement (n=43) are between the ages of 18 and 21.

Table 2. *Participant demographics in the second measurement*

Demographic Data		***n***	***%***
Gender	Female	40	81.6
	Male	9	18.4
	Total	49	100.0
	18-21 years	20	40.8
	22-25 years	28	57.1
	26-33 years	1	2.1
	Total	49	100.0

According to Table 2, 81.6% of the pre-service teachers participating in the second measurement were female (n=40) and 18.4% were male (n=9). The majority of the pre-service teachers participating

in the second measurement are between the ages of 22 and 25 (n=28)

Research Instruments and Processes

To assess the participants' metaphors for the concept of "environment", participants were asked to complete the sentence "I think the environment is like….., because.....". The concept of metaphor was explained to the students before the implementation, and it was emphasized that they could use their imagination and creativity when developing metaphors. The open-ended questionnaire form was administered to participants in two stages, before and after they completed the Environmental Education in Early Childhood course. In both implementations, participants were given approximately a half-hour to fill out the statement and were asked to focus on only one metaphor.

Data Analysis

Content analysis, one of the qualitative research methods, was used to analyze the data. The metaphors produced by pre-service teachers were completed in three stages (coding the metaphors, developing the categories, and ensuring validity and reliability).

1. The coding phase of the metaphors: The metaphors expressed in the participants' written materials were transferred to the computer environment, and codes were developed. Each code is given its own name in the metaphor. The reasons for choosing metaphors were transferred to the computer environment together with the coding. The coding of the metaphors was performed separately for the first and second measurement data.

2. The phase of category development: The metaphor codes were evaluated in terms of the participants' perspectives on the concept of "environment" and divided into categories. In this respect, 19 different conceptual categories were identified in the first and second measurements.

3. Validity and reliability: For the reliability of the study, the metaphor table and the categories developed in both measurements were presented to 3 experts' opinion. The data analysis process was explained in detail in accordance with qualitative research to ensure the validity of the study. In addition to that, the findings were presented both quantitatively and qualitatively through quotations from participant statements. The participants' views were expressed by the codes assigned to them by the researchers. In the first measurement, the participants were coded as "TFM…" In the second measurement, the participants were coded as "TSM…"

Ethic

The ethical committee approval was obtained from Pamukkale University, Social and Human Sciences Scientific Research and Publication Ethics Committee numbered 68282350/2022/G06 and subsequently data was collected from the students.

FINDINGS

Table 3. *Frequency values of metaphors obtained for the concept of environment in the first and second measurements*

Code	The First Measurement	*f*	The Second Measurement	*f*
1	Family	1	Tree	1
2	Lung	1	Mirror	2
3	Mother's Womb	1	Skill	1
4	Friend	1	Computer	1
5	Mirror	3	Science	1
6	Diet	1	Kidney	1
7	Brain	1	Flower	1
8	Blank notebook	1	Child	3
9	Blank sheet	1	Nature	1
10	Chameleon	1	The world	1
11	Boomerang	1	House	1
12	Skin Care	1	Migratory Birds	1
13	Flower	1	Sky	1
14	Child	1	Sun	3

Code	The First Measurement	*f*	The Second Measurement	*f*
15	The World	2	Air	1
16	Education	1	Life	4
17	Vacuum Cleaner	1	Human	3
18	House	3	Skeleton	1
19	Sapling	1	Concept Map	1
20	Sun	1	Book	1
21	World of Imagination	1	Breath	2
22	Life	2	Oxygen	2
23	Physician	1	Orchestra	1
24	Human	1	Money	1
25	Human Heart	1	Compass	1
26	Human Basis	1	Grater	1
27	Reflection of Human	1	Soap	1
28	Woman	1	Work of Art	1
29	Paper	2	Water	4
30	Book	3	Scales	1
31	Culture	1	Seed	1
32	Breath	7	Soil	1
33	Oxygen	3	Jigsaw puzzle	1
34	School	1	Chain	1
35	Ocean	1		
36	Cotton	1		
37	Grater	1		
38	Art	2		
39	Water	3		
40	Broom	1		
41	Telephone	1		
42	Seed	1		
43	Soil	3		
44	Salt	1		
45	Wagon	1		
46	Life	1		
47	Newborn baby	1		
48	Nest	1		
Total		70		49

