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Education for sustainable development: Investigation of preschool children‟s metaphorical perceptions and views regarding “global problem” concept

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This research will explore preschool children‟s metaphorical perceptions and views about the concept of “global problem” in the context of education for sustainable development. The study will involve 20 preschool children, who are aged between 60 and 70 months and are attending a public kindergarten in İzmir, Turkey, during the Spring of 2021-2022 academic year. The data collection process involved semi-structured interviews. Interviews were carried out with 20 preschool children on their perspectives and perceptions of „gbbal problem,‟ which was interpreted via content analysis. The findings of the qualitative analysis provided participants‟ perceptions and views related to global problems. The sample group was formed via convenient and criterion sampling method. The data were collected through a demographic information form and a semi-structured interview form which includes a metaphor sentence and open-ended interview questions. The results suggest that the preschool participants created themes (pillars), sub-themes and eighteen metaphors regarding the concept of "global problem" during the metaphor formation process. It was found that children's metaphors and views regarding the global problem were placed under the themes named “social-cultural”, “environmental” and “economic”. It was also found that the participants placed their metaphors and views regarding the “global problem” under the “social-cultural” theme most frequently.

Key words: Sustainable development, preschool education, global problem, metaphorical perception, opinions.

INTRODUCTION

Sustainability means people's ability to benefit from natural and renewable resources within the natural system by relying on their basic input over a long period of time (World Oceans Review, 2015). The concept of sustainability emerged in the middle of the 19th century, and it was discussed in the World Charter for Nature adopted by the International Union for Conservation of Nature and Natural Resources (IUCN) in 1982 globally for the first time. This document proposes that all land, sea and atmospheric resources within the ecosystem in

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which human beings also live should be managed by maintaining the optimum level of sustainability in such a way that it should not endanger the integrity of organisms and species that live there (Yazar, 2006).

The concept of “Sustainable Development” (SD) was heard in the report entitled “Our Common Future” published by the United Nations (UN) in 1987. It was recognized by large masses in the world after the detection of the ozone hole, the reason of which is human activities, over Antarctica in 1984. In this report, sustainable development (SD) is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs in Brundtland report (Brundtland, 1987). Regarding this report accepted by the UN General Assembly at the UN Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil, in 1992, very important suggestions were extended by leaders from all over the world, and these suggestions were compiled and published in the Agenda 21 Report (Drexhage and Murphy, 2010 cited in Alan, 2015).

Considering the fact that the natural resources on Earth have been depleted much faster than they can be created and restored in recent years, it is seen that people frequently have to cope with intertwined issues regarding social-cultural and economic development as well as important problems affecting local, regional and global environments (Siraj-Blatchford, 2009). In this context, it was argued that SD does not only cover environmental problems but it also includes economic and social-cultural elements during the UN Conference on Environment and Development (UNCED) (1992) also called the "Earth Summit" (Agenda 21, 1992). It was later stated that the three pillars of SD, considered as "interdependent and mutually reinforcing pillars", include a) *social-cultural development;* all social, cultural and political issues that affect the quality and continuity of people's lives at the national and international level, b) *economic development;* meeting the basic needs that can reduce the dangerous burden on the environment and natural resources and efficient consumption of energy, products and materials, c) *environmental development;* awareness of biodiversity and environmental protection as well as the issues like mission to save the present and future generations and to maintain life on earth (Siraj-Blatchford et al., 2010).

SD, being a complex concept that has reached its current terminology over time, can also mean the limitations placed on the use of on present technological and socio-cultural organizations created by human actions on environmental resources (Brundtland, 1987). Therefore, regarding the problems such as global warming, poverty and inequality that resulted from human activity and that we have to cope with today, the structuring of our mental frameworks and the internalization of the concept of “sustainability” are considered very important (Elliot, 2010).

Paprotna (1998) calls for urgent action in order to protect the Earth's natural climate concerning these global problems that humanity has to cope with every day and emphasizes that this urgent need for action can only be met through the development of environmental knowledge, awareness and attitudes that instill a greater sense of responsibility for the present and future states of the environment. Bokova (2012), the former General Director of UNESCO, indicates that economical and technical solutions as well as political regulations and financial incentives are not adequate to solve the problem, and she suggests a radical change in the way we think and act, therefore she views education as the best solution to lead us sustainability (Siraj-Blatchford and Huggins, 2015). Several reports of many congresses and conferences published recently commonly suggest achieving the goals of sustainable development successfully, and they propose education as the most effective way to achieve that (Engdahl and Rabušicová, 2011; OMEP; 2022; Siraj-Blatchford et al., 2010; UNESCO, 1997; UNESCO, 2005b; UNESCO, 2005c; UNESCO, 2006; UNESCO, 2009; UNESCO, 2014).

Education for sustainable development (ESD) is a long-term process which includes educational practices regarding environmental problems, and it also includes social-cultural and economic dimensions which also motivates individuals to think and act in the framework of sustainability, and it is a process that aims to place individual activities on the grounds of equality, democracy and quality of life (UNESCO, 2005a). Therefore, UN decided to start UN Decade Education for Sustainable Development (UNDESD) starting from 2005 since the role of education was commonly accepted as an important one in order to provide a better and sustainable future for everyone during the Johannesburg Summit (2002) held by UN General Assembly (UNESCO, 2014). Subsequently, UN Decade Education for Sustainable Development international plan of action report was published by UNESCO (2005), and the plan suggested that education for sustainable development including all principles, values and actions as well as the three pillars should be integrated across all objectives and levels of education (Kahriman-Öztürk, Olgan and Güler, 2012; UNESCO, 2005b). In this respect, it is seen that education has an important role in ensuring a change towards the development of this sustainability, and sustainability should be included in the curricula of all grade levels including that of preschool children (Elliott and Davis, 2009; Pramling-Samuelsson and Kaga, 2010).

Early childhood is accepted as the most important years because the foundation set in those years" guides children until the end of their lives (Rutter, 2002 cited in Davis, 2010). Therefore, early childhood education has one of the critical roles for attaining the sustainability point of view since children"s cognitive development starts or their cognitive schemas are restructured during those years. UNCED (1992) states children are an

integral part of environmentally friendly thinking processes, and they are a part of every action aiming to protect and sustain the environment. It was also emphasized that every step made to attain sustainability should consider the children"s personal benefits (Agenda 21, 1992).

Several congresses were held, and several reports were written in order to define education for sustainable development and put it into practice. One of them is 7R and its theoretical frameworks was initially introduced by Our Common Future Report by Bruntland World Commission on Environment (WCED, 1987 cited in Engdahl and Rabušicová, 2011), and it was later on developed through projects that support Education for Sustainable Development practices conducted by World Organization for Early Childhood Education (OMEP) (Engdahl and Rabušicová, 2011).

