INVESTIGATING POTENTIAL OF EDUCATION FOR SUSTAINABLE DEVELOPMENT PROGRAM ON PRESCHOOL CHILDREN'S PERCEPTIONS ABOUT HUMAN-ENVIRONMENT INTERRELATIONSHIP

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ABSTRACT

INVESTIGATING POTENTIAL OF EDUCATION FOR SUSTAINABLE DEVELOPMENT PROGRAM ON PRESCHOOL CHILDREN'S PERCEPTIONS ABOUT HUMAN-ENVIRONMENT INTERRELATIONSHIP

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The purpose of this study was to investigate the potential of developed and implemented education for sustainable development (ESD) program on preschool children's perceptions about human-environment interrelationship in line with deforestation, biological diversity and climate change which are the basic components of ESD. The sample of the study is comprised a class of 60-66 month-old eco-preschool children (N=18) living in Ankara, Turkey. For this study, a qualitative case study was conducted. The data were collected through drawings of children about "human-environment" and semi-structured interviews before and after the implementation. Implementation of the program included 14 activities (drama, art, play, science, language etc.) was completed over four weeks.

Findings of the current study indicated that children's perception about deforestation, biological diversity and climate change in line with human-environment interrelationship changed after participated in implementation. Before implementation, children did not perceive humankind as the part of environment, yet

after attending activities, they put the human being in the center of sustainable development. Furthermore, participating in ESD program extends children's points of views to associate relationship among deforestation, biological diversity and climate change with each other. An important finding was that children who participated in implementation gains the critical thinking ability and express their own solutions toward a sustainable future.

Key words: sustainability, education for sustainable development, early childhood education, preschool children

ÖZ

SÜRDÜRÜLEBİLİR KALKINMA İÇİN EĞİTİM PROGRAMININ OKUL ÖNCESİ DÖNEM ÇOCUKLARININ İNSAN-ÇEVRE İLİŞKİSİ ALGISINA ETKİSİNİN İNCELENMESİ

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Bu çalışmanın amacı okul öncesi dönem çocukları için geliştirilen sürdürülebilir kalkınma için eğitim programının çocukların ormansızlaşma, biyolojik çeşitlilik ve iklim değişikliğine uyumlu olarak insan-çevre ilişkisini hakkındaki algılarını incelemektir. Bu çalışma Ankara ilinde bir eko-okulda okula devam eden 60-66 aylık okul öncesi dönem çocuklarını (N=18) içermektedir. Çalışma nitel araştırma yöntemleri kapsamında bir durum çalışması olarak yürütülmüştür. Çalışmanın verilerini uygulamanın öncesinde ve sonrasında çocuklardan elde edilen "çevre ve insan" konulu resimler ile yarı yapılandırılmış görüşmeler oluşturmaktadır. Uygulanması dört hafta içerisinde tamamlanan program ise toplam 14 (drama, sanat, oyun, fen, dil vs.) etkinlikten oluşmaktadır.

Bu çalışmanın bulguları uygulamaya katılan okul öncesi dönem çocuklarının ormansızlaşma, biyolojik çeşitlilik ve iklim değişikliğine uyumlu olarak insan-çevre ilişkisi hakkında algılarının değiştiğini ortaya koymaktadır. Programa katılmadan

önce insanoğlunu çevrenin ve sürdürülebilir uygulamaların bir parçası olarak görmeyen çocuklar uygulamaya katıldıktan sonra insanoğlunu sürdürülebilir kalkınmanın merkezine koymuşlardır. Ayrıca, sürdürülebilir kalkınma için eğitim programına katılan çocukların bakış açıları ormansızlaşma, biyolojik çeşitlilik ve iklim değişikliğinin birbirine olan etkisi hakkında gelişmiştir. Bir diğer önemli bulgu ise programa katılan çocuklar eleştirel düşünme becerisini elde etmiş ve sürdürülebilir gelecek için kendi çözüm önerilerini sunmuşlardır.

Anahtar Kelimeler: sürdürülebilirlik, sürdürülebilir kalkınma için eğitim, okul öncesi eğitim, okul öncesi çocukları

To my graceful friend

Rukiye AKSOY

[1986-2010]

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CHAPTER I

INTRODUCTION

From the beginning of early ages, an environment in which a child lives is crucial for early learning through shaping a child's physical and social world and his/her spending time in different learning areas as both indoors and outdoors (Bodrova & Leong, 2007). Young children need to grow in responsive environments which are always attractive and full of wonder for them. Children love being in environment exploring animals, plants and learning much broader topics about nature (Wilson, 1997 &Pramling Samuelsson, 2011). In history, emphasis was also made on the importance of interaction between children and environment in which they grow. Locke, Pestalozzi, Froebel, Montessori and Dewey, famous contributors to early childhood education, also assert that through direct experience with environment and natural materials provides strong relationship between individuals and the environment. In this regard, John Locke (1632-1704) states that environment and early experiences shape the mind, and that enhance children to develop skills, attitudes, values and behaviors to foster sustainable development which is the result of children's interaction not only with their parents and the teachers but also the environment itself. In similar manner, Friedrich Wilhelm Froebel (1782-1852) who is known as the "father of the kindergarten" put forward that young children are the individuals who are unfolded like flowers and that the educators are gardeners who promote children's development through playing and early experiences in environment (Morrison, 2008). When educators implemented practices that contribute a sustainable future, children become motivated to realize his role for the environment as responsible and respectful individuals. Hence, they know that human being also has a role within the balance in human-environment interrelationship (Rosa & York, 2009).

Even though, human beings' interaction with the environment has been stressed for many years, it is clearly true that today's children have minimal connection with nature (Louv, 2005; Herbert, 2008; Kaga, 2008; Nordahl, 2008;

Edwards, Skouteris, Rutherford & Mackenzie, 2012). This situation is justified in two ways. First of all, towns are growing in sizeandtraffic is increasing on roads day by day. Unfortunately, green areas are eliminated and the natural habitats are eroded. The global world brings about environmental challenges, namely rapid urbanization, diminishing fresh water, extinction of forests and biodiversity prevent children from touching the environment. Besides, because of urbanization and industrialization, nowadays, children learn about the environment through car windows, reading books and watching programs on TV instead of having direct interaction with the environment (Elliot, 2010). The natural world is eliminated by television and digital mediums. Children do not have a direct connection with environment anymore and their experiences are dominated by media, written language and visual images (Chawla, 2007). Unfortunately, this causes children not to perceive that their ice cream comes from the products made by the cow; however, children have misunderstanding that the source of an ice cream is just a supermarket. These challenges make children who are the most vulnerable human being to face with the risks of unsustainability (Davis, 2008).

Unsustainability should be changed and overcome only through education (UNESCO, 2005; UNESCO, 2009). Education is essential, because it has the potential to fill the gaps unsustainability (Qemuge, 2008; Kaga, 2008; Pramling Samuelsson, 2011). Otieno (2008) argued that not only non-formal education, but also formal education is crucial to increase public awareness and that only training for human beings and societies can have them use their potential fully and make them develop attitudes, values and ideas. By being part of internationallyagreed report on Earth Summit, Agenda 21 (UNCED, 1992), countries committed to promote environmental sustainability through education. Chapter 36 of the report is specifically on *"promoting education, public awareness and training"*.At that point,Didonet (2008) claimed that early years of a human being are the most favorable years to develop values and attitudes and early childhood education is considered as a key point, because of children's sense of wonder and tend to explore real world with real issues and explore the cycles in Earth. They are highly interested in how plants grow, how climate impacts us and how human being/plants and animals interact and how living and non-living world are interdependent with each

other. In support, Siraj-Blatchford (2008) proposed that early childhood education has a role to contribute to children's experiences their awareness related to interrelationship between human beings and the environment increases. At this point, the significant question that should be asked is what kind of education converts the unsustainability to sustainability style for a human being?

The importance of protecting the environment was acknowledged in 1980s. It was clarified that world has environmental crisis and it was urgent to take some actions such as educating people about environmental challenges. The term environmental education was created in 1980s, but after a few years later, UNESCO put forward such related but different term as education for sustainability (EfS) and education for sustainable development (ESD) (Rickinson, 2001). Further terms were needed, due to the fact that environmental education perspective was not sufficient for overcoming the environmental challenges that Earth faced. So to say, it is not proper to look from only environmental perspective, because environmental problems havea complex structure and include social and economic dimensions which are all interrelated(UNESCO, 2005; Yan &Fenfeng, 2008). Actually, researcheshave been demonstrated that being aware of environmental issues has a little impact upon behavior (Elliot, 2010). Knowing is not enough to trigger one's action but, that children should be educated about how to care and create a harmonious relationship with the Earth and with fellow human beings.

From this perspective, "early childhood education for sustainability (ECEfS) is more than environmental education"(UNESCO, 2008, p.12) which means that taking children out and instead of talking with them about the environment, ECEfS interested in concrete actions in which children have opportunities to develop point of views to evaluate nature and its elements critically. Creative solutions and alternative perspectives to unsustainable habits are considered one of the ways of early childhood education for a sustainable society. Kaga (2008) also stressed that "education for sustainability must begin in early childhood" (p.54), because early experiences relating sustainability promotes child's basic life skills as communication, autonomy, co-operation, creativity and problem solving. Additionally, there is an interrelationship between investment on early childhood education and a sustainable society (Pressoir, 2008). It is proposed that educators and

teachers can integrate sustainability regarding methodology, content and the strategies of the programs.Keliher (1997) hypotheses that studying and understanding how young children perceive their environment is a way for educators to design and arrange learning experiences, because researches demonstrate that revealing children's understanding and perception is significant for planning environmental education experiences for children.

Actually, it is not necessary to develop new pedagogies in order to create a sustainable society through young children. Early childhood education for sustainability (ECEfS) does not reject the traditional approaches; furthermore, one can create an education for sustainable development (ESD) pedagogy based on traditional approaches in early childhood education (Pramling Samuelsson &Kaga, 2008). ECEfS is not a new perspective; in addition, it is acceptable to reconstruct early childhood education programs which point out decision making, critical thinking, problem solving, communication and co-operation. It is possible to reconstruct the existing early childhood education programs or reorient them for early sustainability (Kaga, 2008). Actually, ESD is considered as a golden opportunity to reconstruct the curriculum of formal education systems. However, the best solution way is to consider that ESD is not a universal model, and that its methods and pedagogic strategies should be translated in to another model at the local level. ESD is an opportunity to rebuild a modern education system for the formal education (McKeown, 2002; Davis, 2010). Educators need to reorient the existing educational programs in the sense of for improving knowledge, competences and abilities (McKeown, 2002). In fact, human beings have to know and recognize environment in order to understand it and protect it. The subnational (community) level of UNDESD (2005-2014) stated that schools are the actors at community level and it is possible to work individually in order to integrate ESD into regular learning activities and programs to reach the upper levels, namely national, regional and international level (2009). UNDESD (2005-2014) proposes that education for sustainable development (ESD) has some key characteristics of education for sustainable development including items, because ESD engages formal,-non-formal and informal education. When it comes to Gothenburg Recommendations (2008), there are specific suggestions about early childhood education. Davis, Engdahl,

Otieno, Pramling-Samuelsson, Siraj-Blatchford and Vallah (2008) proposed that early childhood education is considered as a priority for a sustainable future.

Thanks to the progress of reorienting curricula, a number of countries have integrated education for sustainable development (ESD) into their early childhood education programs. Sustainable planet project which was conducted in Brisbane (Australia) in 2004 was an example inspired by how ESD can be integrated into early childhood education. The Sustainable Planet Project included several mini projects which focused on recycling, gardening, cleaning, using of natural resources and so on. It was achild-centered project and its focus point was 'environment'. Furthermore, the staff's devoting themselves and their personal interests for gardening, wildlife conservation and recycling enriched the project. Another mini project called Shopping Trolley Project raised the awareness of children about local in the local community. In addition,Norddahl (2008) stated that Iceland's national preschool curriculum includes such items as children should respect others and tolerate different cultures. Children should learn communicating with other children and respect the environment. Nordic environmental project called MUVIN (MiljöUnderVisningINorden [Environmental Education in the North]) which focuses on how young children manage the natural resources and seek solutions in their local communities. In MUVIN Project, it is proposed that 5-6 year-old age groups are capable to discuss and explore the problems in the society. This is a reason why we believe in children.Engdahl and Arlemalm-Hagser (2008) also asset that Swedish preschool program has a long tradition of outdoor education. The curriculum includes specific goals concerning environment and democratic values. Kwon (2008) asserted that Korea's National Curriculum for kindergarten has included environmental education since 1992. Environmental education is classified into four or five categories including health, social, expression and exploration. Actually, eco-oriented environmental education is thought far from human centered perspective. In addition to this, eco-oriented program emphasizes that human being is in the center of the environment and that should follow the laws of nature and harmonise himself with the eco-system (Suh, 1999). In China, kindergartens promote children's ideas so that they achieve their own small-scale sustainable development and environmental protection actions. Bewaring of water wastage, encouraging children to not to throw

away rubbish, and recycling are the activities that kindergartens conduct (Yan &Fengfeng, 2008).

When it comes to Turkey, the position of Turkey as far as sustainable development is considered may be summarized by the recent document: Turkey's Sustainable Development Report: Claiming the Future (2012). The report informs approaches, economic, social and environmental developments and the road map of Turkey for the green growth.The report stressed that there is strong relationship between sustainable development and the education. The way to raise a conscious generations is to reorient education process by adding new courses for formal and non-formal education. To add, report includes the enrollment rate which has been increasing year by year especially in early childhood education. Nevertheless, the report does not meet the requirements of a strategy or an approach related to how and why education for sustainable development (ESD) should be integrated in education.

Furthermore, in line with the Rio Declaration (1992), the urgency of sustainable development was put forward though The *National Capacity Action Plan* proposed by the Ministry of Environment and Forestry (2010) aims to determine the strategies for effective implementation of three Rio Declarations; *United Nations Convention to Combat Deforestation*, *Convention on Biological Diversity* and *United Nations Framework Convention on Climate Change.* Within this regard, a project has started to evaluate Turkey's National Action Capacity Plan in the context of Rio Declarations. The project specifically focuses on assessing the current position of Turkey in aspect to deforestation, biological diversity and the climate change.

As for to Turkey's position, even though awareness toward environmental problems has been increasing since Tbilisi Conference (1977), education for sustainability is quite new field in Turkey and it is needed to be improved (Tuncer, 2008). In Turkey, formal education system does not include any specific program for education for sustainable development, but non-governmental organizations such as Turkish Environmental Education Foundation (TURCEV) has arranged several projects such as Eco-School projects and Young reporters for the Environment Programs; and many others work hard to make society much more aware about sustainability challenges that are faced by Turkey (Erdoğan, Marcinkowski& Ok, 2009). On the other hand, education for sustainability was not particularly examined

in terms National Early Childhood Curriculum, yet there were researches focused National Curriculum in aspect to environmental education. Gülay and Ekici (2010) conducted a content analysis to investigate the National Early Childhood Curriculum (2006) in aspect to environmental education. Goals, objectives, acquisitions, concepts and special days indicated in the curriculum were explored roots of environmental education. Additionally a comparative study was conducted to analyze 2002 and 2006 early childhood curriculum regarding concepts and attainment of environmental sustainability (Erdoğan, Bahar, Özel, Erdaş&Uşak, 2012). Even though National Action Plan for Turkey especially indicated that it is needed to put forward a whole centered approach covering environmental, social and economic perspective through practical implementations, early childhood education for sustainability is under-researched in Turkey; therefore it is urgently needed to acknowledge education orientations regarding early childhood education and the principles of sustainability.

1.1 Purpose of the Study

The purpose of the study is to reorient curriculum units to address the sustainability in Turkish context, by means of designing, implementing and evaluating an education for sustainable development (ESD) program for 60-66 month-old preschool children. The designed ESD program, however, targets to offer a better understanding of human-environment interrelationship in line with the basic components of ESD.

The study focused on following research questions:

1. How the designed ESD program changes 60-66 month-old preschoolers' perceptions about the basic components of ESD (deforestation, biological diversity, climate change)?

    a) How did ESD program influence 60-66 month-old preschoolers' perceptions about environment in which they live?

    b) How did ESD program influence 60-66 month-old preschoolers' perceptions about human being and environment interrelationship in terms of deforestation?

c) How did ESD program influence 60-66 month-old preschoolers' perceptions about human being and environment interrelationship in terms of biological diversity?

d) How did ESD program influence 60-66 month-old preschoolers' perceptions about human being and environment interrelationship in terms of climate change?

1.2 Significance of the Study

Davis (2010) stated that "early childhood education for sustainability (ECEfS) is not 'doom and gloom' education" (p.31),yetthere are very few researches about on field when the last 20 years was analyzed due to the fact that transferring young children is considered as an abstract issue (Davis, 2010). In general, early childhood researchers do not pay adequate attention to sustainability issues and environmental education (Davis, 2009). This is the reason why; this study is significant not only for educational implications, but also for the future researches, because the aim of the study is not only putting forward just a result about a specific situation but also creating a curriculum approach which is expected to be beneficial to improve children's thinking style, to create changes in perceptions and values of young children, which is a need for education for sustainability in order to cover one of lacking in early childhood education. Actually, raising environmental awareness in preschool and early grade children does not require an abstract thinking ability; furthermore, meaningful experiences that are provided to children are the sign of environmental awareness in early ages. In fact, examining changes in understanding and perception is the key point of this study. Experiencing sustainable practices, young children are expected to improve their knowledge and realize the interrelationship between self/human being and environment. The formal Turkish education does not include goals and objectives directly related to education for sustainability. Hence, this study aims to put forward an approach to teach young children the link within the environment and reveal the influence of teaching young children about the relationship between human being and environment in order to raise more conscious, more sustainable and more respectful citizens for the future.

1.3My Motivation for the Study

Having realized about importance of education in early ages for one's life and the value and morality development for sustainable life, I believe that there should be connection between early childhood education and education for sustainability. It is possible to find research about why education for sustainability is quiet a necessity in early ages and make children comprehend the links within the environment, yet there are few curriculum approaches to show how education for sustainability can be integrated into early childhood education, indeed. Actually, it is clearly seen that different countries have different educational policies and some of them are really good at teaching children environment and raise them as responsible and action taker individuals to protect the environment and believe the well-being of the future. One of those countries is Sweden, which is famous for its green award and eco schools in which children are thought to be pro-green and respectful individuals for their environment. In order to investigate how environmental education and education for sustainability are integrated into early childhood education and adapt to Turkey's education context, I visited Gothenburg and Stockholm in January, 2012. Throughout my visit, I had opportunity to meet early childhood education teachers, observe activity designs and classroom materials, investigate school garden designs and examine their national curriculum program. As a consequence, I have concluded that the focal point of Swedish preschools' education for sustainable developmentis making them participated in environmental issues directly and nurturing children's problem solving and critical thinking ability. Coming back to Turkey, I have started to design activities to make concrete sustainability and environmental issues both for teachers and children. While designing activities, I considered national early childhood education program, urgent sustainability challenges faced by Turkey that should be solved and children's developmental level. The focal point of this thesis is guiding early childhood professionals toraise new generations aware of the global problems and their reflections in both local and personal levels.

1.4Definitions of Terms

Sustainability: There is no universally agreed definition of sustainability due to the fact it has been gradually evolved and there are many different views on what it is and how it can be achieved.In the current study, the researcher has made her own definition *which is the capability of young children to learn and understand the friendship among elements of environment which are embraced by Mother Nature.*

Early Childhood Education: Early Childhood Education (ECE) is a term that includes the appropriate programs that serve 0-8 year old children; a study field that trains the students about how to work with young children effectively (Essa, 2003).

*Sustainable Development:*Sustainable development (SD) is defined as "development that meets the need of the present without compromising the ability of future generations to meet their own needs" (Brundtland Commission Report, Our Common Future, 1987, p.43).

Education for Sustainability: Education for Sustainability (EFS) is defined as 'frame of mind' for our deep understanding of us, our societal and cultural processes linked to environment (Bonnett, 2002).

Education for Sustainable Development (ESD):"Education for sustainable development enables people to develop the knowledge, values and skills to participate in decisions about the way we do things individually and collectively, both globally and locally, that will improve the quality of life now and without damaging the planet for the future" (Sustainable Development Education Panel, 1998, p. 30)

Early Childhood Education for Sustainability (ECEfS): Early Childhood Education for Sustainability (ECEfS) aims to nurture socio-environmental resilience based on interdependence and critical thinking, setting foundations for lives characterized by self-respect, respect for others, and respect for the environment the quality of their engagement with young children and the early childhood community (ESD Recommendations, 2008).

Eco-School: Eco-schools aim to encourage children to take an active role in school environment to through practical steps which are crucial to reduce the environmental impact of the school (Chapman & Sharma, 2001).

Human-Environment Interrelationship for Sustainability: Human-environment interrelationship refers establishing a balance between the consumption patterns of individuals and the capacity of natural environment is the way to achieve a sustainable life (Schultz, 2002).

CHAPTER II

LITERATURE REVIEW

This chapter presents a review of empirical literature regarding young children, and education for sustainable development. The first part focuses on the need for education for a sustainable development concerning the relationship between human beings and environment while the second part emphasizes the need for the sustainability education in early childhood regarding the rationale to integrate the education for sustainability into early childhood education. The third part addresses reorienting curriculum in early childhood education for sustainability and the last part presents the related studies from international and national arenas.

