



Creating a Guidebook promoting Education for Sustainability and steering children to become Ecologically Intelligent

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The purpose of this functional thesis is to introduce the concept of education for sustainable development and to steer children on the path to becoming ecologically intelligent, by creating a guidebook of activities in cooperation with an English language kindergarten located in Espoo. The aim is to instill habits and values reinforcing sustainability in children. Education can help in developing resilience and skills to support children in becoming active and responsible citizens who can contribute towards a healthy and sustainable living.

The theoretical framework of this thesis consists of a discussion about Early Childhood Education and Care in Finland, Social pedagogy, and Eco-pedagogy. All three have holistic learning, participation, interaction, and providing positive experiences to the children as a common theme. They also have guidelines supporting sustainable and healthy living. Social pedagogy follows a 'head, heart, and hand' approach, whereas Eco-pedagogy follows the 'doing together' approach. In addition, the principles of transformative education were the main guiding force behind designing activities for the children. The activities consist of handicrafts, environmental education, and reading-relevant literature. It also includes activities supporting circular economy and phenomenon-based learning.

Finally, the concept of ecological intelligence and education for sustainability in early childhood education are analyzed. Education in early childhood can be used as the first step to introduce ecological intelligence by using two approaches - habituation through daily activities and through real applications in the surrounding environment.

The implementation included three activities and designing the guidebook, that was done in collaboration with the kindergarten staff. They evaluated the guidebook and gave positive feedback about its utility in a kindergarten, which indicated that I was successful in achieving the goals set for this thesis.

Keywords: Education for sustainable development, early childhood, ecological intelligence, environment.

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1 Introduction

Currently, the world is facing environmental, social, and economic problems. There is a concern about global warming in addition to water shortages and pollution, soil contamination and infertility, marine life depletion, and habitat obliteration. The world population is under stress due to refugee crises, conflict over diminishing resources, increase in the human population along with a spike in contagious diseases such as Severe Acute Respiratory Syndrome (SARS), Swine flu (H1N1) and currently the COVID-19 pandemic. There is a need to recognize that human development should not be only about economic growth. Development should not be at the cost of our environment.

Climate change and sustainability have a global impact and concern all members of society. According to Davis (2010), children are more susceptible to the impacts of unsustainable living due to their physical and cognitive vulnerabilities. Therefore, education can play an important role in equipping children to face future challenges. In the words of B.F. Skinner, “Education is what survives when what has been learned has been forgotten”. Learning shapes our personality, our opinions, and defines our character. We may forget most of the subjects learned during our school life, but values, beliefs, and opinions formed while studying remain with us for long. Similarly, children may be unable to understand the intricacies of sustainability and related issues but teaching them values and supporting the development of habits that reinforce sustainability will stay with them for life. We are aware that education is a lifelong process and it starts from early childhood. In a world that is rapidly changing and the kind of new crises that the world population has to face, it is necessary that children are educated in values, beliefs, and survival skills that form the basis of their social development.

Education plays an important role in nurturing resilience and skills that support the children to become active and responsible citizens who are competent enough to contribute towards healthy and sustainable ways of living (Davis 2010). Children begin to develop critical thinking skills at an early age. As early years educators we have a responsibility in offering children positive experiences to support their learning and understanding the environment in the context of their surroundings. It will help them make responsible and informed choices and decisions to support sustainable living. We can provide positive role models to children by engaging them in conversations regarding sustainable development and having discussions about solutions for problems concerning them. We can also tell them about the significant achievements of people like Greta Thunberg that will give a positive disposition to the subject, instead of presenting a picture of misery. Therefore, learning in early childhood can be used as the first step to introduce ecological literacy by using methods that are appropriate for their age.

2 Background

2.1 Aims and objectives

While formulating the objectives of my thesis, I realized that teaching or practicing sustainability and environmental education is a lifelong process. It is an approach to education as a whole, rather than a subject. It relates to the inter-relationship between nature and humans. It also takes into account present energy sources and their limits. Therefore, the use of diverse and functional methods should be used for promoting the creativity and participation of children and provide natural ways of learning. These methods are not only a means but also a target for learning and educators should use them to guide the children to experiment with and use them with different size groups or with individual children. Children should be encouraged to ask questions, express wonder and explore and solve problems together. These various methods require versatile environments. By using different senses, natural phenomenon should be observed in different seasons while learning the concepts connected with nature. (Finnish National Agency for Education 2019).

The main aim of this thesis is to prepare a guidebook that will lead the children to become ecologically intelligent. The goal will be achieved by using the 3Rs of early childhood education -Relationships, Repetition, and Routines. These will be discussed in detail in the implementation part. The guidebook will incorporate activities that support to achieve four sub goals. These are shown in Figure 1: Aims and objectives of the thesis.



Figure 1: Aims and objectives.

Environmental education aims to involve children in a personal experience of nature by exploring the immediate surroundings of the school, like the yard, nearby forests, and field trips through their senses. As the children may not understand all the scientific aspects of the subject, emphasis will be on introducing and developing these aspects. The children will be introduced to use nature as a means to develop language, numeracy, aesthetic appreciation, creativity, and environmental ethic. Secondly, the aim is to provide an opportunity to observe and understand the natural phenomenon.

It has been observed that knowledge doesn't necessarily mean that there is a change in behavior. The children watch about recycling in Peppa Pig, but it is found that they do not implement it in real life. A concrete sustainable practice must be inculcated in the children so that they do not feel recycling is a burden or responsibility of adults only. The third objective is to make the children aware of best segregation practices, recycling, and its advantages to the environment. Introducing experiential learning and practicing in daily life to ensure that the children understand the importance of recycling.

The concept of eco-literacy will also be introduced. It will take into account the 3 Rs of the circular economy namely reduce, reuse, and recycle. The children will be made aware about reusing things and not discarding broken or old things by using waste and recyclable material from the playschool or homes to make toys, board games, and artwork. This includes using toilet paper rolls, cardboard boxes, paper strips, bottle caps, etc., to make a new product or an artwork as well as using materials gathered from the forests and other field trips to make artwork, cards, etc. The awareness about sustainability and environmental education cannot be possible in a short time. It is an ongoing process. Therefore, the aim is to develop a step by step guideline for imparting this knowledge so that children can be led on the path to becoming ecologically intelligent.

2.2 Working life partner

The working life partner is an English language non-profit kindergarten managed by parent's support organization for children aged 3 to 6 years. The 3-5-year-old group is divided into small groups based on the age of the children. It follows the City of Espoo Early Childhood Education Plan and the pre-school education plan has been formally approved by the City of Espoo. The goal is to carry out purposeful activities in support of child development and learning in English. The staff regularly evaluate and develop operations. The starting point for learning is the child's previous experiences, interests and competences. The child gets involved in the planning, implementation and evaluation of the activity according to his / her own abilities. (Espoon Englanninkielinen Leikkikoulu n.d.).

The kindergarten activities follow the language immersion method, where English language is learned through practical experience, using language in all activities similar to the mother

tongue. The children learn the language as well as use it as a method to learn new things. The most important feature of didactics is the use of language as a means of learning, not as an object or purpose. They learn the language through real communication and meaningful interaction in real day-to-day situations. Teachers understand the children and also speak Finnish when needed. Guardians can also communicate in Finnish or English. (Espoon Englanninkielinen Leikkikoulu n.d.).

A lot of excursions and visits to learning areas like museums, parks, forests, theatre performances, and libraries around Helsinki metropolitan area are arranged throughout the year. The kindergarten is located in an area where there are a lot of green areas and parks, children often visit these places. Nature walks and forest trips are a part of their normal routine. There is no planned curriculum for education for sustainability, but the teachers and care givers do certain activities that reflect the same. The target group for the activities included in my thesis is five to six-years old children, but some of the activities can be implemented for all the children. (Espoon Englanninkielinen Leikkikoulu n.d.).

2.3 Functional Thesis

This study will be in the form of a functional thesis. Functional thesis aims to instruct, guide, and rationalize practical activities. It consists of a functional part and a thesis report. The report consists of documentation and evaluation of the process by the means of research communication. The objectives and results of the functional thesis should be distinctly visible in the report. The contents should be well organized and presented to facilitate easy understanding and comprehension for the reader. It is a meaningful way to develop a product that is functional and useful for the working life partner. It should be done by using practical approaches, based on research and depicts the professional competence of the writer. The final product is a concrete output in the form of instructions, information packages like a guidebook or leaflet, portfolio or event. (Vilkka & Airaksinen 2003).

2.4 Ethical Considerations

The research is carried out in accordance with the values and policies of the working life partner as well as the ethical guidelines recommended by Talentia (2019).

The Finnish Advisory Board on Research Integrity lays down the guidelines for ethical conduct of research. According to the guidelines, due diligence was carried out while researching the subject and theoretical background. The works of other researchers that is used have been given due respect by citing their work and publications appropriately. The numerous online sources are referred after making sure that they are trustworthy and reliable. The sources used are from the 21st century, although one reference is from the year 1998, as it was relevant in the present day as well. The necessary permit for research with the working life

partner was duly acquired before the start of the thesis. The Director of the playschool had informed the parents about the same.

The Ombudsman for children in Finland (2014) recommends the children's rights. Accordingly, due care is taken to ensure that the identity of the children is in no way compromised in the pictures and the report.

3 Early Childhood Education for Sustainability

Education is the process of enabling learning. It has been an indispensable part of human societies since before we were even human. Even animals like chimpanzees teach their younger ones specialized foraging and hunting techniques. Education prepares children and gives them the tools and knowledge they need to survive in the real world. It has played an important role in the survival and development of humans. It began with staying alive against odds and since then it has gone beyond survival to development of schemes of writing, arts, and tools. Different parts of the world had different techniques and methods to survive. These included identification of the flora and fauna, how to make fire and tools, clothing, shelter, and defensive tactics, etc. They have a major role to play in education. Throughout human history, cultural knowledge has a strong association to strive and flourish in the immediate surroundings. By facilitating the tools and knowledge, education prepares children to survive in the physical and social environment into which they are born and may spend their whole life. (Assadourian & Mastny 2017, 32).

In the modern world, rapid economic development has caused the ecology of our planet to change. Education needs to be transformed to help students to learn the skills and knowledge that will help them to survive the uncertain future on a changing planet. It may prove beneficial for the present and future generations to adapt to the changing environment and build a sustainable world. This includes reorienting education so that the students become promoters of sustainability, to bring about a change in the socio-cultural, political, and economical context to build a more sustainable society. To navigate through the challenges of the future, education must teach the students to be resilient by offering them coping skills in addition to social and emotional learning that are as important as contemporary education. (Assadourian & Mastny 2017).

3.1 History

The roots of environmental education were first laid down in The Belgrade charter (UNESCO 1975), which was adopted by the United Nations and provides a widely accepted goal statement for environmental education. According to the Belgrade Charter (UNESCO 1975) the aim is to develop a world population that is conscious and concerned about the environment.

Davis (2010) states that education for sustainability has roots in environmental education. The first expression of the important role of environmental education and environmentally educated teachers can be found in the 1977 Tbilisi Declaration. In recent years, with the launch of the United Nations Decade of Education for Sustainable development (2005-2014), early childhood education for sustainability is an emerging field in early years education. This program aimed to mobilize the educational resources of the world to create a more sustainable future. It further aimed to combine the principles, values, and practices of development into all aspects of education and learning. It stated that although education alone would not be able to achieve a more sustainable future, without education for sustainable development it would not be possible to reach that goal. (UNESCO n.d.). In 2007, an international workshop 'The Role of Early Childhood Education for a Sustainable Society', was jointly organized in Göteborg, Sweden, by Göteborg University, Chalmers University of Technology, and the City of Göteborg. The ideas that were put forth in the workshop were that there is a need for a new kind of education to prevent further degradation of the earth, which should be available to all and must begin in early childhood as values, attitudes, and skills gained during this period may have a long-lasting effect in life. (Samuelsson and Kaga 2008).

There was a consensus among the participants of the workshop that education for sustainability should start early in life. The main attribute of early childhood and care is to lay a strong foundation for intellectual, psychological, physical, emotional, and social development and life-long learning. This includes fostering values that support sustainable development, e.g., the wise use of resources, cultural diversity, gender equality, and democracy. The participants agreed that sustainability education is more than just environmental education. It should participate in a discourse about sustainability, and instead of just talking about reading, writing and math, the focus should also be on the 7Rs for education for sustainable development namely reduce, reuse, recycle, respect, repair, reflect and refuse. (Samuelsson and Kaga 2008).

In 2015, the United Nations General assembly adopted the 2030 Agenda for sustainable development, which is an action plan for people, planet, prosperity and peace. It deals with the major developments and environmental challenges facing humanity and the earth. The Agenda includes seventeen sustainable development goals to be achieved by the year 2030. These goals are for all the countries and all people have a responsibility to act to achieve these goals. (Sustainable development Goals n.d.). The goals related to conservation of the environment including land and water, climate change, and revitalizing the global partnership for sustainable development are in the scope of this thesis.

3.2 Education for Sustainable Development

Sustainable development was described by the Brundtland Commission Report 1987 as the development that focusses on the needs of the present without compromising the ability of future generations to meet their own needs. Sustainability is about thinking for the future in which there is a balance between environmental, social and economic considerations, while still pursuing development and improved life quality (UNESCO 2012). According to Blatchford et al. (2016), it can be depicted as shown in Figure 2 Three pillars of Sustainable Development.