According to Table 3, the participants developed 48 metaphors in the first measurement and the most frequently produced three metaphors for the concept of environment were breath (f=7), house (f=3), book (f=3), water (f=3), soil (f=3) and the world (f=2), life (f=2), paper (f=2), and art (f=2). Additionally, 34 metaphors were produced in the second measurement. The most frequently used three metaphors were found to be life (f=4), water (f=4), child (f=3), sun (f=3), human (f=3), mirror (f=2), breath (f=2), and oxygen (f=2).

Table 4. *Categories for the concept of "environment" (The first measurement)*

Categories	Metaphors	Frequency of the Metaphor Within the Category	Total Frequency of the Metaphor Within the Category
Care	Sapling (1), Skin Care (1), Newborn Baby (1)	3	3
Vitality	Life (1)	1	1
Diversity	The world (1)	1	1
Natural	Cotton (1)	1	1
Educational	Education (1), Book (1), School (1)	3	3
Flexibility	Chameleon (1), Paper (1), Water (1), Blank notebook (1)	4	4
Aesthetics	Art (2)	1	2
Development	Child (1)	1	1
Peace	House (1)	1	1
Necessity	Family (1), Human Heart (1), Breath (7), Oxygen (3), Home (1)	5	13
Importance	Diet (1), Flower (1), The World (1), Sun (1) Life (2), Physician (1), Water (1), Telephone (1), Soil (1), Salt (1), Wagon (1)	11	12
Diligence	Human (1)	1	1
Eternity	Book (2), Ocean (1), World of Imagination (1)	3	4

Categories	Metaphors	Frequency of the Metaphor Within the Category	Total Frequency of the Metaphor Within the Category
Formative	Brain (1), Human Basis (1), Grater (1), Water (1)	4	4
Cleanliness	Vacuum Cleaner (1), House (1), Paper (1), Broom (1)	4	4
Social Values	Friend (1), Culture (1)	2	2
Social Life	House (1)	1	1
Reflective	Lung (1), Mirror (3), Blank sheet (1), Boomerang (1), The reflection of Human (1), Woman (1), Seed (1), Soil (2)	8	11
Life	Mother's Womb (1)	1	1
Total		56	70

From Table 4, it is seen that the metaphors generated by participants for the concept of environment in the first measurement are combined under 19 groups. Some of the statements of the participants about each category outlined in Table 4 are presented below:

Regarding the category of care,

I think the environment is like a sapling. Just as a sapling will not grow unless it is given the necessary water and care, the environment will vanish if care and attention are not paid to it." TFM 7

Regarding the category of vitality,

"I think the environment is like life. Because it is always alive." TFM23

Regarding the category of diversity,

"The environment is like the world. Because the environment involves differences like our world." TFM14

Regarding the category of a natural,

"I think the environment is like cotton. Because it is sensitive, natural and clean. It becomes dirty and damaged as a result of our improper use." TFM60

Regarding the category of educational,

"I think the environment is like an educational book. Because it teaches us new things." TFM35

Regarding the category of flexibility,

"I think the environment is like a chameleon, because a person's environment, that is to say, every ordinary situation around her/him, is related to the environment she/he is in, and takes color and shape accordingly." TFM20

"It's like a paper. Because we can shape the paper into whatever shape we want, and by acting consciously, we can benefit the environment in a more beautiful and healthier way." TFM63

Regarding the category of aesthetics,

"I believe that the environment is like an art. Because, if we understand the environment correctly and pay real attention to it, like an artist, we can transform the environment into a work of art."TFM31

Regarding the category of development,

"It is like a child, because as it grows and develops, it becomes more beautiful and livable."TFM5

Regarding the category of peace,

"It is like our home, because we have realized during the pandemic we experienced that what we need more is our living environment that gives peace to our souls and bodies rather than the houses we live in."