2.1 The need for Education for a Sustainable Development

2.1.1 The Interrelationship between Human-Environment in a Sustainable World

Growth of the human population, wealth, knowledge and technological developments and the domination of human on environment are the formidable issues that humanity faces today (Pratt, 2010). The capacity of the Earth is being consumed so rapidly that it has become almost impossible to restore it. Thus humanity faces serious global problem such as climate change and extinction of species (Siraj-Blatchford, 2009). On one hand, industrial development has brought out important merits and promoted technologies for the welfare of the societies, however on the other hand, environmentally sustainable manners are not developed because of the lack of favorable contributions of such developments (WCED, 1987). Earth's natural systems displays several signs of climate change, ozone depletion, and nitrification of the biosphere, new kinds of pollution, loss of species and lack of fresh water because of overloaded human population, consumption and the generation of wastes (WCED, 1987). Such kinds of circumstances have an influence on human beings, non-human beings and also the interaction between them. Consequently, sustainability is urgently needed to establish a balance between the resources of earth and the utilization of such resources by human beings by means of bringing in a radical shift in human beings' attitudes, values and the notions (Davis,

2008). World Conservation Strategy (1991) introduced those two independent principles of sustainability as for nature (ecological sustainability) and for each other (social sustainability). The World Conservation Union (IUCN), United Nations Environment Programme (UNEP) and World Wildlife Fund (WWF) define ecological sustainability as being related with people who are a part of nature and they are intertwined; humankind should respect nature at all times (IUCN/UNEP/WWF, 1991). In this effort, respecting nature refers to effective use of resources, approach to humility and caring and shaping and supporting the public policies to nurture sustainability. World Conservation Strategy focused on the process of living sustainably and defines the concept as follows:

> *Living sustainably depends on a duty to seek harmony with other people and with nature. The guiding rules are that people must share with each other and care for the Earth. Humanity must take no more from nature than nature can replenish. This in turn means adopting lifestyles and development paths that respect and work within nature's limits. It can be done without rejecting the many benefits that modern technology has brought, provided that technology also works within those limits* (IUCN/UNEP/WWF, 1991, p.8).

Furthermore, it is indicated that every living kind on Earth has the right to live (Fien, 2004). Humankind should respect and protect the complexity of ecosystems to enhance the life of all living things in their natural habitats (Johansson, 2009). Human beings are responsible to maintain the ecological balance, the variety of life and the usage of resources which are supported by ecosystem. Human beings and the environment are interlinked; therefore it is inappropriate to think them separated. After human being's evolving, the relationship between mankind and the environment also emerged (Elliott, 2010). The question of "*What is nature?"* and the interrelationship between humankind and the environment can be answered and explained in many perspectives, yet this study is interested in critical role of human beings regarding his impact on environment together with all forms of living and non-living. Environment includes connection between human beings and includes human kind as a part of the environment rather than separated a species (Elliot, 2010). This was the first principle of the sustainable life indicated in Rio Declaration (1992) as *"Human beings are at the center of concerns for sustainable development.*

They are entitled to a healthy and productive life in harmony with nature"(p.1).Actually, this perception is firmly a counter argument that human beings are disconnected and separated from other species and above environment as a whole. From this perspective, Elliott (2010) stated that a sustainable future depends on a deeper understanding of human being in environment, not against it, thus disconnectedness between human-environment has no place in a sustainable world.

Human beings –even young children- are considered as a key point for sustainability (Chawla, 2007). Environment and sustainability issues are also the parts of children's lives (Davis, 2010). Wilson (1996) examined the concept of ecological self to reveal the children's connection with environment. To him, one's ecological-self starts when he is born as a baby. Immediately after that, a relationship begins between environment and the human being due to the need for food, water and air (Wilson, 1994). On the contrary, today's children's ecological self depends on what they watch on televisions like dying birds, polar bears, the livings under waters, atmospheric pollutants and urban slums (Davis, 2010). But still, immersing children into sustainability and environmental issues is a debate, since there are arguments whether children are capable or not to understand the sustainability (Cohen &Horm-Wingerd, 1993). In fact, there is not a certain age to start learning about sustainability. However, there is an ignorance of young children and an attempt to separate them from the sustainability issues. After the link between children and environment was examined by many researchers (Chawla, 1988; Clement, 2004; Louv, 2005; Palmer, 1995; Rosenow, 2008), the findings indicated that children have an understanding about their environment but there is not a clear statement about how humankind fits this world (Prince, 2010). The underlying perspective of this ignorance comes from the idea that children are too young and incapable of problem solving, decision making and critical thinking (Engdahl&Rabusicova, 2011; Huckle& Sterling, 1996). Based on these prospects, it should be considered normal that today's children suffer a 'nature deficit disorder' as Louv (2005) states, which can be defined as disconnection of children from environment. At this point, today's children should be examined in terms of life styles and their connection with environment, because life styles are important for shaping children's experiences. The life style of 2000s makes children travel by car

rather than walking (Prince, 2010). It's certain that this is not the decision of children themselves; rather, the community has a great impact on how children perceive their environment (Chawla, 1988; Chawla, 2007). Rosenow (2008) asserted that children are discouraged by their parents to explore the external world. Instead of going out, children are led to stay indoors and play with video and computer games and watch DVDs or spending their time watching TV. Attractive screen-based technologies draw children away from global problems that our planet faces (Elliott, 2010). As a result, "young children grow more familiar with wireless Blackberries than wild blackberries" (Rosenow, 2008, p.11). In the same way, Richard Louv's worthy contribution *Last Child in the Woods* claims that being a nature deficient is not result of children's own decision, rather, the whole community is responsible for children's lack of concern for the environment (2005). Certainly, the parents should not be attributed solely as the reason of loss of connection between their children and environment, yet the structure of the cities is an important reason of children's' disconnection to environment. The streets are car-friendly rather than being children-friendly, there is an unfavorable point of view toward inclement weather and the safety concerns can be acknowledged as the reasons of why children are too far from environment (Davis, 2010).

That is the reason why sustainability is evolved so emergently for an urgent response to unsustainability (Pigozzi, 2007). Sustainability, however, is defined by United Nations Environment Programme (UNEP) (nd) as follows:

> *A process of continual improvement driven by efforts to minimize resource consumption and waste generation, improve environmental quality and well-being, and adhere to social imperatives such as equal opportunities, recognition and respect of gender issues, abolition of child labor etc. Any actions contributing to this process for example, reduction of energy or paper use or recycling are referred to as 'sustainability activities'*(p.2)

Indeed, sustainability should be considered more than environment, conservation and the global warming (Davis,2007). It includes an orchestrated working way from ecological, social, economic and the political aspect (Fien and Tilbury, 2002). Nature, society, economy and the political issues are interdependent.

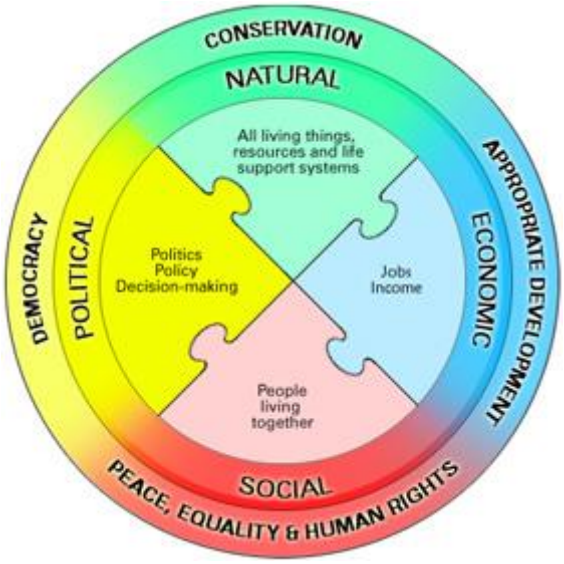

Figure 2.1 Four pillars of sustainability

Figure 2.1 shows four dimensions of sustainability are interlinked as pieces of a puzzle. Social sustainability refers to peace and equity, ecological sustainability is related with conservation. Economic sustainability emphasizes appropriate development, and political sustainability's key point is the democracy (UNESCO, 2006).

Economic sustainability refers to efficient usage of raw material, energy, production process and manufacturing of durable and recyclable products. (Salonen&Tast, 2013). Examining the countries that face ongoing economic crisis, it is seen that economic crisis comes as a result of social and political fallout (Pressoir, 2008). Furthermore, social sustainability is mainly about human rights issues and people's living together in culturally appropriate ways (UNESCO, 2005; Davis, 2007). The issues to which social sustainability refers are democratic governance, reduction of poverty, crisis prevention and recovery, environment, energy and HIV/AIDS in an effort to improve global sustainability (UNDP, 2012). In Earth Summit (1992), the social sustainability was defined as "a systems which provides ways for people to live together peacefully and equitably with respect for human rights and the dignity". What is more, political sustainability has an important role on political systems. It aims to create fairly and democratically usage of power within political systems (Davis, 2010). Political sustainability is concerned about politics,

policies and decision-making. In final analysis, environmental sustainability aims healthy natural environments in which all life systems -both human and non-human- are supported (UNESCO,2005). It is related with conservation of natural systems to ensure that all living kinds protected without compromising the life of future generation (Engdahl&Arlemalm-Hagser, 2008). If human beings do not have understanding of such kind of balance, it will obviously be a threat. Frankly, current human living patterns cannot be sustained (Australian Government, DEH, 2000).

2.1.2 The Role of Education for a Sustainable World

In order to promote sustainability, UNESCO (2002) proposes that humankind must learn the impacts and the consequences of their actions on the sustainability of future and must take precautions to convert unsustainability to sustainability. The Decade of Education for Sustainable Development (DESD, 2005-2014) has been declared by UNESCO at this point to integrate the principles, values and practices of sustainable development into all aspects of education and learning. The Decade of Education for Sustainable Development (DESD) stresses that human beings should adopt new behaviors and the practices for sustaining life on the planet for human and non-human beings. As well, it is stated that educational efforts are vital to create a more sustainable future in respect to environmental integrity, economic viability and an equitable society for present and future generations will be the result of educational efforts (UNESCO, 2005).

Henceforth, the principles and the values of sustainability should form a basis of education for sustainability (EfS) in order to improve the quality of life. The decade of education for sustainable development (DESD) (2005) has been declared because it is such kind of a guide to reach good practices which are determined as developing appropriate education programmes. In support, Siraj-Blatchford, Smith and Pramling Samuelsson (2010) argued that education is needed for a sustainable development because it enhances a perspective for the balance between human beings' welfare and economic development with cultural, political and environmental respect. UNESCO's Director-general Koichiro Matsuura highlighted that "Education- in all forms and all levels- is not only an end itself but is also one of the most powerful instruments we have for bringing about changes required to achieve a sustainable development" (UNESCO,2005, p.3).

Accordingly, it should be noted that the world leaders and the policy makers have an important role in addressing the sustainability issues. Taking radical solutions requires immersing individuals in sustainable practices beginning from early childhood years (McKeown, 2002). Actually, the outcomes of unsustainable living have a great impact on young children who have to grow up with the problems left by previous generations (Stuhckme, 2012). Hence, it is vital to equip children in a way to manage the challenges of sustainability as well as to contribute, alongside the adults, to current improvements. Children have the right to have a sustainable future (Didonet, 2008). Sustainability is about creating and experiencing a healthy, safe, and secure future for every child, so it is the fundamental right of each child on earth. With regards to this issue, Pramling Samuelsson and Kaga (2008) propose that "every child has the right to adequate care, learning, development and protection, and a sustainable society is where everyone's rights are recognized, respected and fulfilled" (p.14). However, children are the most vulnerable and fragile individuals experiencing adverse impacts of unsustainable ways of living (Davis, 2008; Vandenbroeck&Bouverne-de Bie, 2006). Therefore, the education industry, particularly early childhood education has a significant potential to contribute to sustainability which will be discusses in the next section.

2.2 The need for Early Childhood Education for a Sustainable Development

2.2.1 The Philosophy of Early Childhood Education for Sustainability

Early childhood education for sustainability (ECEfS) is a synthesis of education for sustainability and early childhood education together, and has been developing dramatically in recent years (Davis, 2010; Davis, 2013). Early childhood education for sustainability has started with the leadership of OMEP (World Organisation for early Childhood Education) and improved with Gothenburg Recommendations and Education for sustainable development in 2008. Moreover, it is asserted in the report of the conference *The Power of ESD-Exploring evidence & promise* held in Sweden (2012) that "*education for sustainable development should start in early childhood but there is little attention given to ESD at preschool level. A radical shift is needed to convert unsustainability into sustainability. The paradigm that use for transformation reveals the importance of education. It is recommended that an integrated and a holistic approach should be integrated in children's*

education in order to support children's learning and make sense of their own world. (Article 5.1)"

The goals of early childhood education for sustainability (ECEfS) can be aligned as embedding the whole central approach to sustainability and education for sustainability; the use of action research to investigate and create a change in early childhood settings and changing the systems for ECEfS (Davis, 2008). Literally, education for a sustainable development is not interested in what has happened before, yet the focal point is what can be done for the future. At this point, educators and early childhood centers have a role to provide opportunities for young children to promote their understanding and make them to have knowledge about environment (Pratt, 2009). As a contributor of sustainable society, Wals (2006) stated that kindergartens are places which offer more moving towards a more sustainable world than many of our universities, because in kindergartens, children live and learn, explore boundaries. Kindergartens present children conflicts emerge every day which are quiet valuable as 'teachable' moments. Moreover, kindergartens are multi-cultural places where children from different backgrounds come together and get each other both with parents and the grandparents.

The mid-report of United Nations Decade of Education for Sustainable Development (DESD, 2005-2014, 2005) which was published to review the decade in the progress shows that UNESCO Chair in Early Childhood Education and Sustainable Development puts forward several objectives that are particularly related with early childhood education in the context of Gothenburg Recommendations as reinforcing cooperation with parents and collaboration with universities effectively to teach young children democratic values (2008).

Many times, one part of this collaboration might be young children due to the fact that children are seen as the part of the sustainability challenges because many of them not only take environmental education but have the potential to impact their families and the society in which they live (Davis, 2010). As educational systems increasingly consider teaching how human actions have an impact on planet, quality of life and health, they will help promote hope and find solutions to the local and global issues to children (Björneloo, 2007). To make an illustration, such kind of an obligation is recognized in Australia as not teaching about the consequences of the

unsustainability, on the other hand children need to know about sustainability to become responsible citizens and bring about positive change for the sustainable life (Davis, 2009)

However, the children's perspectives have not taken into account in evolving timeline of sustainability (Özdemir, 2007). As Chawla(1988) states that in 1970s when the environmental education movement has started, there has been an extensive attention on adults' concern toward environmental challenges. On the other hand, young children were perceived as little consumers which makes them ineffective to be achieved what they think about their environment. To reach a more sustainable life, one of the significant aspects is to get children's notions. The United Nations Convention on Rights of the Child (CRC, 1989), article 12, emphasizes the importance of taking children's perspectives. In the same way, in Sweden, the education legislation indicates receiving children's thoughts and experiences as starting point in accordance with CRC. Davis (2010) stresses that even though there is a growing interest on education for sustainable development (ESD) at international and local levels about sustainability, international and national researches are very limited to reveal the vitality of early childhood education and perspectives of children, unfortunately. Focusing on how ESD can be learned and taught in preschools are still a gap to be fulfilled through new researches (Davis, 2009). Hence, the study which was conducted by Jonsson, Sari and Alerby (2012) is precisely noteworthy in terms of its purpose. The aim of the study is to get Sami children's visions of future. The Sami people are the indigenous people with their own culture and language living in the northernmost part of the Europe. It is possible to meet Sami people in Norway, Sweden, Finland and Russia. The study was concluded with the importance of giving an ear to children's voices for shaping or re-designing the educational systems regarding cultural and geographical differences. Moreover, it was revealed with this study that Sami children's visions about their future include many nuances which might not be recognized by the systems (Jonsson, Sari &Alerby, 2012). Thus, as asserted by UNICEF (2003) and Hutchinson (2006) as well, children's experiences are vital to direct the future. There is such kind of a truth that children are also experiencing the impact of rapid change of society with new challenges and the possibilities. As it is stated in Agenda 21 (1992) that the

specific interests of children need to be taken fully into account in the participatory process of any actions taken to improve the environment for future sustainability (Chapter 25:12).

Supposedly, children's connection with environment is associated with sustainable development. Bonnett (2004) states that children's connection with environment increase direct, intimate and tacit knowledge which triggers the affective knowledge of one. Effective knowledge is also the source of curiosity, enthusiasm and the wonder (Elliot, 2010). Similarly, cognitive knowledge of the fact is also crucial, so the educational pedagogies can be designed to promote children's interests which come from cognitive knowing. Other perspective that Elliot (2010) proposes for education for sustainability is the willingness. Constructing the knowledge in one's own is not adequate sometimes, but what is required is to engage with the challenges. Playing in environment gives children the sense of dealing with real life experiences, helps in changing the abilities or life styles to live more sustainably. In brief, there is no single experience in nature that creates a sustainability frame of mind, but many over time, crucially beginning in early childhood (Elliot & Davis, 2009).

2.2.2 The Outcomes of Early Childhood Education for Sustainability

Early childhood education for sustainability (ECEfS) is favored as a transformative education. Transformative education is interested in values, and encourages individuals to seek solution through critical thinking and decision making. ECEfS takes place in different forms as *in*, *about* and *for* the environment which have varied focus points in teaching children about the environment (Davis, 2006;Davis, 2010). Education *in* the environment refers to the learning experiences in outdoor setting, and the outdoor and its materials is used for learning sources. Children have opportunities to explore outdoors and learning activities such as gardening, performing arts and playing with sand, mud, water, leaves and stones (Davis, 2010). Education in the environment is pivotal to make children participated into by touching and feeling the elements of environment (Sauve, 1996). On the other hand, education *about* the environment encourages individuals to explore the systems within the environment such water cycle, carbon cycle and so on (Davis, 2010). It helps children to realize the intertwined position of human and

environmental systems. Furthermore, education *for* the environment aims to make individual gain a critical point of view to trigger their action taking progress. Creating a collaborative problem solving and bring about solutions to environmental issues are the components of this "for" aspect (Pramling Samuelsson &Kaga, 2008).

Actually, the key difference between environmental education and education for sustainable development lays in this 'for' issue. It is accepted that learning in and about environment is not satisfactory for one to bring solutions to convert unsustainability to sustainability and fails to give cause-effect understanding to human beings. On the other hand, education for the environment perspective gives pupils a strong sense to become active agents to eliminate the environmental and sustainability issues (Davis, 2007; Davis, 2010). Therefore, the notion of education for sustainability in early childhood education is a "doom and gloom" and can be eroded through early childhood education. In this aspect, early childhood education gives a hope to develop societies in long term. Children are as sponges that absorb what they learn, observe, see and feel which makes early childhood period valuable to start education for sustainability. If child's thinking, acting and learning can be changed or modified in early years; this will be continuing in his/her whole life and makes education for sustainable development effective in long term (UNESCO, 2007). The inspiring examples about how education for sustainability is figured out with young children fall under the umbrella of the next sessions of this chapter.

One of the outcomes of early childhood education for sustainability is to create an empowering approach to emphasize democracy and the value of environment to foster the change toward sustainable learning communities (Davis and Elliott, 2009). In this perspective, empowering refers to changing the ways of thinking and internalizing responsibility to minimize the global impacts and foster environmentally and socially sustainable practices included in the early childhood settings, home environment of children and wider community.

Action taking is another outcome of the education for sustainability (Davis, 2008; Davis, 2010). It is stated that children are often discouraged in making decision and action-taking processes. On the other hand, early childhood education for sustainability aims a transformative education to promote children in terms of action taking and making decisions for their own environment. The United Nation's

decade of Education for Sustainable Development (DESD, 2005-2014, 2005) suggests that existing educational approaches can be enhanced by implementing much more innovative and active learning ways. In this way, holistic and multi- and interdisciplinary approaches can be achieved to enhance the transmission of learning. At that point, teachers have an urgent role, since they have a significant impact on children, because it is teachers' approaches which shape children's mind (Pressoir, 2008). The early childhood period is significant for one to develop basic values, attitudes, skills, behaviors and habits which are the base to foster values, attitudes, skills, behaviors and habits (Pramling Samuelsson &Kaga, 2008). Moreover, children's attitudes and the values towards book reading or gaining in social interactions are formed in early years and it is believed that adults have a role on shaping and achieving those beliefs and attitudes. On the contrary, one thing that the parents and the teachers of young children shall deliberate is the fact of environment in many ways. The term environment is associated with holes in ozone layer or global warming. Actually, the focus point should be understanding the environmental issues and then internalizing them as biological diversity and ecological sustainability by the early childhood teachers through conveying the meaning of environmental challenges truly.

2.3 Reorienting Early Childhood Education for Sustainability

Mckeown (2002) argued that education for sustainable development is more than knowing about environment, society and the economy. It also covers learning skills, perspectives, and values as a guide for motivating people for a democratic society. Actually each country has different environmental crisis and sustainability challenges in local level; therefore it requires fundamental manifestations in addressing education for sustainable development (ESD) strategies. The ESD strategies represented that each country must determine implementation methods and take action to reorient the curricula (Mckeown, 2002). In this juncture, one of the four major thrusts of education for sustainable development is indicated in international implementation scheme of United Nations Decade of Education for Sustainable Development as reorienting existing education programs (UNESCO, 2005). According to McKeown (2002) there are two priorities for education for sustainability. The first priority is to improve the basic education. In fact, basic

education displays differences in all over the world in terms of years, or focus points and so on, yet this basic education does not advance the societies in terms of sustainability. On the other hand, reoriented educational systems and curriculums are highly required to address sustainability in order to foster critical thinking and decision making skills. Factually, basic education is still in process in many countries and is not fruitful to create sustainable societies, since the education for sustainable development requires more than what environmental education serves.