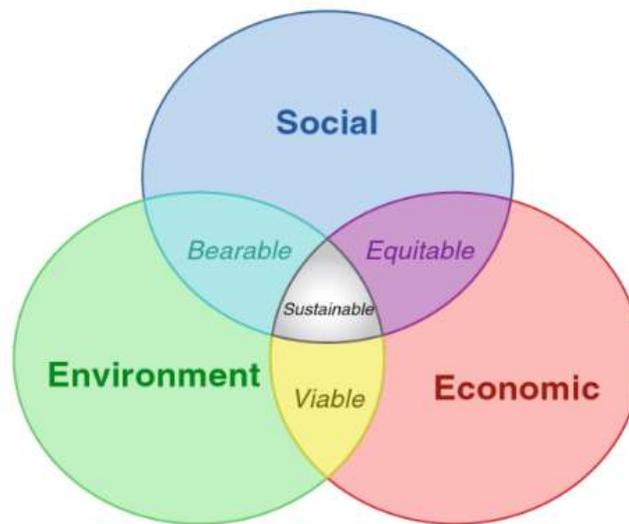


Figure 2: Three pillars of sustainability. (Blatchford et al. 2016)

A prosperous society is dependent on a healthy environment to provide for clean air, safe drinking water, food and other resources to its citizens, therefore all the three considerations are interlinked (UNESCO 2012). Elliot and Davis (2009) state that according to Orr (1992) the crisis humanity is facing in terms of sustainability cannot be solved by the same kind of education that has helped create it. The sustainability paradigm is radically different from the economic development paradigm. It is a fresh and much needed change as we are now realizing the serious threats to the environment and human beings as a direct result of economic development. Until recently these ramifications were thought of as common and unavoidable. In the sustainability paradigm there is no place for these damages and threats to the wellbeing of mankind and environment in the name of economic development. (UNESCO 2012). For the purpose of this thesis, I will focus only on the environmental part.

Blatchford et al. (2016) refer to Sen (2000), to explain that in an educational perspective sustainable development can be defined as “development which promotes the capabilities of the present people without compromising capabilities of the future generations”. This

reverberates with the view taken by Schumacher (1999) who suggests that “development does not start with goods, it starts with people and their education, organization and discipline. Without these all resources remain latent, untapped, potential.” (Blatchford et al 2016, 2).

Therefore, sustainability can be defined as a long-term goal i.e. a more sustainable world, whereas sustainable development is the many processes and ways to achieve sustainability, i.e. sustainable production and consumption, sustainable agriculture, good government, research, education, technology, etc. (UNESCO 2012). Participation and involvements are basic requirements of education for sustainable development accentuating empowerment and support for active citizenship, human rights and societal change. All phases of education need to be redesigned to include community learning, thus making education for sustainable development a broad process challenging the current method and objectives of education itself. (The Gothenburg Recommendations on Education for Sustainable Development 2008).

3.3 Environment Education and Sustainability

According to Prince (2010), Fler (1998) states that during the late 1990s, the word environmental education was used to denote education about knowledge and care of natural environment and of hands on experience about environment. Since then, there has been a shift from emphasis on environment to sustainability as there is an increased awareness about the necessity to care for the earth’s natural resources for the present and future. To describe how a child is connected to nature Prince (2010) refers to Wilson’s (1996) concept of the ‘ecological self’ where he argues that the development of ecological self begins before birth. After the child’s birth the need for food, water and air and intrinsic features of natural surroundings confirm the person-environment relationship. As the child grows this relationship develops through emotional and psychological aspects of the ecological self (Prince 2010). This shows us that we cannot separate environmental education from education for sustainability, as conservation of nature and our inter-relationships are important for sustaining a habitable planet.

3.4 Early Childhood Education and Sustainability

Early Childhood Education and Care has a major role in developing present and future citizens to make necessary changes in their attitudes concerning the environment. During the decade of Education for Sustainable development, the focus was on the contribution that Education for Sustainable Development can make in preparing children to face future challenges and opportunities. Even though clear progress has been made, much work still needs to be done. (UNESCO 2014). Education for sustainable development in early childhood helps to promote participation, values, decision-making skills, and collaborative learning. They help to enrich everyday experiences of children; integrate the curriculum and creativity; support problem-solving and solution-seeking; promote intercultural understanding and acknowledge inter-

dependence; connect with the wider community; support active citizenship in the early years and help in creating a lifelong culture of sustainability. Young children are the present and future citizens capable of shaping sustainable societies. Investing in building their awareness, values, knowledge, and capacities for sustainable development will assist to set the world on a path of sustainability in the present and the future. (UNESCO 2014).

An important question is at what age should sustainability education start and is it appropriate to introduce children to such a serious concept? Davis (2015) explains that no matter how we may wish that children stay unaware of the stark realities (effects of droughts, floods, refugee crisis, dying birds and ecosystems, wars, urban slums, etc.) they can be directly affected or may become aware of it by seeing pictures or listening to elders talk about it. As we would take action against bullying, racism, or gender stereotyping, we should also take action against a larger challenge looming over the entire world population. As we do not know what ideas and impressions children form about these issues, education offers a remedy. Turning a blind eye would defer their ability to make sense of the world around them. According to Engdahl and Rabušicová (2010), The World Organization for Early Childhood Education interviewed “9,142 children” in the age group of two and eight from 28 countries as a part of its Children’s Voices about the state of the Earth and Sustainable Development project and the findings suggest that children are capable of contributing to positive discussions on environment/sustainability issues (UNESCO 2014).

Early childhood education for sustainability is described by Davis (2015) as executing transformative, empowering, and participative education related to sustainability issues, topics, and experiences within early childhood settings such as homes, daycares, playschools, kindergartens, pre-schools, schools, gardens, zoos, etc. Irrespective of the setting it supports the early learning community to form ‘cultures of sustainability’ that change and transform thinking practices, and relationships corresponding to sustainability. However, it is not about reducing or replacing the existing curriculum that includes play and learning experiences that characterize early childhood education with learning and projects centered around sustainability and environmental issues. The normal curriculum will continue to provide solid beginnings in exploring, shaping, and understanding their world. Therefore, early childhood education for sustainability is about enriching such experiences and distinctly building children’s knowledge, inclinations, and skills to make a difference in their own lives in the present and the future. (Davis 2015, 22).

Davis (2015) states that early childhood education for sustainability is not about painting a picture of doom and gloom. It is called transformative education as it regards, encourages and supports children to be problem seekers, problem solvers, and action takers in their surroundings. It is especially about bringing a social change and the basic principle is the redistribution of power and authority. In this context, early childhood education for sustainability

empowers children by providing greater opportunities to participate in making decisions and having choices. It facilitates empowerment and transformation which means bringing about changes in the manner in which children think, learn, and act when confronted with sustainability issues, topics, and practices. (Davis 2015, 23). According to Laininen (2018), transformational learning can change our current understanding and notions about the interdependence of humans and nature, the spirit of humanity, the basics of wellbeing, and the role economy plays in our lives. The aim is to develop a holistic worldview and in-depth realization of the effects our actions have on the environment. It leads to learning communities and ecosystems that demonstrate new, resilient, and sustainable lifestyles which finally would lead to a cultural transformation into a sustainable society and the world.

Education for sustainable development should start in early childhood to promote educational access for everyone to facilitate life- long learning. According to Davis (2010), early childhood education and care is a synthesis of education for sustainability and early childhood education. It is a unique and rapidly emerging field. By adopting a whole centre approach; using action research to explore; and using systems thinking to support and bring about a change in early childhood education settings; continued development of education for sustainability can be achieved. For the purpose of this thesis, I will only investigate the first point, i.e. the adoption of whole center approach in early childhood education for sustainability education. Davis (2010), refers to a model by Young and Williams (1989) of Health Promoting Schools to illustrate a whole center approach which is shown in Figure 3.



Figure 3: Whole centre approach. (Davis 2010).

The diagram recognizes the three key constituents that should be applied if a center wishes to become sustainable. Curriculum and Pedagogy consist of play-based, integrated learning and teaching activities, and projects where children are active learners, reacting to actual sustainability issues related to them. It includes physical and social environments where prospects to interact with and learning from nature are easily accessible and where democratic, inclusive learning, teaching and management methods are most important in dealing with

sustainability issues. Partnerships and community comprise of the close relationships with families and the centre's broader community and local organizations to guarantee learning and teaching for sustainability as a continuous, reciprocal process. (Davis 2010).

Davis (2010) states that all three components must be used together. It is not just the children who are involved in sustainable activities, rather the whole centre must follow appropriate management practices and approaches. One example can be minimizing paper and energy use. It should always practice what it preaches. Therefore, the centre can adopt a 'culture of sustainability', where it includes all sustainability ideas and practices into all aspects of teaching, operations, environment, and relationships. This leads to sustainability practices and habits becoming a part of daily learning.

3.5 Ecological Intelligence and Ecoliteracy

To understand the concept of ecological intelligence, let us first look at an example of how consumerism has affected our lives and how ambiguous the concept of natural and artificial products has become. Almost everyone is familiar with the kinder egg or kinder surprise. It originated in 1972 and is a global phenomenon, mass-produced by franchise companies all over the world. The product is a story of combinations. It consists of an aluminum wrapper (a majority of which is mined in Australia), an egg-shaped chocolate candy (made in the UK), a small toy made of plastic (made in China), and a paper with instructions for assembling the toy (paper of unknown origins printed in Belgium). Special edition toys are introduced during holiday periods. The toy is designed by commissioned artists and made with plastic. In some countries, this is a popular collective item for children. Now, it is an online game as well. The design of this product is constructed around the take, make, and dump model. The eggs are a global phenomenon, they are sold and manufactured in different countries. As a result, the waste created is also globally distributed. It is advertised and marketed in such a way that kids and parents are allured to buy more. The gratification is short-lived but the packaging materials and sometimes the toys most likely end up in landfills and never decomposes. (Clarke 2012).

Similarly, if we consider an apple, once eaten its remains will rot, and in a few weeks, it will decompose, but if we look at it as a product and not as fruit then the story is not very different. This fruit is also a product of significant human intervention and design. The apple tree originated in Western Asia. It is now grown worldwide with China, The United States, Iran, Turkey, Russia, and India being the leading producers. There are more than 7,500 known varieties. Winter apples that are picked during autumn are stored just above freezing and are an important source of food in Asia, Europe, Argentina, and the United States. The apple farms need large land space, fertilizer, and pesticides, as well as packaging and movement from farm to plate. (Clarke 2012).

After considering both the examples it is not very clear what is natural and what is manmade. Our brain is accustomed to distinguishing between natural and artificial. While we see a human role in the creation of Kinder egg, we possibly overlook many of the production techniques when we consider the apple. An apple is just one example of where things are grown and where they might end up. Through these examples, we can see the enormous amount of waste that we create. One kinder egg might look very harmless, but the amount that is consumed all over the world is enormous. Consumerism is driving our lives. Almost all kinds of goods are available in developed countries. If children living in developing and poor countries yearn for such consumer goods, it is not their fault. Every country is striving to be economically developed which means an increasingly consuming society. It is evident that there will not be enough resources available in the future unless we change our consumer behavior. Although technological innovations have benefitted mankind in innumerable ways, it has also given rise to natural disasters and calamities which has caused the loss of life and natural habitats. (Clarke 2012.)

We should always remember that the indigenous communities and the less developed countries have not created the waste and are not responsible for damaging our ecosystems. It is the educated and more developed countries who are responsible for this. Being educated doesn't mean we do all things correctly. In our quest for development, we might not have wished for such a grave environmental concern, but the current situation demands attention so that it doesn't get worse. Our current education systems are partly to blame for this situation. Education has helped create the next generation of consumers. It is based on consumerism and industrial growth economics. Our education system teaches us math, reading, and writing, but if we are to truly move towards a sustainable way of living, the education format should be redesigned. It means changing what we do and how we do things. We should recognize that education is necessary for our collective needs, to participate in society, to be a part of the workforce, and be good citizens in a sustainable way. (Clarke 2012).

A change in mindset is needed. For this, we first need to define what is ecological sustainability. According to Capra (2009) in order to understand how nature sustains life, we need to understand ecology because sustained life consists of a whole ecosystem rather than a single species. The Earth's ecosystems have developed particular principles of organization over a period of billions of years of evolution to sustain a web of life. Children should be taught the most fundamental facts of life - that one species waste is food for another species, energy needed for all the ecological cycles comes from the sun and all the cycles are continuous, and more importantly, life did not appear on Earth by combat but by networking. These principles of ecology are just different attributes of a single primary pattern of organization that allowed nature to sustain life. Life in nature is sustained by creating and nurturing communities. No individual species or organism can survive in isolation. Animals are dependent on the photosynthesis of plants for their food, plants are dependent on carbon dioxide produced by

the animals and nitrogen fixed by bacteria at their roots. Animals, plants, and microorganisms together control the whole biosphere and preserve the conditions favorable for life to exist. Thus, sustainability involves a whole community and is not an individual property rather it is a property of a complete web of relationships. To sustain life, it is necessary to build and nurture a community. Thus, in ecological sustainability, a sustainable human community interacts with human and nonhuman communities in ways that support them to live and grow according to their nature. (Capra 2009).

Capra (2007) states that human communities can be modeled after nature's ecosystems that consist of sustainable communities of plants, animals, and microorganisms. We should learn from the inherent capacity of our biosphere to sustain life. A sustainable human community must be one where our way of life, technology and social institutions honor, support, and collaborate with nature's ability to sustain life. Thus, in order to build sustainable communities, we must recognize the principles of organization in ecosystems that have evolved for thousands of years. This understanding is known as ecological literacy.

Goleman (2009) describes ecological intelligence as a person's capacity to apply what they learn about their impact on the environment to make changes in their behavior and live more sustainably. Social and emotional intelligence enables children to see from another's perspective, empathize, and show concern. Ecological intelligence applies these attributes to an understanding of natural systems and combines cognitive skills with empathy for all. It develops knowledge, empathy, and action to practice sustainable living. Therefore, Ecoliteracy is an integration of emotional, social, and ecological intelligence. (Goleman 2009).

All living forms coexist in nature. They form an integral part of our environment. If one of these elements is broken, the environment will be affected. One example is when there is mass deforestation and logging the whole ecosystem is damaged. Landslides and soil erosion occur as the soil loses its capacity to hold water. Development and progress made without an awareness of its effects on the natural environment have caused extensive damage to the planet. Although evidence of climate change can be seen in some parts of the world, most of us do not notice or experience it. It is termed as ecological crisis. (Yulindrasari et al. 2020). The education regarding this field must begin early in childhood. According to Yulindrasari et al. (2020), it begins with propagating environmental awareness in children. Every-day life experiences should be used to develop it. According to Johnson (2014), the attitude of eco-literacy starts with the emergence of environmental awareness in children, followed by responsible behavior for maintaining the surrounding environment (Yulindrasari et al. 2020).