When relevant literature regarding the three pillars of Education for Sustainable Development, namely social-cultural, environmental and economic pillars, as well as 7Rs were investigated (Elliott, 2013 cited in Borg, 2019; Engdahl and Rabušicová, 2011; Kahriman-Öztürk et al., 2012; Pramling-Samuelsson and Kaga, 2008) it is seen that 7Rs include the three pillars of SD and works in an integrated manner. In this respect, reduce and reuse of 7R represent the environmental pillar, respect, rethink and reflect of 7R represent the social-cultural pillar and recycle and redistribute of 7R represent the economic pillar (Engdahl and Rabušicová, 2011; Kahriman-Öztürk et al., 2012; Pramling-Samuelsson and Kaga, 2008).

Early childhood education for sustainable development can be viewed as synthesis of "early childhood education" and "education for sustainable development", and some research was conducted regarding this both in Türkiye and abroad (Alan, 2015; Ahi and Balcı, 2017; Alıcı, 2013; Alıcı, 2021; Ärlemalm-Hagsér and Sandberg, 2011; Ayvacı et al., 2021; Bulut and Polat, 2019; Caiman et al., 2022; Cengizoğlu, 2013; Davis, 2009; Elliot and Davis, 2009; Engdahl and Rabušicová, 2011; Feriver et al., 2019; Güler-Yıldız et al., 2021; Güler-Yıldız et al., 2017; Haktanır et al., 2012 cited in Haktanır, Güler and Kahriman, 2016; Kahriman-Öztürk et al., 2012; Korkmaz and Güler-Yıldız, 2017; Lee et al., 2019; Li et al., 2019; Palmer et al., 1999; Palmer, 1999; Popratna, 1998; Siraj-Blatchford et al., 2010; Yazar, 2006). However, there is limited amount of research in Türkiye regarding the investigation of views and metaphorical perceptions of preschool children about "sustainability" and "global problem". Findings from Davis" (2009) research titled "Revealing the research „hole" of early childhood education for sustainability: A preliminary survey of the literature" reveals that less than 5% of the articles of the international research published during 1996-2007 covered early childhood education and Education for Sustainable Development. Therefore, it can be said that there is a need for theoretical and practical research in these two domains. Nevertheless, Somerville and Williams (2015) updated the research findings regarding sustainability education for early childhood and found that educational activities regarding sustainability for early childhood are used increasingly. They illuminated that there was an increase in the number of researches regarding sustainability education during early childhood, and they emphasized that even though that was a new research domain the research concerning this topic has increased today comparing to the results of Davis (2009). In addition, research on the literature indicates that enough research was conducted in the field in that sound criticism may start to be extended as a result of the interaction among the research conducted with different paradigms on this topic. Güler-Yıldız et al. (2021) investigated the scientific articles on sustainability education for early childhood published during 2008-2020 stated that the mostly the environmental pillar was discussed in those articles and concluded that more research with a holistic approach including all pillars of sustainability is necessary in the future. Toran (2017) conducted a research in Türkiye on studies about sustainability for early childhood and found a limited number of studies, and yet stated there has been an increase in the number of studies in recent years. Similarly, Bulut and Polat"s (2019) study entitled "The Investigation of Sustainability Concept in Early Childhood Education" published in Türkiye stated that there are not enough studies and activities focusing especially on education for sustainable development for early childhood. In this respect, it is necessary to increase the research for education for sustainable development in Türkiye, which is an emerging field of research, and it is also important to include the environmental, social-cultural and economic pillars into it.

As a result, early childhood education, being critical for the development of children"s cognitive schemas, is an important step and investigating children"s views and metaphorical perceptions regarding the concept of global problem in the context of sustainable development principles and goals may contribute the existing literature of early childhood education for sustainable development. Therefore, the objective of this research is to investigate preschool children"s metaphorical perceptions and views regarding the concept of "global problem" in the context of education for sustainable development. In this context, the problem statement of this research is "What are the metaphorical perceptions and views of preschool children regarding the concept of the global problem on our planet?"

1. "What are the metaphorical perceptions of preschool children regarding the concept of the global problem on our planet?"
2. "What are the opinions of preschool children regarding what the global problem on our planet might be?"
3. "What are the opinions of preschool children regarding the cause of the global problem on our planet?"

Table 1. Frequency and percentage distribution of pre-school children"s demographic information.

Gender	Participants	Frequency	Percentage
Girl (G)	G2, G3, G4, G5, G8, G14, G16, G17, G20	9	45
Boy (B)	B1, B6, B7, B9, B10, B11, B12, B13, B15, B18, B19	11	55
Total		20	100

Source: Author

4. “What are the opinions of preschool children regarding the effect of the global problem on our planet?”
5. “What are the opinions of preschool children regarding the solution of the global problem on our planet?”

METHODOLOGY

Research design

The quality of educational experiences offered to preschool children is important for them to internalize the concept of sustainability. In this context, it is possible to increase the quality of education by reducing the faulty and unwanted by-products of education through collecting information contained in children's mental frameworks and offering children educational activities in line with the information gathered (Alan, 2015; Alıcı, 2013; Ayvacı et al., 2021; Cengizoğlu, 2013; Elliott and Davis, 2009; Gülay-Ogelman, 2012; Güler-Yıldız et al., 2017; Haktanır et al., 2012 as cited in Haktanır et al., 2016; Inoue et al., 2016; Kahriman-Öztürk et al., 2012; Prince, 2010; Siraj-Blatchford et al., 2010; Stuhmcke, 2012; Susan and Amy, 2013). Therefore, one of the strongest tools that can be employed to examine the thoughts and opinions of children formed as a result of educational experiences organized by teachers during the preschool education is metaphors created by children regarding a concept.

According to Nikitina and Furuoka (2008), a metaphor functions as a mental tool that mental images that represent people's perceptions of the real-world use to filter the reality. Lakoff (1992:1) stated the concept of metaphor used in contemporary metaphor research has changed over time, and it started to be used as “cross-domain mapping in the conceptual system”. The term metaphorical expression means a linguistic expression formed as a result of surface realization of the domains in question (Lakoff, 1992). Thus, metaphors enable an image to be reflected on another image by gaining a stronger mental form as a result of expressing a phenomenon by comparing it to another phenomenon in an implicit or explicit manner (Ayvacı et al., 2021).

This research aiming to examine the metaphorical perceptions and views of preschool children regarding the concept of "global problem" is a qualitative research, and it employs phenomenological research design. Phenomenology follows an empirical approach aiming to describe the qualitatively different ways that people use in regard to phenomena that they experience, perceive, understand and conceptualize in their lives (Marton, 1986). Therefore, the phenomenological research design emerges as one of the important approaches used for the examination of the basic phenomena in education.