Within this perspective, one of the obvious distinction between education about sustainable development and education for sustainable development is the word "for" which refers to a purpose. Sustainable development is a difficult concept to define, because it is gradually evolving (UNESCO, 2012). The original definition of sustainable development was suggested by World Commission on Environment and Development (WCED) chaired by former Norwegian Prime Minister Gro Harlem Brundtland as "sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (1987, p.43). Even though education is emphasized as the solution of unsustainability, there is a paradox that the most educated nations caused the deepest ecological footprints (Global Footprint Network, 2007). That is to say, they have highest rate of resource consumption. Interestingly, for example, United States has more than 80 percent of the population some of which have post-secondary education and about 25 percent of individuals have a four-year degree from a university (Fien, 2004). Contrary to this education level, United States ranks nearly the top level around the world in terms of the use of energy and waste generation. Orr (2004) explains this situation as an environmental crisis that earth faces today which is not an outcome of ignorant people, but the result of the actions by BAs, BSs, LLBs, MBAs and PHDs. and he added, "so, what was wrong with the education?" He attributes that there were something wrong with the education system, because environment should not be deliberated by individuals through theories rather than values, abstraction rather than consciousness; answers rather than questions and technical efficiency over conscience (Orr, 2004).

Education for sustainable development is not related to the amount of the education, but is totally related with relevance and content which makes the

ignorance of early childhood education for sustainability irrelevant. Motivating individuals to think, to question, to investigate beginning from the preschool years until the university is the goal of reorienting curriculum in a holistic and multidisciplinary context to meet each individual as a whole (Scoullos&Malotidi, 2004; UNESCO, 2005). Agenda 21 (UNESCO, 1992) proposes that education for sustainable development has a holistic perspective for the curriculum approaches. Sustainability can be integrated in all learning areas. That is to say, early childhood education for sustainability does not reject any subject or try to replace any subject area. The holistic treatment requires combining and focusing on different subject areas to cover the process and the individuals as a whole (Tilbury, 1995).This indicates that simply educating an individual to higher levels is not adequate for creating sustainable societies. The focal point is to educate people with the values of ever-demanding for resources and consumer goods. That is the reason why, every nation will require reexamining curriculum at all levels beginning from the preschool education to professional education (Kaga, 2008).

Reorienting education is quiet powerful to assist educators in understanding at every level from nursery school through university, indeed. An effective reoriented basic education is value-based and includes principles, skills and perspectives for sustainability (Wals, 2006). Reorienting education also promotes skills, values and perspectives in individuals to enhance them in comprehending the underlying meaning of sustainable development and to trigger their motivation to take action and to pursue sustainable livelihoods (Gadotti, 2010). Education for sustainable development (ESD) needs innovations and creative thinking about the content of ESD concepts and principles in curricula. A separate subject area in curriculum is not required to embed sustainable development in curriculum; on the contrary, numerous activities in many different spheres, topics and the cases related to sustainability might be integrated in curriculum (Pigozzi, 2007).

In Turkish context, the urgency of sustainability was put forward through The *National Capacity Action Plan* proposes by the Ministry of Forestry and Environment (2010) which aims to determine the strategies for effective implementation of the three Rio Declaration; the *United Nations Convention to Combat Deforestation,United Nations Convention on Biological Diversity and*

Framework Convention on Climate Change. Within this regard, the Ministry of Forestry and Environment of Turkey has launched a project to evaluate Turkey's National Action Capacity Plan within the context of the Rio Declarations. The project specifically focuses on assessing the current position of Turkey with respect to deforestation, biological diversity and the climate change.

The item 6.4 of National Action Capacity Plan suggests, *"a partnership must be constructed with the Ministry of National Education of Turkey and shall include conducting mutual projects and assigning a role on non-governmental organizations to increase the awareness of public".* It is revealed in the report that there isn't any particular subject or course in the curriculum of national education and higher education. Actually, it is indicated in the capacity plan that lack of materials, national and international level education programs and the limited opportunities to learn about those issues make the education vitally important in Turkey. On the other hand, it is stressed that the education process should not be merely visual, but practical applications are highly required. Therefore, a partnership should be established with the National Ministry of Education and studies and activities for all level of the society should be arranged. Along, it is indicated that in-service training should be reevaluated and education system should be reoriented or updated in respect to the three Rio Declarations (Ministry of Environment and Forest, 2010).

The United Nations Convention to Combat Deforestation was emerged in Earth Summit in 1992 and came into force in 1994. The aim of the convention is to promote countries experiencing unfavorable impacts of deforestation with respect to sustainable development. Turkey is one of those countries subjected to rapid urbanization after 1950s and industrialization in 1980s which creates pressure on the natural sources of Turkey (Ministry of Environment and Forest, 2010). Actually, rapid urbanization and industrialization have been caused by eroding agricultural areas. Destroying the forest areas has resulted in experiencing negative impacts of erosion such as infertile soil and decrease in the amount of the soil. Therefore, the National Action Plan was prepared by the Ministry of Environment and Forest which suggests actions, original activities and the action areas to be planned. In order to increase the public awareness, it is revealed that conferences are arranged in formal education and related topics are included in course books (Action 62: 2); and in order

to make early childhood children gain positive attitudes and behaviors, practical activities must be designed to foster love of nature (Action 62:3).

National Action Plan on Biological Diversity is also shaped for Turkey by the requirements of Convention on Biological Diversity. Extinction of the species is identified as one of the most severe threats that humankind faces in today's world. Even though Turkey is considered as a rich country in terms of flora and fauna, it is required to develop strategies to define and evaluate, and to create protection strategy of the natural habitat of Turkey. Education is one of the goals of the National Action Plan on Biological Diversity as *public interest should responsively be increased about biological diversity and its sustainable usage (Goal 2.3).* The strategic action of this goal is related with the subjects and messages about protection of biological diversity and sustainable usage of biologic sources which are included in the national education programs. (Action 2.3.1)

National Climate Change Strategy Plan (2012) aims to prevent climate change regarding sustainable development policies and at the same time to assess the specific conditions of Turkey. One of the aims indicated in the strategy plan is related with increasing public awareness for being an environment friendly consumer in order to prevent undesired impact of climate change. In this respect, early childhood education is specifically stressed in the report as one of the action areas in struggling with climate change and adaptation to climate change by integrating related topics to education programs (Action Area Y9.1.1). As a process of this action area, it is mentioned that consumption patterns, energy efficiency and climate change issues should be integrated in early childhood education. As performance indicator, reorienting curriculum and educational material is pointed out.

2.3.1 Reorienting Curriculum Examples from International and National Fields

Reorienting Curriculum Examples from International Field

Several world countries serve pretty excellent examples to suggest how ESD can be integrated in formal school curricula. Australia is one of the pioneering countries in terms of early childhood education for sustainability. Australian Government (2009) released the second National Action Plan for Education for Sustainability depending on the principles indicated in the United Nations Decade of

Education for Sustainable Development (2005-2014). The national plan aims to equip all Australians with the skills and knowledge of sustainability. Furthermore, there are some principles put forward by Australian National Action Plan which are; transformation and changing, lifelong learning for all, systems thinking-interconnected environmental, economic, social and political systems, providing a better future, critical thinking and reflection, participation and creating partnerships for change (Australian Government, 2009). To add, this action plan also includes a guideline for the teachers across Australia to assist them with respect to the integration of education for sustainable development into their national curriculum.

The Australian Government (2009), to illustrate, has given a start to a research to find out the needs for reorienting educational processes for sustainability and early childhood education. One of the inspiring Australian examples comes from a study managed in Brisbane, Queensland. Sustainable Plant Project is a bountiful study on how working with children creates a great impact on sustainable development (Davis, Rowntree, Gibson, Pratt &Eglington, 2005). Campus Kindergarten was a long day care center in Brisbane, Australia where the project was launched in 1997. The participants of the study were 2½ to 5 year-old children. Actually, the project has proceeded gradually. First of all, the school staff worked on mini projects depending on children's and their own interests such as gardening, wildlife conservation and recycling, but in time, those mini projects became daily practices of the center. By participating to the sustainability issues in their daily lives, children became the main initiators of the project. One of the examples of those mini projects is related with the water conservation. Concerns about water consumption resulted in excessive water usage in center. Led by the staff, children recognized that their peers are pouring out more water rather than using it to drink and then tipping the rest into the garden. Then, a whole kindergarten was included the water project and collaboration was raised among teachers, children, parents, yet the project was mainly conducted by young children who were aged around 4 years. A water barrel was also designed and located into the sandpit for the children's sand play. It was determined that the barrel was filled just one time in a day, thus children have learned to adjust their water consumption. The findings of project implementation underlined that even though children at younger ages were capable to respond

environmentally issues critically and make decisions in their own. Sustainability Planet Project should be taken into account as Davis et al. (2005) indicated, because it provides an approach to shape the pedagogical practices in the capacity of children.

When it comes to England, the English National Curriculum also embeds environmental education guidance in national curriculum. Chatzifotiou (2006) claimed that the national curriculum and the educators are two fundamental elements of bountiful school performance. This framework provides a base for the classroom activities to transmit children the intertwined concepts of about, in and for the environment. Actually, the English national curriculum is intended to reflect those three components through a holistic approach and provides opportunities to acquire the knowledge, values, attitudes, skills which are required in order to manage the sustainability challenges. The study conducted in United Kingdom in the context of Eden Project shows similar structure with the Sustainable Planet Project. The Eden project is a global garden including thousands of plants from all around the world (Bowker, 2007). The study analyzed 9 to 11 (N=30) year-old children's drawings of tropical rainforests immediately before and after a visit to the *Humid Tropics Biome* at the Eden Project, Cornwall, UK (Bowker, 2007). During their visit, children have participated in preparatory workshop, and peer and adult interaction was used to encourage children to focus on the shapes, textures and the function of the plants. Evidence of the study indicated that children had constructed new knowledge based on being exposed to the new environment of the tropical rainforest. Although children's learning took place within a limited time, the results pointed out that, out of school experiences, these activities were such a powerful tool in enhancing children in being open and comfortable in expressing what they learned. Actually, the foci point in both Eden project and the Sustainable Planet project is children's capability to understand what they were taught about specific issues related to sustainability. The second outshined issue in this study was utilizing drawings as research tools. It was highlighted that drawings were better opportunities to reveal children's knowledge when compared to conventional forms of recording and expression (Bowker, 2007).

It is obviously seen that projects were considered as efficient tools to teach sustainability to young children. Furthermore, another important point is that projects

depended on countries' local sustainability problems. That is to say, each study was shaped accordingly the needs of local environment which was also highlighted in UNESCO (2007) document. In this perspective, Lewis, Mansfield and Baudains (2010) conducted a study to explore the impact of education for sustainability (EfS) through three projects: biological survey, reed planting and turtle nest watch. The sample of the study was compromised of 36 preschool children. Data were gathered through questionnaires, observation and the collection of work samples. It was pointed out that the findings of the study were meaningful to immerse young children in sustainability issues, because after participating in projects, children were able to express their attitudes toward local environmental issues and to outline their behavioral intentions and actions. That is the reason why, the study put forward that young children can learn about sustainability in real life, local environmental context by actively participating in tasks which empowers them.

One more study from example also displayed how education for sustainability can be integrated into early childhood education. Prince (2010) conducted a study to integrate principles of sustainability to national early childhood curriculum of New Zealand called *TeWhariki.* The project was conducted throughout 12 months across two New Zealand early childhood centers. The participants of the study were 30 children from 3- to 5- years-old from kindergarten and 30 children from 2-to 5- year-old from childcare center. Not only children but also parents and the teachers constituted the participant groups. The study process included two phases as case study part including two weeks curriculum integration to assist teachers in gaining confidence and secondly participatory action (PAR) to help teachers to create a community of learners to promote education for sustainability in early childhood through conducting project approach for in-depth investigation. The findings indicated that participating in learning experiences enhanced a transformation in learning about environment and sustainable living Moreover, the findings pointed out that education for sustainability should be an integral part of the early childhood curriculum. One of the outshined features of this study is involving parents which is also suggested by Gothenburg Recommendations (2008). Additionally, project approach was emphasized one more time to reveal children's active involvement in learning sustainability.

Believing in children's power as active agents for their environment, a study was designed and conducted within the context of 'A Tree for Greece' initiative established to restore the stricken areas due to the huge forest fire that Greece witnessed in the summer 2007 (Hadzigeorgiou, Prevezanou, Kabouropoulou and Konsolas, 2011). The study was conducted to investigate the effectiveness of storytelling teaching approach on kindergarten's children's retention of ideas about the importance of trees. The sample of the study was compromised of 159 preschool children from eight different schools. There were treatment and control groups and the effectiveness of the storytelling approach was assessed trough pre- and post-tests. Storytelling approach has created difference between pre- and post- tests. Children stated in pre-results that trees are important, because they produce fruit and they are used to make furniture whilst post-results pointed out a different reason that trees were important for protecting human being from flood and that trees were the source of oxygen. The findings revealed that storytelling approach helped children through group discussions. In this way, children enhanced understanding and appreciation of their value.

Another study was conducted in a city kindergarten in New Zealand as participatory case study (Mackey, 2012). The participants of the study were 3 to 4 year-old preschool children (N=30) attending the morning sessions of institutions. Likewise the current study, this study was also conducted in enviro-school in New Zealand. The data of the study were gathered through observations, conservations on digital recorders, learning stories and the photographs. The focal point of the study was immersing children themes which were about the right to know, the right to have their contribution valued and heard, the right to find a solution and the right to take action. Regarding the themes, researcher met children regularly and presented children occasions such as penguins in Antarctica, a butterfly, waste conservation and solution for water. The findings of the study pointed out that respecting the right of children to participate in taking action for the environment should be fostered by adults through presenting dilemmas to make children in selecting the best solution in their own. Actually, the outcomes of the current study also include discussion session in which children share experiences and express how they feel during the activities related to endangered species, destroyed forests or polar bears and penguins. Mackey

(2012) states that listening to the children's voices and their concerns are vitally crucial to explore the issues related to their children's lives. Investigating the utmost issues help educators design the most appropriate educational progress to foster children's participation in education for sustainability.

Moreover, one of the case study approaches from Australia put forward utilizing project approach to immerse children in sustainability. Within the context of dissertation, Stuhmcke conducted an instrumental case study to investigate the children's participation in education for sustainability (2012). The participants of the study were 3½ to 5 year old preschool children (N=22). The study explored the experiences of a class of kindergarten through implementing project approach for learning about sustainability. In this study data were collected and analyzed over a 7 week period. The findings indicated that project approach can be utilized as transformative practice, since it was found out that preschool children can change agents for sustainability. In addition, it was found that young children were able to think critically about sustainability issues, thus have the potential to create a change in their local context and influence other's behaviors.

As it is obviously seen, the researchers from international arena have concentrated on studies which have been conducted as projects and case studies to fill gap in the field of early childhood education for sustainability. This was also the focal point of Davis (2009) that particularly how studies are firmly needed to demonstrate the integration of education for sustainability into early childhood education. The notable issue is that, studies presented above were conducted as projects in early childhood setting and/or field trips in the real context of sustainability issues. What is more, the focal point of the researcher is the change in behaviors and how to reach the transformative education. The findings of the study highlighted that children are capable individuals to understand sustainability and are active agents, and they have the power to change community which makes early childhood period pivotal to reach sustainable societies.

Reorienting Curriculum Examples from National Field

When it comes to Turkey Haktanır, Güler, Yılmaz, Şen, Kurtulmuş and Ergül (2011) conducted a study as a contribution of OMEP Turkish National Committee.

The project was designed to teach young children about reducing and recycling the wastes. The project was conducted in four preschools. The aim of the project was to inform preschool children, parents and the teachers about recycling of papers and plastics and reducing the water usage. 80 preschool children who were 5 to 6 year-old have partaken in the study. The project included series of educational activities such as drama, physical education, literature, science, play, arts and so on. The findings of the study outlined that the level of knowledge of preschool children was increased thanks to partaking in activities about sustainability issues. Moreover, increase in the level of children's knowledge triggered by the improvement in behaviors was observed. Haktanır et al. (2011) indicated that preschool children can learn new knowledge and behave well through the program which is prepared based on the project approach about the concepts of reusing and reducing consumption.

What is more, a study conducted by Gülay-Ogelman (2012) puts forward a project example to demonstrate how education for sustainable could be integrated in early childhood education. The project called *Learning about soil with Tipitop* was applied through an experimental method used for experimental and control groups. The participants of the study were 5-6 year-old preschool children. The project process included pre-test, pilot activities, program applications, post-tests and follow-up tests completed in 9 days. The focus point of the study was enhancing children's awareness toward soil conservation. In this respect, children have participated in a series of activities with the main character *Tipitop* which was a puppet particularly designed for this study in order to make children familiar with soil conservation. The results of the study indicated that participating in soil education project made children familiar with the soil and resulted an increase in children's knowledge. Children learned about soil with its various features, its importance for living organisms as well as the importance of conserving soil. Actually, the study not only contributed to the preschool children, but also kindergarten teachers gained experiences and also families' attention was taken toward environmental protection. Actually, it was proposes that soil education project developed awareness and knowledge regarding environment and the results of the study were the indicators of importance of developing the educational policies (Gülay-Ogelman, 2012).

While Haktanır et al. and Gülay-Ogelman highlighted the active involvement of children with the studies they conducted, Kahriman-Öztürk, Olgan and Güler (2012) put forward investigation of preschool children's ideas about sustainable development. The participants were 5 to 6 year-old preschool children (N=36). The data were gathered through semi-structure interviews to gain the ideas of children about three pillars of sustainability which are environmental, economic and socio-cultural pillars. The findings pointed out that, for the environmental pillar, the majority of children focused on reducing water, paper and electricity consumption whilst in socio-cultural aspect it was found that children respects animals, plants, nature and people. Besides, children stressed recycling in terms of economic aspect of the sustainability. The findings of the study assert that children were capable to understand recycling issues.

Even though it is not possible to figure out a particular curriculum orientation of education for sustainable development (ESD) in formal education in Turkey, it is hopeful to see published reports, determined aims by Turkish government in sustainability issues and study examples. Actually, the studies which were presented above seems hopeful for the future of early childhood education for sustainability, because,Davis (2009) acknowledged a preliminary survey (1996-2007) considering Australian and international research journals in environmental education and education for sustainability. It was found that, over 12-year period, very few articles were published on environmental education and education for sustainability in early childhood. From this juncture, Davis inferred that early childhood researchers did not focus on teaching environment or integrating sustainability in curriculum (2009). When the empirical studies published over 12-year period were examined, it was seen that the majority of the studies were related with the education in the environment. There were also a smaller number of researches related to the environment, yet there were almost no study focused on children's capabilities in learning sustainability issues such as water conservation and energy consumption which are all related with education for the environment. Actually, the field was so under-researched; particularly researches in early childhood centers were highly needed (Davis, 2009). On the other hand, it was highly stressed that a newer conceptualization was required for developing a transformative early childhood

education which values, encourages and supports children as problem seeker, problem solver and action taker for sustainability issues related to their own lives.

In this perspective, the current study aims to put forward reorienting the curriculum approach to address the sustainability in Turkish context through designing, implementing and evaluating the education for sustainable (ESD) program for preschool children to get a better understanding of human-environment interrelationship by considering the basic components of ESD as deforestation, biological diversity and climate change.

CHAPTER III

METHODOLOGY

This part provides information about the methodology of the study including research questions, the design of the study, school setting and the participants, instruments and data collection procedures, data analysis, trustworthiness of the study, role of the researcher and the limitations.

3.1. Research Questions

The purpose of the study is to reorient curriculum units to address the sustainability in Turkish context, by means of designing, implementing and evaluating an education for sustainable development (ESD) program for preschool children of 60-66 month-old. The designed ESD program, however, targets to offer a better understanding of human-environment interrelationship in line with the basic components of ESD.

The study focused on following research questions:

2. How the designed ESD program changes 60-66 month-old preschoolers' perceptions about the basic components of ESD (deforestation, biological diversity, climate change)?

    a) How did ESD program influence 60-66 month-old preschoolers' perceptions about environment in which they live?

    b) How did ESD program influence 60-66 month-old preschoolers' perceptions about human being and environment interrelationship in terms of deforestation?

    c) How did ESD program influence 60-66 month-old preschoolers' perceptions about human being and environment interrelationship in terms of biological diversity?

d) How did ESD program influence 60-66 month-old preschoolers' perceptions about human being and environment interrelationship in terms of climate change?

3.2 The Design of the Study

The current study was conducted as a case study. As Creswell (2007) put forward a case study is a type of methodological design and a kind of product of inquiry which is interested in bounded system or multiple bounded systems over a time by collecting in-depth data through observations, interviews, audio-visual material, documents and reports. Likewise, Merriam (2009) defines case study as an in-depth description and analysis of the bounded system. From this point of view, the current study can be considered a case study in a bounded system for the reason that the focus group is just one classroom setting and one group of children subjected to already developed education for sustainable development program. Moreover, one of the characteristics of the case study is searching a recent issue in its real-life context (Miles & Huberman, 1994) which fits the design of this study because children were subjected to real-life issues in their real-life context. All in all, conducting as case study is applicable for this study in order to make known changes in children's perception regarding human beings and environment interrelationship through real life issues in their real life context.

3.3 School Setting and Participants

School Setting

As Merriam (2009) stated, a qualitative inquiry should have rich descriptions including words and pictures about the setting where the study takes place, participants, or the phenomenon. Correspondingly, Miles and Huberman (1994) propose the importance of thick descriptions of the study context to better understand the situations and the phenomena. That is the reason why the detailed description of school setting and the participants are useful to acknowledge the boundaries of the study.

This study was conducted in an independent public preschool established in 2006 in Ankara. The school has approximately 150 students and 8 teachers. There

are students of 36-48 month-old, 48-60 month-old and 60-66 month-old groups who attached in the fall semester of 2012. The study took place at 60-66 month-old children's classroom. In accordance with National Early Childhood Program, the classroom setting included a book reading centre with numerous picture story books, concept books, interactive books; a science centre with green plants, a microscope, a human body figure, magnets, weather graphs, thermometer; a drama centre including costumes and various kinds of puppets; an art centre including various kinds of crayons, cardboards, waste materials; and a mathematic centre including a number concepts, patterns with natural materials and graph examples which were designed by classroom teacher properly in conformity with the revised national early childhood education program (MoNE, 2013). Furthermore, the flow of traffic in classroom environment was provided by separating centres using carpets and shelves and it was eligible for children to conduct each activity or spend free time efficiently.