Technological advances in almost all fields have brought the world closer than before. One can be in three different time zones in one day. To adopt sustainable lifestyles in their lives, young children must understand how their lives are interlinked with nature and how their

actions affect nature. Their wise and responsible choices about what they eat, mode of travel, what they wear, how they build, spend their leisure, and co-relate with the local community and foreign lands could make or break the future of the Earth. (Samuelsson and Kaga 2008).

Salonen (2020) states that in the present context, man's relationship to place, time, and the life-sustaining environment is hazy. What a country lacks can be procured easily from another country. The food, water, livelihood, energy, materials or sacred inspiration do not come from our immediate surroundings, but from all over the world. Through immersion in ecology, young children can form deep emotional bonds between themselves and the environment that they inhabit. The basis of learning eco-intelligence is the belief and respect for children as capable learners who can know themselves - their competences and limitations and acquire a very important "sense of place" naturally and purposefully. This way the children learn for life. Ecoliteracy offers an opportunity to take part in different learning experiences including varied knowledge areas, to spend time in a natural setting, to play an important part in gardening, caring for animals, producing art, etc., to use tools and develop practical life skills, to take part in activities that entail physical challenges and inspire a sense of wonder about nature and cultivate cooperative skills. (Samuelsson and Kaga 2008).

4 Theoretical Framework

In this section, I will discuss the Early childhood education and care in Finland, social and eco-pedagogy that can be applied while guiding and educating the children to be ecologically intelligent. Environmental damage and related sustainability issues concern all of us therefore it can be termed as a social problem. The two pedagogies have one theme in common and that is the children should be given positive experiences through interactions with the educators to understand environmental and sustainability education and empower them to face the future and offer solutions by becoming active and responsible citizens of the community. Salonen (2012) states that a change is needed in the individual and societal behavior in order to build a sustainable society. Social pedagogy is a significant tool in a change towards a smart, sustainable, and inclusive society as it characterizes a theory and practice of holistic education. Social pedagogy is based on the principles of human rights and social justice. Along with ecological knowledge, it can support planetary orientation including people, animals, plants, and non-living factors.

4.1 Early Childhood Education and Care (ECEC) in Finland

The early years of children are the most crucial for their development. During this time, they learn at a quicker pace than at any other time in life, developing social, emotional, and

cognitive skills that are essential for their growth. Investing in children during the early years through their families and access to high-quality ECEC leads to solid personal, social, and economic returns. Effective learning envisages positive well-being in adulthood including general well-being, physical and mental health, educational achievements, and employment. Disadvantaged children benefit the most from quality ECEC. Therefore, providing high-quality ECEC can enhance social mobility and inclusive growth. (Schleicher 2019, OECD).

According to The Law on Early Childhood Education and Care (540/2018), it is obligatory for the municipalities to arrange Early Childhood Education and Care (ECEC) for families with young children (Finland 2018). In Finland, it is based on the 'EduCare' model which is an integrated approach to education and care. It is an important part of The Finnish education system and an important step in the growing and learning path for children. Although the primary responsibility of upbringing children is primarily with the parents or guardians, ECEC assists and supplements the home's educational tasks and shares the responsibility of children's well-being. ECEC in Finland is a systematic and goal-oriented approach consisting of education, instruction, and care with special emphasis on pedagogy. All children under school-age are entitled to ECEC. The municipalities have a statutory duty to meet the demands for care. They also have a duty to provide care during evening, weekends, or over-night for children whose parents work in shifts. Municipalities organize the ECEC services themselves or by purchasing the services from private units and are responsible for offering ECEC for children residing in their jurisdiction services in the official languages Finnish, Swedish, and Sami. Families have the right to opt for private service providers. Starting from August 2020, the universal entitlement to full-time ECEC will be reinstated after being limited to 20 hours a week in 2016. ECEC is now termed as a right of the child as opposed to the earlier focus on the parents' right to have a daycare place for their children. Participation in ECEC is voluntary except in pre-primary education prior to the start of school. (Eurydice Finland 2020).

Since August 2016, attending pre-primary education is mandatory. Municipalities have an obligation to provide free pre-primary education to children living in their jurisdiction in the year prior to compulsory education. It can be organized in ECEC centers or schools. Most children attend pre-primary education in ECEC centres. Families of children in pre-primary education can claim other ECEC services and most children are also enrolled in complementary ECEC services to make up a full day. (Eurydice Finland 2020).

The National Core Curriculum for early childhood education and care (ECEC) lays down the objectives and contents of the ECEC and they are legally binding on the ECEC providers which includes municipalities and private day care service providers. The municipality adopts and prepares the curriculum and ensures that ECEC personnel, guardians and children have a chance to participate in preparing and developing local curriculum for ECEC. In order to ensure systematic, goal-oriented education and care, an individual ECEC plan is prepared for

each child based on his/her best interests and needs. The opinion and wishes of the child along with the observations and views of the personnel and guardians are taken into consideration during the ECEC plan process. Whenever necessary, the individual ECEC plan must include information on any support needed by the child in learning and development. The plan must be revised at least once a year. (Finnish national Agency for Education 2019).

The pedagogical activities of the ECEC have a holistic approach. It aims to promote learning and well-being along with the transversal competences. Pedagogical activities are carried out as free activities, that are planned and led by the personnel. The personnel and children plan the activities or something that the child wishes to do. The framework of the pedagogical activities is depicted in the figure 4.

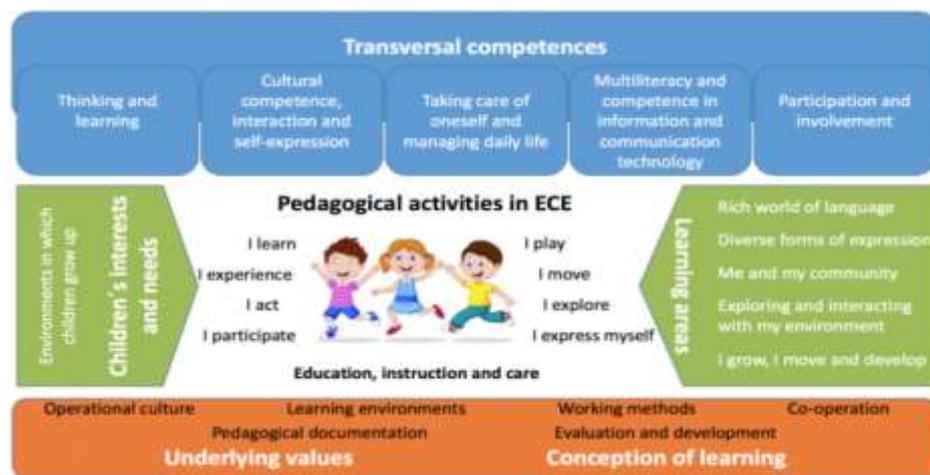


Figure 4: The framework of pedagogical activity in Early Childhood Education and Care. (Finnish National Agency for Education).

One of the aims of ECEC is to guide children towards healthy living and wellbeing by providing opportunities to develop emotional skills and artistic thinking. Sustainable way of living is encouraged by taking into account the social, cultural, and ecological aspects. It aims for understanding ecological sustainability as a precondition for social sustainability and the realization of human rights. The role of environmental education in ECEC is to strengthen the relationship between children and nature, the ability to act responsibly in nature, and to lead them to a sustainable way of living. The three elements of environmental education are learning in the environment, learning about the environment, and acting for the environment, which means that the local natural and built environments are objects of learning as well as learning environments. An important part of ECEC which is very popular and common is making field trips to natural and built environments. The interaction with these surroundings strengthens the children's relationship with nature. The natural phenomenon is observed, discussed, and examined. It is a practical way to learn about concepts of nature using all their senses. Environmental education promotes a sustainable way of living and the development of

the skills needed for it. The practical skills include recycling, reducing and repairing things, saving energy and water, not wasting food, and not littering in the environment. (Finnish National Agency for Education 2018.)

4.2 Social pedagogy

According to Moss and Claire (2011), the term social pedagogy is often misunderstood as it is always associated with political practice. They further state that the term was first named by Karl Mäger in 1844 as the “theory of all the personal, social and moral education in a given society including the description of what has happened in practice”. This description is relevant today as well. They refer to Petrie et al. (2006) to describe it as where education and care meet, related to the upbringing of children, as a broad educational method to tackle social problems, education that takes place in everyday lives, and education in a wider sense. They further refer to Jensen and Hansen (2002) to define the aim of social pedagogy which is to improve learning and developing options on the basis of the ideals of individuals and society. The theory combines ideals of a good life, understanding individuals and groups and their resources and needs, and understanding of social resources, values, and demands. They state that some of the following principles stated by Petrie (2006) can be applied to focus on the children’s holistic development when there is a relationship between educators and children and they both occupy the same life space whereby there is an absence of hierarchy. It can also be applied to recognize the importance of teamwork, learning, and communicating. (Moss and Claire 2011, 8 & 9).

Moss and Claire (2011) state that according to Stephens (2009) the term pedagogy refers to a broad educational role including the holistic development of the child and social pertains to many features such as concerns and interrelationship between individuals, groups, communities and societies. They explain the aims of social pedagogy in a Diamond model which is shown in Figure 5. It is named as a diamond model to focus on the basic belief supporting social pedagogy, that human beings are inherently rich with immense potential, abilities, knowledge, and resources, whether they are children or adults and they need to be valued and respected. The diamond model gives a simple outline of the conceptual foundations of social pedagogy and their interconnection. It depicts four points acting like a navigating compass - well-being, holistic learning, relationships, and empowerment. At the core of the model is the aspiration to provide people with long term positive experiences leading to successful lives. (Moss and Claire 2011).



Figure 5: The Diamond Model. (Moss and Claire 2011).

When describing wellbeing Moss and Claire (2011) follow Seligman and Csikszentmihalyi (2000), the founders of positive psychology to define wellbeing. It can be described as a feeling of satisfaction about the past, happiness in the present, and optimism about the future. Therefore, wellbeing needs a process-oriented and sustainable approach through which children gain a thorough understanding of themselves, can construct positive self-images, and consequently search ways for a long-lasting sense of wellbeing. They further state that in the absence of a fixed definition, Ryan and Deci (2001) note that wellbeing comprises something more than happiness and it can be attained by the actualization of human potentials.

Moss and Claire (2011) state that according to Pestalozzi, education needs to be imparted holistically, having a 'head, heart, and hands' approach. He stresses that for developing the mental capacities (head) of children, education must not enforce knowledge but enhance children's capacity to think and wonder and kindle their curiosity about their surroundings. The moral capacity (heart) is developed by the power of our hearts through love. It provides a sense of direction. It helps build empathy and compassion. They further refer to Heafford (1967) to describe the significance of hands (body) which are the physical experiences of our daily lives that give rise to mental and spiritual experiences. Thus, pedagogic practice must always keep a balance of the head, hands, and heart.

Friedrich Fröbel, the pioneer of the kindergarten movement, and Maria Montessori, who developed a pre-school and school method, formulated to stimulate all senses and children's 'absorbent mind', stressed the importance of having confidence and trust in children's capabilities. These methods support self-directed learning within a social context. Thus, relationships are about living together constructively. It develops our inner worth, inner richness, and upholds human dignity. Relationships form the basis for empowering approaches towards children's rights and participation in the real world. (Moss and Claire 2011, 44).

Moss and Claire (2011) refer to Johann Wolfgang von Goethe to state that children need roots and wings for development. Nurturing empowerment in social pedagogy highlights children's human rights, their active involvement in decisions affecting them, and the empowerment at an individual and collective level. The relationship between the children and teachers or parents is not of power or control, but of independence and interdependence, which enhances children's abilities. Paulo Freire (1921-1997) put forth the idea that children's right to meaningful participation in decisions touching their lives allows them to empower themselves, take responsibility, and feel respected. Meaningful participation is always a social and inclusive process. It is about exploring different perspectives and engaging in dialogue as human beings. (Moss and Claire 2011).

Social pedagogy aims to provide positive experiences through these core aims. The ability to experience something positive, something that gives happiness, achievements, acquisition of new skills, and support from others has a double impact. It enhances self-confidence and feelings of self-worth which reinforces a sense of wellbeing, of learning, of feeling empowered and forming strong relationships. By strengthening the positives aspects of children their negative complexes also can fade away. (ThemPra Social Pedagogy n.d.).

While working with children, everyday activities are meaningful and not just routines. Activities like play, eating together, homework, creative activities, and holidays are often referred to as the 'common third', in Denmark. The activities concern the educator and the child and act as a 'third party'. When the educators and children are doing a task with a common intent and goal, the common third provides a mutual objective for them. Activities form a medium through which a relationship is formed between the educators and children and creates a platform for dialogue. An equal engagement from both the parties builds confidence, self-esteem, and trust between them which arises from successful completion of activities, whether individually or as members of a group. These creative activities termed as a common third can be a means of enjoyment and making friends also. At the beginning of the activity, the educator and the children may or may not know the result of the activity, but everyone can contribute to it. Drama, visual arts, and singing are ways in which children express themselves about regular or important or difficult matters. It is a way to offer positive experiences to the children through interaction, participation, and expression. (Moss and Claire 2011).

4.2.1 Social Pedagogy in Nordic Countries

In Nordic countries, the social pedagogy tradition is a distinctive approach in Early Childhood Education and Care (ECEC). The ECEC pedagogues view children as agents of their learning and as competent learners who aspire to engage with the world. A wider concept of pedagogy is used where the approach combines care, upbringing, and learning without hierarchy. A holistic approach is applied with an emphasis on learning to live together and supporting

children's current developmental tasks and interests. Primary importance is given to the freedom, creativity, and pleasure of the individual child in a learning environment in which the needs of the society are also met. (MacNaughton, Smith & Hughes 2008).