Study group

The participants of this research are 60-70-month-old, 20 preschool children, attending an independent public kindergarten supervised by the Ministry of National Education in İzmir, Türkiye during the Spring Semester of 2021-2022 academic years. The study group was formed via convenient and criterion sampling methods. In convenient sampling, the researcher recruits the participants who are easy and accessible in order to speed up the research (Kılıç, 2013). In criterion sampling a situation or situations that meet a criterion that was set up by the researcher can be investigated (Yıldırım and Şimşek, 2008). In this research, convenient sampling method was employed to select the independent kindergarten, and the criterion sampling method was used to select the participants, the criterion being 60-70-month-old. Information regarding the participants" gender is summarized in Table 1 in terms of percentage and frequency.

When Table 1 is examined, it is seen that 45% (f=9) of the 60-70-month-old preschool children in the study group are girls, and 55% (f=11) are boys.

Data collection instrument and data collection procedure

The data of the research was collected via face-to-face interviews conducted with the participants. The data were collected through a demographic information form in which information regarding the age and the gender of children is obtained, and a semi-structured interview form including the metaphor sentence and open-ended interview questions developed by the researchers.

The phenomenological interviews employing a semi-structured interview form are traditionally designed as unstructured or semi-structured interviews. They are generally used to determine different concepts of a phenomenon by answering key questions of “what” and “how”, to participate in a task or to solve a problem in order to reveal qualitatively different concepts of a phenomenon (Bruce, 1994). Therefore, the preschool participants answered the questions asked in the semi-structured interview form in order to provide data. In this context, literature regarding education for sustainable development in early childhood was examined in order to have information about the metaphorical perceptions and views of preschool children regarding the concept of global problem while the semi-structured interview form was being prepared (Alan, 2015; Buyer, 2013; Buyer, 2021; Ärlemalm-Hagsér and Sandberg, 2011; Borg, 2019; Bulut, 2019; Davis, 2009; Elliot and Davis, 2009; Engdahl and Rabušicová, 2011; Kahriman-Öztürk et al., 2012; Paprotna, 1998; Siraj-Blatchford et al., 2010, Yazar, 2006). Based on the literature review, a semi-structured interview form that includes fill-in-the-blanks type of sentences as well as open-ended questions was developed.

The metaphor sentence and interview questions prepared to determine the metaphorical perceptions and views of preschool children about the concept of "global problem" on our planet are as follows:

The metaphor sentence is; “The global problem on our planet is like .... Because…”.
Interview Questions:

a. What do you think the global problem on our planet might be?

b. What could be the cause of the global problem on our planet?
c. What do you think the effect of the global problem on our planet is?
d. What can be done to solve the global problem on our planet?

The metaphor sentence and interview questions stated above were examined by 2 academicians and 2 teachers working in the field of preschool education, and were finalized after their feedback and corrections. After the revision of the form and questions, the data collection process continued as follows:

1. The data collection was carried out in the classrooms of the teachers who volunteered for the research. Detailed information was given to the participating teachers, and a consensus was reached to proceed effectively before the data collection process starts.
2. Since the study group consists of 20 children who are 60-70-month-old, their families were informed about the aim and scope of the research, and their permission was obtained for their children to participate in the study before the data collection process starts. Also, the researchers visited the participants in their classrooms and met with them before conducting the interviews.
3. Information was obtained regarding the preschool participants" educational experiences and activities organized by their teachers concerning "sustainability" and "global problems" during teacher interviews before the data collection process starts. In addition, information about children's prior knowledge was obtained by reading a story (Elliott and Newham, 2022) about the topic via interactive reading technique in the classroom. In light of the information obtained, it was decided that it would be appropriate to examine the metaphorical perceptions of children and to get their opinions regarding the concept of global problem.
4. During the interviews with the teachers, information was obtained regarding whether there were practices in students" previous educational experiences that enabled them to activate their metaphorical perceptions and to express themselves through metaphors. In this context, sample metaphor formation studies were carried out with children before the data collection process started. In this process, the question “What does it look like?” was asked for some concepts. It was exemplified by expressions “such as ...” and the children were also asked to respond using the word “such as”.
5. The data of the study were obtained from 20 children individually in a comfortable environment via semi-structured interviews which took approximately 10-15 minutes for each child in May, 2022. During the data collection process, which lasted approximately 5 hours in total, the answers given by the children were recorded in writing by the researchers, and some questions were repeated and their answers were confirmed in order to prevent possible data loss.

Data analysis

Content analysis technique was used to analyze the data obtained from face-to-face interviews with 20 preschool children who are 60-70-month-old. According to Tavşancıl and Aslan (2001), content analysis is a scientific technique that involves the objective and systematic classification and analysis of the database obtained from verbal, written and other materials. Therefore, content analysis technique was employed to analyze the metaphors developed by the preschool participants and their answers given to the interview questions. Content analysis technique includes coding and sorting data, finding themes, organizing data under themes, assigning codes to the data, and interpretation of the findings (Yıldırım and Şimşek, 2008). In line with this information, in the process of generating themes in content analysis, the data obtained from the interviews were carefully read and codes were created according to the meanings that emerged in line with the purposes of the research. For this purpose, the metaphors and answers given to the interview questions which were already in written form were coded. The coded data were analyzed and arranged due to their similarities and differences. Then, the codes that are related to each other were brought together to form themes and sub-themes. It was examined whether the codes and themes were determined effectively and logically. At this stage, the researchers coded each answer separately in order to determine under which themes and sub themes each answer could be placed. The relevant literature was also considered during the coding process, and each answer was coded separately by each researcher. In content analysis, it is recommended that the first data set be coded separately by two or more researchers and then reviewed together. It is stated that for coding adequacy, it is important that each encoder re-checks coding at a different time and goes through encoding reliability again (Miles and Huberman, 1994). These stages were followed in the coding process to generate the themes in the research.

Validity and reliability measures used in qualitative research were employed to ensure the validity and reliability of the research (Erlandson et al., 1993 cited by Yıldırım and Şimşek, 2008; LeCompte and Goetz, 1982; Miles and Huberman, 1994; Yıldırım and Şimşek, 2008). In the research, literature review was conducted during the question formation process to ensure the credibility of the interview form, and 2 researchers" and teachers" opinions, who were the subject matter experts, were asked. The interview form was rearranged in line with the experts" opinions. In addition, preliminary interviews were conducted with 4 children who are also 60-70-month-old and who attend an independent kindergarten in order to determine whether the questions in the form serve their purpose. After that, the form reached its final version.