TFM45

Regarding the category of necessity,

"I think the environment is like the breath. Because no living thing can live without breathing. It is critically vital for every living thing to live in an environment in which it can only live." TFM52

"I think the environment is like the breath one breathes, because without the environment, one cannot breathe and disappear." TFM68

Regarding the category of importance,

"It's like a diet. The environment is critical to our development, and it is in our hands to control it after a certain time. For instance, we can choose our own child's environment in a way that suits us." TFM47

Regarding the category of diligence,

"It's like human beings because if we don't give proper care to both, they vanish." TFM55

Regarding the category of eternity,

"It is like a huge ocean. There are numerous things, and we may encounter all kinds of things." TFM56

"It's like a vast world of imaginary because the environment is full of surprises, as if nothing is real." TFM57

Regarding the category of formative,

"I think the environment is like a grater because it changes the shape of an object. Just like the environment influences a city." TFM25

Regarding the category of cleanliness,

"I liken it to paper because the cleaner the paper, the better it can be used, but the dirtier it is, the more difficult and worse it is to use." TFM30

"The broom, because just as the broom keeps the houses clean, the environment keeps our world clean." TFM67

Regarding the category of social values,

"I think the environment is like culture because it keeps the elements of society together. It is inclusive, integrative." TFM11

Regarding the category of social life,

"I think the environment is like home. Because home is the common living place of family members where individuals live and feel comfortable. The environment is also the home of all humanity. The more sensitive we are to our environment, the more comfortable our lives will be." TFM27

Regarding the category of reflective,

"I think the environment is like a boomerang, because no matter how we treat it, it will respond to us in the same way." TFM38

"I think the environment is like a mirror of society because we can understand the sensitivity, values and cultural level of society by looking at the environment" TFM50

Regarding the category of life,

"*It is like a mother's womb. Because the placenta, like the environment, provides a living space for*

the baby, and many factors such as the mother's nutrition, habits, and genetic diseases are important in this living space, just as the living space we create by being environmentally sensitive." TFM59

Table 5. *Categories for the concept of "environment" (The second measurement)*

Categories	Metaphors	Frequency of the Metaphor Within the Category	Total Frequency of the Metaphor Within the Category
Care	Tree (1), Computer (1), Nature (1)	3	3
Obscurity	Children (1)	1	1
Diversity	Migratory Birds (1), Concept Map (1)	2	2
Valuable	Money (1),	1	1
Educational	Book (1)	1	1
Flexibility	Water (1)	1	1
Development	Human (1)	1	1
Sensibility	Children (1), Water (1), Scales (1)	3	3
Necessity	Skill (1), Kinsey (1), Sun (2), Air (1), Life (1), Breath (2), Oxygen (2), Water (2), Jigsaw Puzzle (1)	9	13
Inclusive	Earth (1), Life (1)	2	2
Coordination	Life (1), Orchestra (1)	2	2
Importance	Children (1), Home (1), Life (1), Skeleton (1), Chain (1)	5	5
Diligence	Science (1), Flower (1)	2	2
Guidance	Compass (1)	1	1
Eternity	Sky (1)	1	1
Responsibility	Life (1)	1	1
Formative	Grater (1)	1	1
Social Values	Artwork (1)	1	1
Reflective	Mirror (2), Sun (1), Human (1), Soap (1), Seed (1), Soil (1)	6	7
Total		44	49

When Table 5 is examined, it is seen that the metaphors developed by the participants for the concept of environment in the second measurement consist of 19 categories, which is similar to the results of the first measurement. Some of the participants' statements about each category in Table 5 are reported below:

Regarding the category of care,

"I think the environment is like a computer. Because the computer constantly needs to update itself and virus cleaning and protection are required, and the environment needs cleaning to renew itself. Many problems occur when the update, cleaning, and protection is not made." TSM40

Regarding the category of obscurity,

"It's like a child because there's so much to discover." TSM2

Regarding the category of diversity,

"I think the environment is like a concept map. Because it includes many concepts and these concepts interact with each other." TSM8

Regarding the category of valuable,

"It's like the Euro because it's gaining in value every day." TSM14

Regarding the category of educational,

"I think the environment is like a book. Because it teaches us a lot like a book. Just as we become conscious as we read a book, and find ourselves in a different world of imaginary, we learn a lot about our environment." TSM28