The National curriculum guidelines offer a framework for the municipalities and ECEC providers based on previous consultations with parents and educators that are influential in guiding the work and practices of the centres. Every centre enjoys the independence to formulate their own learning plan according to the national guidelines. Educators are motivated to create enriched and effective learning environments that nurture growth and confidence. They recognize the importance of natural learning ways like learning through play, interaction, activity, and experimentation. By engaging in cooperative project work, the children get a firsthand experience of working in teams, understand sharing, and learn about diverse themes. Language, communication, and negotiation are also key factors in project work. Nature activities and play in built and natural environments encourage thinking, marveling at things, and practicing skills. Through these activities, children are encouraged to deepen their understanding of their daily experiences. (MacNaughton et al. 2008, 128 & 129.)

4.2.2 Development of Social Cognition in Children

According to Garnett (2018), the word 'cognition' means 'thinking'. Social cognition is an inherent feature of social skills that can be simply described as the ability to process the extensive range of social information that children are exposed to in their daily lives as they encounter and interact with each other. Humans have the capacity to think and reflect on their thoughts. This gives them the capability to make decisions that benefit their own and other people's lives. It can also be termed as how humans process social information, how they acquire it, and apply it to social situations. According to Garnett (2018), Kihlstrom (2010) states the social behavior of people is not reliant on the situation they find themselves in, rather it is their discernment of the situation, which includes related knowledge, memory, reasoning, judgment, problem-solving and decision making. (Garnett 2018).

Children flourish with strong social cognition as it allows them to be active learners, prepared to tackle life situations, and contribute to society. This kind of learning begins between one and two years of age and this growth surges between four and six years of age as children's language skills improve. Social cognition develops through interactions. Toddlers listen to adults, observe them, and learn to point and gesture with others. As they grow, they gradually acquire ideas and language skills that help them to communicate effectively. They play and interact with siblings, friends, and educators at early childhood education and care centers. Whether they are playing alone or in groups, their interactions create thought processes. These also help them to learn the social rules of their interactions through which they know what to do and how to do things. Positive and successful interactions help children to

become responsible, empowered, and active citizens. In the future children can become adults who are good at making appropriate decisions, setting goals, and achieving them. Educators in ECEC play an important part in this development. They can support and guide children in activities by allowing them to practice thinking skills in different situations. Through practice, reflection, and support from educators, children can develop thinking skills, competence, and confidence in their life. (Garnett 2018).

4.3 Eco-Pedagogy

According to Grigorov (2012), Gadotti has described Eco-pedagogy or Earth pedagogy as a project that can be undertaken by children and young people for a new ecologically sustainable civilization. The aim is to provide children of all ages with the knowledge of how to cope with the serious present and future problems. e.g. destruction of nature, air, water, food, forests, animals, and plants, climate change, geoengineering, ozone layer depletion, etc.

Grigorov (2012) refers to Kahn and Gadotti (2008) that in 1992, after the First Earth Summit held in Rio de Janeiro, Brazil, eco-pedagogy appeared as an education and was first called as a pedagogy for sustainable education. The works of well-known pedagogues including Paulo Freire have turned it into a new model for sustainable education from an ecological point of view. One of Paulo Freire's last writings was on ecology. An essay published after his death mentions that in his pedagogy of the oppressed a chapter on earth was missing. He considered earth as a living organism in evolution that is also oppressed. (Grigorov 2012).

Gadotti (2012) states that the behavior of our environment is influenced strongly by human behavior. The condition of our planet is a direct consequence of our actions. We are moving from a production course to a destruction course. We are leaving trails and tracks that are destroying natural habitats and the environment. There is an urgent need to rebuild the earth. For that, we must understand earth not only as an astronomical phenomenon but also as a historical entity. This pedagogy considers the earth as a living organism that has a history. There is a need for Earth's paradigm. Here, the concept of sustainability is a dream of well living, a balance with oneself, with the environment, and all living beings. It considers sustainability as hope for humanity and opposes everything that is unsustainable. (Gadotti 2012).

Eco-pedagogy also emphasizes on art education. It encourages children to develop capabilities to feel, imagine, create, relate, and express themselves. It enables the children to move from object to subject, to participate in imagining and creating a world they want. This indicates that languages, theatre, music, visual arts, dance, etc. are fundamental tools for expression and creation of an educational project. This pedagogy supports "Doing together" activities. The children and the educators or parents can tell a story followed by drawing pictures, inventing natural art, playing in nature, singing together, observing, and giving support

and love. (Grigorov 2012). This type of learning was used as a base while designing activities for the guidebook.

5 Methods Reinforcing Education for Sustainability

In this part, I will explain the various methods used and their importance in guiding the children to be ecologically intelligent. This includes being in nature, learning about different cycles of nature, art and crafts using natural and recyclable materials and its importance, circular economy, and reading literature based on environment and sustainable practices. Phenomenon based learning is also used as one of the methods to study the natural and non-natural phenomenon. The activities based on these methods can show the way for children to develop attitudes and behavior which have a positive impact on our environment. These activities will help them understand the importance of the effects their actions can have on their surroundings. Change does not happen overnight. Inculcating respect and empathy for our natural surroundings and by reusing and recycling things, they can take a step forward to become responsible citizens of the society. Little steps taken in this direction by the children can go a long way in reducing damage to the environment and building a better future for everyone.

5.1 Learning in nature and outdoors

Learning in natural surroundings and outdoor environments have significant and positive impacts on children in ECEC. According to Lloyd and Gray (2014), pro-environmental behavior during the early years has shown to have a deep relationship and connectivity with natural surroundings. Place-based outdoor learning supports a relationship with the natural environment, builds a deep environmental knowledge and understanding of the surrounding world in the children. This kind of learning acknowledges the importance of forming close relationships with the place through regular visits. Therefore, for the holistic development of children, they should be taught in, for, and about the environment.

Blatchford et al. (2016) state that UNESCO has focused on three main sustainable development issues after the Bonn Declaration 2009, which are biodiversity, climate change, and disaster risk reduction. Following this strategy, it is seen that many educators have recognized the potential of outdoor play to promote environmental awareness, especially in Scandinavian countries where the aim is to improve physical development and the children's connection with nature. Cheng and Monroe (2010) cited by Lloyd and Gray (2014) have developed The Connection to Nature index which measures enjoyment of nature, empathy for creatures, sense of oneness, and sense of responsibility. Their research suggests that connection and

previous experiences in nature, supposed family attitudes towards nature and self-efficacy, positively influenced the children's environmentally friendly behavior and attitudes.

Children learn best when they are active. When the children are outdoors their brain gets fresh air and oxygen which is beneficial for gross motor coordination that develops and support the fine motor skills which are important factors of a rich learning environment, e.g. climbing trees and frames, which leads to the strengthening of legs, shoulders, arms, and hands. The garden or the schoolyard can also act as a learning environment. According to Bruce (2011), Tovey (2007) has examined the importance of outdoor learning and the necessity to have open-air spaces that challenge and present risks that are essential for children's learning. Children are many times overprotected and too much emphasis is on their safety. She suggests that children are more susceptible to accidents if they do not learn to think about their actions when climbing a tree or using tools for cutting, etc. One example is the Forest schools of Denmark, which is based on the Froebelian approach, where the children learn in nature.

Lloyd and Gray (2014) refer to the book *Pedagogy of Place* by Wattchow and Brown (2011) to strengthen their argument of teaching outdoors and allowing the children to connect with the local surroundings regularly. This can be the parks or forests near the ECEC centre. In Finland, there is no dearth of such places. It just needs to be a place or a forest where the children can learn, wonder, play, and explore. The spaces used for outdoor play and learning is only limited by the sense of motivation of the teacher.

Chawla (2009) states that while paying more attention to children's interaction with plants and other elements of nature, they should be made aware that nature is not a world that the humans have created. Children respond to everyday encounters in nature with simple actions, for example keeping surrounding areas clean and not littering. Through interactions with teachers and adults around them, children learn what they want to do and what they can do. They are not just passive participants, but over a period they construct a history of related experiences, develop ways of unraveling these experiences and learn the roles and practices that are required from them. Chawla (2009) refers to Sobel (2008), who proposes that in the early years, educators should pay attention to nurturing children's comfort and pleasure in nature through activities like exploring natural areas, gathering treasures like small stones, flowers, leaves, cones, and observing seasonal changes like solstice and equinoxes. She further states that according to Bandura (1997) a sense of agency starts to develop in early childhood, where the child recognizes that actions produce outcomes. Through these outcomes, the child can develop a sense of self. Chawla (2009) refers to Chawla (2007) to state that natural areas have rich resources that provide opportunities to help develop competence building of this kind and it may be the basis of explaining why positive experiences of play in natural surroundings in early childhood have been connected with the outlook to care for the

environment. This can be explained further by referring to Chawla (2009) who states that Chawla (2007) suggests that natural areas have an abundance of materials like water to splash, mud to mould, branches to swing, sticks and stones to construct tents or forts, which produce enjoyable effects as well as support creative and cooperative play with peers. There are also certain challenges, which the children can gradually overcome. There may be a branch of a tree that a child is not able to reach, but in due course of time, he/she may be able to hold it either because he has grown tall or has taken the support of a stone or rock under his legs or jumped up. Even small instances like these can enable children to experience new levels of achievement. This is a form of a positive experience that children relish and can be expected to contribute to an emotional bond with nature. (Chawla 2009).

According to Bruce (2011), children learn and develop in an environment that includes the people with whom the children interact, the other objects in the surroundings that they encounter, places, and events they experience. The environment is the tool that the educator uses creatively to bring the children and different aspects of knowledge together. According to Bruce (1987), the key to good learning is “observing, supporting, and extending”. (Bruce 2011, 66).

5.2 Creativity and Arts activities.

According to Uyanik (2010), in a creative process old and new experiences come together. Among art activities, painting and drawing are the most common ones. Various art activities help the children to express their thoughts and emotions, use various body parts in coordination with each other, develop language and vocabulary, learn to measure and enable them to acquire skills to use different tools. Cutting, tearing, pasting, rolling, and folding paper play an important role in developing decision making and reasoning skills. It also encourages the children to display creativity and imagination with the artwork, improve crafting skills, and muscle motor skills whereas molding paper and other materials help children to understand and construct spatial concepts. (Uyanik 2010).

The goals of craft education are an area of aesthetic inclination producing the joy of doing, developing hand skills, awakening insight and thinking, and exploring one's skills and limitations. Fundamentally, the child develops “I know how” experiences that are significant to learning and success. The joy of doing things by hand allows children to try and explore as well as experience the taste of success. The most important thing is not always the product, but the joy can be found in the activity alone, where children can do something with their own hands, their very own creation. A very interesting fact is that while doing an activity, children observe and analyze other aspects relating to it. For example, while painting balls, children also observe how the balls rotate at the bottom of the container and how it forms patterns on the paper or fabric placed on the bottom of the container. At that moment an

interesting artwork can be formed. The ball activity is a good exercise for practicing motor skills as wrists, palms, and fingers are used. Skillful fingers are needed for ordinary everyday activities like closing buttons, tying shoelaces, braiding hair, etc. (Ruokonen, Rusanen & Välimäki 2009).

Ruokonen et al. (2009) refer to Aristotle who emphasized that skills are practiced not only for their own sake but are tools for good human life practice. This is also the case with hand-made art and crafts. They are not only done to get a final product, but the process is also an important part of it as it can promote goodwill and expertise. During the process, the children also have an opportunity to familiarize themselves with the properties of the material while working towards the goal. In early childhood education, the goals of craft education are that it produces a joy of experience and success, supports the development of sensory and motor functions, develops observation, creativity, spatial perception, sensitivity, skills for making handicrafts, and awakening thinking and insights for learning. (Ruokonen et al. 2009.)

When making crafts and artwork, a skill can be described as a versatile bundle of abilities that include knowledge as well. They can be considered as a key to thought processes. For developing skills, sensory-motor, and psychomotor skills along with socio-emotional dimensions such as self-esteem is required. Skills and knowledge can be termed as a capital that children possess which tell them about their strengths and characteristics' and can be used to deal with future challenges. (Ruokonen et al 2009). Special attention must be given to develop skills in arts and crafts. It does not matter what basis and materials are given to them, it should be something from which they can explore their creativity and experience. If children have been guided in creativity and doing things by hand, they can have the courage to take advantage of the world of childhood intuition and fantasy in the future. (Ruokonen et al. 2009). For example, many of the inventions and discoveries were a result of childhood fantasies that the inventors had. Having a fantasy of flying may have given birth to the airplane.

As in many other fields, craft materials for children are highly commercialized. It is essential for ECEC centres to provide ready-made models, work processes, and the associated expensive materials like wheels, moving eyes, blocks, Styrofoam balls, sparkle, and other standardized materials, but ECEC centres have limited budgets. Convertible materials such as yarn, craft felt, other materials like milk cartons, yogurt cups, packaging materials from laptops, phones, shoes, and other materials that can be easily found can also strengthen and diversify the children's abilities. Simple materials like paper can be used to diversify the spatial perception of children with various three-dimensional tasks such as crafting and folding. It should always be remembered that creativity can happen anywhere and with any materials. They need not be expensive and sophisticated (Ruokonen et al 2009). According to Uyanik et al (2010), one of the options for selecting materials is waste or recyclable material which can help children gain new experiences and ideas. This type of activity encourages creative

thinking and improves visual perceptions while children create something new from a non-usable thing.