In addition, the coding system was developed based on the insights gained from the in-depth interviews and the data was organized into meaningful themes that represent the observations. Furthermore, a comprehensive analysis was conducted on the themes to gain a deeper understanding of the phenomenon. Lastly, deeper analysis was conducted to confirm the findings. To ensure the trustworthiness of the study, the reliability between the codes of the two researchers was examined, and direct quotations were given. The reliability formula of Miles and Huberman (1994) was used during the reliability analysis of the data. The data were coded and the themes were given names by both of the researchers individually, and the reliability between their codes was calculated. For this purpose, Miles and Huberman's (1994) reliability formula for coding reliability is; Consensus/Consensus+DisagreementX100. This reliability should be close to 80% (Miles and Huberman, 1994). The reliability between the researchers" codes was found to be 92% for this research. In addition, direct quotations (statements) from the participants were presented. The position of the participants and the researchers are clearly defined, and the opinions expressed were confirmed by the participants, and the interview and analysis processes of the research were tried to be explained adequately in order to ensure the confirmability of the research.

FINDINGS

The findings of this research acquired via the data collected from the preschool children were explained in line with the sub problems in this part of the research. The preschool children"s answers were examined in the context of the metaphor sentences regarding “the global problem on our planet”; what the global problem on our planet was, its causes, its effects and its solutions. In this context, the metaphors and opinions of preschool children were coded into themes (pillars) and sub-themes

and were depicted in terms of frequency and percentage which are forms of descriptive statistics.

Findings regarding the first sub problem of the study

The descriptive statistical findings regarding the question *"What are the metaphorical perceptions of preschool children regarding the concept of the global problem on our planet",* the first sub problem of the research, are presented in Table 2.

As depicted in Table 2, the metaphors created by the preschool children regarding "global problem" make up three themes, three sub-themes and eighteen metaphors. In this context, it was determined that 12 children (60%) formed the metaphors of hunter, guard, shelters, plastic, rotten fruit, bomb, mine, plastic bag and funnel by establishing a relationship between global problems and the sub-theme of "harming nature" which was placed under the "social-cultural theme". 5 children (25%) created the metaphors of disease, virus, tornado, glacier, fire and desert by establishing a relationship between global problems and the "disasters" sub-theme of "environmental" theme. 3 children (15%) formed the metaphors of money, space and lamp and they focused on the relationship between global problems and the "financial difficulties", which was the sub-theme placed under the "economic" theme. It was determined that the metaphors created by children were included in the "harming nature" sub-theme of the "social-cultural" theme predominantly. The metaphors in the "financial difficulties" sub-theme of the "economic" theme were used the least.

B1, focusing on the relationship between the global problem and "harming nature" sub-theme of the "social-cultural" theme, expressed this similarity as *"The global problem on our planet is like 'hunters'. Because just like hunters, global problem kills the living things.".* G2 also established a similar metaphor under the same theme and said *"The global problem on our planet is like 'guards'. Because like the guards, it harms living things".* Similarly, B6 and G8, who created the metaphors of mines and bombs, stated *"The global problem on our planet is like 'mines'. Because, like mines, it explodes in an instant and scatter flames",* and *"The global problem on our planet is like a 'bomb'. Because it scares people away like a bomb."*. G4 stated *"The global problem on our planet is like 'diseases'. Because, like diseases, it puts our health in danger*". G5 and G16, who created similar metaphors under the same theme, expressed "The global problem on our planet is like 'viruses'. Because it poisons us like viruses." and *"The global problem on our planet is like 'viruses'. Because it makes us sick like viruses.".* While G14 who established a relationship between the global problem and the "disasters" sub-theme of the environmental theme expressed her opinion as *"Global problems on our planet are like 'tornadoes'. Because; they are big and messy like tornadoes.".* G15 who established another metaphor under the same theme stated *"Global problems on our planet are like 'glaciers'. Because; problems happen because they also get warm like glaciers.".* Another participant, B13 created a relationship between the global problem and the "financial difficulties" sub-theme of the "economic" theme, and expressed this similarity as *"The global problem on our planet is like 'money'. Because money is needed for it too".* Finally, B11, who established a similar metaphor on the same theme, reflected this similarity by saying *"The global problem on our planet is like 'space'. Because there is no food in space either".*

Findings regarding the second sub problem of the study

The descriptive statistics regarding the question *"What are the opinions of preschool children regarding what the global problem on our planet might be?"* which was the second sub problem of the research are presented in Table 3

Findings shown in Table 3 depict that the opinions of preschool children regarding the question "what the global problem on our planet might be" can be placed under three themes, namely social-cultural, environmental and economic and three sub-themes namely "harming nature" under the "social-cultural" theme, "disasters" placed under the "environmental" theme, and "financial difficulties" placed under the "economic" theme. It was determined that 10 children (50%) expressed their opinions under the sub-theme of "harming nature", 8 children (40%) expressed their opinions under the sub-theme of "disasters", and 2 children (10%) expressed their opinions under the sub-theme of "financial difficulties".

It was seen that B1 and G2, whose opinions fell under the "harming nature" sub-theme under the social-cultural theme, expressed similar opinions and said *"I think global problem is the killings of animals."* and *"I think global problem is that animals are mistreated.".* Also, G8 stated *"It is that some children become homeless.".* It is seen that 5 children whose ideas fell under the "harming nature" category stated *"I think global problem is that there is too much garbage on our planet."* Which appears to be the most frequently used expression for a single problem. Therefore, it is possible to conclude that children mostly pay attention to the garbage problem in nature which was placed under the sub-theme of "harming nature". On the other hand, it is seen that children who express that the global problem fell under the disasters sub-theme which was placed under environmental theme, focus on fires in nature, air pollution, water scarcity, experiencing all four seasons at the same time, global warming, and harmful fuels. Finally, B11 and B13, whose response regarding the global

Table 2. The metaphorical perceptions of pre-school children regarding the concept of the global problem on our planet.

Themes (Pillars)	Sub-themes	Metaphor	Codes (Because)	Participants	Frequency (f)	Percentage
Social-cultural	Harming nature	Hunter	Harms people like hunters	B1	12	60
		Guard	It harms living things like guards.	G2		
		Shelters	Like in shelters, they do not treat dogs well.	B12		
		Plastic	It emits poison like plastics.	G3		
		Rotten fruit	It smells very bad, like rotten fruit.	B7		
		Plastic Bag	It is harmful and plastic like plastic bags.	B9		
		Funnel	It is huge and plastic like funnels.	G20		
		Mine	It explodes like mines and scatter flames.	B6		
		Bomb	It scares people away like bombs.	G8		
		Disease	Like diseases, it puts our health in danger.	G4		
		Virus	It poisons us like viruses.; It makes us sick like viruses.	G5, G16		
Environmental	Disasters	Tornado	It creates big mess like tornadoes.	G14, B19	5	25
		Glacier	It gets warm like glaciers.	B15		
		Fire	It causes damage like fires.	B10		
		Desert	It is like being dehydrated as in deserts.	G17		

Source Author

problem was placed in the sub-theme of financial difficulties under the economic theme, said that *"I think global problem is that some children cannot find food."* and *"I think global problem is that everything is very expensive."*

Findings regarding the third sub problem of the study

The descriptive statistics regarding the question *"What are the opinions of preschool children regarding the cause of the global problem on our planet?"* which was the third sub problem of the research, are presented in Table 4.