There were both full day and half day classes of the school. The first and the second floor of the school were consisting of classrooms and toilets for children. Also, kitchen and a messing hall were located at first floor. Furthermore, basement floor had varied kinds of atelier for art and recycling activities and a play room was designed numerous kinds of equipment for physical activities.

The school where this study was conducted was a pilot school selected by the Ministry of National Education to apply National Early Childhood Education Program which was updated in 2012 for Turkish children (MoNE, 2013). Additionally, the school was a member of Eco-school project of Foundation for Environmental Education (TÜRÇEV). Within the scope of Eco-school project, children are considered as active individuals who take their own democratic decisions and think critically regarding cognitive, emotional and aesthetic aspects (TÜRÇEV, 2012). To add more, the school is a coordinator school of one of the Comenius project called "Don't Throw Toy Away, Recycling with the Play". The target of the project is to reuse the broken or unused toys in cooperation co-operation with parents and teachers. Children are allowed to create their own toys with the broken toys at recycling workshop to get the idea and importance of reusing and recycling. At last but not least, the school is also a member of "Minik TEMA", which is a non-governmental organization in Turkey that aims create a connection

between young children and environment in order to support their physical, social-emotional and intellectual development through producing several projects (TEMA, 2013). That is to say, children who go to this eco preschool are supposed to be aware of the existing local and global environmental issues through participating and supporting various kinds of projects, activities and learning experiences (Mogansen& Mayer, 2005).

Participants

The participants of this study consisted of 60-66 month-old preschool children (N=18) went to a public eco-preschool in Ankara. The sex ratio of participants was 6 girls and 12 boys. Eight of them had one-year, 8 of them two-year and 2 of the children had three-year eco-preschool experience.

Purposive sampling method was considered eligible for the study. As Fraenkel andWallen (2006) stated, purposive sampling method depends on researcher's personal judgment to decide on sample because there should be specific criteria to conduct a study. Furthermore, according to Patton (2002), purposive sampling method can be worthy when the researcher wants to investigate rich cases which can be studied in-depth.

The researcher had one specific criterion for selecting participants for the study. Attending an Eco-preschool of participants was accepted as criterion for the study because eco-school project's purpose is to give education about environmental awareness which is the first step for sustainable development and to enhance environmental awareness among children (GirginandSönmez, 2009). It was expected that children going to this eco school had background knowledge about local and global environmental issues, which made the implementation period effective because the implementation period encouraged pre-schoolers to comprehend the interrelationship between the systems within the environment and human beings rather than directly teaching them. In this aspect, conducting this study in an eco-school environment enhanced the research process through recycling boxes, reused materials and toys, warning boards about water and energy consumption were the stimulators of children's attention toward the implemented education for the sustainable development program.

3.4 Creating and Implementing ESD Program Procedure

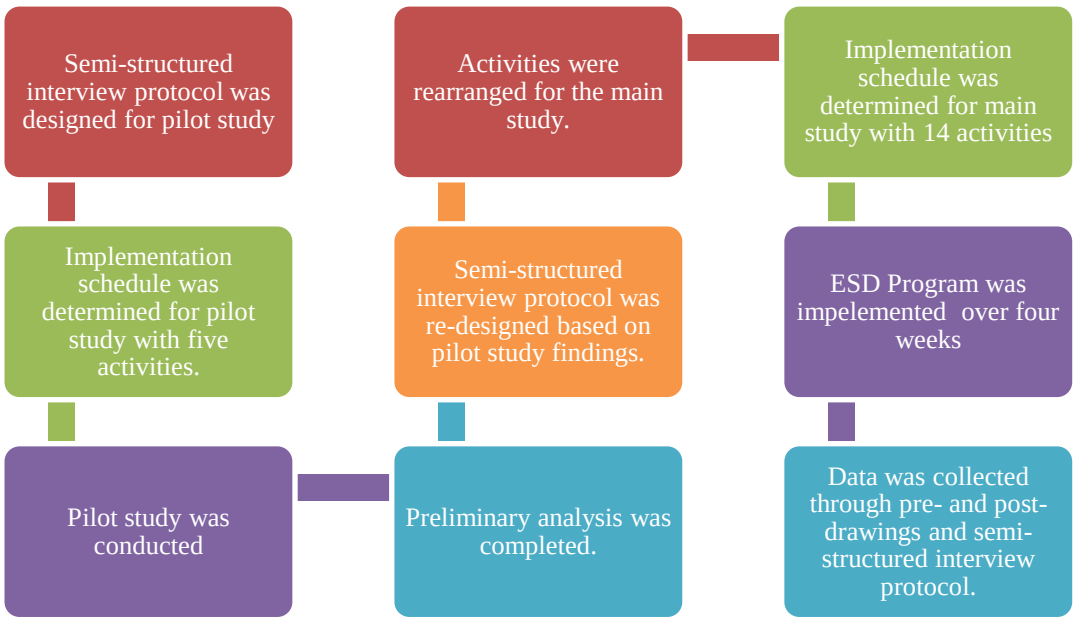

Figure 3.1 The hierarchical steps of creating and implementing ESD program.

As figure 3.1 demonstrated that creating education for sustainable development program procedure started up designing semi-structured interview protocol and implementation schedule for pilot study. After conducting pilot study the interview protocol was res-designed with the light of findings of pilot study and the ESD program for the main study was conducted with 14 activities. The data collection procedure for the main study included pre- and post- drawings and pre- and post- semi structured interviews.

3.4.1 Pilot Study

The purpose of the pilot study is to make preliminary decisions on the implementation of the designed education for sustainable development (ESD) Program and on testing the efficiency of the instruments. The major criterion for making preliminary decisions on the implementation was to observe the applicability of the activities and the children's responses, those of the instruments; however, were related to check if the outcomes are meaningful to make evaluations as far as the research questions of this study are concerned. Furthermore, by conducting the pilot

study, the researcher had chance to acquire more skills and experience to manage the drawing sessions.

The sample of the pilot study was composed of 60-72 month-old pre-schoolers (N=5) going to a public Eco-preschool in Ankara/Turkey. The participants of pilot study were summer school children who were different from participants of main study. The purposive sampling method was used because having basic knowledge about environmental issues; the participants were selected from an Eco-preschool. The ESD program for pilot study includes five activities (#1, #4, #5, #13, #14) as shown in Table 3.3 selected regarding activity types and the issue that the activities focused on. Before the implementation of the activities, in pilot study, children were asked to close their eyes and imagine what they know about human beings and environment. Afterwards, children were asked to draw a picture about "human beings and environment" and/or "environment and us". A A4 size drawing papers together with colourful pastel crayons enabled children to do it. The pilot study included one pre-drawing and one post-drawing session. Each session took about 30 minutes. Immediately after the drawings were completed, the researcher conducted semi-structured pre- and post- interviews with each child individually in the same day in order to gain in-depth information about their drawings and perception regarding the interrelationship between human-environment. The subsequent comments of children were audiotaped.

Conducting pilot study provided the researcher with several advantages. As a result of pilot study, some of the interview questions were eliminated and revised for children in order that they would understand the essence of the questions better. It was decided that questions which were direct and informative were not so efficient to obtain children's perception. Therefore, they were converted according to the case formats in order to draw children's attention. To illustrate, in order to obtain children's perception regarding the climate change, the researcher preferred to elaborate children's conservation through asking question as "*Have you ever heard about polar bears and emperor penguins? Yesterday, while scanning the news, I learned that they had lost their homes because of melting icecaps. Why and how could this happen, do you have any idea?"* rather than *"What do you think about melting ice caps affecting polar bears and emperor penguins unfavourably?".* As a

result, drawing process was rearranged. In the pilot study, children were asked about their drawings in the semi-interview process; however, at the end of the pilot study, it was decided that, it would be better to discuss about drawings with each child before having an interview with him/her, because children could experience confusion about talking about drawings and interview question one after another. Thus, for the main study the researcher conducted drawing sessions first and discussed with each child about his/her drawings for a week, and the following week interviews were conducted with each child. At last, the pilot study enabled the researcher to improve her interviewing skills with young children regarding elaborating the question to take the answers and encourage children to express their ideas freely. What is more, pilot study provides researcher an experience in aspect to implement education for sustainable development activities. During pilot study, it was determined that what kind of materials can be used alternatively or/and in which way an activity could be conducted in more bountifully. What is more, through pilot study, the researcher gained experience about how to arrange learning environments to conduct fruitful activity process. To add, researcher gained experiences regarding the content analysis of pilot study drawings. As a result of analysis, the categories were emerged which formed a base for the main study.

3.4.2 Instruments and Data Collection Procedures of Main Study

Various data collection procedures such as semi-structured interviews and drawings were used to increase credibility of the study. The data of the study was collected through pre- and post- interviews/drawings before and after the implementation .Table 3.4 shows the steps of the data collection procedure

Table 3.1 Steps and Timeline of the Data Collection Procedure

Data Collection Type	Date	The Number of Participant Children
Pre-Drawings	November 26-30 2012	18
Pre-Interviews	December 3-7, 2012	18
Intervention	December 10, 2012-January 11, 2013	18
Post-Drawings	January 14-19, 2013	18
Post-Interviews	January 21-25, 2013	18

As it is presented in Table 3.1, he main study including pre and post interviews, drawings and implementation with 18 children completed in two months. One set of semi-structured interview protocol and drawings of children was used as instruments of the study before and after the implementation. The interview protocol (Appendix A) was used to get the perception of children regarding the interaction between human beings and environment, specifically in terms of deforestation, biological diversity and climate change. Merriam (2009) stated that "interviewing is necessary to understand how people interpret the world around them" (p.88). The researcher paid attention to conduct the interview process as they were in a conversation and children were asked; therefore, the children's thinking was facilitated and the imagination was nurtured.

Semi-structured Interview Protocol

The semi-structured interview protocol included 9 questions to investigate how children perceive their environment and interaction between human beings and environment in terms of deforestation, biological diversity and climate change (Appendix A). Each interview took about 10 minutes. Wortham (2008) argues that interview with young children must not exceed 10 minutes because children do not have long term attention span compared to adults. Interviews were completed one by one in the art workshop of the school which was the most appropriate place to conduct an interview with children due to the quietness of the place. Interview protocol was conducted with each child before and after the implementation.

Required ethical measures were taken for this study. First of all, the school principal gave an approved for making interviews, drawings and conduct activities. A consent form which also included the purpose of the study was prepared for parents (APPENDIX B) The parents were informed about the importance of their giving consent, through the consent form, to their children so that they would participate in the study. To add more, the classroom teacher arranged a meeting with parents and explained who the researcher was and the aim of the activities. In this way, the voluntarily participation of children was ensured. The questions were prepared through reviewing related literature. First of all, the National Action Capacity Plan for Turkey was examined and it was decided that deforestation, biological diversity and climate change are the issues that Turkey should take action for a sustainable future. After that, related literature was reviewed in terms of similar studies to reveal how those topics were integrated in early childhood education and in which ways children's ideas were obtained about sustainability. Then, the interview questions were prepared. Revisions were done by two experts in early childhood education and environmental education fields at Middle East Technical University. The first four questions aimed to obtain children's primary and general ideas about the relationship between human beings and environment including sustainability. The participants were asked about what they understood when they heard the word "environment" and about the relationship with human beings. Next six questions were particularly prepared to explore what children knew and how they perceived human beings relation to biological diversity, deforestation and climate change.

Semi-structured interview protocol offered researcher to catch the points before and after the implementation of ESD program. Table 3.3 shows that focal points of interview protocol consisted of four main issues regarding perception about environment, perception about human being relation to deforestation, climate change and biological diversity. The example questions referred the main issues obtain their perception.

Table 3.2The examples of main issues related to semi-structured interview protocol

Main Issues	Example Questions
Perception about environment	*Do you think that human beings are the friends of the environment or not? How do they behave environment and how does environment behave human beings?*
Perception about human being and deforestation relation	*Imagine that a huge forest in which varied animals, plants are living in harmony is destroyed and the forest is extinct. How could this happen? How do you feel when a forest is extinct?*
Perception about human being and biological diversity relation	*Have you ever heard before there were living things that lived on Earth happily are extinct. How could this happen?*
Perception about human being and climate change relation	*Have you ever heard about polar bears and emperor penguins? Yesterday, while scanning the news, I learned that they had lost their homes because of melting icecaps. Why and how this could this happen, do you have any idea?*

Drawings and Children's Explanations of Drawings

Drawings are the second instrument for the study. Barraza (2006) asserts that children's drawings provide a window into their feelings and thought and also reflect an image of their own minds. From this point of view, drawings were used in order to reveal the perception of children based on participants' prior knowledge, existing ideas or conceptions and past experiences which are quiet functional to let children make predictions and explain a phenomenon (Greca& Moreira, 2000). In this way, changes in children's perceptions were obtained through asking children to draw a picture about the relationship between human beings and environment. Mac Naughton, Rolfe and Siraj-Blatchford (2001) assert that children's own drawings and paintings are effective ways to create a discussion on what children think about. That is to say, in the current study, children's drawings are considered as a tool to learn about their internal thinking and perception about environment and human being interaction.

Before starting both pre- and post-drawing sessions, children were asked to close their eyes and think about what they imaged when they heard the word

“environment”. After that, children were asked to draw a picture about “human beings and environment” and/or “environment and us” individually. The A3 size drawing papers were provided to children together with colorful pastel crayons. Each session included 3 to 5 children, and they sat around a table. Each session took about 30 minutes. After each drawing session, the researcher met with each child one by one and asked them to explain their drawings in their own words. During conversation on drawings, the researcher just listened to children’ ideas about drawing and subsequent comments of children were audio taped.

Figure 3.2 Drawing sessions

3.5 ESD Program

The Education for Sustainable Development Program (ESD) Program consists of 14 activities (Table 3.5). The program was designed by the researcher in three months. Even though ESD is a recent term all over the world, favourably, there are project examples that have been conducted in different countries. To create and implement an ESD Program for the context of Turkey, no doubt, it was required to know the position of sustainable development of Turkey. For that reason, the reports which had been published by Ministry of Development, Ministry of Environment and Urbanization and Ministry of Environment and Forestry were examined to decide the main issues in an ESD program in both national and international perspective. In line with these examinations; deforestation, biological diversity and climate change were decided as the main issues of ESD (UNESCO, 1992). At that

point, goals and indicators of National Early Childhood Program (2013) made a good guide to create a basis about children's participation in activities, conducting assessment sessions and selecting the teaching methods.

As Creswell (2007) states, peer review or debriefing is about evaluating research process by an external authority. The role of this external authority is to examine the research process and ask researcher difficult questions about research details in order to keep both researcher and the research process decent. In this study, the external authorities were the supervisor and the co-supervisor of this dissertation. Moreover, designing peer debriefing sessions with a reviewer who was also a research assistant in the field of early childhood education and interested in education for sustainability guided researcher in an honest way throughout the research process. Activities which were designed by the researcher received valuable feedbacks from a researcher with doctoral degree in the field of early childhood education and a researcher with a doctoral degree in the field of environmental education. As a result of their feedbacks, changes were made in the on-going process of some activities. To illustrate, small transitional activities were added for each main activity so that children would understand better and for the motivating children. Each activity included a small transitional activity to have a smooth pass to the main activity. Feedbacks were helpful to redesign transitional activities in order to integrate them into main activities appropriately. Plus, after having the expert's opinions, activity types were elaborated in order to meet the requirements of children as a whole. That is to say, number and kinds of activities such as art, music, language, science etc. were designed in harmony to meet each child's uniqueness.

The program implementation took one month and the researcher met with children three times a week to conduct the activities; however, the rest of two days, she also participated in the classroom environment to take part in children's daily life routines in order to prevent being isolated from children. Long lasting engagement and persistent observation are accepted as a validation method for building trust with participants (Creswell, 2007). For this study, the researcher spent time with children before pre-drawings and pre- interviews were started up in order to have reliability in the eyes of children. The researcher attended classroom activities, contributed to daily life routines and had small discussions with each child to get acquaintance with

them. In this way, when the pre- drawings and pre- interview time came, children felt themselves comfortable and the dialogues were made between researcher and each child in a comfortable way. Additionally, persistent observation of classroom environment and daily life routines of classroom teacher helped researcher to decide appropriate times to conduct the activities to get much more effective activity sessions. In qualitative studies, the researcher isdata collection tool (Marshall & Rossman, 1995). It means that the researcher immerses herself in the lives of the participants. In this study, the researcher was the actual participant in the implementation period of ESD program. The researcher introduced herself to children not as a researcher but as a kind of teacher who would come and apply some activities with them, to prevent the bias in children. In this regard, it is possible to indicate that researcher's role can change in intensiveness and extensiveness which are related to time spending in the setting on a daily life routines and the duration of the study time (Marshall & Rossman, 1995). The researcher in this study fully took part in classroom and school routines on daily on the days which there was not an activity schedule for ESD program. In order to increase reliability with participants, the researcher devoted considerable time to know participants' developmental levels and interests and vice versa. As Marshall and Rossman (1995) state, building reliable relations is the evidence of good data. For drawing process, the children were invited to art workshop which was the familiar place for children to draw something and create their art products, thus this familiar atmosphere made the process easy not only for researcher, but also for children. In the same way, the interview questions were designed to draw children's attention. The researcher required to change her voice tone to draw children's attention and helped them elaborate and express their ideas effectively.

Table 3.3 ESD Program Design

	Name of the activity	Activity Type	Content of the activity	ESD target of the activity	Outcome	Keywords
#1	**What is in the school garden?**	Science (Large group Activity)	The school garden is visited by children to observe the environment. Activity included exploring the environment by means of small handmade binoculars. During activity, children try to find out connections among the elements of nature (e.g connection between clouds and soil, trees and animals human being and flowers etc.)	Understanding the connections within the environment Recognizing children's own impact and connection way on the environment.	Children were allowed to reveal what they observed and what they inferred from during the activity process in discussion time.	Connections in the environment, child's own place in the environment
#2	**What are those children doing?**	Turkish-Language (Large group Activity)	A logo carrying picture of Earth and world's children colouring, cleaning and playing with the figure earth, designed for OMEP 2010 World Congress was presented to children. Children were also asked the questions of the interview protocol of the picture in order to reveal children's knowledge related to sustainability.	Making children familiar with the term "sustainability"	Children expressed their feelings and ideas about picture and what they understood from the term sustainability.	Planet, Earth's Children, Sustainability

Table 3.3 (cont'd)

#3	**Our Ecological Footprints**	Play and Science (Integrated Large Group Activity)	The activity was transited with a play activity as balancing on one foot and two feet. Footprints were designed by the researcher and put on the floor spontaneously. The play was about standing on one foot and /or two feet in a balance. After transition activity, the researcher and children designed the earth with its biological diversity. Footprints which were provided for play activity were used to display the impact of each child on the Earth.	Making children aware about their impact on the environment	At the end of the activity, each child brought about solutions to prevent taking place of living things on Earth. The ecological footprint poster on which each child's estimated impact is seen clearlywas hung on class board.	Ecological footprint, Biological diversity
#4	**Let's make our own forest**	Turkish-Language (Large Group Activity)	The researcher and the children created their own forest ecosystem through figures made by cardboards indicating a forest ecosystem element. In this activity, each child made contribution using their creativities and imagination. Then, a story was generated all together.	Being aware forest ecosystem Understanding the impact of human being on the environment Learning about the importance of forest and deforestation.	At the end of the activity, each child expressed in which ways a forest could disappear and how they would feel if a forest was destroyed.	Forest ecosystem, deforestation, biological diversity

Table 3.3 (cont'd)

#5	**Web**	Science (Large Group Activity)	As a follow up activity of forest ecosystem each child took a figure made by cardboards related to the story and sat down in a circle. The rope provided by the researcher was thrown by each child in order to construct a web to see the interaction within the forest ecosystem in much more concrete way.	Realizing the interaction within the forest ecosystem Recognizing that each element of forest including human being is related with one another.	Each child tried to realize the forest nature elements that affecting and being affected in the forest ecosystem.	Human impact, Interconnecti on within the forest.
#6	**We are a twist!**	Drama (Large Group Activity)	Children were asked take part in and be an element of a forest ecosystem (e.g a bird, a tree, a river, a human being etc., and - using their bodies they imitated their own figures to be interlocked in order to display the interconnection within forest ecosystem.	Understanding the balance within the forest ecosystem	Each child expressed their feelings about the lack of the deforestation for each forest	Forest ecosystem, Interconnecti on within forest eco system

Table 3.3 (cont'd)

#7	**The Garbage Witch**	Turkish-Language Activity (Large Group Activiy)	The researcher entered classroom with the costume of garbage witch and talked to the children about why there were some garbage on her costume. Actually, she was sent to Earth to learn why human beings did not respect forests, ice caps, and living things. The researcher discussed with children about human beings' actions.	Obtaining children's knowledge about human being' actions on Earth.	Each child expressed his/her ideas about how human beings behave environment and how environment reacts.	Human beings' impact on environment
#8	**Save the Earth**	Art (Small Group Activity)	As a garbage witch, the researcher invited children to tables in small groups to create a design in order to find a solution for waste materials. Each group focus on different problems as waste management, deforestation, water sources, climate change and biological diversity. Materials were provided children to enable them creating their solutions freely.	Having children participated in problem solving to save the earth and recognize their capability and favourable impact.	Children worked in small groups and each group created a design. At the end of the activity, each group shared its and expressed what kind of solution that they brought about.	Solution to earth's problems, climate change, deforestation and biological diversity

Table 3.3 (cont'd)

#9	**Visiting a recycling truck!**	Field Trip (Large group activity)	Children visited a recycling truck with their parents. Wastes were brought from home. Worker from recycling centre informed children about recycling process and the importance of recycling.	Understanding how the garbage was recycled. Encouraging each child to take his/her own decision about recycling.	A group discussion was conducted with children about what they observed and inferred from the activity	Recycling of garbage, why we recycle, recycling's' contribution to sustainability
#10	**Water**	Science (Large Group Activity)	Importance of water conservation was explained through a science activity. Children gathered around washbasin. A science experiment was realised by means of counting down for one minute and filling the glasses with water at the same time. In this way, children had chance to observe how many glasses of water can be saved in just one minute. Those glasses of waters were meaningful, so water conservation issue was pretty important.	Understanding the crucial position of wasting water Questioning the importance of water for living things.	Children expressed their feelings and ideas about why they should save water and how they can do it.	Water consumption

Table 3.3 (cont'd)

#11	**Energy conservation animation**	Turkish Language Activity (Large Group Activity)	The animation *The Story of ŞıpŞıp* about connection among energy and water conservation, deforestation and climate change was watched by children.	Making children aware about the impact of climate change Getting knowledge about human beings' impact to the environment. Understanding importance of water for living things.	Having watched the movie with children, the researcher created a discussion atmosphere to learn what each child' thought about the issue.	Human beings' impact on sources of Earth, Energy Conservation ,Climate Change
#12	**Who is a biologist?**	Science (Large Group Activity)	A biologist visited children to inform them which animals were endangered and going to be extinct. Finger puppets of various endangered animals were also prepared and presented children.	Making children aware that the diversity of living things is important, because they are also a part of the environment.	The children expressed their ideas about a biologist, his/her job and why we should respect to diversity of living things.	Biological diversity
#13	**Story of plastic bag**	Storytelling (Large Group Activity)	Children were presented the story of life of a plastic bag, using story card technique. The researcher manipulated story cards on a rope with the help of clips. Children also had chance to create their own story by using arope and clips to tell a story of a plastic bag.	Being aware of non-recyclable position of plastic bags Understanding the impact of plastic bags to the nature Having different alternatives to plastic bag	Each child tried to find unique alternatives to save the earth with plastic bags.	Plastic bag, water pollution, consumption, life of a plastic bag

Table 3.3 (cont'd)						
#14	**Cramped fish**	Music/Play (Large Group Activity)	Children acted as a fish in an ocean and danced in narrow and large areas. Narrow and large areas were determined by using different size of carpets or a board marker. While large area represented clean and limpid water, narrow area represented dirty water which was full of waste plastic bags.	Realizing the negative impact of plastic bags Understanding the unfavourable effects of consumption	Each child expressed what s/he felt while dancing at narrow and large area as fish	Fish, plastic bags, biological diversity

3.6 Data Analysis

As Strauss (1987) states, it is very difficult to make standardization in qualitative research analysis. That is the reason why researchers should be flexible and try to find out the most proper analysis method according to nature of the study.