Uyagnik et al. (2010), state that according to Ozatağan & Baran(2009); Parlakyıldız & Yıldızbaş (2006); Sert (2009), waste materials can be defined as all items that can be preserved in time without losing their characteristics, all those things that are thrown away after use at home or playschool considering that they are of no use, things that can be preserved by saving and keeping in another place and things that are natural, factory-made or hand-made, suitable, that are clean and hygienic. These materials can be classified as everyday use objects and natural products. These can include buttons, empty reels, wool, yarn, cloth, ribbon, plastic bottles and lids, corks, decorative tools, foil, cable, cover paper, cartoon boxes (household appliances, electric appliances, toothpaste, detergents, food packages, etc.) magazines, old books, sponge pieces, crusts of various nuts, eggshells, beads, etc. Natural products such as pinecones, leaves, branches, dried flowers, sand, shells, unused seeds, etc. can also be used. Art activities carried out with waste materials help children to learn to make use of materials by reusing and learn about concepts like texture, shape, weight, and position. According to Uyanik et al (2010), Lloyd and Howe (2003) stated in their research that learning with open-ended materials or waste materials encourages problem-solving and creative thinking skills. (Uyanik et al. 2010).

Properly designed and planned art activities have enormous potential for the development and enrichment of children's creativity in early childhood education. Children who have difficulty in expressing themselves, get an opportunity to express and reflect their thoughts, emotions, and views on daily experiences. Art experiences foster creative thinking by stimulating imagination. The main features of the waste materials are that they are economic, safe, durable, appealing, practical and recyclable. (Uyanik et al. 2010).

Uyanik et al. (2010) states that Eliason & Jenkins (2003); Jackman (2005), mention that children develop productive personality traits rather than consumeristic traits, by collecting, saving waste materials, and pondering where, how and why to use them. Through such activities, children learn to reuse and recycle these materials rather than throwing it all away. Recycling these materials makes it easy for children to understand concepts related to environment conservation and increases sensitivity towards such issues. It assists in fostering positive interaction with the environment by generating a lifelong preservationist attitude. It empowers them to understand and use the depleting resources economically, save and learn to be respectful towards natural habitats and animals. (Uyanik et al. 2010.)

5.3 Circular Economy

The term circular economy has been derived from the natural world. In a natural environmental system, there is no garbage or landfill. The energy is provided by the sun, earth, air and

water also help in the growth of flora and fauna, one species waste is another species food, when living things die, they decompose, and their nutrients return to the soil. Until recently humans followed the linear economy. (National geographic Kids n.d.). It is described in Figure 6.



Figure 6: Linear Economy. (National geographic Kids n.d.)

Currently, we are producing large amounts of waste. We make products, use them, and throw them away littering the planet in the process. Cheaper prices and lots of alternatives have made us buy more and more. We are living in the use and throw world. New raw materials are extracted, made into products, used, and thrown into landfills. As the economy grows demand for things also grows. Let us take the example of a cell phone. When we want a new or better version with advanced features, we immediately tend to buy a new one and the old one goes to the trash bin. This wasteful approach is known as a linear economy. We are running out of resources and also tackling with the problem of disposal of waste. The current unsustainable consumption patterns will deeply impact the ability of future generations to meet their needs. Hence the concept of a circular economy is being adopted by many countries, companies, and producers. We as individuals including children should follow the circular economy principle in our daily life. (Dimas n.d.). According to National geographic kids (n.d.) the circular economy in Figure 7 is shown below. Therefore, the circular economy aims to reduce the input of new raw materials, decrease the quantity of waste being dumped at landfills, and increase the value and use of materials in circulation. In this scenario, even when the economy grows raw materials and waste produced can remain low as product life, use, and circulation increase. (Dimas n.d.).



Figure 7: Circular Economy. (National geographic Kids n.d.)

The whole Early Childhood Education and Care (ECEC) centre can be a participant in circular economy. ECEC centres can be termed as examples of nested systems in the ecological principle, which are inserted within larger systems such as the municipality, states, economies and ecosystems. From these systems the centre derives energy and resources which they use, transform, recycle or release back into the same systems. ECEC centres are responsible for making the wider systems either more or less sustainable by the kind of materials they use; the suppliers and organizations they are affiliated to; and amount of waste and pollution they generate or eliminate. (Stone 2010). Using recycled products, wise use of resources like water and electricity, reducing paper use for administrative purposes, limiting e-waste, sharing resources like I-pads and tablets, and minimizing food wastage are some examples by which the ECEC centre can play its role in circular economy.

Due to environmental concerns the use of recyclable materials has been increasing worldwide. Not doing it would mean that they will be degraded or corroded and destroyed in nature, which denotes the wasting of resources and environmental damage. Asmatulu and Asmatulu (2011) refer to Asmatulu (2008) to describe recycling as a series of processes which includes collecting materials which would otherwise be considered as waste, sorting and processing them into raw materials. Parts of recyclable devices such as televisions, computers, laptops, mobile phones, etc., many times end up in landfills. Along with valuable metals they also contain harmful materials that can contaminate air, soil, and water. Even in small quantities, they can cause serious environmental and health problems. Therefore, recycling supports sustainable development, although in a small way by reducing greenhouse emissions and

has a positive effect on the rate of climate change, air, and water pollution, and contamination of soil thereby, impacting the human and animal life. (Asmatulu and Asmatulu 2011).

Primary and major producers of waste include all types of industries, along with households, schools, and hospitals. Minimization of waste is a process by which poisonous and hazardous waste is reduced. We can reduce waste by optimizing the use of source materials; collecting, sorting, treating and reusing material for other purposes; supporting sustainable and long-term use of resources thus reducing environmental damage; aerobic decomposition of biodegradable organic matter to reduce the amount of trash removed to landfills; donating unspoiled food to local food banks, shelters and community kitchens; and donating clothes, shoes, and other materials to the needy. (Asmatulu and Asmatulu 2011).

According to Samuelsson and Kaga (2008) reconsidering some of the discarded things awakens a feeling of permanence and a sense of belonging. Giving importance to nature and human beings forge ties between them and create an attitude of conservation and respect towards the objects and what they were and what they can be. Giving a new meaning to an object by transforming from its initial purpose to another one contributes to thinking that there is something beyond the utility and that objects have more than one significant purpose. Apart from economic and ecological values, recycling has psychological, philosophical, and pedagogical values: reassigning of meaning, the permanence and belonging in peoples' attitudes. (Samuelsson and Kaga 2008). Although children do not understand the scientific and technical aspects of the benefits of recycling, it is beneficial to cultivate good habits of recycling, reduce, and reuse during the early years. While growing up these habits will stay with them and later, they can get more information and understanding of the scientific aspects of it. It will help to develop sustainable approaches to everything they buy, use, and dispose of.

5.4 Phenomenon based learning

To prepare children for a dynamic future and equip them with skills and competencies that will help them adapt to the changes, phenomenon-based learning has been introduced as an alternative to subject-based learning in Finland. Mattila and Silander (2015) state that in this method learning involves the integration of subjects and it aims to build an interdisciplinary and holistic picture of the selected real-world phenomenon. The reflection is not restricted to one single point of view rather the phenomena are studied holistically from different points of view, surpassing the boundaries of subjects and holistically integrating them. The phenomenon-based method creates rich learning experiences. Personal observations, interpretation, forming meaning, and other activities support the understanding of the things to be taught, and learning becomes a meaningful, significant activity for the children. The phenomenon-based learning supports inquiry learning, problem-based learning, and project learning in educational institutions as well as their practical implementation. Phenomenon-based teaching

motivates learning in children because it is needs-oriented, and children see the utility of the theories and information during the learning process. The learning begins with the aim of understanding a real-world phenomenon that is child centric. They are the active creators and actors who learn theory concerning practical situations and phenomena. (Mattila and Silander 2015).

In the case of sustainability education, the question can be about clouds which may culminate into a project about how they are formed, where does rain come from? How do plants and trees grow? After reflection and analysis of the questions by the whole group, the educator can select one question to study in detail. Later children and educators brainstorm about how to get answers and what methods can be used. The learning products in early childhood education and care are drawings, paintings, art pieces, participatory theatre, handmade crafts, etc. It is an active learning process that develops thinking through communication and shared effort. All the children contribute their skills and competencies, thoughts, and experiences to a collective process resulting in an equal learning opportunity. Everyone's ideas are taken into consideration and acted upon to enrich the collective understanding of the topic. There is no right or wrong answer or question. It can be used to learn about sustainability issues like garbage segregation, recycling, and learning about a natural phenomenon. Projects about recycling waste in the playschool can be a yearlong or monthly project. (Lehtonen et al. 2018).

5.5 Reading

Book reading is an activity that is carried out in almost all kindergartens. It is a tool to develop and enrich language and vocabulary. Reading storybooks with colorful illustrations maximizes the experiences of language learning and may even surpass the power of oral communications and interactions. There are three ways in which children benefit from book reading. Firstly, it allows the children to hear new words that are included in different grammatical sentences. The books that are written for children use short sentences that are well constructed using a rich vocabulary but are still easy to understand. They tend to use the same words in different grammatical contexts thus presenting different ways of using the same words. Books use a wider range of words than we normally use in daily conversations. (Gelman 2012).

Secondly, book reading enriches the lives and language of the children while supporting joint attention and interest. These books have bold colors and contrasts, catchy illustrations, depict animals, and nature in a captivating way that can hold the interest of the child for a long time. While reading a book, educators can easily notice what a child is observing and paying more attention to. They can build on it with comments and positive interactions. During the reading session, the children can also ask or draw the attention of the educator to interesting

pictures or illustrations using gestures or sounds or words. This enables to hold the attention of the children for a longer period. (Gelman 2012).

Thirdly, book reading helps children to learn the language and understand the content, as it requires them to be active participants and take part in responsive interactions about the meaning of the words. Educators should be responsive to the children. A dialogic reading occurs when adults follow the children's interests and engage in a conversation about the matter written in the book or on a particular page and discuss the observations or experiences of the children concerning the story or matter in the book. It becomes an 'up close and personal' experience when done in such a manner and produces a positive outcome in learning. (Gelman 2012). This simple everyday activity can develop environmental ethics and sustainability in children. There is plenty of literature for children in the form of stories, fables, poems, and informative books.

Reading books related to nature and the environment is a part of Ecopedagogy. Reading story-books with a moral is a common method in many early childhood education centres. Reading and telling stories would encourage children to understand current environmental issues, their root causes, and strategies required for solving those issues. When assessing eco-justice issues, children seem to rely more on their emotions rather than intellectual knowledge about the environment. Although the children's strongest emotional connection with nature may be the inherent love of animals, children's literature through the depiction of nature, animals, and birds also can address the emotions of children and build a long-lasting impression on their minds. The environmental literature for children from India, Mexico, Canada, and The United States shows that picture book stories can not only build literacy but encourage making connections across cultures and differences. (Gaard 2009).

6 Implementation

This part consists of the actual procedure that was followed to make a guidebook. Initially, the plan was to do guided activities supporting sustainability with the children. However, the situation changed after I had done only three activities with them. Children stopped coming to the playschool because of the exceptional circumstances due to the outbreak of the corona virus pandemic and the subsequent lockdown. After consulting with teachers in Laurea and personnel at the playschool, it was decided that I can make an extensive guidebook of activities that the playschool staff can incorporate in their yearly curriculum. It was based on the consultations and recommendations of the playschool staff. The whole process from planning to designing the guidebook can be summed up in Figure 8 Process of implementation.



Figure 8: Process of Implementation.

As mentioned in the aims and objectives of this thesis, the 3Rs namely repetition, relationships, and routines were taken into consideration while designing the activities. According to Zucker (n.d.) since birth children form relationships with people and the environment around them. When they have positive interactions with their family, educators, and peers, they are experiencing relationships that assist their brain development. Wasik (2012) refers to Pianta and Stuhlman (2004) to explain that early interventions are important and formative for forthcoming ones. In a playschool setting the positive interactions with educators improves the child's social behavioral skills. Interactions must convey a positive message. Repetitions are repeated opportunities that give children a chance to learn. Simple daily activities can be turned into occasions for learning and repeating them will enhance their learning. They are educational prospects and learning opportunities in a recurring process. (Wasik 2012). Zucker (n.d.) states that repetitions in daily routines help build connections in the brain that advance learning and development. She further states that relationships and repetitions occur in the context of everyday routines and activities. They are predictable and have the same steps and processes. They provide meaningful opportunities to practice and learn new skills. The same routines may happen in homes, playschools, or the community. This denotes that the children have repeated opportunities to practice those skills in different environments, with different people, and with a different set of materials. (Zucker n.d.).

On 5th March 2020, personnel from the Recycling Centre visited the playschool premises. Along with the supervisor from the playschool, we had booked an appointment almost a month ago. They conducted three activities with five- and six-years old children. The first one was about recycling. It was in the form of a story where a bear finds trash in the forest and

how the children can help him to segregate and dispose of the trash. Children learned how trash materials should be disposed of in different kinds of bins. The personnel had brought trash items and different trash bin shapes in different colors. The children practiced garbage segregation with them. The recycling activity is shown in Figure 9. The second activity was making a hat with old newspapers. It was interesting as it only needed newspapers and nothing else. All the children could make paper hats easily. The hat making activity process is shown in figure 10. The third and last activity was learning about the life cycle of a paper. The children sang and danced while enacting the whole process - from a seed to a paper. It was a joy to watch the children act like a seed, a tree, and then paper. From these activities, they learned about the importance of trees, paper, and recycling.



Figure 9: Recycling activity.



Figure 10: Paper hat making.

When planning the activities, I had decided to begin with the simplest ones and then graduate to more challenging ones. On a pleasant morning, I took the 5 years old group of children to a park nearby, which has a playground surrounded by trees. We talked on the way about the activity to be done. We were going to make a new friend. On reaching the park, the children took a good look at all the trees, discussed amongst themselves, and reached a conclusion about which tree they would choose. It was a tall Birch (Koivu) tree. They also had a name for it. They were going to call it 'Tiger Birch', it was named after their group. We then discussed when it will start growing leaves, why it had no leaves at that point, and what is the wood of the tree used for. They also made a circle around the tree and sang songs. After that, we all played in the playground. When it was time to leave, all of them went to hug the tree and said goodbye. Figures 11 and 12 show the children playing around the tree.



Figure 11: Playing around the tree.



Figure 12: Playing near the tree.