As depicted in Table 4, the opinions of preschool children regarding the cause of the global problem on our planet are placed under three sub themes and three themes namely "situations that harm nature" under the "social-cultural" theme, "causes of disasters" under the "environmental" theme, and the "causes of financial difficulties" under the "economic" theme. All in all, 12 children (60%) expressed their opinions under the sub-theme of situations that harm nature, 6 of them (30%) under the sub-theme of the causes of disasters, and 2 children (10%) under the sub-theme of the causes of financial difficulties. Therefore, it was determined that preschool children thought the causes of global problems fell under the sub-theme of "situations that harm nature" which was placed under the social-cultural theme most frequently, and the causes of global problems fell under the sub-theme of causes of financial difficulties under the economic theme with the lowest frequency. B1, whose opinion was placed under the sub-theme of the situations that harm nature placed under the social-cultural theme, expressed the cause of the global problem as *"Because people want to buy more clothes".* It was determined that 5 children who expressed their opinions on the same theme explained it by focusing on the garbage problem in nature. G8 whose opinion fell under the same theme, pointing out wars, stated *"Because there is a lot of wars going on in the world. Thus, children are forced to move away from their homes. For example, my Syrian friend*

Table 3. Opinions of children in pre-school education regarding the concept of "global problem".

Themes (pillars)	Sub-themes	Codes (problem)	Participants	Frequency (f)	Percentage
Social-cultural	Harming nature	It is the killing of animals	B1	10	50
		It is the mistreatment of animals	G2		
		It is that dogs mistreat us	B12		
		It is that plastic garbage kills animals	B9		
		It is that some children become homeless	G8		
		It is that there is too much garbage on our planet	G3, G4, G5, B7, G20		
Environmental	Disasters	It is the increase of fires in nature.	B6, B10	8	40
		It is that cold and polluted air makes our lives more difficult	G14		
		It is the occurrence of all four seasons all at once	B15		
		It is the harmful fuels	G16, B19		
		It is the absence of water in some places	G17		
		It is the global warming	B18		
Economical	Financial difficulties	It is that some children cannot find food	B11	2	10
		It is that everything is very expensive	B13		

Source Author

was like that, but now they have a house. They live in the building opposite us.". In addition, while B6 whose opinion fell under causes of disasters sub-theme under the environmental theme said regarding the cause of the global problem that *"Because necessary precautions are not taken about fires."* B10 and B15, whose opinions also fell under the environmental theme, gave global warming as the cause of the problems, which is the most frequently used theme for a single reason. Lastly, B13, whose opinion was placed under the sub-theme of causes of financial difficulties which took place under the economic theme stated that the global problem is that the price of everything is very high and expressed the cause of the global problem as *"Because the price of everything increases a lot.".*

Findings regarding the fourth sub problem of the study

The findings regarding the question "What are the opinions of preschool children regarding the effect of the global problem on our planet?" which was the fourth sub problem of the research, are presented in Table 5

Table 5 shows that the opinions of preschool children regarding the effect of the global problem on our planet were gathered under three sub themes and three themes: consequences of situations that harm nature which was placed under social-cultural theme, consequences of disasters under the environmental theme, and consequences of financial difficulties placed under the economic theme. In this context, 13 children (65%) expressed their opinions under the sub-theme of the consequences of situations that harm nature, 5 children (25%) expressed their opinions under the sub-theme of the consequences of disasters, and 2 children (10%) expressed their opinions under the sub-theme of consequences of financial difficulties. Therefore, it is seen that preschool children"s opinions regarding the effects of global problems are most frequently expressed under the sub-theme of consequences of situations that harm nature which fell under social-cultural theme. When sentences which were placed under the sub-theme of consequences of situations that harm nature were examined in terms of the frequency of opinions, the expressions regarding the occurrence of diseases, disruption of the natural

Table 4. Opinions of pre-school children regarding the cause of the "global problem".

Themes (pillars)	Sub-themes	Codes (cause)	Participants	Frequency (f)	(%)
Social-cultural	Situations that harm nature	That people want to buy more clothes.	B1	12	60
		Having wars.	G8		
		That people want more than they need	G16		
		That people thinks about their own well-being.	B19		
		Building houses on the places where animals live.	G2		
		That dogs cannot find food in nature	B12		
		That plastic wastes kill animals.	B9		
		Excessive use of plastics and not separating them as recyclables.	G3		
		That there are not enough trash cans.	G4		
		That people do not know that throwing garbage into nature is harmful.	G5		
		That people throw garbage on the ground.	B7		
		That people throw garbage into nature.	G20		
Environmental	Causes of disasters	Failure to take necessary precautions for disasters	B6	6	30
		Global warming	B10, B15		
		That things like oil and natural gas pollute our air	G14		
		Too much water consumption	G17		
		The problem of unnecessary consumption of natural resources	B18		
Economic	Causes of financial difficulties	That people do not help each other	B11	2	10
		That the price of everything increases very much	B13		

Source Author

balance, being foreigners and being homeless, having no planet to live and having no place to live and animal aggression were found. Findings under the sub-theme of consequences of disasters are expressed as global warming, increase in fires, water scarcity and pollution. The findings placed under the sub-theme of consequences of financial difficulties under the economic theme were expressed as hunger and poverty, and they had the lowest frequency.

While B1, whose opinion fell under the sub-theme of consequences of situations that harm nature which was under the social-cultural theme, expressed the effects of the global problem on our planet as *“We begin to be unable to breathe on our planet. Because if animals die, the balance is disturbed.”.* G3 and G4 stated that *“If garbage continues to be too much like this, people may not have a place to live”, “If there is a lot of garbage, people will be infected by viruses and get sick.”.* Also, G8, who expressed her opinion which was also placed under the sub-theme of consequences of situations that harm nature which was under the social-cultural theme stated *“We can't play any games with my refugee friend. Even though he goes to school, he doesn't understand us anything because he's a foreigner"*. On the other hand, it is seen that B6, who gave his opinion under the sub-theme of the consequences of disasters under the environmental theme, stated *“The source of life for humans is oxygen. Without trees and flowers, our oxygen will decrease, and there will be global warming.".* Similarly, G16 stated *"There will be global warming and we will not have a place to live.".* Finally, B13, whose opinion regarding the effect of the global problem was placed under the

Table 5. Opinions of pre-school children regarding the effect of "global problem".