Regarding the category of flexibility,

"I think the environment is like liquids which take the shape of their container. Because it allows the individual to reach his/her best state and live in harmony." TSM41

Regarding the category of development,

"It is like a human. As a human being is fed, he/she develops, grows, participates in life, and becomes hope for the future." TSM9

Regarding the category of sensibility,

"It is like scales. Because when there is a deterioration in an issue that concerns the environment, the whole balance is disrupted." TSM32

Regarding the category of necessity,

"It's like the sun because the environment has an illuminating effect on us, otherwise, it makes us unlivable." TSM23

"I think the environment is like a person's kidneys. Because the kidneys act as a sieve filter in the human body. When the kidneys fail, the human body also causes harmful and waste materials to mix without passing through the filter. If the environment is not like kidneys, our world will turn into dirty and wasteful waste and become unlivable." TSM38

Regarding the category of inclusiveness,

"For me, the environment is like the world. Because it entails everything. Like our environment…" TSM16

"I think the environment is like an orchestra. Because the environment is in a harmony just like the orchestra." TSM43

Regarding the category of importance,

"It is like a house, because every pillar of the house is important to hold the house, and everything around the environment is very important to the individual." TSM46

Regarding the category of diligence,

"I think the environment is like science, because if it is valued and worked on, it becomes valuable and develops. If it is not valued, it will fall behind." TSM20

Regarding the category of guidance,

"I think the environment is like a compass, because while the compass helps us find our way, the environment helps us improve and it guides us." TSM39

Regarding the category of eternity,

"It is like the sky because it is endless…" TSM30

Regarding the category of responsibility,

"*It is like life. The environment is like life, we have to fulfil some needs and responsibilities in order to live." TSM4*

Regarding the category of formative,

"It's like a grater because it creates a shape." TSM42

Regarding the category of social values,

"I think the environment is like a work of art. Because a work of art reflects the values of a society and the characteristics of that society. The environment also serves this purpose in that it reflects societal values and the characteristics." TSM29

Regarding the category of reflective,

"The environment is like soap. If we use it dirty, it will not benefit us at all, but if we use it clean, the environment will benefit us in every way." TSM11

"I think the environment is like a mirror because our behavior towards the environment, good or bad, is reflected in us." TSM19

Table 6. *The comparison of the metaphor categories for the concept of "environment" in the first and second measurements*

Categories	First Measurement	Second Measurement
Care	3	3
Obscurity	0	1
Vitality	1	0
Diversity	1	2
Valuable	0	1
Natural	1	0
Educational	3	1
Flexibility	4	1
Aesthetics	2	0
Development	1	1
Sensibility	0	3
Peace	1	0
Necessity	13	13
Inclusive	0	2
Coordination	0	2
Importance	12	5
Diligence	1	2
Guidance	0	1
Eternity	4	1
Responsibility	0	1
Formative	4	1
Cleanliness	4	0
Social Values	2	1
Social Life	1	0
Reflective	11	7
Life	1	0
Total	70	49

Referring to Table 6, it is seen that the metaphors created by the pre-service teachers for the concept of environment were divided into 12 common categories (care, diversity, educational, flexibility, development, necessity, importance, care, eternity, formative, social values and reflective) in the first and second measurements. Furthermore, vitality (n=1), natural (n=1), aesthetics (n=2), peace (n=1), cleanliness (n=4), social life (n=1) and life (n=1) categories created in the first measurement were not found in the second measurement. However, unlike the first measurement, there are 7 new

categories concerning the environment in the second measurement, namely, obscurity (n=1), valuable (n=1), sensitive (n=1), inclusive (n=2), coordination (n=2), guidance (n=1) and responsibility (n=1).