During the same week, the children also made a craft activity with a cardboard box that was procured from the playschool kitchen. As it was a rectangular one, I asked if we could make a

robot out of it? The children were very excited and readily agreed. We saw a video about how to make a robot. The activity required the children to work as a group. The work was divided amongst all of them. Each was given an opportunity to choose what they wanted to do. Some were cutting, some were drawing, and others were helping paste the body parts. Although it was done in a day, the children could not play with it as the glue was still wet. It was difficult to keep the children away from it, as they wanted to play with it immediately. On the next day, the children could play with it. They named it again as 'Tiger' and decided to use it to tidy up the room, keep stationery and books in the proper places and help in every way possible. It is shown in figure 13. They did not want to share it with other groups. This activity taught them the importance of recycling. Before the activity, I had asked about where would the box go if not used. They knew it would go to the bin and then for recycling. Then we discussed if it could be used again. This teaches children to make optimum use of materials and things that may seem trash can be utilized again.



Figure 13: Robot.

After this activity, I had discussions with the playschool supervisor about what kind of activities they would like to have in the guidebook. While designing the guidebook, I kept in mind the theory and the background for sustainability and environmental education, which put forth the need for a transformation in the way children are being taught. Therefore, the

guidebook should aim to give a future-oriented approach. According to Palmer (1998), the curriculum should be modeled in a way that bridges the gap between environmental education and future studies. It should be based on children's ideas about the future, how their ideas impact the way they behave and act in the present, and how their actions influence the future. It should help them to understand how their actions and decisions regarding the use of resources nurture or disrupt sustainability. It should aim to develop attitudes, awareness, and values to facilitate their involvement in attaining sustainable development. (Palmer 1998). The guidebook was designed as shown in figure 9.



Figure 14: Guidebook design.

7 Feedback and evaluation

In this section, feedback from teachers and children is presented. According to Hattie and Timperley (2007), feedback is a powerful influence on learning and achievement and is theorized as information provided by the teacher relating to the students' performance or understanding. Thus, feedback can be termed as a consequence of performance. Therefore, it is important to get feedback to assess the utility and reliability of the activities in the guidebook.

As far as possible I have tried to design a guidebook that follows the principles stated in Social pedagogy and Eco-pedagogy. They include giving the children positive experiences through art activities, nature walks, phenomenon-based learning activities, and reading books. Positive experiences are also the main aim of the diamond model of social pedagogy. Eco-pedagogy

emphasizes art education and doing activities together whereas social pedagogy uses the term 'common third' which is an activity where the children and teachers participate with a common intent and goal. The activities form a medium through which a relationship is formed between the participants and the interactions that follow create a platform for dialogue through which learning happens. A sense of achievement, happiness can be felt through the routine and meaningful activities as well. The guidelines for the National Curriculum in Early Childhood Education and Care were also followed regarding participation, holistic learning, and using diverse methods for learning.

7.1 Feedback from children

Although I did not get any time to ask for feedback from the children, through observations and reactions their feedback seemed positive. During the tree activity, they were initially amused and then happy to have a new friend. They were very curious to know more attributes of the tree. One of the children said, he can tell this tree a secret and no one will ever know about it, because it never speaks. They were eager to visit next week to see if any leaves had grown or any changes had taken place around the tree. Unfortunately, we could not go back as a group.

The children were very possessive of the robot and did not want to share it with others, although they showed it to them. I could feel that they had a sense of achievement in the whole process. They wanted to use it for cleaning and tidying up. I thought this is a sign that they have understood at least something about keeping their surroundings clean. One of the children asked her parents to come and have a look at the robot they had collectively made. From the parents' reaction, I guessed that they were happier seeing the child so excited and elated rather than the robot itself. There was only one child who did not want to help in making the robot even though she was quite elated to be around us and talk about it. I tried to coax her in participating but had to let go as I focused on the positive experience, she was getting by just being around other children, observing them, and enjoying the process.

The children liked the paper hats and were wearing them during free play. After the activities by the personnel from the recycling centre, one of the teachers and I felt that towards the end of the last activity, some children had started to lose interest and were trying to fool around. We thought that this was because the whole activity lasted for more than ninety minutes and some children do not have the patience to be attentive for so long. We thought that the activities should have been divided to take place over a period of two days. This was not in our hands as the visiting personnel did not agree to it.

7.2 Feedback from the staff at playschool

There were only two teachers in the playschool during the partial lockdown due to the Corona virus pandemic. Initially, I had sent my rough draft of the guidebook. They asked me to add certain things. After obliging their requests, I again sent them the final draft. Both were pleased with the final product. One of the teachers had called up to give feedback. She was happy that the guidebook had well-researched activities and is very usable. She said she had learned new things from the guidebook and was looking forward to doing some of the activities in summer. The other teacher sent a written evaluation which is quoted as under:

“Thank you for your hard work! I thought it was nice that you structured the different activities in the booklet according to the different seasons of the year. I found it useful that there was some theory at the start of the booklet as it helps readers to understand the usefulness of the activity ideas listed further on. It was nice to find a variety of activities including crafts, discussion points, and field trip ideas. We go at least once a month on trips and it is great to have more ideas to explore the environment on a trip. I found it nice that there were books listed for each season of the year. We read books daily to the children and it is nice when we are able to tie certain books to a theme we might be discussing or learning about with the children. I hope to make use of this booklet with all the children in the playschool and found useful ideas for all age groups even though most were tailored for 5-6-year-olds. I look forward to observing, discussing, reading, crafting, and recycling with the children in our care. Some of the ideas that were especially appealing to me were the idea of a trash inspector, energy spy, and making a tree friend. These activities seem like fun ways to put what we are learning into action with the children as they learn a lot through repetition and routines. I personally feel I will make use of the activities in this booklet and look forward to supporting the children in our care to become more ecologically intelligent”.

Overall, from the teacher's view, the guidebook is a useful tool for them to plan and implement activities relating to sustainability. They found it was easy to incorporate these activities in their regular curriculum and the recycling materials suggested in the guidebook are easy to procure and store. I estimated from my observations that even the children were happy to do the three activities, which was my primary goal - of giving positive experiences to the children through these activities.

8 Conclusion and discussion

The initial goal of this thesis was to do activities concerning sustainability and environmental education with five-and six-years-old children and create a guideline for activities to be done at the playschool. The exceptional circumstances due to the Corona virus pandemic lead to

reworking the primary goal of the thesis. The revised aim was to create an extensive guidebook detailing activities' to be carried out at the playschool guiding the children on the path of becoming ecologically intelligent. The activities are not designed to replace the standard curriculum, but it will act as a guide for teachers to include it as a part of the regular learning goals during the year. The point is to immerse sustainability in the curriculum not as a separate subject, but use it during learning Math and English, craftwork, science activities, outdoor play and field trips, and visits. It also has routine activities that are repeated to inculcate sustainable habits. The guidebook was well received, and the teachers were appreciative of the hard work that went into creating it. They were especially happy as activities are planned according to seasons and book suggestions are corresponding to the activities and that all books are available in Helmet Libraries. They appreciated the fact that due importance was given to their suggestions while envisaging the activities.

Looking back at the process, I consider it a success as well as a learning experience. In the beginning, I was confident and sure that I could do all the activities very well as I had put in hours of planning and discussions with the teachers regarding the same. Three activities were conducted successfully as per the plan. However, something that most of us could not have imagined in our wildest dreams happened. Everyone was asked to stay home due to the corona virus pandemic. Although the playschool remained open, there were only three children who attended regularly. Libraries were closed as well. I could not access the books that I had reserved. Suddenly I found that I could not carry out the activities the way they were planned initially. I had to go back to the preparation stage again and plan a guidebook. Teachers from Laurea UAS and staff from the playschool encouraged and helped me complete the thesis on schedule. I have learned a valuable lesson from this situation. One must always have an alternative plan if the initial one does not work, there is always room for improvement, and lastly improvisation. Improvisation is essential in the playschool environment. As a teacher one has to be responsive to the children and the ensuing dialogue can go in different ways, it might not move in the way the teachers have envisioned it. Therefore, improvising helps to keep the activity going ahead and attain the intended goal.

Another thing I learned was that it is not easy to create a learning tool in the form of the guidebook. A lot of research is required to make it suitable for children in kindergartens. Due diligence has to be followed while designing so that all the activities are age-appropriate, the materials used can be easily found and stored, inquiry-based activities are suitable for their age, and keeping in mind the recommendations of the staff. My personal goal was to learn how sustainability and environmental education can be implemented and incorporated into the yearly curriculum without using it as a different subject to be taught, while providing positive experiences to the children. Every day we learn new and different things about sustainable development and practices. Children should be given a chance to take little steps towards

becoming ecologically intelligent by observing sustainable practices. The guidebook will help the teachers to lead the children on that path.

It gave me immense satisfaction when the playschool staff said that they were quite surprised and did not expect such an extensive guidebook and that they would be definitely using and including the activities stated therein during the year. The staff is always very busy and although it is beneficial to introduce sustainability in early childhood education and care, sometimes it is only restricted to nature walks. They find it a useful tool to inculcate sustainability in the playschool setting. Positive feedback and encouragement from them made me realize that I had succeeded in my goal.

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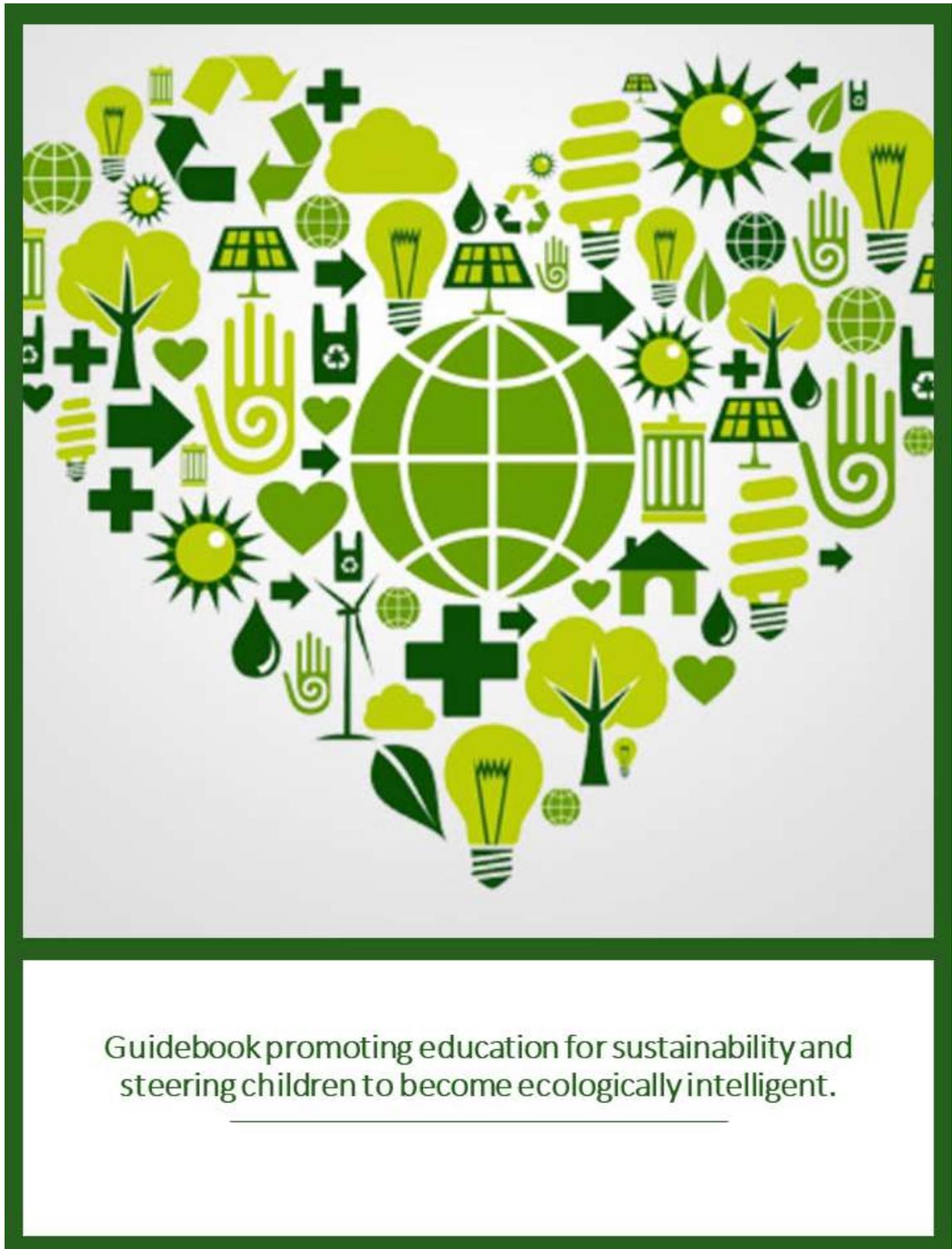
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Appendix 1: The Guidebook



Activities to be carried out for the whole year:

Certain activities should be done regularly so that the children become familiar with them and are less likely to forget them. Zucker (n.d.) explains that there are three important processes for shaping children's brain development. Relationships, Repetition, and Routine can be termed as the 3Rs for early childhood as they focus on how the children learn rather than what they learn.

Relationships:

Nurturing and responsive relationships are foundations for fostering brain development in early learning. In ECEC centres children have interactions with teachers and other children. Consistent positive interactions through these relationships support their brain development and learning.

Repetition:

Children benefit from repeated opportunities while learning. For example, doing the same things every day like disposing of the garbage in appropriate bins will help them learn about recycling. Some children need more practice than others. Repeated learning opportunities in everyday routines assist building connections in the brain that support development and learning.

Routines:

Relationships and routines that occur in the context of everyday things provide opportunities for children to practice and learn new skills in a meaningful way. Some routines take place at home while some take place at ECEC centres or in community settings. Some of them happen in more than one place providing opportunities for the children to practice skills and behaviors with different people, places, and materials. (Zucker n.d.)