Themes (pillars)	Sub-themes	Codes (cause)	Participants	Frequency (f)	Percentage
Social-cultural	Consequences of situations that harm nature	If animals die, the balance is disturbed.	B1, B9	13	65
		Animals start chasing us to protect themselves	G2		
		If the animals have no place to live the balance will be disturbed	B15, G14		
		Living things get sick	G4, G20		
		Children who migrate in wars feel alienated	G8		
		Children cannot play in the park	B12		
		The world becomes a place filled with garbage	G5		
		If the Earth becomes uninhabitable, another planet is searched	B7 G3, B19		
Environmental	Consequences of disasters	Global warming happens	B6, G16	5	25
		Our world gets polluted	B10		
		We can run out of water	G17		
		Animals die, fires begin	B6, G16		
Economical	Consequences of financial difficulties	Children starve, die	B11	2	10
		People become poor, we run out of money	B13		

Source Author

sub-theme of the consequences of financial difficulties under the economic theme said *"People are getting poorer and we're running out of money."*.

Findings regarding the fifth sub problem of the study

The descriptive statistical information regarding the question "What are the opinions of preschool children on the solution of the global problem on our planet?", the fifth sub problem of the research, is presented in Table 6.

As Table 6 shows, distribution of the opinions of preschool children regarding the solution to the global problem in terms of 7R sub-themes developed for education for sustainable development took place under the sub-themes of respect, rethink and reflect under the social-cultural theme as well as under the sub-themes of reduction and reuse under the environmental theme and under the sub-themes of recycle and redistribute under the economic theme. In this context, it has been determined that the frequency of the opinions of preschool children regarding the solution of global problem is expressed like this: 9 children"s (45%) opinions fell under the social-cultural theme, 6 children"s (30%) opinions fell under the economic theme, and 5 children"s (25%) opinions fell under the environmental theme. In addition, it was found that the most emphasized sub-theme of the social-cultural theme was rethink (f=6), and the most emphasized sub-theme of the economical theme was recycle (f=4) and the most emphasized sub-theme of the environmental theme was reduce (f=4). G2, who expressed her opinion regarding the solution of the global problem under the sub-theme of respect which took place under the social-cultural theme stated *"People should accept animals' right to live and respect them.*". Also, B1 who gave his opinion under the sub-theme of rethink stated *"We can produce our clothes with other materials."*. Also, emphasizing the need for new tools as solutions to the global problem B6 and B9 stated *"We can create a combination of soil, clay, mud and water to extinguish the fires."* and *"We can use pincer-shaped tools to clean our environment because germs can make us sick if we use our hands."*.

Table 6. Opinions of pre-school children regarding the solution of "global problem".

Themes (pillars)	Sub-themes (7R"s)	Codes (solution)	Participants	Frequency (f)	Percent
Social-cultural	Respect	People should accept animals' right to live and respect them	G2	9	45
		Animals should be helped	B12		
	Rethink	Adults and children should be more aware and be informed	B10, G14, B10		
		Our clothes must be produced with other materials	B1		
		New tools should be designed to protect our environment	B6, B9		
	Reflect	All wars must end so that children fleeing wars can return to their homes	G8		
Environmental	Reduce	People should buy only what they need	G15,	5	25
		People should turn off running water and light when unnecessary	G17, B18,		
		Instead of cars minibuses should be used	B19		
	Reuse	People should not throw away materials immediately but reuse them	B7		
Economic	Recycle	Garbage should be thrown into recycling bins and should be recycled	G3, G4, G5, G20	6	30
	Redistribute	People should help each other more.	B11, B13		

Source Author

Also, G8 who expresses her opinions under the sub-theme of reflect said *"If all wars end children fleeing wars can return to their homes."*.

G17 who expressed her opinion under the reduction sub-theme of the environmental theme regarding the solution of global problems stated *"We have to turn on the tap water less now. For example, while brushing teeth or washing our hands, we should turn off the tap and inform our elders."*. B18 also expressed his opinion under the same theme and said *"For example, we must turn off the light when leaving a room. We should close taps tightly when we are not using them."*. On the other hand, B7, who expressed his opinion on the reuse sub theme under the environmental theme, said *"I think people should start using materials differently, like me. For example, I know how to make ships and airplanes out of used paper."*. Lastly, G3, who expressed her opinion under the sub theme of recycle under the economic theme regarding the solution of global problem, stated *"People should recycle their trash by throwing it in the recycling bins."*, It is found that B11 who gave his opinion under the redistribute sub-theme stated *"Everyone should treat each other better and help each other."*

DISCUSSION

Adopting a holistic view of sustainability with its environmental, social and economic pillars (Giddings et al., 2002) forms the pluralistic and transformative view and analytical framework for education for sustainability (Ohlsson et al., 2022). Education for sustainability, which is strongly emphasized to be integrated into the preschool period, should ensure that children, also being citizens of the world, be aware of the serious environmental problems that the world experiences today, and should prepare children to find solutions to economic and social problems (Eriksen, 2013; Grindheim et al., 2019; Pramling-Samuelsson, 2011). In this study, the opinions of preschool children on the concept of global problem were presented and interpreted from this point of view.

Many issues and concepts related to sustainability were thought to be far beyond the cognitive comprehension of children during the 2-7year old period, which was called the preoperational period by Piaget, and the necessity of including these issues in their education were not considered until recently (Berndt, 1997 cited by Elliot and Davis, 2009). However, when the relevant literature was examined, it is emphasized that children between the ages of 4-6 can think very consciously and sensitively about many issues such as global warming, waste management and deforestation within carefully

prepared educational experiences (Alan, 2015; Buyer, 2013; Ayvacı et al., 2021; Cengizoğlu, 2013; Fretes et al., 2021; Green, 2019; Gülay-Ogelman, 2012; Haktanır et al., 2012 cited by Haktanır et al., 2016; Kahriman-Öztürk et al., 2012; Palmer et al., 2003; Palmer, 1999; Palmer, 1995; Paprotna, 1998; Prince, 2010). The findings of Palmer (1999), whose research project was about environmental emergencies and was carried out in 16 countries, support this view. His findings demonstrated that children in the 4-6 age groups can think about environmental problems in a more complex manner than many adults do (Alıcı, 2013). Moreover, it was determined that permanent changes were observed in the behaviors of children who were involved in environmental and sustainability education practices during the preschool education period (Cevher-Kalburan, 2009). Therefore, it is suggested that education for sustainability and environment should start from early childhood years in order to raise children who are able to look for the problem, find it, and find a solution to it as the creators of sustainable future today (Ahi and Alisinanoğlu, 2016; Elliot and Davis, 2009; Miller et al., 2014; Ohlsson et al., 2022). In this respect, it is thought to be important to learn about current perceptions and views of children, who are considered to be an integral part of sustainable development, regarding “global problems”. In this context, the results obtained from this research regarding the metaphorical perceptions and views of 60-70 month old preschool children about "global problems" are tried to be discussed in this part of the research.