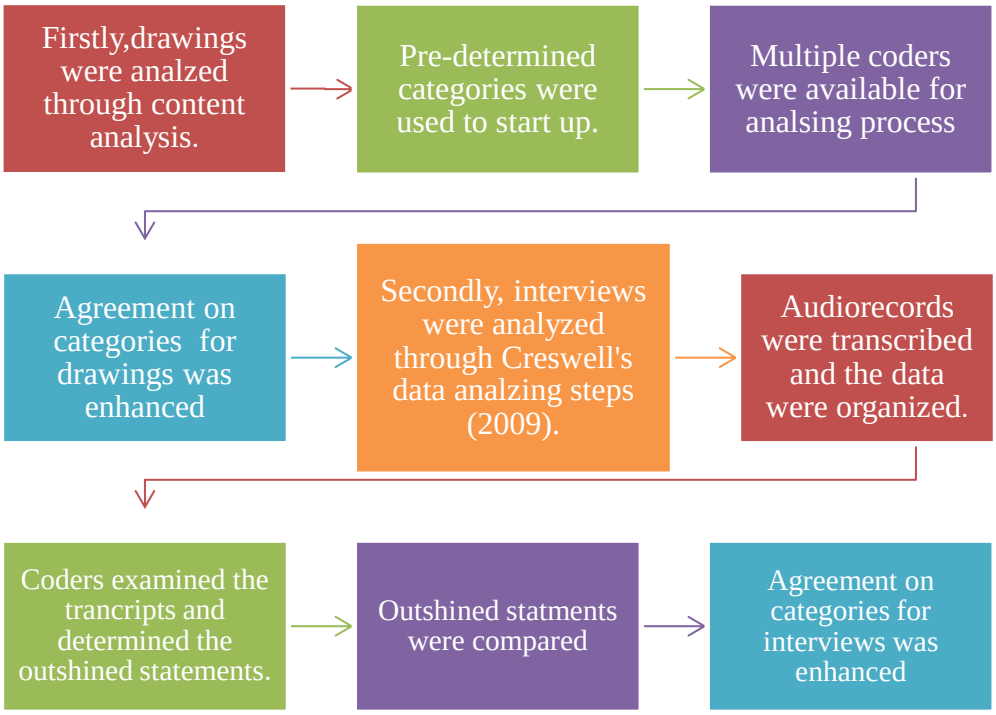

Figure 3.3 Data analysis process

As it is indicated in figure 3.3, drawings made by children were analysed through content analysis method. As Fraenkel and Wallen (2005) state, content analysis is a technique that helps researchers gain information about an individual's or group's conscious or unconscious beliefs, attitudes, values and ideas. In this study, analysis of pre- and post- drawings based on the categories was determined based on the findings of the pilot study. Predetermined categories helped the researcher to start up the analysing procedure, yet each model was formulated identical to this study. That is to say, the overall assessment of the drawing provided the researcher more

reliable findings. Both pre- and post-drawings were analysed in two categories. Agreement on categories and mental models was required for the reliability of the drawings analysis whereas comparing drawing analysis with interview results enhanced the validity.

In this study, pre- and post- interviews were analysed through Creswell's (2009) data analysing steps, namely (a) organizing and preparing the data, (b)making general sense of information, (c)coding (d)describing, (e)representing and (f)interpreting.

Marshall and Rossman (1995) assert intercoding an agreement is the agreement of multiple coders on the same data. Likewise Creswell (2007) asserts that it is related with stability of responses of the multiple coders on codes and themes. In the current study, intercoder agreement was enhanced by two coders; the researcher and a research assistant interested in early childhood education for sustainable development. Data analysis procedure in this study began with the researcher's transcribing audio records in order to organize and prepare the collected data. After that, data in this study were analysed by the two coders who were, mentioned above. As a first step, both coders examined the transcribed recordings to highlight the more important sentences or/and words related the content. The second step was to compare the codes provided by the coders to determine whether there was a big difference between codes or not. As a last step, two coders discussed about common themes or possible themes emerged in the coding process.

Drawing analysis also required multiple coders. Second interview coder had also a role in the content analysis of drawings. Both two coders examined pre- and post-drawings of each child to reveal the changes in children's perception. During the coding process, children's statements were examined and the essential parts about how children perceived the interrelationship between human beings and environment were imparted in their explanations. Moreover, the researcher introduced a comparison between pre- and post- statements that appeared with both drawing and interviews and identified some common and repeated phrases, words and sentences. Besides, related literature was considered to construct the mental models and the themes. Similar themes were found in several studies. The analysing

process included the examination of both drawings and interviews separately. Drawing analysis process has two categories, which are the interaction between human beings and environment and lack of interaction between human beings and environment in children's drawings. The interview analysis continued based on the four basic themes, namely "children's perception regarding environment in which they live", "children's perception about the interaction between human beings and environment in terms of deforestation", "children's perception about the interaction between human beings and environment in terms of biological diversity", and "children's perception about human being and environment interaction in terms of climate change".

3.7 Trustworthiness of the Study

Validity and reliability issues were considered for this study and certain strategies were used to increase the credibility of the study. In this study, prolonged engagement and triangulation were preferred for enhancing validation, whereas intercoding agreement and ethical considerations were provided to get more reliable research findings. As Creswell (2007) states, prolonged engagement and persistent observation are required to explore the environment in which study is conducted and to focus on the interest. Also, using multiple resources and methods to investigate the research questions was another technique called triangulation (Creswell, 2007). In this study, both pre- and post-drawings and interviews were utilized to gain the changes in pre-schoolers' perception. Additionally, peer review and debriefing was provided to eliminate the bias of researcher during the analysing process.

3.7.1 Validity

As Creswell (2007) reports, validation issue makes a qualitative research strong with time spent in the field, the provided detailed and thick descriptions and adequate time spent with participants who are crucial for the accuracy of the study. It is sure that are more than one validation strategies considering interpretive lens of the study. For this study, prolonged engagement, triangulation and peer review and debriefing were preferred for enhancing validation of the study as suggested by Creswell (2007).3.7.1.2 Triangulation

Merriam (2009) proposes that triangulation is considered as another way to enhance validation. It is about using multiple and varied sources to investigate and cross-check the research questions to gain accurate evidences. The current study includes both semi structured interviews and drawings to get children's perceptions about sustainability. Drawings, semi-structured interviews and informal activity notes were evaluated as an integrative way to strength the data's validity.

3.7.2 Reliability

There are several ways that can be addressed in a qualitative research. According to Creswell, detailed field notes and good quality tape recording are helpful to get reliability (2007). For a qualitative study, reliability is related to stability of responses to multiple coders of the data; hence, agreement on codes, themes, and focusing on the same passage are also necessary. For this study, intercoding agreement and ethical issues were enhanced for reliability.

3.8 Limitations

The data collection procedures included some restrictions in the study. Primarily restriction was because of the nature of the study. Due to the fact that the study was designed as a single case study, it was hard to generalize the findings in the same settings. That is the reason why thick and detailed descriptions were provided to increase applicability of the study. Moreover, as the data collection tool, the researcher also limited the study. Furthermore, the study was conducted in a restricted time. Data collection process was completed in two months. In spite of the changes in perception, values and ideas that were observed, following up studies could be required to evaluate the effectiveness of the education for sustainable development program in a long term. At last, conducting the study in a eco-school might be a limitation, therefore the study can be replicated in preschools which are not an eco-school.

CHAPTER IV

FINDINGS

This qualitative case study focused on the potential of created and implemented ESD program on the human-environment interrelationship perceptions of 60-66 month-old preschoolers (n=18) in a public eco-preschool. This chapter presents the findings of the study using varied data sources including pre- and post- drawings and interviews made with the children. Research questions which guided the study are;

1. How did the designed ESD program change the perception of 60-66 month-old preschoolers about basic components of ESD (deforestation, biological diversity, climate change)?
   a) How did the ESD program influence the perception of 60-66 month-old preschoolers about the environment they live in?
   b) How did the ESD program influence the perception of 60-66 month-old preschoolers about the interrelationship between human beings and the environment in terms of deforestation?
   c) How did the ESD program influence the perception of 60-66 month-old preschoolers about the interrelationship between human beings and the environment in terms of biological diversity?
   d) How did the ESD program influence the perception of 60-66 month-old preschoolers about the interrelationship between human beings and the environment in terms of climate change?

4.1 How the designed ESD program changes 60-66 month-old preschoolers' perceptions about the basic components of ESD?

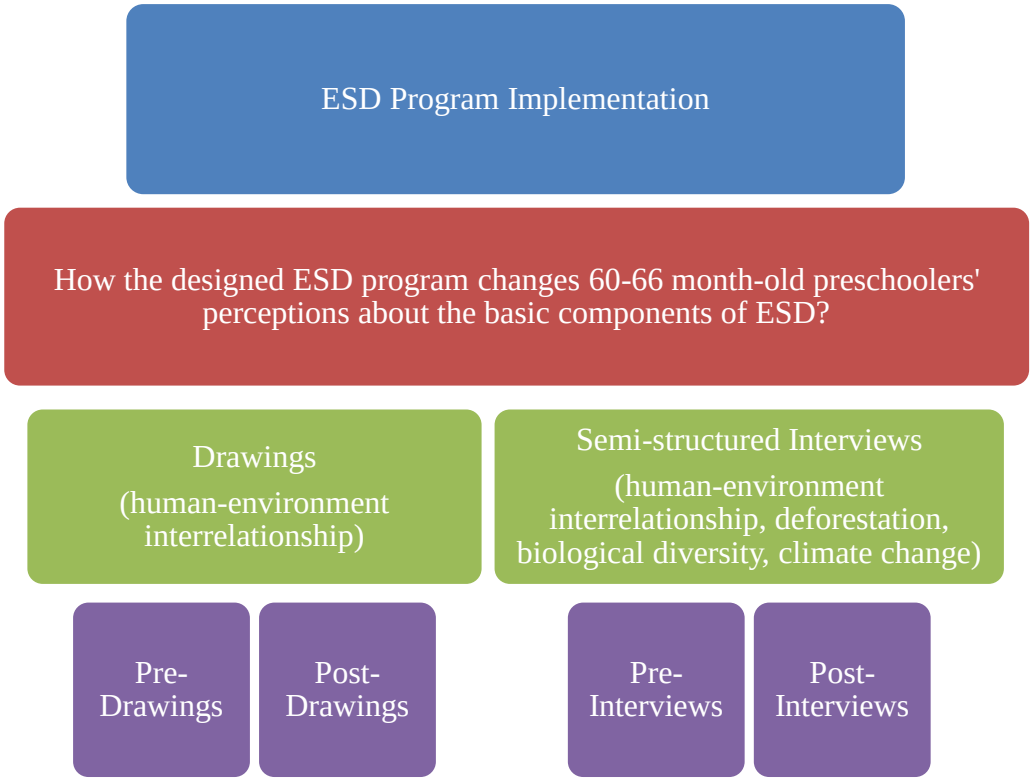

Figure 4.1 Organization schemas of gathered data

Figure 4.1 indicates that education for sustainable development (ESD) program implementation aims to reveal the changes on 60-66 month-old preschoolers' perceptions about the basic components of ESD (deforestation, biological diversity and the climate change) in line with human-environment interrelationship. In this juncture, the data sources of the study were pre- and post-drawings which were about human and environment and pre- and post- semi structured interviews.

4.1.1 Children's perceptions on human-environment interrelationship before the implementation of the ESD program: Pre-Drawings

Within the scope of drawing sessions, children were asked to draw a picture depicting 'human being and the environment'.Immediately after drawings were completed, each child was interviewed to crystallize the underlying meaning of the drawings. Each subsequent comment of drawings was analyzed according to two

main categories; (1) Availability of a human-being and environment interrelationship, (2) Unavailability of a human-being and environment interrelationship. Regarding those two categories pre- and post- drawing findings included models derived from drawings based on related literature and preliminary finding of pilot study.

There were three models emerged from pre-drawing analysis as:

(1)Environment is a place, in which everything looks fine,

(2) Environment is a place, in which fantastic and unusual objects live,

(3) Environment is a place which is learned through secondary sources

Model 1 is based on the study which was conducted by Barraza (2006) with 7 to 9 years old children to determine how environmental problems affect the way children perceive life. One of the thematic categories of Barraza's study is *everything looks fine* correspond with the current study. What is more, the study which was conducted to investigate students' mental models of environment supports Barraza's study (Shepardson, Wee, Priddy& Harbor, 2006). Models 2 and 3, on the other hand, emerged from my study as a contribution of current literature.

Model 1: The environment is a place in which everything looks fine

In the current study pre- drawings indicated that children (n=8) perceived their environment as a natural place in which plants, animals and natural elements were living in a pristine and harmonious way. The common features of the models such as the sunset, flowers, apple trees, clouds, mountain, grass and rainbows are drawn randomly without presenting any relationship among those elements and human being. However, it does not mean that there are no human figures in the drawings. On the other hand, drawings which include natural elements and natural places also include human figures, yet no interaction between human figures and the environment in which they live are indicated. Likewise, 8 out of 18 children indicated that humans do not have any role in the environment other than existing in it. According to the participants, the environment they drew was only a place which gave them a feeling of pleasure and a place for recreation:

I drew a rainbow, grass and an apple tree. Also, it was raining in my drawing and two human beings are playing outdoors. I also drew a sun and the sky. The human beings in my drawing are happy because they like to see flowers. That is all. (P15)(Figure 4.2)

Figure 4.2 Pre-drawing of P15

When I was asked to draw a picture about a human being and the environment, the first thing that comes to my mind is the sun. I also drew an apple, a flower, clouds and rain. There is a girl in my drawing and this girl is collecting flowers for her mother. Actually, my environment is a nice place, and this girl feels happy for being in this nice environment (P1) (Figure 4.3)

Figure 4.3 Pre-drawing of P1

> My drawing includes an apple tree and a sun. The sun is shining and it makes the apples warmer and turns them red. The blue part is the sky and it looks really bright. I am the girl who is gathering flowers because the flowers smell really nice. I think this environment is created for me because it makes me feel better. I spend enjoyable time in this environment with the sun, the bright sky and those colorful flowers (P18) (Figure 4.4)

Figure 4.4 Pre-drawing of P18

Model 2: The environment is a place in which fantastic and unusual objects live

Children (n=5) who were asked to draw a picture about human beings and the environment demonstrated that unusual and/or fantastic objects live in the environment they perceive. The children indicated that even though they had never experienced or observed such objects before they wanted to draw them because the idea of such an environment in which fantastic and unusual objects existed excited them.

> When I was asked to draw a picture depicting a human being and the environment, I drew a banana man [drawings in red] who is areally huge man with huge bananas. The man uses those bananas as bombs and throws them to the human beings with his big hand [figure in blue on the right]. What is more, I like the banana man and the way he collaborates with fire man because they work really well in my environment. Banana man and fire man are working together. While banana man throws big and heavy

bananas to the human beings, fire man creates a machine to send harmful sound waves to them (P10) (Figure 4.5)

Figure 4.5 Pre-drawing of P10

Once upon a time there was a car [The figure in the middle of the drawing paper] which was a flying car, but one day its wings were broken and it fell down. A girl saw this and she becomes really upset, because she wants to use this car to travel into space. Actually, I have never seen such a car before, but I know that car designers can produce such a car for my environment. (P3) (Figure 4.6)

Figure 4.6 Pre-drawing of P3

I want to draw the earth and a hero near this Earth. The mission of this hero is to save the earth. This hero can fly and is invisible. Those are the powers he has. With those powers, he saves the Earth from the aliens. I know that aliens are living in the space, so the Earth may need some help. I have never seen such a hero before, but I like him in my environment, don't you? (P6) (Figure 4.7)

Figure 4.7 Pre-drawing of P6

Model 3: The environment is learned through secondary sources

Children (n=3) stressed that their perception of human beings and the environment comes from secondary sources such as cartoons and the movies watched on television or the books that they have read. The drawings which included the impact of secondary sources do not indicate any relationship between human beings and the environment even though the human figure is in the drawing. Two of the children highlighted the secondary sources as follows:

I preferred to draw Africa and an elephant under the clouds. There is also a giraffe. I wanted to draw Africa to help me remember Africa. Actually, I have never been there but one day I saw a documentary about life in Africa. In addition, there is a cartoon called Zaboo in which animals go to Africa, so I am really interested in life in Africa because I am a really smart boy" (P13) (Figure 4.8)

Figure 4.8 Pre-drawing of P13

I drew a lot of trees because I love trees so much. One day I saw forests on television which is why I wanted to draw them. Also, there is a machine, a seeding machine that I put among the trees. Actually, the seeding machine can fly and the human beings can control it through remote control. They need remote control, otherwise they get tired and their hands become dirty because of the soil. (P16) (Figure 4.9)

Figure 4.9 Pre-drawing of P16

4.1.2 Children's perceptions on human-environment interrelationship after the implementation of the ESD program: Post-Drawings

Post drawing findings indicated that children have a perception that there is a relationship between human beings and the environment in which the human being has an administrative role. In their drawings the human figures were utilized and had an active role in the circumstances within the environment. As a result of post-drawing analysis two models were emerged as:

(1) Environment is a place which is impacted by human being interventions
(2) Environment is a place in which there are links supported by human being for the sustainable life.

Following examples are presented to reveal this outcome.

Model 1: The environment is a place which is affected by human interventions

In post drawings recycling issue in particular were underlined by children (n=8) as one of the required interventions humans should contribute for the well-being of Earth. Waste materials from art activities or bringing plastics, cardboards, metals and glasses from home are the statements of children which depict their views on recycling. Recycling was linked with deforestation by children (n=4) so when they contributed to recycling they were helping the forests, because normally papers used in activities come from cutting trees, therefore the more recycling they did the less trees were cut. In this way, not only human beings but also all living things have fresh air. One of the children stated that;

> I drew some flowers, but those flowers should be grouped into two. Some flowers are real flowers but some are made with waste materials from the cardboard used in our art activity. There are also two trucks in my drawings. One of them is for rubbish and one of them is for wastes. When the two trucks come to our school, I prefer to use the recycling truck and put waste materials, not rubbish, in it, so they will recycle and returned to us as paper and cardboard to use again. In this way, I am saving my real flowers; I am saving the Earth, aren't I? (P1) (Figure 4.10)

Figure 4.10 Post-drawing of P1

Moreover, the post drawings of the children depicted that recycling was not just about saving trees, but also protecting the natural habitats of living things, especially animals. Children (n=4) associated recycling with biological diversity as:

> I think that all people on earth should know the importance of recycling. What I am trying to say is that people, for example my mother, throws everything into the same bin, which I think is wrong, because waste materials can return to us as new materials if we want. I prefer to put plastic into the recycling bin which we have at our school and in my classroom, because it takes a long time for plastic to disappear in the environment. If I release the plastics into the environment, I will be occupying the habitat of living things which also have to right to live and I should not prevent it (P8) (Figure 4.11)

Figure 4.11 Post-drawing of P8

Children (n=6) put recycling issues in the center of their post-drawings and expressed that the recycling process is a cycle in which humans have a role. The driver of the recycling truck and the workers in the recycling center and the human beings who bring wastes to the recycling center all have a responsibility in the recycling process.