Recycling, reusing, and reducing:

Throwing trash and garbage in appropriate bins is one such habit that can be cultivated by practicing regularly. It can be done before and after lunchtime. Before lunch, the teacher can remind the children to put leftover food in their plates in the biowaste bin. The teachers can tell the color of the bin to children who are 3 years or less as they might not understand what biowaste means. During lunch, children should be encouraged to take suitable portions of food, so that nothing is wasted. After lunch teachers can keep an eye on whether the children are disposing of waste in the correct way.

Children should be informed that paper should be put in the appropriate bin, plastic or other waste should be put in the bin for plastic or if there no such bin then it should go to the mixed trash bin. After finishing activities children should be encouraged to keep books and other stationery articles in a proper way and in their designated places. This helps to keep them in a good condition and teach children to make good and proper use of materials, by which they can last longer. This can be done in an interesting way. Each group can have a Trash inspector (roskapoliisi) for one week. The child is responsible for making sure that everyone throws trash in the respective bins, the classroom is clean after the activities, everyone helps in tidying up and all books and stationery is kept back neatly and properly. The child can also be the one who ensures that lights are switched off when not needed. This will help build leadership qualities in children. Leadership helps to instill confidence in children, to solve problems creatively, work in teams, and in cooperation with each other. Most importantly it supports children to act and behave responsibly. (Bobbermen 2019).

Saving paper

Paper should be used on both sides. Restrict one printout for each child per day. For sustainability, purposes try to cut the standard A4 sheet into half as children many times do not utilize the whole sheet of paper.

Saving water and electricity

Energy production poses many environmental problems, the most serious being climate change. Everyone can reduce the energy consumption in the ECEC centre by their own actions. For example, lowering the indoor temperature by one degree reduces energy consumption by 5 percent and properly designed lighting can reduce energy consumption by up to 50 percent. (Sunikka et al. 2010).

Children should be encouraged to optimally use water and electricity. Water faucets should not be left open. Encourage children not to talk or keep looking in the mirror when washing hands under running water and reduce use of hot water. Ask the children to switch off lights when not needed and when leaving the classroom. Leaking water faucets should be fixed immediately.

Children can also act as energy spies, secretly observe neighboring groups and leave thanks messages or comments on the bulletin board for things like turning off lights, room temperature, or efficient ventilation. Together with children, various information leaflets reminiscent of environmentally friendly ways can be made indoors (Turn off the lights; Sort waste; Close the tap for hand washing, etc.).

Many commercially purchased and industrially produced materials can be easily replaced with natural materials. These materials come free of cost. A wide variety of interesting and useful material can be found in the natural surroundings, such as grasses, cones, twigs, sticks and leaves. If the collection of materials is carried out together with children, different details such as shapes, colors and different textured surfaces can be viewed at the same time. The materials can also be utilized holistically, i.e., the leaves of trees and shrubs, for example, can be used first as an aid in species identification, then to learn how to press the leaves and finally to make cards or other necessary things from them.

Different things form a whole and a chain connecting different subjects at school. (Sunikka et al. 2010).

Buying craft material from recycling centre at a reduced cost can cut down on expenses of the Play School. The stores stock cheap, ecological craft supplies such as buttons, wooden beads, pieces of cloth, ribbons, and assorted sundries. These can be found at all stores. Children learn about reusing things. They provide craft materials to educators and other non-commercial user's for free as part of the Näprä wholesale at Nihtisilta department store in Espoo. More information on

https://www.kierratyskeskus.fi/in_english/craft_supplies_and_workshops

Field trips or excursions

Children can go out to visit forests or parks nearby in all seasons to enjoy every kind of weather wearing appropriate clothes. There are several benefits of being in nature:

- It helps form positive relationship with nature.
- It is a safe environment.
- Creates an understanding of natural events and changes due to weather.
- For children it can be a source of constant experience of discovery and wonder which makes them curious to know new things.
- It gives them a multisensory experience, i.e., sensitivity to see, hear, smell, and feel. It enriches the lives of both adult and child.
- Increases their awareness relating to trash and unwanted things that spoil the forest environment.
- Boosts motor skills.
- Language skills can be developed by naming the trees, knowing the natural phenomenon, learning how to count (they can count trees, cones they collect, leaves and flowers as well), learning language (learning opposites with natural materials and their properties for e.g. big-small, heavy-light, dry-moist, smooth-jagged, thin-thick, sharp-blunt, etc.), learn colors, etc.
- Children can observe small insects, animals, birds and their habitats.

- Pedagogy of place-According to Wattchow and Brown (2011) the concept of place has relevance with how people foster and experience a connection and attachment with locations around them. It also shows how people effect and are affected by those places and the changes taking place. It suggests how the place and people interact and change each other. (A pedagogy of place). Children feel an attachment with the place they visit often and are concerned about its wellbeing and changes affecting it. They feel a sense of possessiveness for the place and are more likely to take care of it.
- There is lots of space to play games and enjoy the outdoors and get fresh oxygen for a healthy life.

Worksheets to practice saving water:

https://www.swfwmd.state.fl.us/sites/default/files/store_products/mywateractivitybook.pdf

Things to remember when visiting forests, beaches or other natural surroundings.

- Do not make too much noise, it might scare the tiny animals and birds.
- No plucking and uprooting plants.
- Being careful while walking, do not trample on flowers and plants on purpose.
- Do not litter.
- Do not leave food in the forests. Especially bread and plastic. Sometimes the squirrels and birds eat it. Bread can become moldy in the forests and is harmful for them. It is not their natural food and can cause a yeast infection in birds and ducks.

During the year if the children are interested, a circulating library can be arranged. It is a sustainable way of sharing books. Most children have books at home. The teacher can arrange or build a class library. Each child can get one or two books from their home. The books should have the child's name on it. The teacher collects the books and during pre decided times, either the children can borrow one book to read or the teacher can read one book to all of them. In this way children have lots of books at their disposal without having to buy them. Saves cost to the parents and play school. After everyone has read the books, they can be returned back to the respective children.

The next part of this guide book has activities designed basically for five and six years old children. However, they can be modified or used according to the children's capabilities and interests. The activities are written according to the seasons. They consist of art activities, fieldtrip activities, books suggestions and phenomenon based activities.

Autumn

Field trip and excursions

Autumn feels much livelier and more enjoyable by going on frequent excursions. In this way children can get used to the changing weather. When moving outside, they notice the changes that take place in nature. Autumn trips can always be made to the same place, but different routes can be taken to the excursion site to observe the changes in the surroundings. The autumn excursion site should be selected before the plants have begun to wither. Over the course of the fall children can observe how the park has changed, which plants have withered, and which remain the same in winter. Leaves that have fallen into the yard are raked either into compost or under bushes as wintering grounds for small animals. (Sunikka et al. 2010). They can collect leaves, cones and small stones for activities.

A simple activity can be making a tree friend. Children can choose a tree in the forest to be their friend. They can play near it, around it, observe if any birds or squirrels live on it, mark the changes happening to the tree over the course of seasons. Looking at the skies children observe flock of birds flying in one direction. This could lead to an explanation for their migration and used as an activity in class.

Activities for learning recycling and waste management

If possible, personnel from recycling centre can be invited to educate the children about recycling in the correct way. They also have more related activities. These include how paper is made. (Seed-small plant-tree-then it is cut-processed to make paper-packaged and sold-use of paper-recycling-to make new paper). Another activity is how to make hats with newspaper without using scissors and glue. Further information can be found at https://www.kierratyskeskus.fi/ymparistokoulutus/oppitunnit_ja_tuokiot

In this exceptional situation during lockdown HSY has introduced learning games on the Seppo platform for distance education. For ages 5 and 6 there are two games one with water and another relating to circular economy.

Children can learn about recycling through an online game which also has an audio for those who cannot read. Children are required to put waste items in correct corresponding bins.

http://papunet.net/pelit/tarinat/kuvakirja/lue/Kierr%C3%A4tyspeli_valokuvilla

http://papunet.net/pelit/tarinat/kuvakirja/lue/Kierr%C3%A4tyspeli_piirroskuvilla

Art and crafts activities

Children can draw and paint their observations from the forests or parks.

Making a bird feeder.



Materials needed- milk cartons, paints, paint brushes, twine(thread), scissors.

Instructions if needed can be found on:

<https://www.youtube.com/watch?v=IV2uD5xDY9A>

Other craft ideas:

Making hedgehogs with leaves. Other animals can also be made according to the age of the children. More information on <https://www.easypeasyandfun.com/fall-crafts-for-kids/>

Owl pine cone craft: <https://meaningfulmama.com/owl-pinecone-craft.html>

Father's Day cards can be made with waste materials.



A cardboard piece cut into a circular shape or use yogurt box lids to make the medal. Paint and sketch pen, blue paper for the ribbons. Glue and scissors.

<https://www.craftymorning.com/gold-metal-fathers-day-gift-kids-make/>

More activities can be found on the internet.

Phenomenon-based learning activities.

As the children are going to the forest, they always find trash or leftover food by campers or picnickers. This theme can be used to make the children understand about decomposition and recycling. Circular economy can be introduced at this stage. The lifecycle of a candy wrapper might be easy to begin with. Starting with the material used for the wrapper. What happens to it after it is thrown away? Where does it go? Does it go to the landfill? If it is recycled what are the benefits? What if it is burnt or left at the landfill? Does it generate pollution? These are some of the questions the Teacher and children can consider interactively. The missing information or knowledge can be researched on the internet together.

The Ellen McArthur Foundation website has valuable information about how not only humans but animals build things, how natural things are recycled and reborn. Info at <https://www.made2bmadeagain.org/>.

Compost can be made with leaves and carrot peels. Children and teacher can do it together. It can be used later in the garden when planting saplings or children can take small amount home to put in their gardens or yards. Information can be found at <https://www.youtube.com/watch?v=0B6nbtSLcLc>

Another activity can be migration of birds. Children often observe flock of birds flying towards one direction. The questions can be about where and why they are going? Do they fly in a pattern or shape? How do they know where to go? Do they have a leader? Don't they get tired? How long does it take for them to reach their destination? These questions can be followed by an activity where the children can draw the pattern in which of the birds are flying and imagine where they will reach. A story can be developed by the teacher and children together about their adventures during flight. It can be drawn on paper and shared with other groups. It can also be done as a puppet show by the children for other groups. More information about migratory birds in Finland can be found at <https://www oulu.fi/northnature/english/englanti/elaimet/mulin.html>

Books that can be read and referred for Autumn. (Helmet Libraries)

1. Where do Garbage Trucks go? By Benjamin Richmond
2. The Wonder of Trees by Davies Nicola
3. Migration- Incredible Animal Journeys by Mike Unwin.
4. Story book Jazzy in the Jungle by Lucy Cousins.
5. Craft ideas- 100 things to recycle and make.
6. Michael Recycle by Ellie Bethel (not available in library, but audio book on YouTube). <https://www.youtube.com/watch?v=aZj14ChIY8I>

Winter

Field trips and excursions

Winter hikes are fun in the snow. Children can try to find and observe footprints of animals and think about which animal it belongs to. Teachers and educators can explain more about those animals.

During visits children can be asked about how birds and animals survive the winter. They don't have woolen clothes. How do they protect themselves? What effect does cold have on animals? A simple game in the snow can be enjoyed. It can be called the Frost and Birds. It is like the banana tag game. One child is the frost and others are birds. If frost catches a child(bird), it freezes, and children need to stand without moving. Other children (birds) can come and save the frozen birds. Children can make snowman and other sculptures in the snow. Children can go skiing in nearby ski slopes or they can practice in the school yard. (Sunikka et al. 2010). More information about exploring nature in winter and other activities can be found on hel.fi/static/ymk/esitteet/talventaika.pdf

There was hardly any snow this year. In such a situation, forest visits can still be organized. Children could visit their tree friend and keep it company in winters (learning empathy). They can play around it, observe changes in the areas surrounding it, check for any animals or birds nearby and wonder why there is no snow. Teacher can explain in an age appropriate way. When they come back to playschool, they can check weather forecasting websites for more information.

Art and Craft activities

Old games or puzzles that have missing pieces or are incomplete can be made into innovative new ones. It can be left to the children to decide, plan and make a new game. It will boost their creativity, teach them how to plan and implement things, importance of storyboard planning and teamwork. Instead of a big group, smaller ones with 3 to 4 children would be a good idea.

One of the simplest activities is coloring pinecones for Christmas decorations



<https://www.dreamstime.com/santa-claus-saint-nicholas-standing-snow-front-gold-colored-pine-cones-starry-sky-dark-blue-image164487958>

Toilet paper roll and cardboard castle (frozen theme). This can be done as a group activity. The whole group can participate to create a big castle.

<https://www.youtube.com/watch?v=kzzOPRQXDE>

A small treasure box or a gift box as the one shown below can be made with egg cartons, procured from the Play School kitchen or children can get it from their home.



Materials: Egg carton, paints and glue stick. Can be done with all ages.

Children can bring egg cartons from home.

This can ensure parent participation.

<https://www.youtube.com/watch?v=wVTEJgYtoBk>

Cute Christmas elves can be made during Christmas activities using cones and felt. Picture and instructions given below.



Materials needed felt and cones.

Instructions can be found on

<https://liagriffith.com/felt-and-pine-cone-elves/>

<https://christmas.365greetings.com/christmas-decoration/top-40-christmas-decorating-ideas-using-pinecones-diy-included.html>

Make bags with old T-shirts. Clothes recycling can be taught by making bags with T-shirts. Children can bring old T-shirts from home to make a bag for themselves. It can be used to take it to the forest or other trips from where children can collect leaves, cones, stones. It is easy to make with preschoolers and 5-year-old children. There is no use of sewing machine. It can be a good way to practice motor skills. Instructions can be found at https://www.youtube.com/watch?v=O33Wq_uz6Y

Making Independence Day cards and Christmas Cards and gifts with recycled and waste materials.

Picture Frame

Materials needed: old magazines or newspapers with pictures, square cardboard pieces, glue and scissors. Cut pictures which have the same color in similar shapes such as square shape. Make a collage and stick them nicely on the cardboard piece. Decorate the sides of the cardboard with colored paper or a ribbon.