Metaphors regarding “global problem” obtained from preschool children through their metaphor sentences consisted of sub-themes of “harming nature” under social-cultural theme, “disasters” under environmental theme and “financial difficulties” under economic theme. Also, it has been determined that metaphors are most frequently produced under the sub-theme of harming nature of the social-cultural theme. In line with this, Prambling-Samuelsson (2011) expressed that today's children, living in a rapidly changing society within the dynamism of the 21st century, can observe, notice, learn and experience poverty, climate change, natural disasters as well as many complex problems among individuals and nations (Borg, 2019). In this context, in a study aiming to reveal the knowledge levels of 4 and 5 years old children attending preschool education regarding the concepts of forests and deforestation, it has been determined that many children stated that the destruction of forests had negative effects on animals, one child stated that this situation would adversely affect the atmosphere, and another child stated that this situation would cause landslides (Ahi and Balcı, 2017).

Therefore, it is thought that children can establish and conclude a relationship between global problems and harming nature through their strong observation skills and environmental perspective. In this research, global problems were examined in general and it was seen that children stated metaphors for environmental problems more intensely.

Based on the results obtained from the this research, the use of the metaphors only for environmental problems by children can be examined in more detail in other studies, and they can be interpreted in terms of the pillars of education for sustainable development. In addition, it is expected that this research will contribute to other studies and related literature in which children's perceptions of environmental problems and the underlying meanings of their metaphors are examined.

Findings regarding the global problem obtained through interview questions from preschool children, consisted of sub-themes of “harming nature” under social-cultural theme, “disasters” sub theme under environmental theme and “financial difficulties” sub theme under economic theme. Also, it was determined that opinions were mostly expressed under harming nature sub-theme of the social-cultural theme. In this context, the opinions of preschool children regarding the global problem seem to emphasize harming animals and the presence of a lot of garbage on our planet under the sub-theme of harming nature. Similarly, Caiman et al. (2022) conducted a study to investigate about characteristics of early childhood education for sustainable development by paying specific attention to the features that take place in their creativity processes synchronously. In their research, it was determined that although children focused on sustainable consumption they discovered sustainable consumption related to the safety of animals in the process. In the light of the findings of the research, it was concluded that these ideas about sustainable consumption resonate with the interpersonal learning discussions (Jickling and Blenkinsop, 2020) and be related to Van and Vandenabeele's (2012) idea of "participatory learning". On the other hand, it was determined that the participants of this research focused on the increase in fires in nature, people's use of harmful fuels, global warming, seasonal changes and water scarcity under the sub-theme of disasters. Parallel to this, other studies in the relevant literature reveal that children between the ages of 2-6 are capable of understanding the concepts of waste, garbage, recyclables and non-recyclables, as well as environmental issues and problems such as global warming, waste management and deforestation (Ahi and Balcı, 2017; Palmer et al., 1999; Palmer, 1999). Finally, under the sub-theme of financial difficulties, the statements "some children cannot find food" and "everything is very expensive" are important. Thus, when the fact that most of the mental frameworks of children are formed during early childhood years by social learning, and that their behavioral patterns are formed by modeling/reflection are taken into consideration, it is thought that reflecting events in social-cultural and socio-economic life to children intentionally or unintentionally affects their perceptions, views and behaviors significantly.

Parallel to this, in Borg's (2017a) study which aims to examine the knowledge levels, knowledge sources and behavioral patterns of children during preschool education regarding the use of money, it was concluded that children tend to share with a sense of social responsibility and moral obligation acquired from their parents and teachers. Again, in Borg's (2017b) study, children studying at eco-certified kindergartens, comparing to children attending other schools, are more aware of the fact that children living in different parts of the world do not have the similar economic status with them, and it was concluded that they reached this awareness through their parents, different media and their personal experiences. Similarly, Grodziéska-Jurczak et al. (2006) state that some environmental patterns of children are a reflection of those of their parents. Musser and Diamond (1999) also stated that siblings, grandparents, teachers, visual or written media and materials such as television and books are as effective as children"s parents on these patterns. The current research conducted in this direction (Borg, 2019; Li et al., 2019; Singer-Brodowski et al., 2019) also emphasizes that a comprehensive sustainability approach can only achieve success through the collaboration of family, school, and community partners. When the findings of this research are considered, it can be concluded that 60-70 month old children who participated in this study have a certain level of knowledge and awareness regarding various global problems. These results obtained from the research generally express the views of children on global problems. Based on the views of children, this research is expected to shed light on future research in which each of the problems experienced in the socio-cultural, environmental and economic pillars of sustainability will be examined separately. In addition, it is thought that it will be important in terms of education for sustainable development to ensuring make other studies examining the ways in which children acquire this knowledge about global problems.

Findings regarding the reason of the global problem, obtained through interview questions from preschool children, consisted of sub-themes of situations that harm nature under social-cultural theme, causes of disasters under environmental theme and causes of financial difficulties under economic theme. It is determined that the opinions of the participating children regarding the reason of global problem fell mostly under the sub-theme of the situations that harm nature under the social-cultural theme. Considering the codes under the themes and sub-themes, the opinions of 60-70 month-old children regarding the cause of global problems mostly appear to have been caused by human actions.

Similarly, Ayvacı et al. (2021) state 58-60 month old children point out human actions as the source of the environmental problems. Šorytė and Pakalniškienė (2019) also investigate the reasons of 6-11 years old children to protect the environment and conclude that children are aware of some environmental problems and actions that produce garbage and harm the environment. The participants of our research, regarding the cause of the global problem, focused mostly on global warming under sources of disasters theme and people"s not helping each other and the increase in the prices of everything under sources of financial difficulties. There is also similar research findings conducted with preschool children (Barrett and Short, 1992; Borg, 2017b; Palmer and Suggate, 2004; Palmer et al., 1999). In this respect, findings of this research are parallel to the findings of similar research conducted with preschool children in terms of the reason of global problem. This research was carried out with the participation of children from Türkiye. It is expected that these findings will contribute to other researches that will examine children's views on the causes of global problems comparatively in different countries, and that the results of these researches will contribute to the literature for education for sustainable development.