> I drew our school and a recycling truck in the schoolyard. The recycling truck waits for the children because they have brought wastes from their homes which they will empty into the recycling truck. Afterwards, the driver of the recycling truck takes away the wastes to the recycling centers. In recycling centers, there were people who help to recycle the papers, newspapers, plastic toys, cans, plastic bottles. Recycling means producing new things from old ones. As I have said all people can help recycling by collecting wastes and transporting them (P2) (Figure 4.12)

Figure 4.12 Post-drawing of P2

Three of the children associated recycling with climate change. They suggested recycling, because this way trees could be saved which meant that clean and fresh air is always available. This prevents polluted air with harmful gases which is dangerous for polar bears because polar bears lose their habitat when the ice melts due to the warming atmosphere. One of the children drew the following picture,

> I drew a recycling bin and a recycling truck. Human beings put their wastes in the recycling bin and I say YES to that because recycling helps polar bears. I also drew polar bears that were cross because their homes were melting? I know the reason. If human beings do not recycle it means the trees will be cut and our clean, fresh air will be gone. The air will get warmer due to cars, factories and fires and this has an unfavorable impact on polar bears. It seems really sad, I think (P14) (Figure 4.13)

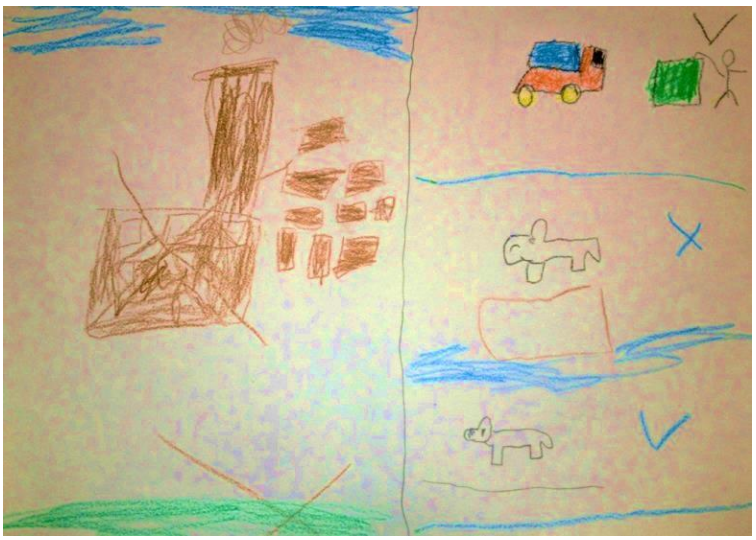

Figure 4.13 Post-drawing of P14

On the other hand, the children have indicated that human beings do not have the right to intervene in the lives of other living things with their actions, because all living beings have the right to live and the actions of human beings must not prevent this right. The participants suggested preferring bicycles or public transportation as a way to minimize the unfavorable impacts of climate change.

> I drew a girl with purple shoes. Also there are two cars (red and green). There is also a polar bear. The polar bear is going to fall down, because of melting ice. Due to the fact that cars release dirty smoke into the atmosphere it is getting warmer and warmer causing the ice to melt. If I were this girl, I would prefer going to school on foot. If all people use their

individual cars the air pollution will warm the atmosphere in a major way which so that polar bears cannot continue to live (P9) (Figure 4.14)

Figure 4.14 Post-drawing of P9

In my drawing, there is just one tree because of hunters and this tree is really sad because it is alone. I think the reason why hunters have cut the trees is to earn money, because they cut the trees and sold them to earn money. This affects not only the life of human beings but also the lives of other living things because trees are the source of fresh and clean air and the homes of many species as well. As a solution, I drew some seeds in my picture and then clouds for rain so that the seeds could grow, because water is crucial for life on Earth (P13) (Figure 4.15)

Figure 4.15 Post-drawing of P13

Model 2: The environment is a place in which there are links supported by human beings for sustainable life.

Eleven out of 18 children demonstrated not only the intervention of human beings in their drawings but also the association among different cycles on Earth. The children put not just one result of human being intervention in their pictures; they depicted more than one result of human impact on the various cycles which sustain Earth.

P18 demonstrated that human impact on deforestation would mean that polar bears lost their habitats and cutting trees would result in less fresh air in the atmosphere. She says that;

> When the trees go down the bears lose their homes, because they live in forests. When they lose homes, how can they live? They will face extinction. Also, the fresh and clean air will be gone which is not good not only for us but also for other living things, even the polar bears in the Artic. There is a relation between trees and the ice caps on which polar bears live, so I want to warn people not to cut trees. It affects many things. (Figure 4.16)

Figure 4.16 Post-drawing of P18

In the same manner, P3 preferred to draw a recycling bin and recycling truck to put their wastes in it. He states that;

> Recycling is so important because it protects our environment. When people recycle regularly, they save trees. If they save trees, they save the soil, if they save the soil, they save the animals living under the soil. Although I cannot see the small animals under the soil, I know that they have a right to be in the environment. They are part of the environment in which we live. Isn't it? (P3) (Figure 4.14)

Figure 4.17 Post-drawing of P3

One of the participants linked the energy consumption habit with climate change in his drawing:

> The purple sticks are the street lights. Those lights should be on only in the evenings and at night. If we use them in the daylight, the polar bears and penguins are not happy with that because if we waste electricity then factories are obliged to produce more energy. This means more factories which will be producing black and polluted gases which are released into the atmosphere. So, the hot atmosphere –due to the black and polluted gases- causes polar bears and penguins to lose their homes (P4) (Figure 4.18)

Figure 4.18 Post-drawing of P4

All in all, pre- and post- drawing findings of children display differences in their views of the interaction between human beings and the environment. Before implementation, children perceived the environment as a natural place in which humans spend time just for recreation with a favorable attitude toward the environment. Natural elements such as the sun, grass, trees, clouds and human being figures are common in both pre- and post- drawings, nevertheless, the difference comes from the subsequent comments of children which indicate that in the post-interviews' human figures have a role and impact on the status of the environment which is depicted in the drawings of the participants. The prominent points of the pre-drawings are the perceptions of the participants which depend on secondary sources and their imagination including unusual and fantastic objects. On the contrary, after the implementation, the human figure and intervention by humans becomes the center in the post-drawings. In post drawings, children preferred to draw something related to real life issues which are highly possible to experience such as recycling. Recycling was one of the outstanding issues that most of the participants preferred to draw and which they mentioned in their subsequent comments about the post drawings. Instead of explaining just what s/he had drawn, the participants

constantly associated varied systems within the environment. In other words, it is possible to see in the post-drawings that the participants created a framework in which they perceived the environment to include systems such as a forest ecosystem, living creatures, the impact of climate change which are all intertwined. In addition, as distinctly different from the pre-drawings, children suggested solutions and how action could be taken to overcome environmental challenges.

4.2 Children's perceptions on human-environment relationship: Pre- and Post- Interviews

Within the scope of pre- and post- interview sessions, children were asked questions about their general perceptions about the relationship between human beings and the environment, deforestation, biological diversity and climate change which were also considered as categories of interview findings.

4.2.1 General perceptions of children in terms human-environment interrelationship

In the pre-interview, children were asked what they perceive when they were asked to think about the environment. Participants' (n=13) responses indicated that trees, the sun, grass, flowers, apartments and cars were the main and the most common elements in their environment. Clouds, roads, dogs and plants are considered as minor elements. When they were asked about those living in the environment the most common answer given by the participants in the study consisted of human beings and animals (n=12).

Similar to the pre interview findings, post interviews indicated that trees, the sun, human beings and animals are the most common elements of the children's environmental perception. Distinctively, polar bears, penguins and fish were added as elements of the environment that they perceived. Moreover, two children preferred to talk about an action instead of indicating single objects as "when I hear the term environment, the thing that comes to my mind is not to cause any harm to the environment" (P9) and "…the environment means not demolishing the habitats of animals" (P5).

In terms of the subsequent question about being a friend of the environment, the participants (n=11) stressed that they were environmentally friendly, yet 9 out of 11 children stated that “I am a friend of the environment, of course, but I cannot justify this statement in any way...” (P13) and “I think that I am one of the best friends of my environment, because I always stay in my home without going into environment. In this way, I am a good friend” (P14). Additionally several participants (n=5) expressed their relationship with their environment as “In my opinion, I am a friend of environment, because I live in it, my apartment is in it, so I love my environment for my own well-being”. Besides, 5 out of 18 children explained that they are not the friends of the environment, because this is “nonsense” and “impossible”.

The post interview findings revealed that all participants agreed that they are environmentally friendly or that they should be. Children proposed specific reasons why they should be environmentally friendly as follows:

> It is clear that I am a friend of my environment. For instance, one day a kitty came to me. I realized that it was really hungry which is why I gave it some milk. It liked the milk very much. I did not want it to be hungry so I wanted to help it, because when kitty grows it will catch mice. It has a role in the environment. (P7)

> Human beings should be environmentally friendly. I think they should also be a friend to penguins which live in the Artic. In fact, not all human beings have a favorable attitude in terms of the environment, because they are not aware how penguins live or where they [penguins] live, but they should know. Before I used to want lots of toys from my parents but now I do not, because if we buy many toys which we do not need, this causes the establishment of new factories to produce lot of toys. Factories also mean that more energy will be consumed and smoke released into the atmosphere. For this reason, I think I am a friend of my environment. (P12)

> I behave as a friend to my environment, because I know that the environment is also a good friend of us. For instance, clouds bring us water, animals give us food in the form of meat, eggs, milk and even our home is located in the environment. The environment protects us, so we have to behave as friends. We should not upset our environment. (P18)

Furthermore, in the pre-interviews the majority of the children agreed that they have to love and respect the environment in which they live because of several reasons. The first reason is the aesthetic beauties the environment has which are very attractive for children. Animals are cute and the flowers smell nice, so this is the reason for children (n=8) to love and respect the environment.

> I respect my environment, because there are many nice and colorful flowers are in my environment. If I do not love the environment it may become offended, therefore I love and respect it. (P3)

> I think that plants, flowers, trees and small animals are really cute. They look at us full of love, so I love all of them, because they make me feel better. I feel better when I touch the fur of a cat. (P13)

Secondly, because their apartments are in environment, children (n=3) think that they have to love and respect the environment because if they lose their home they have no place to live. The children gave reasons such as "I have to love my environment, because my apartment and my school building are in my environment". (P11)

In terms of the question about loving and being respectful to the environment, post-interviews indicated that all participants agreed that they have to love and respect their environment. Children (n=15) mentioned that they have to love and respect the environment, because the environment is the source which sustains life:

> It is sure that we should love and respect our environment, because the environment is important for us. If the environment ceased to exist how could we live? For instance, if there were no trees how could we find fresh air? We have to be respectful of the environment, our friends and polar bears, as well. Polar bear are losing their homes because of us. They also have the right to live, therefore we must take precautions against the smoke of factories and/or we must travel short distances via bicycle. In this way, I will be a good friend to my environment (P1)

> I think that we should love our environment, because there are many ducks and trees, even rabbits. If they do not exist, then we do not exist, ok? We should live all together. We need them. Cows give us milk. For example, I have a rabbit. Its name is Kartopu. I love Kartopu so much. I feed it with lettuce, because I know that it is also a part of the environment. (P10)

> We should respect our environment. For instance, we can respect our environment by conserving our water usage, because water comes from the environment. It comes from nature. If we consume it inefficiently, not only will human beings suffer from lack of water but animals and plants as well. (P11)

Finally, children were asked about what sustainability is. In the pre drawings, all children reported that they had never heard this terminology before, thus they could not formulate any explanations. Instead of defining the term, they were asked what comes to their mind, when they heard the word 'sustainability'. Two participants indicated that their explanations was "…sustainability can be related with trees and the wind" (P3) and the second participant's explanation was "it can be related to a happy life for human beings" (P2).

However, in post drawings, all children had generated an understanding and perception about the word "sustainability". Nine out of 18 children associated the term sustainability with respect, being respectful to others and being respectful to life:

> I think everyone should be careful with his/her life. If human beings do not harm plants and animals and if they respect others, life will be sustainable for all of us (P1)

> When I hear the word sustainability I think of bees because bees give us honey and we eat honey and make them happy. We should respect them because they are working with us. When we are respectful, they feel better and continue to live, continue to produce honey which is their role in our environment (P3)

> For example, if we kill animals they do not sustain their lives, but human beings do not have the right to do that. If people become respectful they will not kill animals, will not cut trees and will not waste water in which case life is sustained (P9)

What is more, four children found a link between sustainability and recycling as "…sustainability means recycling. When we recycle, we protect both trees and the homes of polar bears. In this way, they can continue to sustain their lives" (P17) and "I think sustainability means sustaining the life of everything. For this, we should recycle and respect living things on Earth and behave in a favorable way" (P2).

4.2.2 Perceptions of children about human-environment interrelationship in terms of deforestation.

Regarding the question which is related to forests and the importance of forests, the pre-interview findings demonstrated that trees (n=14), wolf (n=6) and bears (n=6) are the most common figures that the children reported. According to the children (n=6) forests are important because of two reasons. The first reason is that forests are places for the pleasure of human beings, because many people prefer forests for their recreation, "In forests there are lots of trees and from time to time we go to a forest for a picnic" (P13) and "In forests, there are a lot of trees which makes us happy, because fruit trees provide us with different kinds of fruits such as blackberries" (P6).

Moreover, two of the children indicated that forests were not nice because they hosted horrible witches and wizards, "I never go to a forest, because I know that there is a boy, a pig and a horrible *forest witch* in it" (P8). To add, "…one day while I was watching a cartoon called Little Red Riding Hood, I saw a wolf in the forest and it was really frightening, therefore, forests are not desirable for us" (P16).

With regard to the question related to destroying forests and how this was reflected on the emotions and perception of the children, five children in the pre-interviews associated the destruction with human beings. They reported that "The human beings go into forests and they cut trees and then light a fire there. If I see this kind of a situation I will call the police. Forest fires upset not only me, but animals as well. (P14) and "…bad human beings cut trees, I am upset because we need forests to be happy" (P2).

Nevertheless, a majority of the children (n=10) brought a different perspective to reasoning how a forest can be destroyed which is magic. Horrible witches and magic powder are the tools used to destroy forests "…the reason why forests are disappearing is the magic powder. I become sad because trees are beautiful and the magic powder of the black witch is wiping out all the trees" (P17), "Is it possible that someone can make a forest disappear with magic?" (P9), "…. someone may use magic. A little wizard can do this. I feel upset, because I like the

smelling of flowers in the forests" (P8) and "…because of the magic of the Black Queen, all trees will end up in the Black Queen's new palace" (P13).

While some participants associated destroying a forest with magic, two others indicated that terrorist attacks were a reason why trees were destroyed. "… There were two options. The first one is that a man came to the forest and kidnapped the trees and the second option is terrorists. Terrorists attacked the trees with their bombs and all the trees were destroyed (P4)" and "…because of guns. The weapons of the terrorists destroyed the trees and as a result, I am deeply upset" (P15).

Within the scope of the post-interview findings related to deforestation, children presented similar findings in terms of the common figures of forest ecosystems. According to the post-drawing findings, all participants agreed that trees are the major figure they think about when they think about forests. Additionally, lions, snakes, elephants, dogs, plants and animals (in general) are common figures that the children reported. "…when I think about forests, first I think of trees and then lions, bears and also human beings (P16)" and "…forests mean trees" (P18).

A distinction from pre- interview findings, in post- interviews the children (n=10) reported that forests were not only the homes of animals but also a source of fresh and clean air for all living things "… animals are living in forest, but trees also give us fresh air. Sometimes human beings damage trees which prevents us from getting healthy air" (P17) and "… forests are important, because if trees do not exist, then we would not get fresh air"(P8).

Finally when asked about the destruction of forests and its impact, all the children linked it with the intervention of human beings:

> I know that one of the reasons why forests are disappearing is forest fires, because some people go to forests for a picnic and because they are carelessness they cause forest fires which are harmful to all living things (P14)
>
> If people go to the forests with their cars, this can be harmful for trees, because trees can be affected unfavorably from the polluted gases released by car. Then the leaves of the trees fade away. Forests are not important just for animals, but also for human beings and the plants. (P2)

Additionally, children presented their action taking and the solutions they generated;

> In my opinion, a forest can be destroyed this way: a human being comes to a forest and cuts the trees. Of course this upsets me but I can immediately go and buy young plants and seeds to grow trees again. After planting, I would water them so that they grow rapidly. (P7)

> A woodsman might go to a forest and destroy trees with his saw. It is possible that this man might want to erect an apartment in the middle of the forest. If I saw an eroded forest I would try to grow plants again to save our planet. (P3)

Post interview findings also revealed that children associated biological diversity, deforestation and/or climate change with "… scorpions and snakes face extinction because forests are destroyed. Forests consist of trees. Trees are associated with various kinds of animals. Forests protect different animals. If trees are extinct, then scorpions and snakes become extinct" (P3) and;

> A forest includes dogs, cats, snakes and many other kinds of animals and also there are numerous varieties of trees. Forests are important because they protect various animals and they give fresh air. Fresh air is crucial for polar bears, because the reason why polar bears are obliged to live on melting ice is polluted and smoky air. If we destroy forests, then polluted and smoky air will increase which is bad for polar bears. (P11)

To sum up what has been discussed so far it is evident that the perception of children in terms of deforestation displays differences between pre and post interviews. The focus point of children in pre-interviews is that forests are habitats for the pleasure of human beings to enjoy and use for recreational purposes while in post-interviews the focal point for the participants was the role of forests in the ecosystem in cleaning the air or providing a habitat for various types of animals and in terms of biological diversity. The affiliation of humans in terms of deforestation was not indicated in the pre-interviews; the destruction of trees was due to magic and terrorist activity according to the perception of the children whereas post interview perceptions of the children included perspectives derived from a cause and effect relationship. The statements of children indicated the importance of forests and the impact of humans on forests was not limited to only one issue but involved many links within the environment.

4.2.3Perceptions of children about human-environment interrelationship in terms of biological diversity

Extinction of species is another environmental challenge that Turkey must manage. In order to find out the perception of the children regarding biological diversity, they were asked about living things which had lived for many years but had become extinct. According to the pre-interview findings, a majority of the children (n=15) reported they did not know anything about living beings which had become extinct. One of the children stated "I saw a dinosaur in a museum and I know that dinosaurs disappeared many years ago" (P14) and "…, I do not know the exact name but there is one animal facing extinction on Earth today. I learned this from a documentary that I watched on TV" (P13). Only one child mentioned a type of dolphin which is one of the endangered species.

Unlike pre interview finding, post interview findings demonstrated that all children reported at least two endangered species. The most common endangered animals that children mentioned was the polar bear (n=13). Also penguins, sea turtles, pandas, gorillas, dolphins and seals are among the living creatures that children indicated as endangered. The children not only mentioned the names of the endangered animals but they also emphasized why those living beings were threatened with extinction. Actually, children (n=9) highlighted that some species were becoming extinct because of human interventions;

> I know that Comodo dragon is an endangered species. Also swans and pandas are becoming extinct, because Chinese people kill pandas for nothing. Pandas must be protected because they are such beautiful animals and a part of our environment (P14).

> I heard about sea turtles which are about to become extinct. Also pandas are endangered animals, because hunters kill them or sell them to the circus. Human beings should know that those living things have a role in nature and they [human beings] should not behave for their own pleasure (P3).

What is more, children indicated their concern for future generations in terms of endangered species:

> I think that when we waste water or use perfumes, this has an impact on other living things and animals such as the polar bear, seals and pandas are endangered. I worry about children in the future because if those living creatures become extinct how will the children in the future know their names, their physical appearance and their characteristics? (P9)

> Polar bears and penguins have been endangered to the point of extinction because of polluted smoke released into the atmosphere by cars, buses and factories. When they become extinct the human beings in the future will never know them. (P15)

Children indicated not only their future concerns and the intervention of humans on biological diversity they also reported what action can be taken to prevent extinction of species and protect biological diversity.

> Polar bears, penguins and the grizzly bear are going to be extinct, because of the action of human beings. People prefer to use their individual cars rather than public transportation. When they do not prefer to take a bus this has an impact on the life of a polar bear. Hereafter, I shall choose to ride a bicycle which does not release any harmful gases into the atmosphere. (P7)

> Gorillas, pandas, the polar bear and sea turtles are going to be extinct, I know. However, I think that recycling can be a solution to protect those endangered animals, because if we support recycling, human beings would not throw wastes into the environment and occupy the living habitats of those endangered animals (P5)

To summarize, while pre-interview findings indicated that the majority of the children were not aware of endangered living things and why they were doomed to extinction, post-interview findings indicated that the children had gained general knowledge about endangered living things as well as the possible reasons for this and what action could be taken.

4.2.4Perceptions of children about human-environment interrelationship in terms of climate change

Children were asked to explain their understanding in terms of climate change and its impact on polar bears and penguins living in the Artic. Pre-interview findings indicated that 3 children stated they had no idea why polar bears and penguins were losing their homes. On the other hand, 2 children indicated that they knew the reason because they had seen on television; “One day I watched polar bears and penguins on

television in a cartoon where the polar bears and penguins were sitting on a block of ice which was melting but I do not know why the ice was melting" (P4).

However, a majority of the children (n=12) agreed that the sun was one of the reasons why polar bears and penguins were losing their homes. Children claimed that polar bear and penguins are losing their homes because the sun was making ice caps melt "…*I know the reason is sun (P10)*, "*Now, we are in winter and the summer went to the Artic, so because of the sun, the ice is melting (P8), "…the sun may be getting angry with polar bears, therefore it makes the ice melt. Isn't it possible?" (P17) and "The sun makes the atmosphere warmer and warmer so the ice caps are melting" (P6.)*

The findings suggest that children associated the sun with melting ice. Even though the children were reminded during the interview that the sun has always been there but the melting of ice is a recent issue and polar bears and penguins have been faced with this crisis recently they insisted that the sun was the reason why the ice was melting and did not implicate human interaction with climate change.