Wall décor made with newspapers for the classroom can be made as a class project. It can be used as a Christmas decoration for the class. More information:

<https://www.youtube.com/watch?v=Qy9mdDeO5ac>

Phenomenon based learning ideas for winter.

The shortest day of the year is on 21st December. There could be a discussion about it. Weather forecast websites can be seen together with the children to check dark hours and daylight hours for this day. What would happen on the next day? How gradually the days become longer and nights smaller. This could lead to an explanation of how the earth rotates around the sun and revolves on his own axis. Information about seasons and the sun for teachers can be found at <https://www.youtube.com/watch?v=b25g4nZTHvM>

After discussing about animals during forest visits, the subject can be expanded to make a project. Where do animals take shelter in the snow? Discuss where animals live or find shelter. What protects them from cold? Winter habits of indigenous species like the bears and reindeer. Concept of hibernation can be discussed. The horns or antlers of the reindeer change in each season. The children can discuss along with the teacher about it. Information can be found on <https://www.pbs.org/newshour/science/7-things-didnt-know-reindeer>

Indigenous animals and birds found in Finland and their food and habitat can be discussed. Why these animals live only in the cold areas? For example, children can be shown a picture of a polar bear standing in a desert. The children can be asked is it possible? Do polar bears live in hot places? Why can't they survive in hot areas? Or if they do survive, will they still look the same? What changes will they need? For example, people in cold region wear sweaters and wooly coats in winter and people wear very light and cotton clothes in hot regions. How will they protect themselves from the heat? What will they eat? Are seals and fishes are found in the desert areas? It can be fun and creative exercise for the kids as their imagination can be very different from the scientific facts.

Drawing these animals in their natural habitat or making them with toilet paper rolls can sum up the activity. <https://www.youtube.com/watch?v=FFA0E8mAzR8> (polar bear)

<https://www.youtube.com/watch?v=SkNFwh2auSk> (penguin)

<https://www.youtube.com/watch?v=inqZ4R0JbAk> (reindeer)

Learning about Eskimos and igloos can be a good learning topic followed by making art and craft relating to it.

Water can be used as a medium to learn about its various states. Water can be kept in plastic recyclable and reusable jars or in milk cartons to observe how slowly it turns into ice. What happens when hot water is poured on ice? How long does it take for ice to melt into water after it is brought back inside? What are the reasons? Basic science activity can also help further preschoolers their knowledge about water cycle in nature.

If the weather is very cold and children are not able to go out, they can also watch a video about crabs. A good example of recycling and reusing and what we can learn from animals. It is about crabs and their shell exchange. The teachers can explain it in easy language or in Finnish. <https://www.youtube.com/watch?v=f1dnocPQXDQ>

Books that can be read during the Winter(available in helmet libraries.)

1. Frozen Wild-How animals survive on the coldest place on Earth by Jim Arnosky.
2. Story Book The Lorax by Dr. Seuss. (Teacher should consider reading this book taking into account the children's sensitivity as it deals with effects of deforestation.)
3. Wow! Its nighttime by Tim Hopgood.
4. 100 things to recycle and make by Lucy Cousins.
5. Our Planet-The one place we call home by Matt Whyman.
6. The Go Away Bird by Julia Donaldson. (Story of friendships)
7. 101 Facts. BEARS by IP Factly and IC Wildlife. (Available as free eBook on amazon kindle.)

Spring

Excursions and field trips

Try to visit the same place where the tree friend is. Observe the vegetation surrounding it. Is there new grass? What kind of wildflowers are there? Are there different colored flowers? Do all the leaves have the same green color or there are different shades of green? Going by the same route every day, observe the vegetation and plants growing along the way. Pictures of the places and forests can be clicked by the teacher and made into a collage on Tablets. Children can practice media skills on Tablets. They can also draw what they observed in nature during the excursions.

As a result of the melting of snow in the spring, puddles form in the forests and in the yards. For example, in the spring one can find bugs in the long-lived puddles of the rocks, e.g. mosquito larvae. From puddles as well as from the shores of the sea, lake, pond, river or creek, teachers and children can try to catch animals with a sieve or a strainer. A sturdy kitchen strainer is a great fishing tool. The catch can be put in a white plastic box for examination. Old food boxes can be requested from the kitchen of the kindergarten for this use. Bugs can also be caught in a small jar aquarium for examination, but they should be released back into their home waters after examination. Insects may be so small that they need to be viewed with a magnifying glass. (Sunikka et al. 2010). Spring comes earlier in some years, later in others, but it always seems to go by very quickly. A diary can be prepared with the children about the progress of spring, in which nature observations are recorded, for example, every day or at least when they notice a clear sign of spring. For example, the first spring brook, widow's leaf, and lemon butterfly are worth noting. They can also write and draw nice memories of the trips. Dried buds and leaves, for example, can also be stored on the pages of the diary. It is fun to compare the progress of the spring in different years if the diary has been kept for several years. If a school or kindergarten has a digital camera, teachers can take pictures of a certain place with children every day, for example, and watch the snow melt, the grass turn green and the leaves sprout in that place. (Sunikka et al. 2010). Bird watching trips can be arranged to nearby forests. Villa Elfvik has nature trails and there are a lot of birds in the forest around it. Bird watchers frequently visit these areas. If anyone has a binocular, it can be used to spot birds in high trees.

Craft and Art activities for spring:

Many crafts and arts activities can be found on the internet. Two examples are shown below.



<https://www.thebestideasforkids.com/toilet-paper-roll-butterfly/>



<https://www.architectureartdesigns.com/15-extremely-creative-easy-diy-toilet-paper-roll-crafts> <https://www.architectureartdesigns.com/15-extremely-creative-easy-diy-toilet-paper-roll-crafts/>

Phenomenon based learning in Spring

How is a butterfly born from a caterpillar? Since butterflies are common in the surroundings it can be used to learn something new about how they are formed. Teacher can explain about how the caterpillar forms a cocoon around itself and then transform into a butterfly. A very informative and colorful video about metamorphosis can be found at <https://www.youtube.com/watch?v=O1S8WzwLPLM>

Since it is spring and windy outside, it is a good time to learn about wind as a source of energy. It can start with making a pin wheel and while its blades rotate if air is blown over them, the subject about wind being used as a source of energy can be initiated. Children have mostly seen windmills in pictures and know about it. They can be asked about what is energy? How do humans get energy? Why is it needed? Then slowly the teacher can progress to how the lights in the room work? Where does electricity come from? How it is produced? What materials are needed? How vehicles move? Have they seen smoke coming out of cars when they are on the road? Is it good for environment? How wind can be utilized as a clean source of energy? It can be followed by making a working windmill with toilet paper rolls.

It rains in the spring and there is also sunshine. Ask children if they have observed that the water in the yard or in puddles dries up after certain time? Why does it happen? Where does the water go? How are clouds and rain formed? A short explanation about the water cycle can be done followed by drawing the whole process.

Celebrating earth day

It can be celebrated by telling the children about earth day and why it is celebrated. The children can count the number of lamps switched on during the day at the play school and ponder whether they are actually needed on a bright day. Or the children can be taken on a simple nature walk admiring the nature around.

The children can learn about the different recycling logos that are printed on various products and what they mean. This will encourage them to buy things that have the recycling triangle on product packages. Teachers can find information about the symbols at <https://www.greenmatters.com/renewables/2018/09/13/ZG59GA/plastic-recycling-numbers-resin-codes>

Children can take a look at them on food packaging in the kitchen or on toys packaging in the playschool.

Books to be read (available in Helmet library)

1. The butterfly house by Katy Flint
2. Into the forest-wander through our woodland world by Christiane Dorian.
3. The variety of Life by Nicola Davies.
4. Outside-Discovering animals. Wild facts about nature By Dias Andy Seed.
5. Bees like flowers by Rebecca Bielainvski (available as a free eBook on amazon).

Summer

Leaf inspection in the summer, children can collect the leaves of different trees (use the t-shirt bags made during autumn), compare them and sort them into piles. The leaves are then mixed and rearranged. In this way, too, children can learn to notice differences and similarities. In late summer and autumn, the leaves are observed for various shades of yellow, orange and red. One can think about what the leaves of different tree species look like and what happens to them in different seasons. Which tree's leaves are usually yellow, which are reddish, and which are brown? Which tree has the largest and which has the smallest leaves? (Sunikka et al. 2010). Are they long, round, feathery or heart-shaped leaves? Children can learn opposites this way. For Example, big-small, large-short, thick-thin, etc.

Children can also get to know the trees with the help of a Puuhippa game. It is used to make the children identify trees. Choose an area which has lot of similar trees. First, choose an easily identifiable tree, such as birch. In the play area, the hippa chases other players who can be saved by touching any birch tree. After a while, the types of safety trees are changed, so that the play leader can shout "Pine!" In the middle of everything, after which all the pines in the play area are safe places. (Sunikka et al. 2010).

Summer flowers can be made into wreaths and wonderful bouquets. When different grasses start to bloom but are not dusty yet are collected. Small scissors are a good help in picking hay and other plants. It is worth learning that grasses break best at the point of nodes and other plants from where the leaves branch from the stem. Natural flowers can also be collected for pressing or drying. For example, yellow buttercup flowers, reddish grasses and delicate daisy flowers remain beautiful when dried or pressed. Blue is the hardest color to retain. It almost always fades to white. They can be preserved by sprinkling a little salt on top of the flower before drying. (Sunikka et al. 2010). The children can also learn properties of salt and how it helps to preserve other things as well.

When picking plants and flowers, it is good to remember and remind children that no plants should be uprooted to their liking. However, flowers are always at their most beautiful in nature in their proper habitat. To find summer flowers, go to explore the flowering plants in the yard, nearby park or meadow. Look for and collect flowers and plants of different colors. Attempts can be made to distinguish plants by comparing their leaves and flowers. Leaves and flowers can also be glued to dark cardboard and made into memory cards. In this way, in addition to playing, children can also learn the names of plants. Teachers can also start collecting plant saplings together with the children. The plant can be common to everyone in the kindergarten. Preschoolers can make each of their own little plant book from pressed plants. (Sunikka et al. 2010).

Just like in spring, water puddles can be studied in summer. Together with the children, a summer puddle can be built together, for example, to the delight of small birds. First, dig a small flat pond with shovels into the yard or school yard. Dig a shallow, flat pit, on the bottom of which a plastic film is placed. The plastic is made to stay in place by placing larger and smaller stones on its edges, which at the same time become a beach rock around the puddle. They can also put small stones on the bottom of the pond. Finally, carefully pour water into the pond. Therefore, the finished pond is very shallow, so no one can drown. If properly managed, the sparrows may take the pond as their bathing spot and go for a drink from it. (Sunikka et al. 2010).

Art and craft activities

Mother's Day activities. Crafts or cards can be made using the flowers and leaves collected from the forests. Children can use their own imagination for it.

Phenomenon based learning



https://www.pinterest.co.kr/pin/736479345284861771/?nic_v1=1aa09BK%2BJTFClpzwjqVPO6Zf8Mfas5r874elDExgl4AZuwX3wZqMFtpdUWFtkmmW59

Rock balancing is an activity which can be carried out in the outdoors or in play school. Rocks are collected and children try to balance it one above each the other. Many children are interested to collect stones or rocks. This can be turned into a meaningful activity. Choosing, collecting, transporting and then storing them is engaging and fascinating. Children understand about weights better than when it is being taught in a conventional setting. Giving them a chance to build, topple and rebuild stone towers, it makes them understand fundamentals of physics like weights and balance. It teaches them patience. They use trial and error method to make towers. After a few attempts they get an idea how to stack the rocks in the right way.

They learn the following:

- Larger rocks at the bottom, stronger base is needed as a foundation.
- Learning about smooth and rough surfaces and how they affect the stack.
- Oval, square, triangle and all kinds of shapes can be observed. Children can count the number of sides a rock has.
- Pointed, blunt and curved rocks are observed and how they can be used as a base for stacking.
- Develop hand-eye coordination.
- Learn about gravity.

It is a complete STEAM activity as it combines counting, science of gravity, basic engineering making learning fun. (Rock Balancing: Stone Stacking Art)
Stone surveys during summer and autumn with rainfall are the best time for rock exploration. Rounded rocks can be found especially on the beaches. The split stones show the different structures and crystals of the stone. Such boulders or gravel are usually found on construction sites or in gravel piles. The stones are at their finest wet. For kids just bring bags (preferably the handmade ones) along and collect rocks! One can see how many different stones can be found. For example, are there rocks, who flicker like glass? And what colored stones can be found? Are there any white or red stones? Is there rust in the stones? Watch the rocks sparkle on a sunny day in the sun. The most beautiful stones can be stored in a water bowl.

Let's talk about everything that is made of stone and how the stones are born. The rocks are large or small boulders detached from the rock over time, which gradually crack into smaller and smaller ones, eventually turning into grains of sand and dust, and eventually stratifying, squeezing in the earth's crust, or turning into new rock again in volcanic eruptions. All of this can take millions or even hundreds of millions of years. (Sunikka et al. 2010).

Books For summer in Helmet library.

1. How mountains are made by Zoehfeld Kathleen.
2. Muddle puddle farm.
3. How we are -notes for living on planet earth by Oliver Jeffers.
4. One day on our blue planet-in the Savannah by Ella Bailey.
5. From lost to loved-a stray dogs tale by Pamela S. Canepa. (Free eBook on amazon kindle)

For more information:

[https://craftingagreenworld.com/articles/50-diy-toilet-paper-roll-crafts-need-see/\(toilet paper roll crafts for all seasons,\)](https://craftingagreenworld.com/articles/50-diy-toilet-paper-roll-crafts-need-see/(toilet%20paper%20roll%20crafts%20for%20all%20seasons,))

From trash to treasure. http://www.gov.pe.ca/photos/original/4h_trashtreasure.pdf

<https://www.kierratyskeskus.fi/ymparistokoulutus>

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