The findings of this research regarding the effects of the global problem, obtained through interview questions from preschool children, consisted of the sub theme of consequences of situations that harm nature under social-cultural theme, the sub theme of consequences of disasters under environmental theme and the sub theme of consequences of financial difficulties under economic theme. In addition, it was seen that the participants" opinions mostly fell under consequences of situations that harm nature sub theme. It was found that children who voiced their opinions about consequences of situations that harm nature and consequences of disasters focused on homelessness, having no place to live (having no planet to live), harming the living things and global warming. In addition, children who voiced their opinions under the consequences of financial difficulties sub theme focused on poverty and inequality. Basing on the findings, it can be said that preschool participants have a certain level of knowledge regarding several global problems, and they are capable of observing the consequences of these problems. Pramling-Samuelsson (2011) indicates preschool children know about problems related with global warming and poverty (Brog, 2109). Parallel to this, Palmer and Suggate (2004) investigated about the opinions of 4-10 year old children in England regarding their factual knowledge on rain forests and poles (global warming), which are very far away regions, and also investigated about their opinions regarding the causes and the effects of environmental changes in these regions. Their findings concluded that children who are younger than 4 years of age are capable of giving simple and correct statements about the effects of big environmental changes on living things and habitats. Therefore, it is possible to say children need more opportunities than ever to express their voices about sustainability (Bautista et al., 2018; Borg and Pramling-Samuelsson, 2022). In this respect, it is emphasized that

education for sustainable development, which embodies a potential for supporting social environmental solidarity basing on interdependency and critical thinking and offers a potential for an individual to respect himself/herself, others and the environment, should be integrated into every level of formal education (Davis et al., 2009; Ohlsson et al., 2022). This way, it is envisioned that children can become active decision-makers of the sustainability process by turning to purposeful actions related to issues affecting their own lives (Mackey, 2012 as cited in Borg, 2019). According to the results obtained from this research, it is thought that children can make inferences about the effects of global problems. It is expected that the results of this research will contribute to new researches that include the preparation and implementation of education programs for sustainable development, which will support children's awareness of the effects of global problems and make inferences about these problems.

The findings of this research regarding the solution of the global problem, obtained through interview questions from preschool children, are stated in terms of social-cultural, environmental and economic themes, the three pillars of sustainable development. The participant children"s opinions were investigated in terms of 7R"s which were developed to define education for sustainable development for early childhood. The findings of this research indicated that solutions to global problems offered by the preschool children fell under respect, rethink and reflect sub themes of the social-cultural pillar. Hedefalk et al. (2014) analyzed the research published during 1996-2013 regarding early childhood education for sustainable development in terms of sub themes. Their findings indicated that research conducted between these years evolved into research on education for children that views them as active agents of change for environment and sustainability rather than teaching real dimensions of environment and sustainability. It is thought that one of the goals of Education for Sustainable Development, creating proficient children who are able to think by themselves and give well-informed decisions, can only be created through this new approach. These decisions given after making critical discussions and conducting research regarding alternative ways to make changes are viewed very critical for today"s world. In this respect, the findings of Borg"s (2019) research on preschool children which state preschool children are able to voice their opinions by combining them with one or more related opinions is parallel to the findings of this research. The participants of this study are 60-70 months old preschool children. The results of this research are expected to make meaningful contributions to future research in which the perspectives of the younger preschool children on global problems are developed and evaluated according to the 7R. The results of this research are expected to make meaningful contributions to future researches in which children's perspectives on global problems are developed and evaluated according to the 7Rs.

In terms of the social-cultural theme, Grodziéska-Jurczak et al. (2006) research state that children generally tend to emphasize the value of nature, respect the living things and maintain clean environment around them. Šorytė and Pakalniškienė"s (2019) research indicate that children"s opinions regarding the protection of environment is related to human beings and other elements of the nature and also children give statements about the importance of protecting human life, human health, animals and plants. In addition, research on early childhood education today indicates that children, parents and teachers do not focus only on local problems but they also focus on global problems such as making compost, reduction, reuse and recycling (Alıcı, 2013; Ärlemalm-Hagsér and Sundberg, 2016; Cengizoğlu, 2013; Güler-Yıldız et al., 2017; Häikiö et al., 2020).

When the findings of this research is generally considered, it was found that 60-70 month old preschool participants of this study have a certain level of knowledge and awareness about global problems regarding the social-cultural, environmental and economic pillars of education for sustainable development. It was found that preschool children"s metaphors and their opinions regarding what the global problem might be, its" reasons, effects and solutions were mostly fell under the social-cultural theme. In addition, although it was also found those preschool children"s metaphors and opinions regarding the concept of global problem and its reasons, effects and solutions most frequently fell under social-cultural theme it was also found that the children mostly voiced opinions about nature under the sub theme of the social-cultural theme. It was determined that the preschool children gave opinions about “questioning” placed under the social-cultural theme, “recycling” placed under the economic theme and “reduction” placed under the environmental theme as the solution of the global problem for sustainable development most frequently.

It is also thought that children are a part of the global problems and it is important that children"s knowledge should transform into behaviors after combining their knowledge with their environmental, social-cultural and economic awareness, sensitivity and consciousness. The six modular steps of goals regarding present global problems and solutions (1) Education and skills, gender and inequality (2) good health, well-being and demographics (3) separation of carbon from energy, clean energy and sustainable industry (4) sustainable food, soil, water and oceans (5) sustainable use of land; cities and communities and (6) digital transformation for sustainable development (Sachs et al., 2021; Sachs et al., 2019). Therefore, when current global problems are viewed from the viewpoint of education for sustainable development, both the future goals for the world and the results of this research suggest that it is necessary to present educational experiences that support sustainable

development during preschool years. It is thought that educational experiences that support sustainable development contribute children"s self-recognition and self-realization to a great extent and also has a critical role for the sustainable future of the world they live in.

SUGGESTIONS

Basing on the results of this study, the following suggestions are extended in order to shed light to the future research:

1) The relationship between preschool teachers" and prospective teachers" opinions and their metaphorical perceptions regarding global problems and their environmental, social-cultural and economic behaviors can be investigated.
2) Educational activities about sustainability prepared by preschool teachers in order to make the concept more concrete for students and to be internalized by them can be investigated in terms of quality and quantity. In addition, the number of these educational activities can be increased.
3) The effects of educational activities regarding sustainable development on children"s thinking skills, resilence, cognitive flexibility and viewpoints of nature can be investigated.
4) Experimental studies about environmental, social and economic pillars of sustainability for preschool education can be prepared and their developmental consequences in terms of sustainability can be investigated.
5) Preschool teachers" planning, implication and evaluation processes of sustainability activities and difficulties they encounter during this process can be investigated.
6) Children can be provided more information by conducting studies of sustainability in collaboration with administrators, teachers, students and families in educational institutions offering preschool education.
7) Teachers" professional development can be supported and their self-efficacy can be improved by organizing E-Twinning activities regarding education for sustainable development at the national and international levels, and consequently preschool children can increase their knowledge, skills and behaviors regarding sustainability.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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