Contrary to the pre-interview findings, post interview findings in terms of the children's perception on climate change and human emphasized that the reason for melting ice caps and of polar bears and penguins losing their homes was the polluted and smoky gases which were being released from cars and factories, "I know polluted smoke from factory chimneys are the reason why polar bear are losing their home" (P2) and "I have heard about huge ships visiting the Artic and the penguins are disturbed by the sharp propellers of the ships and the smoke they release into atmosphere" (P12) and,

> Because there are many cars, factories and high buildings we need more energy to operate them. This means that we need more factories to cover the energy consumption. Those are all reasons as to why the atmosphere is getting warmer; the released polluted gases warm the atmosphere and causes ice caps to melt (P7).

Additionally, children presented their suggestions related to climate change;

> The harmful gases from cars are rising up into the sky like clouds. This warms the atmosphere and makes the ice caps melt which is why the polar

> bears and penguins are losing their habitat. That means that if we prefer to use automobiles instead of riding bicycles we are also contributing to polar bears and penguins losing their homes. (P3)
>
> Polluted smoke from factory chimneys and cars are floating to the sky and because the polluted smoke is hot it warms the atmosphere and causes the ice caps to melt. My solution is to walk home from school because my apartment is very close to our school and it is not necessary to use a car. (P18)
>
> The polar bears and penguins are losing their home because of polluted and harmful gases. The gas is responsible for the atmosphere of the Earth getting warmer and warmer and since the polar bears and the penguins also live on Earth they are also affected. I prefer coming to school on my scooter instead of car anyway. (P6)
>
> The reason for this is the polluted gas released from the exhaust pipes of cars. I have a solution for that. Instead of car, I prefer to take the bus. While a car transports just two people, a bus transports many and each of them [car and bus] has one exhaust pipe. Moreover, planting seeds and growing trees is another solution of mine, because trees give us fresh air and they clean the atmosphere (P16)

In summary, the pre- and post- interview findings regarding the perception of children as to why polar bears and penguins are exposed to losing their homes display differences. Children claimed that the sun is the culprit and no human intervention on polar bears and penguins was indicated in the pre-interviews, whereas, post interview findings revealed that children considered the release of polluted and harmful CO_2 gases from cars and factories as the result of human intervention.

4.3 How the designed ESD program changed 60-66 month-old preschoolers' perceptions about the basic components of ESD: Summary of Findings

The participants were 60-66 month-old preschool children attending a public eco-preschool who were asked to draw a picture about "human being and the environment" and asked to attend pre- and post-interviews. Data was collected in order to establish the changes in the perception of the children in terms human-environment interrelationship. The detailed data analysis was based on pre- drawings and pre-interviews and accordance with preliminary findings, while post-drawing

and post-interview findings helped me to make a connection between their perception before and after the implemented ESD program. Each child was unique in terms of school experience, age range, and family background etc. which was obtained as common themes for both drawing and interview findings. Drawing findings are presented as mental models depending on current literature and interview findings which are presented as themes. This chapter displays a created and implemented ESD program in a local context and has an influence on the perception of the children in terms of the relationship between human beings and the environment. The major research question of the current study guides the drawing and interview sessions to reveal the influence of the created and implemented ESD program.

4.3.1 Changes in perceptions of 60-66 month-old preschoolers after the ESD program implementation as indicated by pre- and post- drawings and interviews

Drawing findings indicated that there were differences in the perception of the children before and after the implementation of ESD program. Even though pre-drawing findings included three mental models under the category of "Unavailability of a human being and environment interrelationship" the post-drawing finding indicated that all children included a human figure as an intervention element in the environment. It means that all participants addressed a human figure in their drawings and that there were interactions or human intervention on environment.

Table 4.1 How the designed ESD program changed 60-66 month-old preschoolers' perceptions about the basic component of ESD as indicated by drawings

Participant	Pre-drawings	Post-drawings
P1		
	…..the first thing that comes to my mind is the sun. I also drew an apple, a flower, clouds and the rain. There is a girl in my drawing and this girl is collecting flowers under the rainbow for her mother. …my environment is a nice place, and this girl feels happy for being in this nice environment.	I drew some flowers which are grouped into two groups. Some flowers are real flowers but some of them are made with waste materials…There are also two trucks in my drawings. One of them is for rubbish and one of them is for wastes. …I prefer to use the recycling truck and put waste materials…In this way, I save my real flowers; I save the Earth, don't I?
P12		
	I drew a huge sky and propellers that send waves to human beings making them cold…I also drew helicopters and the missions of those helicopters was dropping bombs on human beings because of an ongoing war.	I used blue crayon for coloring the sky and the sea.…some people leave their rubbish …fish, octopus, polar bears all have the same right to life as human beings…they are a part of the environment. They have a role in our environment. Some ships have jagged propellers and those can harm tuna fish. This should be prevented

Table 4.1 (cont'd)

P14		
	…human beings on the road. They are going to their apartments …they feel happy, because they like their apartment. Actually, I want to draw a lot of people, otherwise, those apartments could be empty and I do not want that.	I drew a recycling bin and a recycling truck. Human beings put their wastes in recycling bins …because recycling helps polar bears. I also drew polar bears but it is a little bit angry, because its home is melting…If human beings do not recycle …trees will be cut and our clean, fresh air will disappear. The air will get warmer due to the cars, factories and fires.
P16		
	I drew a lot of trees …I saw forests on television…Also, there is a machine, a seeding machine that I put among the trees…the seeding machine can fly and human beings can control it by remote control…otherwise they can become tired and their hands get dirty, from the soil.	My drawing included a lonely pine tree. The pine was lonely because human beings had cut the rest of the trees and only one tree remained standing alone…there is another man near the tree and this man will help this lonely tree…when it rains, the pine cones will start to grow. In this way, this lonely tree will not be a lonely tree anymore.

As indicated in table 4.1 the pre- and post- drawings of the same children displayed differences in terms of the relationship between human beings and the environment. While pre-drawings included figures of natural elements and human beings, it is not clear whether the human being is perceived as a part of the environment. What is more, children mentioned unusual characters such as flying seeding machines and heroes which had been learned through secondary sources such as movies in their environment. In the pre-interviews the children depicted no environmental challenges or crises; everything was fine in the environment.

On the other hand, post drawing findings indicated that the human being was also a part of the environment in which s/he lived and his/her actions have both favorable and unfavorable impacts such as recycling. The recycling issue is one of the prominent issues reported by the participants and that they associated recycling with deforestation, climate change and biological diversity. Moreover, in post drawings, it is clear that children put forward their suggestions to solve the environmental challenges that they are faced with. Participants presented what kind of actions should be taken in order to overcome the problems which is one of the goals of education for sustainable development.

Table 4.2 How the designed ESD program changed 60-66 month-old preschoolers' perceptions about the basic components of ESD: as indicated by pre- and post-interviews

Participant	Theme	Pre-Interview	Post-Interview
P5	General perception about the environment	Human beings are environmentally friendly. They love the environment because of flowers…smell really good.	Human beings are environmentally friendly, because the environment is friendly toward us. For instance, a bee is our friend because it makes us honey. I am also a friend of the bee. I eat honey and make it happy.
P13	General perception about the environment	I think that plants, flowers, trees and small animals are really cute. They look	We should respect the environment, because environment gives us life. Cow gives us milk, chickens

Table 4.2 (cont'd)

		at us full of love, so I love all of them, because they make me feel better. I feel better when I touch the fur of a cat	give us eggs and goats give us yoghurt. For this reason, I have to be respectful to nature, because it is obvious that it [environment] respects us.
P15	Deforestation	When I heard the word forests, I remembered a zoo, because I had never seen a forest before. I do not think that forests are important. I have no idea.	Forests include numerous kinds of animals living in the forest ecosystem all together. Forests are important both for animals and the soil. Trees conserve the soil and make the Earth much more powerful. If forests are destroyed, then the soil is eroded. Soil and trees hug each other and stand together.
P18	Deforestation	In my opinion, a forest can be destroyed with magic. A wizard …using his magic power, he can destroy the trees. …because a forest is a good place to have a nice picnic	I think a human being could destroy the forest …Maybe a hunter came to the forest and destroyed trees,…because if forests are destroyed, how can we get fresh air so why would a human being destroy a forest for his own pleasure. …when forests are destroyed animals lose their habitat and face extinction.
P3	Biological diversity	I have not heard about any living creature that is going to be extinct.	I heard about sea turtles which are going to be extinct…pandas are endangered animals, because hunters kill them and they are sold to the circus…those living things have a role in nature and they should not be used for their own pleasure.

Table 4.2 (cont'd)

P4	Biological diversity	Actually, I have no knowledge about any living creatures that are going to be extinct. I have no idea.	…polar bears, dolphins and sea turtles are living creatures that are going to be extinct, because of unfavorable impact of human beings. They should not become extinct…They are a part of our nature.
P16	Climate Change	I think the sun is the reason of why ice caps melts…in summer, when I buy an ice cream, I have to eat it quickly, because …the sun makes it melt.	…polar bears and huge penguins are losing their ice caps is because of polluted gases. The gases…released by cars. Actually, one of my solutions is planting seeds. Trees…releasing fresh and healthy air.
P9	Climate Change	I think it is very sad that polar bears are losing their homes. …I have seen such a scene in a movie – Shrek-. Shrek also loses its home when he turns green and becomes Shrek.	The dirty smoke from factories, apartments and cars is the reason why polar bears and penguins are losing their homes. …polluted smokes warms the atmosphere …when people use more cars or establish factories in Ankara, polar bears and penguins become upset in the Artic.

Table 4.2 presents samples of the pre- and post- interviews of the findings for the same children. The reasoning of children about their perception of the environment in general is presented. In pre-drawings, children indicated that the environment was for recreation and to make human beings feel better; on the other hand post interview drawing included natural elements of the environment and human beings and focused on the mutual relationship between them. Similarly, forests are considered a recreation place in pre-drawings. Some participants stressed

that their forest perception came from a secondary source such as a movie, a cartoon or documentary. However, post interview findings indicated children's arguments about deforestation and its possible impacts. In pre-interviews, participants did not express any knowledge about living creatures that are going to become extinct, yet post interviews included not only the names of species, but the possible reasons for their extinction. In the same way in terms of climate change children claimed that the sun was the reason why polar bears and penguins were losing their homes but in post drawings they presented considerably different reasons and even presented solutions for climate change.

CHAPTER V

DISCUSSION, IMPLICATIONS AND RECOMMENDATIONS

Key findings of the perceptions of preschool children in terms of the interrelationship of human beings and the environment in the context of ESD were discussed in detail and recommendations for further studies and implications were provided in this chapter.

5.1 Summary of the Study

The current study shed light on the potential of developed and implemented education for a sustainable development (ESD) program. Investigating the role of education on the perception of young children is crucial to understand how preschool children perceive the environment and the role of human intervention on the environment (Herbert, 2008). Effective methods should be available so that children can learn to gain a depth in their understanding and awareness (Qemuge, 2008). Hence, the objective of the current study was to explore the changes in the perception of 60-66 month-old preschoolers in terms of the interrelationship of human beings and the environment with the use of a developed and implemented ESD program.

The focus of this study was threefold consisting of developing a program related to the human-environment interrelationship in the context of ESD, implementing the developed program and evaluating the potential of the implementation. The sample of the study was comprised of 18 preschool children attending a public eco-preschool. In order to make an in depth investigation and increase the credibility of the study, drawings and a semi structured interview protocol were utilized before and after the implementation of the program. Drawings were obtained particularly for understanding how preschool children perceive the human-environment interrelationship, whilst a semi structured interview protocol was utilized to obtain information regarding the perception of children related to deforestation, biological diversity and climate change which are the basic components of education for sustainable development. The key findings of the current research were presented as follows.

5.2 Key Findings

5.2.1 General perception of children in terms of the interrelationship of human beings and the environment

Table 5.1 Key Findings from Drawings

Key Findings from Pre-Drawings

Key Findings from Pre-Drawings	Key Findings from Post Drawings
• Preschool children's perception of nature includes repeated, idyllic and stereotypical images. • Birds, flowers, clouds, animals and apple trees were the most popular figures that children associated with the environment in pre-drawings. • Preschool children perceived the environment as peaceful and pristine without attributing any intervention of mankind. • Preschool children preferred to draw fantastic and unusual objects. • Drawings indicated perception of preschool generated through secondary sources • Preschool children did not indicate any human-environment interaction in their pre-drawings.	• Preschool children depicted that the environment is a place impacted by human interventions • Recycling issue was outshined by majority of children • Preschool children associate the recycling issue with climate change • Preschool children interlinked the recycling issue to deforestation • Preschool children made a connection between deforestation and biological diversity • Preschool children indicated that all living beings have the right to live.

Table 5.2 Key Findings of Interviews regarding the general perception of children in terms of the interrelationship of human beings and the environment

Key Findings of Pre-Interviews	Key Findings of Post Interviews
• Preschool children explained trees, the sun, grass, flowers, apartment buildings and cars as the main and the most repeated elements of environment. • Preschool children claimed to be environmentally friendly, yet they did not justify this claim. • Preschool children acknowledged that they should love and respect the environment because of aesthetic beauties it contained. • Preschool children did not give any explanation about what sustainability is.	• Preschool children added polar bears, penguins and fish instead of trees, the sun, animals and human beings as the most common figures in the environment. • Preschool children revealed that as human beings they were environmentally friendly in many ways. • Preschool children indicated that they should love and respect the environment, because the environment is the source which sustains life. • The Majority of children associate the term "sustainability" with being respectful to living and non-living beings.

Table 5.3 Key findings from the interviews regarding the interrelationship between human beings and the environment in terms of deforestation, biological diversity and climate change

Key Findings from Pre-Interviews	Key Findings from Post-Interviews
• Preschool children perceived forests as a place of recreation. • Preschool children indicated that forests were not nice places because of horrible witches and wizards • Preschool children remarked that forests were destroyed because of magic and terrorist attacks. • The majority of preschool children reported that they had	• Preschool children noted that forests were important, because they were the home of many animals such as lions, snakes, elephants and plants. • Preschool children acknowledged that forests were the source of fresh and clean air. • Preschool children associated forests with climate change and biological diversity.

Table 5.3 (cont'd)

• no idea about living beings facing extinction. • The majority of preschool children associated melting ice caps with the sun. • Preschool children did not note any human intervention as the reason for melting ice caps and the disappearance of the homes of polar bears and penguins.	• Preschool children suggested ideas for the protection of trees and forests. • Preschool children indicated that polar bears, penguins, sea turtles,pandas, gorillas and seals were endangered animals. • Preschool children acknowledged the importance of biological diversity. • Preschool children presented concern for future generations regarding endangered species. • Preschool children explained the intervention of human beings on biological diversityi • Preschool children emphasized that polar bears and penguins are losing their homes as a result of melting ice caps because of dirty and smoky air. • Preschool children revealed cars and factories as the reasons for dirty and smoky air causing the atmosphere to grow warmer and warmer • Preschool children identified suggestions such as preferring bicycles or scooters to protect polar bears and penguins.

5.3 Discussion

5.3.1 General perception of children in terms of the interrelationship between human beings and the environment within the context of ESD

This study focused on the early childhood practice through education for the sustainability perspective. Development and implementation of the human-environment interrelationship through the ESD program was realized by means of utilizing a transformative ESD program with a group of preschool children. As a

result, changes in children's perceptions regarding the interrelationship between human beings and the environment before and after the implementation were evaluated. Pre-findings revealed that children did not display an extensive range of understanding and perception in terms of human-environment interaction (Table 5.1). The common points in pre-findings shared by the majority of children were repeated as were the idyllic figures of natural elements. In both pre-drawings and interviews, children stated common and replicated natural elements such as an apple tree, the sun, grass, flowers, birds and clouds to depict the environment. Similar findings have been found in different research studies (Alerby, 2000; Barraza, 2006; Keliher, 2007; Loughland et al., 2002; Taşkın and Birgül, 2008 and Ülker, 2011). In this aspect Keliher's study (2007) which was conducted to reveal children's perceptions of nature with similar findings with the current study is worth mentioning. Keliher found that regardless of outdoor experiences and the family background, children who were 6-7 year-old perceive their environment as trees and birds in peaceful and pristine surroundings without depicting any environmental challenges. The underlying reasons why children draw stereotypical images were explained by Keliher (2007) in the form of a 'learned response'. That is to say, secondary sources lead children to learn certain things in certain ways in the early years, even though the early childhood period is crucial for one to learn about the environment and the forming of perception (Elliott, 2010; Barraza&Cuaron, 2011)

In this perspective, the reason why children have stereotypical images in their mind might be explained by Piaget's stage theory. According to Piaget, between the ages of two and seven, preschool children are still in the preoperational stage. In this stage, children tend to comprehend their world with their own perspective and fail to understand other points of view (Piaget, 1959). That can be the reason why preschool children value the environment as aesthetic beauties which are available for their pleasure. The 'environment scheme' of children was created according to what they see in their environment without attributing any association between humans and the environment. Accordingly, Alerby (2000) stressed that having similar perceptions about natural elements might be the sign of their thinking process which is obtained from their own concrete reality. Another alternative perspective elucidated by Taşkın and Birgül (2008) revealed that children perceive concrete

objects which they observe in their lives and they perceive trees, flowers, birds, human beings etc. in their environment, yet they do not indicate any interaction between them. What is more, it was reported in the study conducted by Ülker (2012) to explore the image Turkish children (K-8) had of nature that children's perception of nature developed independently from the function of items in nature. That is to say, the participants have the capability to draw natural elements as they perceive them, however, they have insufficient understanding of the function which was also determined in the current study. In other words, it was observed that participating children tend to draw nature in a certain way.

At this juncture, some conclusions can be inferred in terms of school ethos. It was indicated that studying with eco-school preschoolers was one of the criteria for the study, because it was expected that being a member of an eco-school gives children an awareness which makes them concerned about their environment for facilitated association within the ESD program. However, the pre-findings of the current study revealed that even though participants were eco-school children, their prior knowledge about the environment displayed limited understanding. This position was also examined in several studies conducted by Collado and Corraliza (2011) to determine children's perceived restoration and their environmental orientations. It was argued that direct interaction with the environment has a positive affect on the way children respond in terms of their environment. This means that children who are attending environmentally oriented classes and schools are more environmentally concerned in comparison to others. Whereas the study conducted by Barraza (2006) highlighted the fact that the school ethos did not display any statistically significant differences. Children attending a school with environmental policies were no more interested and concerned about environmental crisis than children from other schools. Children from environmentally oriented schools did not display more awareness of the environmental crisis than the others. In Barraza's study there was no strong evidence to suggest children from the schools with environmental policies promoted children's concern in terms of environmental issues. Besides, the study which was conducted by Boeve-de Pauw and Van Petegem (2013) indicated that eco schools can differ in their educational approaches and in their teaching about the environment. Within the scope of their study, the main focus

of Flemish eco-schools is focusing and transforming values, yet this can differ from country to country, because some schools are interested in environmentally responsible behavior as well, but the key point should be searching for different pedagogical approaches and to determine the most appropriate one for the social-cultural context of each country. That is to say, eco-schools should be evaluated in the context of own needs, their educational approach and their vision. That can be the reason why the findings of the current study pointed out that the eco-school in which the current study was conducted revealed some limitations regarding its environmentally oriented education. The pre-findings of the current study put forward some limitations in children's understanding about action such as recycling, energy consumption, water conservation and their role in the well-being of the environment. Therefore, it can be inferred from the current study that eco schools in the Turkish context might be arranged in accordance with the socio-cultural structure of the Turkish society, because the needs of each society can display differences, thus educators should be aware of the needs of their local environment and then design curriculum approaches to make individuals more aware of their local environment.

At this point, the impact of the implemented education for a sustainable development (ESD) program should be discussed. Kukk (2009) acknowledged that through practice and external confirmations, it is possible to internalize the values and integrate education objectives on a preschool level which is noteworthy in promoting children's different developmental areas simultaneously. The implemented ESD program provided children elements to think about and act in terms of sustainability issues. Children had the opportunity to engage with numerous kinds of issues such as recycling, biological diversity, climate change, water consumption, energy consumption through utilizing numerous kinds of learning tools such as art, drama, science, play etc. Therefore, active involvement might be the reason why children's pre-findings display differences when compared to post-findings in terms of the general perceptions in terms of interrelationships between human beings and the environment because post-findings of the current study indicated that children have become aware of their own actions in terms of promoting sustainability. In post-drawings, children put themselves at the center of

the drawings and focused on his/her and/or human intervention on the environment. Factually, the expectations from the current study was to make children alert in terms of their potential role regarding sustainability with both favorable and unfavorable impacts. In this conjuncture, post findings pointed out increasing levels of knowledge and perspectives of children in terms of the environment they live in. The Soil Education Project called *Learning about soil with Tipitop and his friends* (Gulay-Ogelman, 2012) shares the similar finding with the current study in terms of outcomes. Participating in the project actively contributed to children learning about soil with its various features and how they can conserve it. The study was carried out with the collaboration of university and kindergarten staff and family participation as well (Gulay-Ogelman, 2012). The underlying reason might be the experiences that children underwent through the implemented education for a sustainable development (ESD) program. That is to say, as far as the experience gained through this study has been considered, participating in the ESD program made children aware of the environment itself with both indoor and outdoor activities (Davis, 2010).