Table 7. *The participants' views on the necessity of environmental course and aspire to take another course except than environmental course (The first measurement)*

Participants' Views		***n***	***%***
Views on the necessity of the environmental course	Yes (it is necessary)	68	97.1
	No (it is not necessary)	0	0.0
	Not sure	2	2.9
	Total	70	100.0
Views on the taking another course except than environmental course	Yes (I would like to take another course)	3	4.3
	No (I do not want to take another course)	54	77.1
	Undecided	13	18.6
	Total	70	100.0

As can be seen in Table 7, 97.1% of the participants in the first measurement find the environmental course necessary (n=68) whereas 77.1 % (n=54) of the pre-service teachers do not want to take any course instead of environmental course. Additionally, thirteen pre-service teachers (18.6%) are indecisive about taking another course instead of environmental course.

Table 8. *The participants' views on the necessity of environmental course and aspire to take another course except than environmental course (The second measurement).*

Participant's views		***n***	***%***
Views on the necessity of the environmental course	Yes (it is necessary)	49	100.0
	No (it is not necessary)	0	0.0
	Total	49	100.0
Views on the taking another course except than environmental course	Yes (I would like to take another lesson)	1	2.1
	No (I do not want to take another course)	46	93.7
	Undecided	2	4.2
	Total	49	100.0

According to Table 8, all of the participants in the second measurement find the environmental course necessary (n=49). 93.7 % (n=46) of the pre-service teachers do not want to take any course instead of environmental course.

DISCUSSION AND CONCLUSION

According to the findings of the study, which revealed the metaphorical perceptions of preschool pre-service teachers about the concept of environment in a longitudinal analysis, 48 metaphors were produced in the first measurement and 34 metaphors in the second measurement. Further, the metaphors generated in the first and second measurements were divided into 19 categories. 12 of the 19 categories produced in two measurements (care, diversity, educational, flexibility, development, necessity, importance, care, eternity, formative, social values, and reflective) were found to be common. As different from the first measurement, the seven new categories were produced in the second measurement, namely, obscurity, valuable, sensitivity, inclusiveness, coordination, guidance, and responsibility. In light of the findings obtained, it was found that while there was a difference between the two measurements in terms of the number of metaphors, no difference was detected in terms of the number of categories. This situation can be explained by the number of pre-service teachers who participated in the first and second measurements. It can thus be implied that the decrease in the number of pre-service teachers who participated in the second measurement might have led to the decrease in the number of metaphors. The fact that the number of categories did not change in two measurements can be interpreted as the pre-service teachers' perspective on the concept of environment remained basically unchanged. The 12 categories that remained the same in both measures (care, diversity, educational, flexibility, development, necessity, importance, care, eternity, formative, social values, and reflective) revealed various aspects of the concept of environment. Additionally, given that there is no direct literature addressing this issue, this study is of vital importance in terms of originality. Referring to previous studies, Deniş Çeliker and Akar (2015), who investigated secondary school students'

metaphorical perceptions of environment, reported similar categories such as "diversity, a source of life, guide, and an indispensable value." In a study conducted by Yazıcı (2013), geography teachers used metaphors such as importance, reflectivity, and diversity to describe the concept of the environment. It can thus be contended that this result is consistent with the findings of the present study. Meral, Küçük, and Gedik (2016) conducted a study on the same topic with social studies pre-service teachers and highlighted the categories of diversity, life, importance, reflectivity, beauty, and love, which are consistent with the categories of the current study. In a similar vein, Aydın (2011) conducted a study with 615 university students from various departments whereby 92 metaphors and 10 categories were produced in the study. In this respect, the categories of importance, reflectivity, life, love, and beauty can be said to overlap with the categories in the present study. In another study (Ateş & Karatepe, 2013), 250 university students from various departments participated in the study and created 150 metaphors in 9 categories related to the concept of the environment. The common categories found in this study are need, care, and formative (Ateş & Karatepe, 2013). In this study, the first three metaphors most frequently produced in the first measurement were breath (f=7), house (f=3), book (f=3), oxygen (f=3), water (f=3), soil (f=3) and the world (f=2), life (f=2), paper (f=2), art (f=2), and the first three metaphors most frequently produced in the second measurement were life (f=4), water (f=4), child (f=3), sun (f=3), human (f=3), mirror (f=2), breath (f=2) and oxygen (f=2). In a nutshell, there are common metaphors as well as metaphors that differ between the two measurements.

The new categories created in the second measurement (obscurity, valuable, sensitivity, inclusive, coordination, guidance, and responsibility), which differ from the first measurement, can be interpreted as a positive outcome of the environmental education course. It can be argued that as the knowledge levels of pre-service teachers about environmental education increase in the early childhood period, there may be an increase in their knowledge about the content, scope, and importance of the subject. This finding emphasizes the significance of environmental education practices in teacher education. Yücel et al. (2006) mentioned that students who take environmental and nature protection courses at a higher education level have more positive attitudes toward the environment than students at lower education levels. A series of previous studies have indicated that students who take environmental courses may exhibit more positive attitudes, behaviors, and sensitivities than those who do not (Aksoy & Karatekin, 2011; Değirmenci, 2012; Koç & Karatekin, 2013).

According to the research findings, explaining the environment through various metaphors reveals the multidimensionality of the concept. At this point, Kaşot (2020) drew attention to the multidimensionality and various definitions of the concept of environment. Atasoy (2015) pointed out that the concept of environment can be examined under five titles: quality, the individual's internal and external environment, geographical and spatial environment, and that each title has more than one sub-dimension. As can be seen from similar prior research, students created lots of metaphors and categories related to the environment, and there are similarities in both metaphors and categories. Metaphors allow people to reveal their perceptions of a concept using metaphors (Cerit, 2008). Thus, revealing preschool pre-service teachers' perceptions of various issues, particularly the environment, will help us better understand their perspectives as young educators.

It is seen that pre-service teachers' views about the necessity of the course and whether they want to take another course instead of Environmental Education in the Early Childhood Period differ in favor of the second measurement. A significant majority of participants thought the course was necessary in the first measurement. In the second measurement, on the other hand, all of the participants found the course necessary. While the majority of participants stated that they did not want to take another course instead of the relevant course in the first measurement, it was concluded that there were students who were undecided and wanted to take another course. The second measurement revealed a decrease in the number of students who were undecided and wanted to take another course. It is understood that the Early Childhood Education course, by means of its content and implementation method, enabled

learners to achieve targeted learning outcomes, experience and knowledge level. It is worth stating that environmental courses need to be incorporated into existing curricula to help students of all levels develop positive attitudes and behaviors toward the environment (Karakuş et al., 2016). Incorporating current issues such as technology (Çakır et al., 2019), particularly the environment, into teacher education curricula, both theoretically and practically, will improve educational quality in the short and long term. Teachers' knowledge of current issues can also boost their self-efficacy, thereby allowing for better classroom management and curriculum implementation (Durmuşoğlu Saltalı, 2022). In this sense, it is vital for teacher education to include contemporary and current issues, and pre-service teachers' knowledge levels need to be increased.

Considering the study's limitations, various suggestions for future studies and implementations can be made. This study is limited to third-grade preschool pre-service teachers at the same university. Further studies can be conducted with a larger group of pre-service teachers from various universities and classes. The study is also limited to two measurements. More measurements can be performed in future studies to investigate pre-service teachers' metaphorical perceptions over a longer period of time. It is also important to note that since the second measurement was conducted in the last course, the study was limited to those who attended the course. New arrangements can be made to maintain the same number of participants in the measurements. Besides that, this study is limited to the concept of "environment". Terms such as "environmental problems", "environmental pollution" and "global warming" may be discussed in further studies. The metaphorical perceptions of female and male pre-service teachers and teachers about the concept of environment can be compared. The number of environmental practices and courses can be increased in teacher education. Pre-school pre-service teachers can be encouraged to conduct applied environmental education with children and families. The attitudes of preschool pre-service teachers toward the environmental education course, as well as the course's effects on environmental literacy, attitudes, and behaviors, can be investigated. Pre-service teachers' perspectives on issues such as ecophobia can be investigated. The effects of environmental education practices using experimental methods can be discussed. Quantitative research can be carried out to determine the attitudes and behaviors of pre-service teachers using various variables. Longitudinal studies may provide insights into long-term environmental attitudes and perceptions among pre-service teachers. Environmental education certificate programmes and seminars can be organised for pre-service teachers.

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