Herein, the point that we should discuss are “experiences”. The implemented ESD program provided children the opportunity to experience human-environment interrelationship within the context of sustainability through both indoor and outdoor environments. Discovering the environment might enhance children’s feelings of belonging, respect, interest and assessment of the environment. Post findings of the current study indicated that all children continued to reveal similar natural element figures, yet they put the human being intervention in their statements. Actually, the expected outcome of the current study taking its roots from the first principle of the Rio declaration (1992) “human being is at the center of concerns for sustainable development...” (p.1). In this juncture, Martinez Agut, Angeles Ull and Aznar Minguet (2013) indicated physical, natural, social and cultural environments integrated in preschool curriculum facilitates knowledge and helps children to comprehend what the role of children is specifically and what they may experience in the environment. Thanks to education for sustainable development (ESD) program, post findings revealed that children put themselves at the center of their actions and were able to indicate reasons to love and respect the environment, because the

environment is the source of sustaining life as they stated. Children acknowledged that they should respect trees, because trees were the source of clean and fresh air not only for human beings but also for protecting the homes of polar bears, they should love and respect cows, because cows are the source of milk which help them to grow up and they should respect chickens, because chickens supplied children with eggs. The reason for those statements of the children might be the result of participating in daily life-related issues through the implemented ESD program which consisted of activities such as energy consumption, water conservation, recycling, biological diversity, forest ecosystems which were linked with each other in order to make children feel, experience and appreciate the environment which they were also a part of.

5.3.2 Perception of children regarding the interrelationship between human beings and the environment in terms of deforestation, biological diversity and climate change

The current study also focused on how children perceive deforestation, biological diversity and climate change. Before the implementation of education for sustainability (ESD) program, children did not have and extensive in-depth understanding about the forest ecosystem, how forests could be destroyed (except the impact of black witches and magic); which species were endangered by extinction and why biological diversity is important; the possible reasons of melting ice caps resulting in polar bears and penguins losing their homes. On the contrary, post findings highlighted that children gave reasonable statements corresponding to the interview questions about those components. The post interviews revealed that children were able to present why forests were important as the source of fresh and clean air. Also, they attributed human intervention to deforestation. Actually, during the activities related to forest ecosystems, biological diversity and climate change there had been a great deal of discussion about why forests are important, for whom they are important, how they could be destroyed, the importance of biological diversity, the possible reasons of the extinction of species, possible reason for melting ice caps and human interventions on all those components. In parallel to the nature of this ESD program, studies showed that children's perception can be changed through a series of activities in which children participate actively (Gulay-

Ogelman, 2012; Prince, 2010;Stuhmcke, 2012). That is to say, children were exposed to a series of activities connected with each other to create their own meaning about those environmental issues. It deserves to be noted that according to post findings, children also indicated their own suggestions to overcome the challenges to achieve sustainability. The underlying reason for this might be that when given the opportunity children are capable of understanding what they have learned through education (Bowker, 2007). Through activities, children had the opportunity to learn components of the forest ecosystem, become familiar with endangered species and gain awareness about the impact of human intervention on polar bears and penguins. Actually, the statements of children indicated feelings of love, care and respect for the Earth with its forests, living species and melting ice caps. This position can be explained as active involvement of children which enables children's primary contacts with sustainability issues supporting the children's understanding about life systems on Earth (Burgess & Mayern-Smith, 2011).

In this juncture, Gulay-Ogelman (2012) stated that children's knowledge about the environment and their sensitivity towards the environment increased as a result of activities that they participated in. In regard to change in children's perceptions, it should be pointed out that children's most frequent responses after the teaching intervention were about the aspects that they had been taught. Actually, this is an indication of the potential of the implemented ESD program. All this can be considered evidence of the potential of the ESD program in making children think critically and have a role in decision making. As it is indicated in chapter two, environmental education itself is not sufficient to contribute to developing sustainable practices or creating agents for sustainability (Davis, 2010). The current study was the kind of extended type of education regarding the environment which focused on social and economic aspects so that preschool children continued to learn about the environment by participating in the transformative approach.

Transformative education described by Davis (2010) as supports and encourages children in problem seeking, problem solving and action taking within their environment. One of the potentials of the implemented ESD program is that it makes children act as active agents for the environment. This transformative

education might be the reason that children have recognized that many of them perceive the impacts of climate change on polar bears and penguins resulting from human activities and as a result they found their own solution to use a bicycle and/or a scooter to decrease the release of smoky air into the atmosphere. In addition, in terms of the separation of wastes, children used the recycling bins in their classroom before class, yet they have no idea why they put the waste cardboards, papers, newspapers, glass, metals and the plastics into the bins, but the ESD program has had the impact that children have a knowledge about the process of recycling and its necessity for the well-being of trees as well as polar bears and saving the economy. This is also confirmed by earlier studies. Barraza and Robottom (2008) for example, reported in their study related to gaining the representations of individuals' mental constructions of sustainability issues, that 16% of the children put forward alternative solutions to environmental problems such as air cleaning machines, solar energy vehicles, special rubbish containers and different artifacts which might prevent water and air pollution.

In this regard, real issues and real contact with sustainability encourage children to perceive, decide and take action. To illustrate, it is possible to see in post-interviews (Table 5.3) that some of the issues that children excelled at was recycling and coming up with explanations about endangered species. The reason why participants emphasized those two issues might be due to the activities such as visiting a real recycling truck which came to school, meeting a worker and listening to him explain why and how the wastes were recycled. Also, an activity that includes meeting a biologist and discussing the reasons why living creatures have become extinct and learning how we could help from the expert might influence children. This is also indicated by the opinions of Bruner (1966) and Vygotsky (1978) that new knowledge is constructed by exploring new experiences in the environment and with social interaction (Essa, 2003).

5.4 Educational Implications

The focus point of the current study is to reveal the potential of developed and implemented education for a sustainable development (ESD) program. The objective of the ESD program conducted with 60-66 month-old preschool children

was to determine the changes in the perceptions of children in terms of human-environment interrelationship.

The major conclusion of this study is assessing the importance of early childhood education for sustainability. The implementation of education for a sustainable development (ESD) program in this current study included conducting a series of activities which continued for four weeks. That is to say, even though preschool children participated in a series of activities for only four weeks, the post-findings indicated that there was a noticeable change in the children's perception about how they perceive sustainability in terms of the human-environment relationship. Factually, this supports the statement of Samuelsson and Kaga (2008) that education should start during preschool years in order to achieve sustainable development which has been proposed by UNESCO. There is a kind of a truth in that opportunities in early childhood settings makes children engage with challenges they have when they face complex questions dealing with sustainable development (Pramling Samuelsson & Kaga, 2010).

Early childhood education plays a great role in diffusing values, attitudes, behaviors and customs (MartinezAgut et al., 2013). In this aspect, early childhood centers have great potential; because those are the places where children spend most of their time (Collado & Corraliza, 2011). In Turkey, children who attend early childhood institutions spent approximately 5 to 10 hours of their time in those institutions per day (MoNE, 2013). Integrating education for sustainability into the national early childhood program provides a great advantage to involve children in sustainability issues. In this regard, early childhood education programs should cover education for sustainability both indoors and outdoors. Outdoor experiences are crucial, yet they promote education in the environment and leave out education for the environment. On the other hand, establishing an idea about the environment should serve to move toward more practical and pedagogical tools. In this essence, it should not be perceived that education for sustainability could be integrated through outdoor experiences, yet the indoor area can be appropriate to design learning activities. Early childhood classrooms should be equipped with diverse educational materials to attract children's attention. Various kinds of plants should be placed in a

science center or an earth map should be hung on the wall. The book center should be equipped with different kinds of story books to extend children's perspectives in terms of sustainability issues.

Moreover, early childhood education for sustainability should not depend on the perspectives of just educators and/or researchers. On the other hand, early childhood centers and university staff should collaborate on how awareness education for sustainability can be integrated into the early childhood education. An action oriented approach should be the center point for designing a preschool curriculum for education in sustainability. This study showed that active involvement enhanced children to become much more aware individuals when they are also a part of the environment. That is the reason why education for sustainability is more than equipping children with environmental knowledge while it encourages children to take action as responsible agents for the well-being of the planet.

Actually, making children realize their own potential is one of the expected outcomes of the current study, because the findings indicated that when children perceive the human being –also oneself- as a part of the environment, they think critically, make decisions and take action (Davis, 2010). That is the reason why opportunities should be provided for children to become involved in environmental issues. Herein, the focal point is a multidisciplinary approach which should be considered to fulfill the needs of the child as a whole. That is to say, education for sustainable development (ESD) in formal education should be systematic and promote children in every aspect. Moreover, early childhood education programs should be redesigned to focus on the environmental perspective in order to increase the familiarity of children with the issues which are considered to be the key point in order to change the attitudes, values and the perceptions of young children about the environment. Today, many countries in the world such as Sweden, Norway, Australia, New Zealand and England have reoriented their early childhood education curriculum to cover the needs of sustainability. This could also be possible in Turkey. TheTurkish National Early Childhood Curriculum provides a base for education in sustainability, but the practical considerations and action-oriented approach should be highlighted. As Ernst and Theimer (2011) claimed, revising

educational programs and the exclusion of outdoor activities can be an alternative to prevent the 'nature-deficient' disorder. That is to say, re-arranging learning experiences by regarding age appropriateness and teaching methods, it is possible to make children involved in theecological process. It is revealed that young children have the capability to understand ecological events by combining existing knowledge with emerging concerns.

Finally, as a researcher, there are some educational implications I want to present. As Merriam (2009) stressed a researcher is the primary instrument for data collection in a qualitative study. Within the context of the current study, I observed that children were quick to learn about sustainability. During the implementation period, there were issues which some of the children were introduced to for the first time such as the components of a forest ecosystem, the process of recycling, polar bears and penguins in the Artic and what sustainability is. On the other hand, it was observed that children were willing to take on those issues. As I indicated before, I spent much time with the children with the exception of the implementation of the ESD program. I had the opportunity to attend their classroom routines. During this time, I observed that children use polar bear figures in their play time, and that they had started to use recycling boxes in the classroom to put waste cardboards in after an activity. That is to say, sustainability is not an abstract issue for children if it is taught in an appropriate manner; children are ready to learn. In this context the important issue is how sustainability can be taught to children. It deserves to be noted that at the beginning of the implementation period, I felt too strict and didactic to teach sustainability, yet after a short while, I realized that being flexible makes the activity process much more effective.Actually, the focus point in education for sustainability should not be instructing children, but it should be steering children to think critically through open ended questions and group discussions. If educators provide opportunities for children to think critically, then young children make their own inferences and start to act critically. In this aspect, group discussions are quite efficient for the deliberation of knowledge. During group discussion at the end of the activities, each child had a chance to express what they have learned or felt during the activity process. I have recognized that peer interaction during discussion is also beneficial in making children internalize sustainability. In conclusion, the indoor

classroom environment is also a place to teach sustainability. Providing appropriate materials and selecting appropriate teaching methods, educators should use not only the outdoors but also the indoors as a place to teach sustainability. To illustrate, during implementation, we turned off the lights when we left the classroom, designed a forest ecosystem by using art materials, actively used recycling bins in the classroom environment or learned to pay attention to water and paper towel conservation during clean up. That is to say, educators should not be restricted to teaching children only about the natural environment; indoor environments provide opportunities to teach sustainability regarding the environment as well as social and economic issues.

5.5 Recommendations for Further Studies

There are certain suggestions based on the findings of this study. These recommendations are represented in this section.

It is recommended in this study that education for sustainable development should start with early childhood education. This recommendation is also supported by Davis (2011), Pramling Samuelsson and Kaga (2008) and Robinson and Vaeliki (2010). On the other hand, early childhood education for sustainability should become more popular, and it should not suffer due to lack of research and theorizing (Davis, 2011). Within this regard, the current study contributes to early childhood education for sustainable development.

It should be noted that teachers and educators have a powerful role in making children recognize and assimilate the learning experiences regarding sustainability (Kaga, 2008). For this reason, teacher education should also be evaluated. As it has been indicated before, ESD is considered as doom and gloom education and it is perceived as difficult to transfer to the ECE context. On the other hand, the current study showed that ESD can be integrated into daily routines easily. For that matter, teacher education programs and workshops can be designed in the context of further studies to inspire educators on how the ESD can be integrated.

Moreover, further studies can include parents in the process of early childhood education for sustainability.The family act should not be ignored, because

it has great influence on young children in developing attitudes, values and skills (Martinez Agut et al., 2013).

This study was conducted only in one early childhood classroom with eco preschool children. The replication of this study in different classrooms with the same age groups should be carried out. Studying with younger children would enhance educators to gain experience and knowledge in terms of starting with ESD in very young children. This way, the differences can be revealed and different pedagogical approaches can be generated to promote children's perceptions toward sustainability

Education for sustainable development (ESD) program in this study continued for four weeks. Thus, it would be appropriate that the period of the ESD program be extended to cover various types of activity because ESD is related to transformations of values, attitudes and perceptions and therefore much more time is required for a transformative education. The educational programs should be composed of projects that support active participation and permanent learning. In this aspect, a project approach can be helpful to follow a systematic process for curriculum integration. Follow up studies should be conducted to explore the influence of the present study in the long term.

Future research possibilities should also be identified. In the first place, longitudinal studies can be conducted in order to follow the later stages of the children who participated in the education for sustainability in early childhood settings to determine the effectiveness of the program. It would enhance to investigate the long-term outcomes of starting early with education for sustainability. In this aspect, children's daily life experiences could be observed and the way they were influenced by attending education for sustainability programs could be determined. In addition, transformative learning approaches should be embedded into the early childhood curriculum on a national level to explore children's participation. That is to say, transformative education is highly required to reveal the evidence of children's preliminary knowledge about the environment, practices, actions and the impact on the communities.

The study included different data collection methods such as drawings and interviews. Thus, more data could be obtained from an increased number of classroom observations to achieve a broader and more detailed account of the eco school preschoolers' perception in terms of human-environment interaction.

It is necessary to promote education for sustainable development programs in developing countries and the countries where the adverse effects of environmental crisis are experienced. In the light of these findings, educational policies should be developed to inform children about environment and let children understand the environment.

Even though the National Early Childhood Curriculum for Turkish children provides a baseline to support sustainability, the practical educational activities implemented in preschool classrooms are controversial (Kahriman-Öztürk, 2010). That is the reason why research studies and projects can be designed with children, with in-service and pre-service teachers. Particularly, case studies could be helpful to demonstrate how ESD can be integrated into early childhood education which is one of the gaps in this field (Davis, 2007; Davis, 2010; Göteborg Recommendations, 2008).

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APPENDIX A
INTERVIEW PROTOCOL

1. Gözlerimizi kapatsak ve düşünsek, ben merak ediyorum çevre dediğim zaman aklına ne geliyor? Çevremizde neler vardır? Kimler ve neler yaşar çevremizde?
2. Sence insanlar yaşadıkları çevre ile arkadaşlar mıdır? İnsanlar nasıl davranır çevreye? Sen nasıl davranıyorsun içinde yaşadığın çevreye?
3. Sence içinde yaşadığımız ve bulunduğumuz çevreyi sevmeli miyiz ve çevreye saygı duymalı mıyız? Çevremizi nasıl sevebiliriz ve nasıl saygı duyarız? Bunlar için neler yaparız, yapmalıyız?
4. Sence sürdürülebilir yaşam nedir?
5. Bir orman düşün desem sana aklına ne geliyor? Ormanlar sence önemli midir? Kimler ve neler için önemlidir ormanlar?
6. Düşün ki yüksek, çok yüksek, çok çok yüksek çam ağaçlarının olduğu, mavi bir derenin hızlıca aktığı, güzel kokulu bir orman baktın ki bir gün yok olmuş. Böyle bir durum nasıl olmuş olabilir? Nasıl hissedersin böyle bir durumda? Başka kimler ve neler nasıl hissediyor olabilir?
7. Önceleri yeryüzünde mutlu bir şekilde yaşayan, ancak artık sayıları azalan ya da yok olan bir canlı duydun mu hiç?
8. Peki bu canlılar neden yok oluyor olabilirler ve sayıları neden azalıyor olabilir?
9. Yaşadığımız yeryüzünde buzullar ile kaplı olan yerlerde kutup ayılarının ve büyük penguenlerin evleri var. Ben geçtiğimiz gün bir haber izledim ve öğrendim ki bu canlıların evleri yok oluyor. Bu durum nasıl olmuş olabilir? Bir fikrin var mı?

APPENDIX B: ETHICAL PERMISSIONS

ODTÜ ETİK KURULU
İnsan Araştırmaları
Veli Onay Mektubu

Tarih

Sayın Veli

Orta Doğu Teknik Üniversitesi, Okul Öncesi Öğretmenliği Bölümü'nde yüksek lisans öğrencisiyim ve ODTÜ İlköğretim Bölümünde araştırma görevlisi olarak çalışmaktayım. Yrd. Doç. Dr. Refika Olgan danışmanlığında ve Doç. Dr. Gaye Tuncer ortak-danışmanlığında yüksek lisans tezi çalışmam kapsamında geliştirdiğimiz ve uygulamasını yapacak olduğumuz sürdürülebilir kalkınma için eğitim programının 60-66 aylık okul öncesi dönem çocuklarının çevre-insan ilişkisi kapsamında sürdürülebilirlik ile ilgili algılarını ne yönde değiştirebileceğini incelemeyi hedeflemekteyim. Bu nedenle, bu formun ve mektubun yollanış amacı çocuğunuzun da çalışmamıza katkıda bulunabilmesi için sizden gerekli iznin alınmasıdır.

Yapılacak olan çalışmanın temel amacı sürdürülebilir kalkınma öğelerini Türkiye'de uygulanmakta olan okul öncesi eğitim programına bütünleştirmek ve çocukları Türkiye'nin sürdürülebilirlik kapsamında ormansızlaşma, biyolojik çeşitlilik ve iklim değişikliği ilgili karşı karşıya kaldığı problemler ile tanıştırmaktır. Bu çalışma sonucunda elde edilecek bulgular okul öncesi dönemde sürdürülebilir kalkınma için eğitimin okul öncesi eğitime nasıl bütünleştirileceği ve çocukların algı ve anlayışlarını nasıl değiştireceği konusunda katkıda bulunacak ve okul öncesi dönemde sürdürülebilir kalkınma için eğitimin önemini vurgulayacaktır.

Çalışma kapsamında geliştirilen sürdürülebilir kalkınma için eğitim programının uygulamasının yapılmasından önce ve sonraçocuğunuzdan "insan-

çevre” hakkında bir resim yapması istenecek ve yapılan bu resim ile ilgili çocuğunuzdan açıklama yapması istenecektir. Ayrıca, yine programın uygulanmasından önce ve sonra insan-çevre ilişkisi, ormansızlaşma, biyolojik çeşitlilik ve iklim değişikliği ile ilgili dokuz sorudan oluşan ayrı bir görüşme de yürütülecektir. Görüşmenin ortalam süresi 10-15 dakikadır. Veri toplanırken hiçbir şekilde isim ya da aile kimliğini belirleyici sorular sorulmayacaktır. Araştırma kapsamında daha güvenilir bilgiye ulaşmak için görüşme esnasında ses kaydı yapılacaktır. Ayrıca, uygulamanın yapılacağı dört haftalık süreçte etkinlikler süresince fotoğraf çekimi de yapılacaktır. Ancak, çalışmamız katılımcıların fiziksel veya ruhsal sağlığını tehdit edici ya da onlar için stres kaynağı olabilecek unsurları içermemektedir. Çalışma sürecinde çocuklarınıza sorulacak soruları incelemeniz mümkün olacaktır. Çalışma kapsamında çocuklara sorulacak sorular, çizimleri hakkında yapılacak görüşmeler ve programın içeriği olan etkinlikler hiçbir şekilde kişisel rahatsızlık verecek olumsuz ögeler bulundurmamaktadır. Ancak, katılım sırasında sorularda, program kapsamındaki etkinliklerden ya da herhangi başka bir nedenden ötürü çocuğunuz kendisini rahatsız hissederse çalışmadan kendisi sonlandırılacaktır.

Bu çalışmaya verdiğiniz destek için şimdiden teşekkür ederim.

Çalışma hakkında daha fazla bilgi almak için İlköğretim Bölümü Araştırma Görevlisi Seçil CENGİZOĞLU (Ofis: EF 29; Tel: 2107538; Eposta: ksecil@metu.edu.tr)

Seçil CENGİZOĞLU

Yukarıda açıklamasını okuduğum çalışmaya, oğlum/kızım _____’nin katılımına izin veriyorum.

Ebeveynin:

Adı, soyadı: _____ İmzası: _____ Tarih: _____

Araştırmacını Adresi: Odtü Eğitim Fakültesi oda EFA-37 ODTÜ/

Ankara

Araştırmacının E-postası: ksecil@metu.edu.tr Araştırmacının

Telefonu: 2107538

İmzalanan bu formu lütfen ..... aracılığı ile

.....'e ulaştırın.

Çocuğunuzun katılımı ya da haklarının korunmasına yönelik sorularınız varsa ya da çocuğunuz herhangi bir şekilde risk altında olabileceğine, strese maruz kalacağına inanıyorsanız Orta Doğu Teknik Üniversitesi Etik Kuruluna (312) 210-37 29 telefon numarasından ulaşabilirsiniz.

APPENDIX C:TEZ FOTOKOPİSİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü ☐

Sosyal Bilimler Enstitüsü ■

Uygulamalı Matematik Enstitüsü ☐

Enformatik Enstitüsü ☐

Deniz Bilimleri Enstitüsü ☐

YAZARIN

Soyadı : CENGİZOĞLU
Adı : Seçil
Bölümü : Okul Öncesi Öğretmenliği

TEZİN ADI (İngilizce) : Investigating Potential of Education for Sustainable Development Program on Preschool Children's Perceptions about Human-Environment Interrelationship

TEZİN TÜRÜ : Yüksek Lisans ■ Doktora ☐

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir. ☐
2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir. ☐
3. Tezimden bir bir (1) yıl süreyle fotokopi alınamaz. ■

TEZİN KÜTÜPHANEYE TESLİM TARİHİ: