



Exploring the Challenges and Opportunities of Winter Nature Education in Kindergartens

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This research looks into the challenges and opportunities of teaching children about nature in Finnish kindergarten during the winter. Pilke luontopäiväkoti, a private daycare center focused on nature, commissioned the study to offer useful insights and suggestions for improving nature education in the winter months. The main beneficiaries are the daycare center and its staff, who can use the findings to enhance their teaching methods.

The study aimed to identify the main challenges faced by educators in teaching about nature in winter and to explore the unique opportunities that the season presents. The research was based on Act on Early Childhood Education and Care, National core curriculum for early childhood education and care (2022), as well as existing literature on environmental and nature education (e.g., Palmer's Tree Model).

For richer information, a questionnaire was provided to the kindergarten staff. It would be possible for the participants to describe their experiences and opinions, hence generating valid qualitative data and using them to inform and develop future practices. As identified in this study, the complexity of organizing outdoor activities for young children in addition to the short daylight hours and poor weather conditions are possible difficulties in teaching nature in winter. However, even under challenging conditions, it was educational for children to appreciate nature with activities that involved snow and learning how ecosystems function in winter. In short, this research study concludes that Finnish kindergartens, with adequate resources and support, could implement winter nature education within their teaching program.

Keywords: early childhood education, environmental education, winter nature education,

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1 Introduction

The realm of early childhood education in Finland is distinguished not only by its high standards of educational quality but also by its unique integration of nature education throughout the curriculum. This thesis explores the challenges and opportunities associated with implementing winter nature education in Finnish kindergartens and how they adapt their teaching methods to continue effective environmental and nature education during the harsh winter months.

Finland, located in Northern Europe, experiences a long and diverse winter that lasts from November to April, with average temperatures consistently below 0°C. The winter begins in mid-October in Lapland and progresses slowly southwards, affected by the sea and large lakes which delay the onset of winter conditions. Notably, the region above the Arctic Circle experiences "polar nights," where the sun does not rise for up to 51 days. Permanent snow cover establishes about two weeks after winter begins, peaking in mid-March with snow depths ranging from 20 to 90 cm depending on the region. In this winter of 2023-2024, the last snowfall in Uusimaa region was on 23 April. The severe winters see lakes and even the Baltic Sea freeze over, creating unique challenges and opportunities for nature education in kindergartens, such as teaching about winter ecosystems and promoting outdoor activities in extreme conditions (Finnish Meteorological Institute).

My decision to explore the implementation of nature-oriented education during the winter months in Finnish daycare centers is deeply rooted in a personal fascination with Finland's unique approach to nature education. Before coming to Finland, I had heard through various media that Finnish children engage in outdoor activities for the whole year, regardless of rain or snow, and even babies sleep outdoors daily. I was eager to understand this experience and philosophy. This interest is further fueled by the understanding that engaging in a thesis is a journey of learning, where one builds knowledge on a subject driven by personal interest, as underscored in Laurea's explanation of "What is a Thesis?". The opportunity to deepen my comprehension of Finnish nature education—a distinguished feature of the country's educational landscape and to envision its application in future professional endeavors marks the foundation of my research motivation. Furthermore, my current internship at a private, nature-oriented daycare center-Pilke luontopäiväkoti, which also stands as my thesis's work-life partner, presents a real-world context where the challenge of executing nature-centered teaching activities during the winter months is ever-present. This convergence of institutional need with my personal and professional growth aspirations forms the cornerstone of my topic selection.

Although much importance is given to nature education in Finland, the problems, and on the contrary, opportunities concerning winter are really underestimated. This gap shall be filled by this research, which will point to valuable insights and practical suggestions for better nature education in Finnish kindergartens during winter. This study is critical as it highlights the unique challenges posed by the Finnish winter environment toward nature education and how these can be turned into valuable learning opportunities. It, therefore, fills a significant gap by providing practitioners with evidence-based strategies for improving practices in nature education.

2 Key concepts

This chapter provides an insight into the basic concepts of the Finnish winter nature education study in kindergartens. It defines and clarifies the core terms of the study and sets the stage for further exploration of the challenges and opportunities associated with this educational approach. Key concepts of the research include early childhood education and care (ECEC), environmental education, nature education, and the distinction between the latter two.

2.1 Early Childhood Education and Care

Act on Early Childhood Education and Care (2018, section 2) defined that Early childhood education and care (ECEC) is a systematic and goal-oriented entity that includes upbringing, education, and care, with a special emphasis on pedagogy. FNAE (2022) states that ECEC is an integral part of the Finnish education system and a crucial stage in a child's development and learning journey. The goal of ECEC is to support children's learning capabilities, promote lifelong learning, and ensure equality in education in accordance with the principles of inclusion.

2.2 Environmental Education

According to EPA (no date), the concept of Environmental Education is "a process that allows individuals to explore environmental issues, engage in problem solving, and take action to improve the environment. "

The modern conception of environmental education dates back to the environmental movements of the 1960s, with a significant milestone being the 1972 United Nations Conference on the Human Environment held in Stockholm. This is regarded as the first great world event where environmental questions were treated and underlined that an educated and informed citizenry is essential for appropriately addressing ecological issues (UN 1972, principle 19). Currently, environmental education has expanded into covering subjects from climate change

and biodiversity to resource management and sustainable development. It is not centered on the natural environment alone. Still, it also revolves around the actions of human beings and human-made environments, with a mix of ecological, social, economic, and cultural dimensions aimed at sustainable awareness and behaviors.

2.3 Nature Education

Nature education, using the working definition of Nikodin, Kokkonen, and Viberg (2013), is a part of environmental education with a strong emphasis on experiential learning to raise ecological sensitivity, fostering closer bonds with the natural world and advancing through understanding of natural systems.

Jean Jacques Rousseau was an early advocate for nature education. Nature education is the approach that lays stress on learning through direct contact with the environment under study and sees nature as a venue and an implement in the learning process. It believes that if one experiences nature firsthand, he can develop practical skills and moral awareness. It was Jean-Jacques Rousseau who first introduced the idea of nature's education systematically with his seminal work, "Emile: or, On Education." He insisted that the process of education harmonizes with instincts and emotional development in children and criticized all contemporary education systems for breaking this natural connection between people and nature. Rousseau advocated for a return to nature, allowing children to grow naturally through direct interactions with the natural world.

According to Pekover (2012), Rousseau's theory of nature education had a profound impact on subsequent developments in outdoor and experiential education. His theory underscores that education should be attentive to the natural developmental stages of individuals, using child-centered teaching methods and building learning experiences based on nature. This educational framework not only promotes personal growth and self-discovery but also highlights the importance of nature for the well-being of society as a whole. Peckover (2012) further emphasizes the contemporary relevance of Rousseau's theories, pointing out the irreplaceable role of nature education in nurturing people's natural instincts and maintaining societal health.

2.4 Difference between Environmental Education and Nature Education

According to Neal & Palmer (2003), as cited in Jeronen, Jeronen, and Raustia (2009), Environmental education (EE) can be defined in three parts: 1) education about the environment, which builds awareness, understanding, and the necessary skills; 2) education in

(or from) the environment, where learning occurs outside of the classroom, such as in nature; and 3) education for the environment, aimed at achieving goals related to nature conservation and sustainable development.

Environmental education is closely related to nature education, yet they differ in focus and scope. Environmental education covers a broad array of topics that concern relationships between people and the environment, encompassing ecological, social, economic, and political factors. It aims to develop knowledge, skills, and values that help individuals make informed decisions concerning the environment, including sustainability and conservation efforts. Environmental education is broad and aims at addressing a wide range of environmental issues at various scales, nature education zooms in on the experiential aspects of learning directly within natural settings, often aiming to instill a deep-rooted sense of stewardship and direct responsibility towards local environments. That's to say, Nature education specifically focuses on the first aspect-learning about the environment and the second aspect-learning in the environment. It concentrates on direct experiences and interactions with the natural world, aiming to deepen individuals' connection with nature and enhance their appreciation and stewardship of natural environments.

Existing literature, especially in English, focuses more on environmental education, with relatively few studies on nature education. Despite the challenges, I aim to focus this research on nature education, specifically on how to help children establish a broader connection with nature.

3 Theoretical frameworks

This chapter explores the theoretical framework that has guided research on winter nature education in Finnish kindergartens. It examines the guiding documents and models that underpin best practice in integrating nature learning into early childhood education, particularly during Finland's challenging winter months. The main theoretical frameworks discussed include the National Core Curriculum for Early Childhood Education and Care, the Act on Early Childhood Education and Care, Palmer's Tree Model, and various approaches to nature education.

3.1 National Core Curriculum for ECEC

The Finnish National Agency for Education establishes the National Core Curriculum for Early Childhood Education and Care (FNAE 2022) in Finland. It is a part of the Finnish education system, as provided in the objectives of the Act on Early Childhood Education and Care that guarantees that the requirements set in federal law are met through individual plans and

local curricula. The localities base their curriculum on this national curriculum, allowing them to, therefore, develop their educative content while ensuring that the overall goals and standards set at the national level are not compromised.

The ECEC, thus, is all-inclusive, ensuring that any child has a right to be educated and cared for independently of their diverse backgrounds. The approach not only enhances equality, equity, and non-discrimination but also values diversity, fostering social participation and solidarity. Integration of such principles into the curriculum itself laid a strong base for lifelong learning for children. It enabled them to possess skills and values that would make them succeed in a diversified society.

A sustainable way of living

In the words of the National Core Curriculum for Early Childhood Education and Care (2022), sustainable development is comprehensively integrated into educational practices, embracing ecological, social, economic, and cultural dimensions detailed in the United Nations' 2030 Agenda for Sustainable Development (UN 2015). This embedding has been reflected in the curriculum in that it does not just provide for the obligations under various international agreements, including the UN's Sustainable Development Goals, but deeply embeds the principles within the heart of pedagogic frameworks. Core curriculum orientation of a "Healthy and sustainable way of living" directs children toward lifestyle-oriented health promotion in terms of well-being, coupled with emotional and aesthetic development. The emphasis on the principles of sustainable living practice with social, cultural, economic, and ecological dimensions gives a broad base to eco-social knowledge and skills. This approach allows children to understand environmental sustainability as a prerequisite for social sustainability and the realization of human rights.

Besides, the values underpinning the ECEC curriculum echo respect for life, human rights, and sustainable development, underlined by the inviolability of human dignity. These are values reflecting a commitment to children's education through ways that ensure respect and preservation of the environment while fostering fair and culturally inclusive practices crucial for the realization of broader goals in sustainable development (FNAE, 2022, Chapter 2.4).

Curricular Objectives for Environmental Education

Environmental education has been incorporated as part of children's learning in the National Core Curriculum for Early Childhood Education and Care under chapter 4.5. The children can view their surroundings with observation, analysis, and understanding. This is through active and structured exploration that increases their ability to think and interact with both natural and artificial environments. The curriculum for environmental education, therefore, is three-fold: learning in the environment, learning about the environment, and acting for the

environment. The curriculum should be weaved into daily activities so children grow up attached to their surroundings.

The curriculum also emphasizes operational aspects of field visits to natural and built environments that are needed for concrete interaction and better understanding. These trips give a child a firsthand experience and learning from nature—using all the senses to discover the many phenomena offered by the changing of seasons. The curriculum also supports children in being sustainable by engaging in activities that promote recycling, energy saving, and careful resource use. Through such activities, children learn facts and how their behavior affects the environment, thereby developing a sense of responsibility for keeping the world in balance. This approach ensures that environmental education in Finnish kindergartens is practiced in ways where knowledge is gained and applied so that it sticks to a person's life for sustainability—that is, creating sustainable habits throughout life (FNAE2022, chapter 4.5).

Promote outdoor learning

The national core curriculum for Early Childhood Education and Care in Finland details that there is particular importance placed on promoting outdoor learning and physical activity. More specifically, this is highlighted in Chapter 4.5 of the curriculum, a chapter related to physical activity, which sets out that children must be motivated to be in active play activities outdoors in any season. This is important as it supports good life and development overall. The curriculum highlights the fact that it brings joy to children in doing physical activities using a variety of forms, such as outdoor play, which is not only essential to keep a child healthy but also for their cognitive and social skills development (FNAE 2022, Chapter 4.5). In this way, kids reap benefits from nature right from the beginning, which is essential in developing a sense of the ecosystem to embrace an active lifestyle.

As indicated in the curriculum, requirements under an inclusive perspective in conducting outdoor experiences state that these should be flexible and planned for all seasons to optimize as many learning opportunities and sensory experiences as possible (FNAE 2022, Chapter 4.5). In this sense, ECEC aims to set a foundation anchored on health and well-being values through varied and frequent physical experiences. The children's daily structure is set to keep them from extended periods of sitting and includes a multitude of physical activities that enhance movement skills, including balance and coordination, and incorporate educational components, such as food education and safety. This holistic approach integrates physical education with environmental learning, illustrating how Finnish kindergartens utilize the outdoor environment as a dynamic classroom, regardless of the season, to enhance children's physical abilities and their understanding of the world around them.

Promote children's holistic growth

The Finnish National Core Curriculum for Early Childhood Education and Care (FNAE 2022) provides a robust theoretical backdrop for research into nature-oriented teaching activities in Finnish daycare centers during winter, integrating principles of holistic child development, active learning, and transversal competences. It emphasizes the child's growth and learning path (chapter 2.3), advocating for learning experiences that are holistic, interactive, and responsive to the child's environment (chapter 2.5). The curriculum underscores the importance of developing transversal competences, such as thinking, learning, self-care, and cultural interaction, through engagement with diverse and inclusive learning environments (chapter 2.7 & 3.2). It promotes versatile working methods (chapter 4.3) that encourage exploration, creativity, and physical activity, crucial for implementing nature-oriented activities. Particularly, the learning areas section (chapter 4.5) details how educational content should foster linguistic skills, expressive arts, community understanding, environmental interaction, and physical development, all through integrative pedagogical activities. These components of the curriculum collectively frame a theoretical foundation for exploring how nature-oriented teaching can support children's holistic development, cater to their individual needs, and foster a rich learning experience, even in the challenging context of Finnish winters.

3.2 Act on Early Childhood Education and Care

The Act on Early Childhood Education and Care (540/2018) gave a legal basis for conducting my research. The Act calls for promoting children's holistic development, considering health and welfare, and in such a way as to build early childhood education and care in respect of children by developing a positive learning environment for them. This aligns with the winter nature education objectives, which are intended to expose children outdoors and encourage their development in terms of physical and mental health, as well as social-emotional well-being.

The Act also reveals how it is essential to ensure equitable access to winter nature education and care for children since every child has their own developmental needs and interests in learning.

3.3 Palmer's Tree Model

Palmer's Tree Model (1998) is renowned as one of the most widely recognized and utilized frameworks in the field of environmental education. This model metaphorically uses the structure of a tree to delineate the various components of environmental education. The roots represent foundational beliefs and values, grounding the model in ethical and philosophical principles that nourish the entire educational approach. The trunk symbolizes the core knowledge and understanding necessary for informed environmental decision-making and critical thinking. Branches extending from the trunk illustrate the diverse pedagogical

approaches and strategies employed to apply this environmental knowledge in practical and real-world settings. These branches facilitate active learning and engagement with environmental issues, effectively incorporating education about, in, and for the environment.

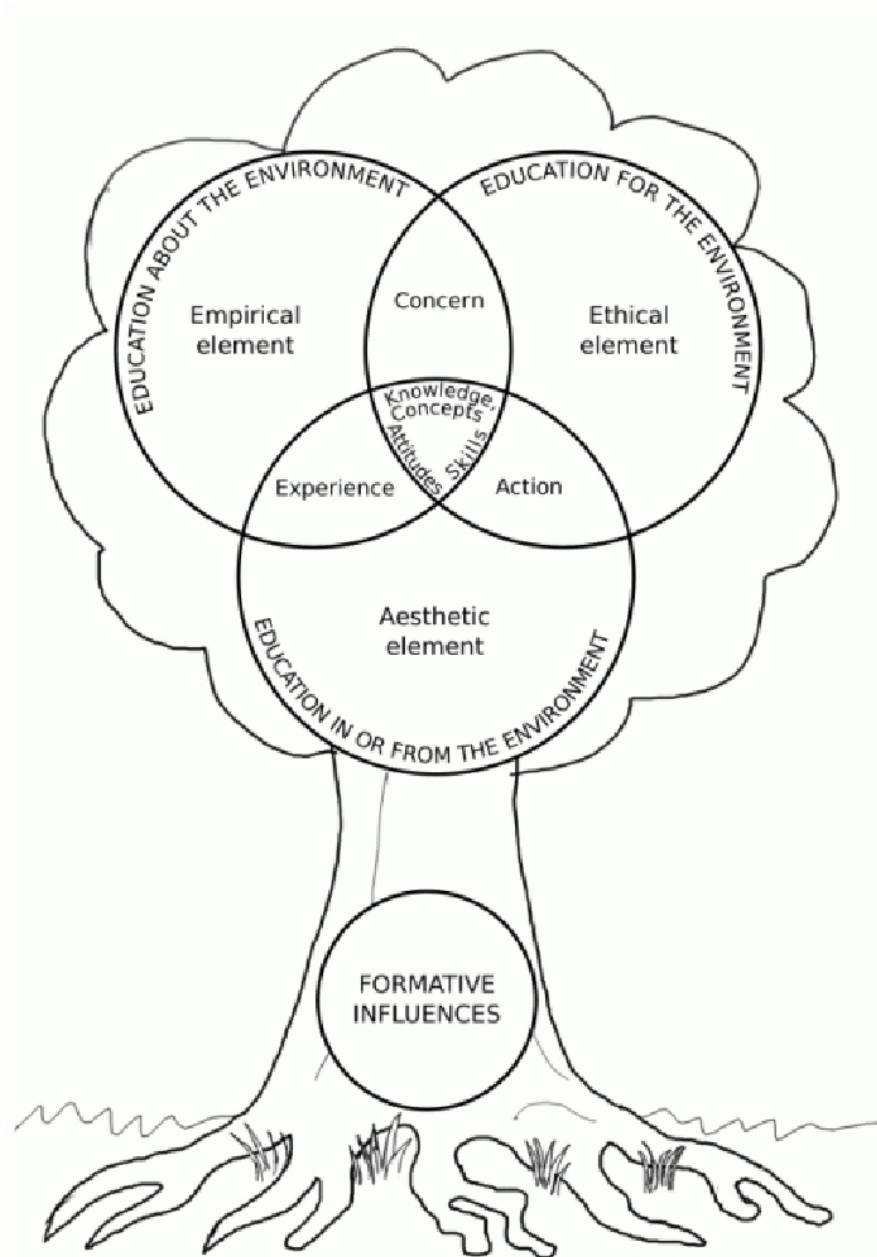


Figure 1: Palmer's Tree model (Palmer, 1998)

According to Palmer, as cited by Jeronen, Jeronen, and Raustia (2009), all components of the environmental education model should be systematically addressed, intertwining issue-based, action-oriented, and socially critical education. The leaves, symbolizing the outcomes of this educational process, represent the development of skills, attitudes, and actions aimed at fostering environmental stewardship and promoting sustainable practices. This model elegantly outlines how environmental education can flourish, starting from a robust

foundation of values and knowledge, through effective teaching methods, to achieve impactful environmental engagement and sustainability practices.

Reunamo & Suomela (2013, 2-3) states that Palmer's tree model concentrates on individual learning and its essential elements, including experiences, attitudes and values, knowledge, behaviors, and environmental concern. According to the article, it is critical to give young children access to meaningful, long-lasting experiments that promote engagement and social education. This is because children's welfare and their opportunities to love, have, and belong are fundamental building blocks for taking care of one's surroundings.

3.4 Sensory Observation Method

"Sensory observation" is a natural education method that emphasizes using the five senses—touch, smell, taste, hearing, and sight—to explore and learn about the environment. This method is especially effective in environmental education because it connects learners directly with their surroundings, enabling them to experience nature in a profound and engaging way. As Auer (2008) explains, sensory perception is not only one of the primary ways of obtaining knowledge of the world for an infant but is also a matter of human survival throughout history. Children, once exposed to the environment through their senses, learn in ways similar to the way early humans learned: experiential learning that forms the base for an intuitive and deep connection with nature.

The further introduction of sensory observation in learning has gone on to explain more complex causes and effects of human actions and the environment. It increases the understanding level for the student about their biological connection with the surroundings and, therefore, being sensitive to the various effects of their behavior on the environment (Auer, 2008). The Montessori education system believes that sensory education is essential in determining the concept of reality and intelligence. As Ullerup Mathers (2022) put it, the latter is what Montessori pedagogy makes us realize—sensory experiences are essential in learning more about ecology and enhancing one's relationship with nature. The way does not only enrich an educational experience but also brings a deep appreciation of nature's details to foster a lifelong commitment to care for the environment.

3.5 Nature Arts Method

The Finnish National Core Curriculum for Early Childhood Education and Care (FNAE 2022) considers arts education an integral part of the overall development of children's expressive skills in music, visual arts, crafts, and physical expression. Incredibly, much of this approach is dedicated to letting children have a view of various forms of art and cultural heritage, thereby giving them rich potentialities in creativity and knowledge about the world. Art activities are directed at developing a child's potential in learning, social skills, and the

development of self-image by letting the child bring out thoughts and emotions in various forms of art. Such experiences will certainly help not only in the further development of children's thinking but also in fostering an appreciation of the aesthetic and cultural values of humankind.

"Nature Arts" in this model would involve the children doing artistic productions involving natural elements that would enhance expression and contact with the children's emotions while coming into contact with the natural world. According to Johnstone et al. (2022), studies conclude that such settings considerably positively influence the social abilities, emotional welfare, and cognitive development of children compared to standard indoors. These benefits are derived from diversified and immersive nature experiences that generate deeper environmental connections, increase creativity, and facilitate healthier social interactions.

4. Significance of Nature Education in winter

The National core curriculum (FNAE 2022,46-47) emphasize that we should encourage children to go outdoors and participate in sports activities throughout all seasons. This can enhance their relationship with nature and enable them to learn to appreciate and observe natural phenomena with different senses in different seasons.

In winter, even the seemingly barren forests offer a rich experience for the observant hiker. From deer nibbling on branches to rabbits hopping gracefully and foxes leaving tracks in the snow, the winter landscape is alive with life and waiting to be explored and discovered; activities such as ice-skating, skiing, sledding, making snow sculptures, exploring frozen ponds or observing ice formations add fun and creativity to winter hiking, and can also promote children's physical mobility, balance and co-ordination skills. These winter experiences encourage children to use their imagination, creativity and problem-solving skills, and help them understand how the natural world changes from season to season (Lyytinen & Wilenius 2020,113-133).

Playing in the winter environment is important for the growth and development of children. By engaging in a variety of activities in the natural environment, children not only learn to deal with changing climatic and environmental conditions, but also develop valuable democratic qualities such as independence and self-confidence. In the interaction process with the winter environment, children acquire their own play culture to answer uncertainty and challenges. While they go about in the snow and ice, children learn continuously, experience and explore, shape and make sense of themselves and their surroundings, and become "winter children" matched to the changeable natural environment (Sanderud, Gurholt & Moe, 2020, 10)

5 Aims in the thesis and Research question

This thesis aims to answer the research question:

‘What challenges and opportunities does the winter season offer for nature education in kindergarten?’

This thesis aims to analyze the challenges faced by Kindergartens in Finland during winter and explore the unique learning opportunities that the winter environment offers for nature education. The research also seeks to propose practical activities and strategies for integrating winter outdoor learning into the ECEC curriculum, encouraging kindergartens to integrate season-specific environmental education activities and resources.

6 Thesis Implementation

This chapter outlines the research methodology, data collection process and data analysis techniques used in the research. The thesis used qualitative research methods. Data was collected through an open-ended questionnaire administered to the staff of a nature-oriented kindergarten in order to gain detailed insights from kindergarten teachers about their experiences of winter nature education. I analyzed the data collected through the questionnaire using thematic analysis methods to identify key themes and patterns related to the challenges and opportunities of winter nature education. These methods were essential to fully understand the research questions and to guide the study to meaningful conclusions.

6.1 Research Method

This study adopts the qualitative research methodology. Qualitative research involves collecting and interpreting non-numerical data, for instance, texts, videos, or audio recordings. Particularly valuable in understanding thoughts, feelings, and experiences, it is sometimes considered a preliminary method. Qualitative research focuses on detailed insights into human behavior and social phenomena; instead of quantifying issues according to statistical models, it does the contrary. This approach is used by many scholars, especially in anthropology, sociology, education, and health sciences, for the investigation of complex phenomena (Bhandari, 2023).

Based on the theme of this thesis, qualitative research is applicable since environmental education encompasses a wide range of activities and experiences that cannot be measured quantitatively. Through qualitative methods, specifically open-ended questionnaire survey, this study captures detailed and personal insights from kindergarten teachers about their experiences. These insights uncover how teachers navigate the challenges of winter and turn

these conditions into educational opportunities. This method enables a deeper understanding of how environmental education functions in practical settings, essential for developing effective and applicable educational strategies.

6.2 Data collection

The data collection method for this research was open-ended questionnaire. In the initial phase of the research, we had originally planned to use semi-structured interviews. However, during the course of the research, we found it necessary to adjust the data collection method to an open-ended questionnaire survey. This change was implemented for two primary reasons: Language problem and Managerial perspective. Firstly, there were only 1-2 staff members at the kindergarten who could communicate in English freely. Allowing the staff to answer in written Finnish was better for them to express the genuine thoughts and opinions. This also facilitated more accurate and comprehensive data analysis on my part. Secondly, the kindergarten manager wishes to understand the thoughts and difficulties of all staff members regarding winter nature education. By collecting responses from each staff member, the manager could get a comprehensive understanding of all the staff's perspectives, which would be valuable for improving future practices.

The revised data collection involved distributing the original interview questions as open-ended questions in a questionnaire format to all staff members. This approach guaranteed the quality and dependability of the data by giving each participant the chance to offer thorough and considered answers in their mother tongue. Respondents are free to react in their own words to open-ended questions, which can yield insights that the researchers may not have expected (Bhandari, 2023). Additionally, this strategy is in line with the fundamentals of qualitative research, which place a strong emphasis on remaining open-minded in order to get genuine or even surprising answers and comprehend participant experiences on a deeper level (Tasker & Cisneroz, 2019).

The work-life partner involved in this thesis research is a small, nature-oriented kindergarten with five staff members and a manager. The questionnaire consisted of six open-ended questions. Responses were received from five people, including the manager: two answered all six questions, one answered three questions, and the remaining two answered four questions. Although the sample size of this questionnaire was small, it was still possible to analyze it and find a lot of information related to the research questions. It is worth noting that three participants did not answer the last question, which reflects some shortcomings in the questionnaire design, which need to be reflected next.

6.3 Data analysis

This research used thematic analysis to analyze the data collected through the questionnaire. Thematic analysis is one of the data analysis methods used in qualitative research and can be considered a form of content analysis, which will be employed as a method to systematically identify, analyze, and report recurring patterns or themes within the qualitative data (Kallinen & Kinnunen 2021). This approach, detailed by Caulfield (2023), facilitates the extraction of significant topics, ideas, and patterns of meaning that consistently emerge across the dataset. It isn't restricted to any one theoretical framework; thus, it can be used by researchers to address a variety of research problems (Hecker & Kalpokas, 2023).

There are two approaches to thematic analysis: Inductive and deductive approaches. Inductive approach involves allowing the data to determine your themes. Deductive approach involves coming to the data with some preconceived themes you expect to find reflected there, based on theory or existing knowledge.

I used inductive approaches to thematic analysis because this was approach works by letting the data itself determine the themes, rather than analyzing the data with pre-determined themes. In this process, recurring themes and ideas naturally emerge from the data, leading to a final categorization of themes. This bottom-up approach allows for the natural emergence of themes from the data without enforcing any theoretical or conceptual framework a priori over the data material, thus ensuring that new insights are elicited (Delve & Limpaecher, 2024). It will help ensure that the findings are deeply rooted in the actual experiences and perspectives recorded from Finnish kindergartens in winter.

According to Caulfield (2023), this method of thematic analysis can be used in six steps, as is the argument of Labra et al. (2020).

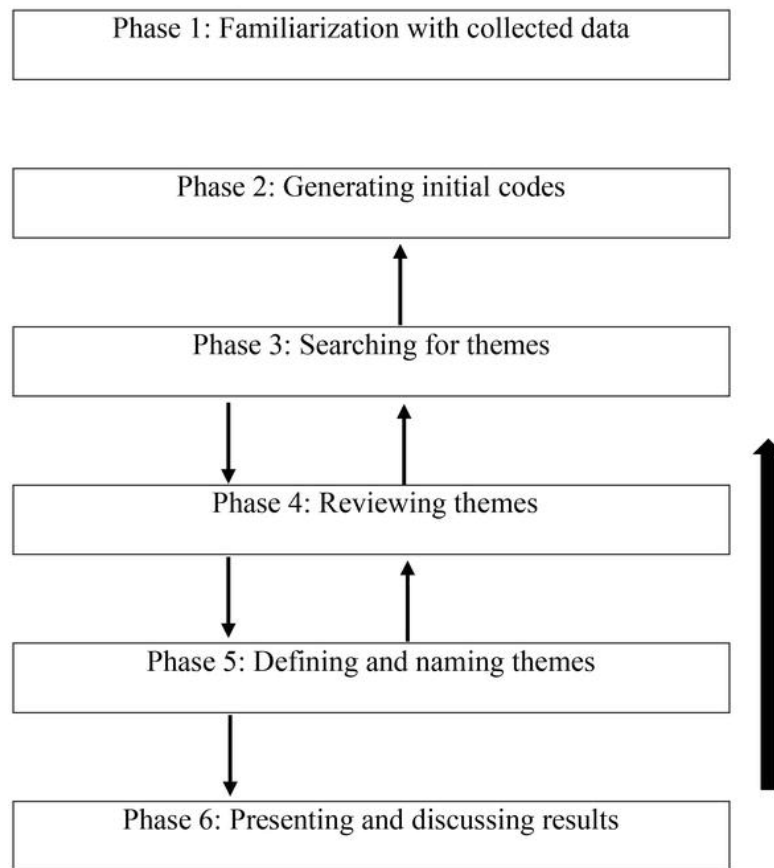


Figure 2: Thematic Analysis: Six-Step Process (Labra et al., 2020)

These steps are data familiarization, data coding, generating themes, reviewing themes, defining and naming themes, and writing up the analysis. The use of these steps will help a researcher to systematize the data and, through that, be able to make sense of the research issues at hand in a more detailed manner.

Phase 1 Familiarization with collected data

First, the collection from responses written on paper and pen must be transferred into a digital form. In doing this, I had to be very careful in ensuring the transcription was faithful to the original handwritten responses. I also cross-checked with every respondent and showed the digital copies to my Finnish colleague, who is more familiar with the Finnish handwriting script. Then, I proceeded to make some initial notes to understand the context of each answer.

Phase 2 Generating initial codes

With the data found in the first phase, the researcher started labeling parts of the data that seemed similar or repetitive. In this case, labels are referred to as codes. These codes help place related data points together; hence, one can comprehend the deeper meaning and

patterns of the participant (Labra et al., 2020; Caulfield, 2023). Based on the transcription data, the initial coding was as follows:

Question 1: Voisitko kuvailla, miten talvi vaikuttaa luontokasvatusaktiviteetteihin teidän päiväkodissanne?

Question	Response	Code
Q1	ulkoilu aika lyhenee; retki paikat muuttuvat; lumi mahdollistaa erilaista toimintaa	outdoor activity challenges, winter learning opportunities, specific winter activities
Q1	ulkoilua voi olla vähemmän lyhyempia	outdoor activity challenges
Q1	kylmillä ilmoilla ulkoilu vähenee	outdoor activity challenges
Q1	pakkanen ja liukkaus ovat haasteena sekä lumen paljous silloin joudumme olemaan enemmän sisällä; joudumme miettimään ulkona reittejä jossa olisi turvallista mennä	extreme weather conditions, indoor adaptations, safety concerns
Q1	Talvi tarjoaa mahdollisuuksia perusliikuntataitojen kehittämiseen, kuten pulkkailu, hiihto ja luistelu. Metsäretket vahvistavat lasten myönteistä luontosuhdetta, edistäen halua suojella luontoa.	winter learning opportunities, specific winter activities

Question 2: Mikä on suurin haaste, kun järjestätte ulkoiluaktiviteetteja lapsille talvikaudena?

Question	Response	Code
Q2	liukkaat kelit; lumi, jää; ulkona on kylmä, tarvitaan paljon vaatetta, jolloin hankala liikkua; vanhemmat eivät ole tuoneet riittävästi lamminta vaatetta lapsille	safety concerns, clothing needs, parental support and involvement
Q2	liukkaus, vaatetus, pakkanen/tuuli	extreme weather conditions, clothing needs
Q2	liukkaus aiheuttaa vaaratilanteita; vanhemmat eivät aina huomioi että lapsilla on tarpeelliset ulkovarusteet	safety concerns, parental support and involvement
Q2	pakkanen, liukkaus, lumenpaljous, vaatettaminen; jos huoltomies ei ole luonut lunta hiekoittanut piha-alueita niin loukkamantumisia sattuu	extreme weather conditions, safety concerns

Q2	talviretkeilyä ajatellessani suurin haaste on henkilökunnan määrä. hiihtoa ja luistelua ajatellessani hyvät ja laadukkaat varusteet, jotka mahdollistavat ilon ja riemun onnistumisten kokemusten mahdollistuessa	equipment needs
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Question 3: Miten mukautatte opetustapoja talven haasteisiin vastaamiseksi?

Question	Response	Code
Q3	enemmän aktiviteettejä sisällä; luonto teema sisä hommissa, esim. askartelut	indoor adaptations
Q3	sisätiloissa pystymme askartelussa, lauluissa, leikeissa, saduissa, ottamaan talviaiheisiä tekemisiä myös havainnollistamalla esim.tuomalla lunta sisälle astiassa ja tutkimaan sitä eri aistein	indoor adaptations
Q3	joinain päivinä joudumme pakkasen vuoksi rajaamaan ulkoilun kestoa/ulkoilukerta	indoor adaptations

Question 4: Mitä ainutlaatuisia kasvatusmahdollisuuksia talvi tarjoaa, joita muina vuodenaikoina ei ole saatavilla?

Question	Response	Code
Q4	lumesta voi rakentaa lumiukkoja, lumilinoja; lunta voi maalata; talvi liikunta: pulkkamäki, luistelu, hiihto	specific winter activities
Q4	talviset urheilu lajit: hiihto, mäenlasku	specific winter activities
Q4	talvisiin urheilulajeihin tutustuminen (hiihto, luistelu)	specific winter activities
Q4	paljonkin erinlaisia mahdollisuuksia voidaan harrastaa eri liikunta lajeja. hiihto, luistelu, pulkkamäki	specific winter activities
Q4	lumen ja jään tutkiminen. talviliikunta ... hiihto, luistelu, mäenlasku, liukuminen ... kehonhallinnan harjoittelu erilaisella tavalla. pukemisen harjoittelu, talviulkovaatteiden pukeminen	specific winter activities, winter learning opportunities

Question 5: Minkälaisista lisätukea tai resursseja tarvitsisitte parantaaksenne luontokasvatusta talven aikana?

Question	Response	Code
Q5	kaikille lapsille kunnon talvivarusteet; talviliikunta välineitä päiväkodille	equipment needs, clothing needs
Q5	pihahuolto	safety concerns, specific winter activities
Q5	pihahuolto (hiekoitus, auraus)	safety concerns, specific winter activities
Q5	mahollisimman paljon talvi liikunta välineitä	equipment needs
Q5	kaipaamme laadukkaita ja hyviä lasten talviurheiluvälineitä ... mm. sukset, sauvat, monot, jotta mahdollisimman moni pääsisi kokeilemaan ja harjoittelemaan. henkilökunnan määrän lisääminen mahdollistaisi paremmin talviretkeilyn päivittäin tai ainakin useamman kerran viikossa	equipment needs

Question 6: Onko talviseen luontokasvatukseen liittyvä näkökohta, jonka koet tärkeäksi mutta joka usein unohtetaan?

Question	Response	Code
Q6	myös talvella ulkoilu on todella hauskaa ja kehittävä, kunhan on oikeanlaiset ulkoilu vaatteet ja tarpeeksi lämpimästi päällä	positive aspects of winter, clothing needs
Q6	toivoisin metsäretkeilyn tai muun talvilurheilun mahdollistumista päivittäin ... siis talviurheilun silloin, kun se lumen ja jään puolesta on mahdollista. ajattelen paljon luontoaltistumisen, mm. metsän, terveyshyötyjä. toivoisin, että kaikkien päiväkotien pihoilla olisi metsäpohjaista kasvustoa	positive aspects of winter, winter learning opportunities

The third step is searching for themes, which involved grouping related codes into broader themes. At this stage, researchers review the codes to identify patterns and start forming themes. Themes are broader than codes and often encompass several codes combined into a single concept (Caulfield, 2023).

Combining the topic and research questions of my thesis, the following themes were generated by analyzing the meanings of the different codes

Theme	Codes included
Barriers to Outdoor Winter Activities	outdoor activity Challenges extreme Weather Conditions safety Concerns
Opportunities in Winter Nature Education	winter learning opportunities specific winter activities positive aspects of winter
Essential Resources and Support for Winter Activities	clothing needs equipment needs parental support and involvement
Alternative Learning Approaches	indoor adaptations

Phase 4 Reviewing Themes

Phase four involves checking the themes. Researchers need to make sure the themes reflect the data well and are helpful. This includes comparing them with the original data to check if they match and are relevant, and making any needed changes to improve them (Caulfield, 2023; Labra et al., 2020).

Theme 1: Barriers to Outdoor Winter Activities

Outdoor Activity Challenges: such as shorter daylight hours and less time spent outdoors.

Extreme Weather Conditions: like cold temperatures, snow, and ice can be dangerous.

Safety Concerns: slippery surfaces and exposure to the cold.

Theme 2: Opportunities in Winter Nature Education

Winter Learning Opportunities: winter also offers learning opportunities such as observing animal tracks in the snow and experiencing seasonal changes

Specific Winter Activities: Sledding, ice skating, and snowshoeing.

Positive Aspects of Winter: provides unique educational experiences not found in other seasons.

Theme 3: Essential Resources and Support for Winter Activities

Clothing Needs: Importance of proper and enough winter clothing for children's safety and comfort.

Equipment Needs: Necessity for winter sports equipment and maintenance.

Parental Support and Involvement: Parents play a vital role in ensuring children are ready for winter activities.

Theme 4: Alternative Learning Approaches

Indoor Adaptations: Creative indoor nature-related activities and lessons such as simulate outdoor experiences, painting and drama.

Phase 5 Defining and naming themes

In this stage, the researcher precisely defined and named each theme to ensure that the meaning of the data was clearly and accurately reflected. This step also included interpreting the themes to explain their significance to the understanding of the data (Labra et al. 2020)

Theme name	Definition
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Challenges of Winter Outdoor Activities	Challenges and safety concerns associated with conducting outdoor activities during winter.
Winter Educational Opportunities	The unique educational environment and activities that winter offers for nature education.
Essential Resources and Support for Winter Activities	The necessary clothing, equipment, and parental involvement required for successful winter nature education.
Indoor Nature Education Adaptations	Modifications to educational practices to facilitate nature education indoors during extreme winter conditions.

Phase 6 Presenting and discussing results

The thematic analysis of the open-ended questionnaire responses revealed several key themes that contributed to a deeper understanding of the challenges and opportunities for winter nature education in Finnish kindergartens. It directly answered my research questions and set the stage for the ensuing discussion of potential strategies and recommendations aimed at enhancing the implementation of winter nature education.

7 Research Results

The aim of this thesis is to understand the experiences and perceptions of early childhood educators about winter nature education and to identify current challenges and potential opportunities in order to seek ways and means of improving their work in the future. An open-ended questionnaire was administered to five educators and the following four themes related to the thesis were analyzed and got research results from them: Challenges of Winter Outdoor Activities, Winter Educational Opportunities, Essential Resources and Support for Winter Activities, Indoor Nature Education Adaptations.

Challenges of Winter Outdoor Activities

Winter activities in kindergartens can always be fraught with difficulties due to harsh weather, including cold temperatures, icing and slippery. Not only do these conditions restrict the time frame in which children may play outdoors, but they also present safety concerns. For instance, many participants reported that extended periods of cold weather often translated to less time

spent playing outdoors, raising the importance of proper preparation and additional safety measures.

Winter Educational Opportunities

Despite the adversities, winter also presents several educative opportunities in nature. Some, such as sledding or ice skating or even being able to spot the animal footprints within the snow, are new learning experiences for the children not be available at other times of the year. When children participate in physical winter activities, they learn some basic skills needed for them, and it helps keep the children in touch with nature. They have illustrated the excellent side of the winter season.

Essential Resources and Support for Winter Activities

Nature-based education during winter cannot be conducted without adequate resourcing and support. Proper winter clothing and accessories are essential to make outdoor activities for the child safe and comfortable. But, above that, parental support is critical in preparing children properly and motivating them. The need for good quality winter sports equipment, coupled with active involvement from parents, are the most essential variables elicited from respondents to make children participate in winter sports.

Indoor Nature Education Adaptations

When it is not possible to go outside due to severe weather, learning can be adapted, and indoor nature education opportunities can be created. These sorts of adaptations simulate outdoor experiences and maintain a feeling of nature. Snow in the indoor environment for sensory exploration or winter-themed crafts and stories, for instance, provides the opportunity to continue children's nature learning in a controlled environment.

The results of this Research closely match 'Palmer's tree model', strengthening the theoretical basis of this study. By applying Palmer's 'tree model' to the results of the research, it became apparent that effective winter nature education requires an integrated approach that considers the interplay of fundamental values, core knowledge and diverse teaching strategies. Identified challenges to outdoor winter activities, such as inclement weather and safety concerns, relate to the 'roots' of the model, highlighting the beliefs and values underlying the provision of safe and engaging environmental education. Such challenges highlight the need for educators to build a resilient and adaptive education model that is sensitive to and can react to seasonal changes. Teaching opportunities presented in winter come through experiences related to specific learning, such as finding animal footprints and engaging in winter sports, which represent the 'trunk' of the model, wherein core knowledge and understanding central to well-informed environmental engagement are stressed. It can involve the 'branches' of the model,

which allow children to have winter activities in place mainly through supplying the necessary support, including dressing and parental participation. These 'branches' represent a variety of pedagogical approaches that seek to ensure active learning and interaction with the environment, even under challenging conditions. The emphasis placed on developing the skills, attitudes, and behavior in children through winter nature activities makes it the 'leaves' aspect of the model, meaning the final output of the development of environmental stewardship and sustainable practices.

Palmer's 'tree' model therefore not only provides a structured framework for analyzing the data, but also supports the findings of the study by demonstrating how a strong foundation of values and effective educational strategies can lead to meaningful and impactful environmental education during the winter months. The model provides a valuable framework for understanding and proposing practical activities and strategies for integrating winter outdoor learning into the Early Childhood Education and Care (ECEC) curriculum in Finnish kindergartens, while encouraging the inclusion of seasonally-specific environmental education activities and resources.

8 Optimizing winter nature education: practical Suggestions

Analyzing the questionnaire responses showed the specific challenges and opportunities that winter nature education brings to kindergartens. Yet, these survey findings are only a part of my research. My goal is to delve into broader research and reviews of literature to create strategies that meet these challenges and make the most of the opportunities, with the end aim of optimizing practical suggestions for improving winter nature education in Finnish kindergartens.

8.1 Diversifying Indoor Nature-themed Activities

Through the responses to the questionnaire, we can understand that almost every participant believes that the extreme climatic conditions of winter make it necessary to shift many activities indoors. Indoor environments not only provide a safe place to protect children from the effects of extreme weather, but also provide opportunities for diverse activities. Nature and environmental education are not limited to the outdoors and natural environment; materials and opportunities provided by nature can also be integrated into the daily activities of early childhood education and care. This approach can be used to teach concepts like responsibility, the importance of nature conservation, and species identification. Children are provided with opportunities to be brave, curious, explore, observe, seek information, enhance teamwork, cultivate interaction, and problem-solving skills (Rantanen 2021, 12).

Play is the foundation of nature education ((Rantanen 2021, 14).). According to Cutter-Mackenzie & Edwards (2013,199), teachers and children can develop knowledge about environmental education in early education settings through different types of play styles, such as open-ended play, demonstrative play and targeted framed play. These play styles provide varied opportunities for children to learn through experience and facilitate teachers' planning in their teaching. Therefore, when enhancing winter nature education, children's interest in nature can be stimulated by designing a variety of rich and varied indoor nature-themed activities that enhance their engagement and learning experiences, thus improving their learning in winter nature education.

Example Activities:

Indoors, we can work with children on a variety of fun nature-themed activities such as songs, poems, fairy tales, discussions, painting, crafts, games and theatre. These activities not only develop children's creativity but also deepen their understanding of the natural world; we can also practice basic physical activity skills indoors to build a solid foundation for winter sports such as ice-skating, skiing and sledding, with an emphasis on balance and motor skills (Questionnaire Response 2024); and there can be indoor nature art projects using pine cones, leaves and snow, where children can express their connection to nature through creative expression, thus deepening their understanding of the natural world (Preira 2017); Create a 'winter nature corner' in the classroom using natural materials collected from outdoor activities, where children can engage in sensory play and science experiments; Read or create stories about winter wildlife; A simple "naava" (beard moss) can be turned into a large-scale project for children to touch, sample, and observe with a magnifying glass or microscope to discover the details(Ahonen 2017, 261); Purchase earthworms from an organic grocery shop and feed them with food scraps such as vegetable peels, which will turn the food scraps into soil and have no odour. Feeding earthworms on a weekly basis provides a multifaceted educational experience in which children learn to care for other living things alongside adults; in some day-care centers renting a chicken hatching box from a local farm and observing the process of hatching and growing chicks, or even making a documentary about it, makes it an educational experience (Ahonen 2017, 262-265).

8.1.1 Sensory experience and Multi-sensory space

Sensory observation

According to Beery & Jørgensen (2018), Learning chances from captivating, varied, and interconnected auditory, olfactory, tactile, gustatory, and visual experiences are referred to as sensory-rich learning. Both adults' and young children's memories are rich in sensory experiences that help children connect with the natural environment and develop ecological

knowledge. Children's understanding of ecosystems is shaped through hands-on experiences such as playing, exploring and collecting. Learning is universal and holistic, which incorporates language, thought, action, emotions, body sensations, sensory observations, and thinking (FNAE 2022,19).

In Ullerup Mathers' research (2022), their teaching team carried out a sensory experience activity that was equally suitable for both indoor and outdoor environments - the sensory bin, even in winter. The sensory bin activity was divided into an indoor and an outdoor section, the activity involves using a variety of sensory fillers, encouraging interaction with nature through projects, and observing natural elements in small groups. Teachers fill the sensory bin each week with new nature-based materials such as snow, pebbles, wood chips, twigs, pine cones, conifer scales, soil with worms, leaves, and moss. In addition, the sensory box includes accessories for a variety of exploratory modalities, such as spoons, cups, bowls, tongs, spatulas, and magnifying glasses (Ullerup Mathers 2022, 52). Outside, activities involve observing natural elements and collecting them in the field. For example, during the course of a week, teachers collect tree branches of various lengths, thicknesses, and textures for students to explore freely. Students are allowed to explore and touch the size, length, and density of the branches with their hands and eyes, and are invited to break the branches as they explore. Interactive observation activities such as observing the bark of a tree and doing a bark depiction activity are also set up (Ullerup Mathers 2022,147).

Sensory bin This activity encourages children to explore nature through sensory experiences by providing a rich variety of natural materials and material pairings to promote interaction and learning with the natural environment. The observation form (Figure3) in Ullerup Mathers' (2022) study is also worthwhile to learn from.

Week	Nature-Based Sensory Activities		
	Outdoor Activities	Indoor & Line Time Activities	Books
1	Snow Sounds Observation	Snow Sensory Bin Snowflake Dance	<i>The Story of Snow</i> by Mark Cassino and Jon Nelson
2	Mud Stomping Observation Thermometer Introduced Ice Observation	Pebble Sensory Bin	<i>Rain, Snow, or Shine</i> by June and Lucy Kids <i>Feeling Things</i> by Allan Fowler
3	Woodchip Observation and Collection	Creating Woodchip Sculptures Woodchip Sensory Bin	
Spring Break Week			
4	Bark Observation Bark Rubbing Activity	Woodchip Sensory Bin cont. Bark Observation	<i>Worm Weather</i> by Jean Taft
5	Bird Observation	Sticks Sensory Bin Listening to Bird Calls Making Binoculars	<i>Crow Not Crow</i> by Jane Yolen and Adam Stemple
6	Bird Observation cont. Wind Observation Windsock Introduced Moving with the Wind	Pinecones Sensory Bin Making Paper Windmills Making Rain Sounds	<i>What will the Weather be Like Today?</i> by Paul Rogers
7	Ground Observation	Soil Sensory Bin Mud Painting	<i>Wiggling Worms at Work</i> by Wendy Pfeffer
8	Worm Observation Open-Ended Nature Observation Listening Walk	Worm Observation Worm Sensory Bin Worm/Bird-Inspired Line Time	
9	Open-Ended Nature Observation Guided Nature Observation Worm Bin Sun Art	Nature Exploration Sensory Bin	

Figure 3: Sensory Observation Table (Ullerup Mathers 2022, 45)

Coincidentally, I did a similar sensory experience with children in kindergarten. I combined this activity with the Finnish nursery rhyme *Lorupussi* (Picture 1) by putting collected natural objects into a nursery rhyme bag and letting the children take turns to touch and feel the objects in the bag while singing the nursery rhyme. Some of the objects are soft and some are hard, some are square and some are round, some are smooth and some are rough, but all of them come from nature and everyday life. Throughout the process, the children were a little bit curious, a little bit scared, and a little bit surprised, and these complex emotions blended together to keep them very interested in the whole activity, and their answers were full of imagination. In the context of children's play, experiences that stimulate children's emotions, curiosity, and interest can spark their desire to play and increase their motivation to learn (FNAE 2022).



Picture 1:Lorupussi sensory activity

Multi-sensory space method

According to Aistien (2024), The Multisensory Space Method is a versatile approach that utilizes various sensory materials such as photographs, sounds, objects, and scents to create immersive learning environments aimed at stimulating thoughts, memories, emotions, and interactions. This method is designed to be easily adapted and can be employed in a variety of settings including learning institutions, libraries, daycares, schools, and NGOs to enhance learning experiences, promote multiculturalism, integrate communities, and empower individuals. This would involve a range of multisensory elements that provoke interaction, learning processes, and well-being for all those participating from different backgrounds. The method fosters collaborative processes wherein it brings people and groups together to co-create spaces on specific themes or issues, organizes discourses, values sharing, and memory, and provokes active engagement.

As it involves sensory experiences, collaborative creation, and interactive learning, the Multisensory Space Method goes well with the idea of 'sensory observation indoors' set in kindergartens. Kindergartens could provide children with various indoor sensory stimuli for qualified observation by creating a multisensory space indoors.

This method can also be developed into an indoor space for kindergartens to use during winter nature education. This multi-sensory space (Picture 2) could include elements such as artificial snow, winter-themed decorations, tactile materials like faux fur or pine cones, sounds of winter activities like crunching snow or chirping birds, and scents reminiscent of winter landscapes such as pine or cinnamon. Additionally, with the help of projectors and other technological means, the children will be able to hear and see the full range of winter nature. Interactive displays, sensory stations, and collaborative activities can be incorporated to encourage exploration, creativity, and learning about winter nature in a hands-on and engaging manner.



Picture 2: Multi-sensory space

Source: Generated by OpenAI's DALL-E, June 1, 2024.

8.1.2 Indoor Nature Art Activities

In the severe cold winter of Finland, the harsh weather conditions limit the frequency and duration of children's outdoor activities. Therefore, we must shift our focus to indoor activities. In this context, art activities have become the primary choice for indoor activities due to their venue flexibility and diverse forms. A wide variety of artwork can be created using different colored leaves, stones, twigs, and other loose materials found in nature (Siro & Mikkonen 2022,30).

At the Day Care Centre, a variety of nature-related art activities are available, including painting, handicrafts, visual arts and many other forms of creativity. These activities aim to stimulate students' creativity, guide them to establish a connection with nature, and express their love and imagination for nature. Students can depict natural landscapes through painting, create nature-themed handicrafts through handicrafts, or express their emotions and understanding of nature through visual arts. These art activities not only enhance students' art skills, but also help them explore the wonders of the natural world in depth (Preira 2017, 24).

Example Activities:

- Winter Theme Painting Exhibition

Children can create winter-themed landscapes depicting snowy scenes, snowmen or winter animals and plants. Encourage their creativity in depicting a winter wonderland. Teachers can prepare a folder or bound art portfolio for each individual student to collect their winter-themed drawings. These painting can be displayed at the end of the day at a Christmas event or Parents' Day assembly, or the children can present what they want to say with their drawings themselves (Picture 3). The mission of early childhood education is to promote children's cultural competence, as well as their ability to interact and express themselves. Learning environments should be planned with children and should support them in expressing themselves and experiencing art through art (FNAE 2022, 36).



Picture 3: Winter theme painting exhibition

Source: Generated by OpenAI's DALL-E, June 1, 2024.

- Winter Creative Workshop

On a weekly hike in the forest, children can collect a variety of natural materials such as pine cones, twigs, leaves, rocks, etc., and then use art materials and tools such as paint, brushes, scissors, glue, etc., and give full play to their imagination to create their own handmade art works and build a winter creative workshop (Picture 6) . Jean Van't Hul's (2024) article introduces 22 Nature Art Ideas for Kids, such as Flower Printing (Picture 4), Painted Rocks and Leaf Rubbings, etc... We can also get some ideas from the Winter Animals Art Ideas and Activities on the Pre-K Pages (pre-kpages.com, Picture 5).



Picture 4: Flower painting (Jean Van't Hul. 2024)



Picture 5: Winter animal art (pre-kpages.com, 2024)



Picture 6: Winter creative workshop

Source: Generated by OpenAI's DALL-E, June 1, 2024.

- Painting on ice and Make an ice cube iglog

In the course of researching nature-based art activities for winter, I found two ice art activities designed by Denise Hope (2024), a homeschooling mum of two boys, that are perfect for Finnish kindergarten winters.

The ice-art painting (Picture 7) involves freezing water in a container overnight to create a block of ice. Participants then place the frozen ice block on a tray alongside watercolor paints and brushes. As the ice block melts, participants use the paints to create artwork on the ice surface. The activity allows for exploration of colors mixing, watching colors disperse on the ice, blending with neighboring colors, and creating an evolving painting as the ice melts. Additionally, participants can sprinkle salt on the ice to create texture, crevices, and little craters in the melting ice, leading to unique visual effects in the artwork (Hope 2024).



Picture 7: Painting on ice (Hope 2024)

The process of making an igloo is.: First, freeze a tray or two of ice cubes and create a base by freezing water in a shallow dish or plate. Dip each ice cube in cold water and place them around the edge of the base plate, allowing them to stick together. Build the igloo in layers by arranging ice cubes towards the center to create a dome shape. Refreeze the igloo as

needed and fill any gaps with slushy ice made by crushing ice cubes in a blender with water. Decorate the igloo with additional elements like crushed ice, stones, gravel, and toy figures for an engaging ice scene (Picture 8). Finally, play and enjoy it.



Picture 8:: Make an ice cube igloo (Hope 2024)

8.2 Maximizing the use of the yard

In Finland, every kindergarten has its own yard. With the exception of one or two weekly walks through the forest, the children engage in outdoor activities 2 times every day in the yard. According to half of the participants' response (2024), the maintenance of the yard is crucial for wintertime nature education, this is not only from the point of view of preventing slippery floors, but also because yards can help us to design nature-themed activities more easily. The yard is the most familiar and accessible natural environment for children. Kindergarten yards are more conducive to children's motor experiments and activities than indoor spaces. If frequent outings to a nearby forest or countryside are not possible, it is

worth considering how to make the kindergarten yard as conducive as possible to the development of movement (Siro & Mikkonen 2022, 12).

A research by Vuorenoja & Rantanen (2020) emphasize different methods of dividing the yard for group activities to facilitate group activities and create a diverse learning environment, which including sensory exploration stations, nature observation points (e.g. winter garden), arts and crafts corners, and themed play areas (e.g. snow play areas), It helps to promote rich experiences and knowledge for children through outdoor education.

The natural and built environments, including yards and playgrounds, serve as versatile learning environments in Early Childhood Education and Care, offering opportunities for play, exploration, physical activity, and nature experiences (FNAE 2022, 31). In the yard, children can observe the growth of different plants, look for different smells in the environment and study the behaviour of light and shadow. If possible, the kindergarten can even create a grassy area in the yard and set up a thematic play corner, or bring in different tables and divide the area into different flow areas. Mathematics, reading, music, drawing and painting can all be incorporated into these areas. Stones, leaves, snow, pine cones, are just a few of the materials on hand. Children can observe clouds and weather conditions in the yard, watch birds and squirrels search for food, and watch ants move around the yard.

8.3 Planned forest hiking in winter

In the snow-covered forest, sensitive observers can spot a variety of animals such as deer, squirrels and rabbits, painting a vibrant picture of wildlife activity. The quiet of winter forests thus offers the ideal climate for an instructive exploration: children can unleash their senses and curiosity. From tracking animal footprints in the snow to observing the unique shapes of frost-covered trees, winter forest walks offer children countless opportunities to discover and connect with nature.

Example Activity:

In Lyytinen & Wilenius (2020,113-133), a variety of winter forest activities are described, including building ice mosaics using natural materials, exploring frozen ponds, creeks, ditches, and icicles, admiring frost-covered trees and delicate ice formations, creating mosaic patterns on the ground using crushed ice blocks, constructing shining forts or castles for the Ice Snow Queen, enjoying ice skating on natural ice. "Tehtäväkortit" (Task Cards)"activity designed by Tenhunen (2021, 43) make it easy to go through forest-related topics with children, such as looking for and identifying animal tracks, observing the changes in tree leaves according to the seasons, identifying flowers and plants.

8.4 Engaging Parents and the Community

8.4.1 Parental support is essential

FNAE (2022, 32) emphasizes the vital role of collaboration between Early Childhood Education and Care (ECEC) providers and guardians to ensure the healthy and safe growth, development, and learning of children. This educational cooperation involves discussions about values, goals, and responsibilities regarding educational work with respect for the diversity of families and children's individual needs. Interaction is necessary between personnel and guardians to promote feedback, exchange daily events of children, and thus build a fundamental platform for their overall well-being. Cooperative efforts play a critical role during transitions in ECEC and in planning and implementing support for children's development and learning.

In the questionnaire responses, two participants mentioned the importance of parental involvement and support for nature education in winter, especially in ensuring that children have enough warm clothing and appropriate outdoor equipment.

Tiikkainen & Vanhanen (2018, 47) also mentions the importance of involving parents in the activities of the kindergarten to promote culturally sustainable development and values. It emphasizes the role of parents in sharing their cultures and participating in events at the kindergarten, contributing to children understanding diversity and one another. This involvement serves as a model for children on how to engage with others respectfully, fostering values of equality and cultural appreciation.

Example Activity:

Host a "Family hiking day" where parents are invited to participate in walking or skiing in the forest with their children; Set up a treasure hunt in the kindergarten yard, where children and their parents look for hidden natural objects such as pine cones, leaves, stones or animal tracks according to clues in pictures or objects; Have a family ice fishing competition on a safe and secure ice surface to experience the fun of fishing in winter and to help children learn about the habits of fish in winter. These activities can ensure parents better understand the meaning of nature education.

8.4.2 Cooperating with the community

FNAE (2022, 43) states that when a child begins to receive early childhood education outside the home, his or her sphere of influence expands and the child encounters other ways of behaving in addition to the behavioural patterns, traditions, beliefs and values of the family. The mission of ECEC is to develop children's understanding of the diversity of the local

community and practice how to act within it. This theme is explored from perspectives of ethical thinking, worldviews, past, present, and future of the local community, and media. Activities such as fairy tales, music, visual arts, play, drama, different media contents, as well as visitors, visits, and events in the local area are utilized to enhance children's learning experiences about their community.

Example Activity:

- Work with local nurseries or farms to get children involved in planting trees, pruning plants, experiencing winter farming activities and learning how food is grown and harvested.
- work with local animal protection organizations to organize wildlife watching activities where children can learn how to protect their winter habitats.
- work with local conservation societies or parks to organize winter nature adventures such as snowshoeing, ice fishing or picnics.
- partner with artists or libraries to host winter nature-themed drawing contests or readings that promote children's understanding of nature and creative expression.

9 Reliability and Ethics

The research was conducted on using nature-oriented education during winter in daycare centers in Finland. In this process, special care was taken to ensure the ethical righteousness and trustworthiness of the study. All necessary research permissions and consents were obtained before the research. The questionnaire was written in Finnish and translated into English to ensure comprehensibility and reliability of the feedback data.

This study adhered strictly to the principles of ethics for safeguarding the rights, well-being, and anonymity of children since it involved children. This population called for special ethical consideration in connection with the study. This involved obtaining informed consent from parents or guardians prior to data gathering on children, and it ensured that information was anonymous for the sake of privacy protection.

Participation was entirely voluntary for all subjects involved in the research project. Subjects could withdraw their participation at any stage of the research process. The participants were clearly and openly informed about all phases of data collection and data analysis, why this was so, how it would be used, etc. All data was anonymized and stored securely to ensure participant privacy.

10 Conclusion

The research aimed to identify challenges and opportunities in teaching nature education during the winter in Finnish kindergartens. The research objectives centered on understanding the obstacles faced by educators, exploring the unique learning opportunities presented by the winter environment, and proposing practical strategies for integrating winter outdoor learning into the early childhood education curriculum. The main beneficiaries are the nature-oriented daycare center and its staff, who can use the findings to improve their teaching methods.

The theoretical framework of the thesis drew upon the Act on Early Childhood Education and Care, the National Core Curriculum for Early Childhood Education and Care, and existing literature on environmental and nature education. These frameworks were applied to understand holistic child development, active learning, and transversal competencies in the context of winter nature-oriented teaching activities.

Methodologically, the study applied a thematic analysis of data collected using open-ended questionnaires distributed to kindergarten staff. The inductive thematic analytical approach allowed the themes to come forth directly through data. It made sure that results were based on some real experiences and views covered during winter in kindergartens within Finland.

The study's principal findings underline but also give opportunities for nature education in winter. Challenges were associated with extreme weather, issues of safety, and clothes and equipment. Opportunities include activities specific to carrying out in the winter season, observation of seasonal changes, and educational experiences unique to the time of year.

Based on the questionnaire survey, literature review and personal experience, proposals and recommendations are made to promote winter nature education in kindergartens: indoor activity diversification during harsh winters, good use of courtyards, Planned forest hiking and increased involvement of parents and the community in winter nature education. These activities protect children from harsh climatic conditions, add elements of nature, arouse children's interest in nature, and enrich the learning experience to promote participation and connection during winter nature education for the holistic development of children.

The limitations included the methodological constraints because of the change in tools for data collection, language barriers, and the study's small sample size. Such weaknesses at the beginning could have affected the depth and breadth of data analysis and its findings.

Future research directions would be enlightened by a few extended studies with larger samples, including diversified methodologies of data collection, to cover various views and enter into new approaches to the challenges and opportunities brought forth by winter nature education.

This thesis will, therefore, elaborate on the challenges in implementing winter nature education in the kindergartens of Finland but also on ways of overcoming these challenges and gaining the most enriching educational experiences simultaneously. From that angle, this study paves the ground for further research and development on nature education in early childhood education, eventually leading to implementing educational methods that foster holistic development and environmental awareness in children.

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Appendix 1: Thesis Questionnaire

Kyselylomake tutkimusta varten talvisesta luontokasvatuksesta Suomen päiväkodeissa⁴

Johdanto:⁴

Olen Li-Tang, Laurea-ammattikorkeakoulun opiskelija, ja teen parhaillaan tutkimusta opinnäytetyötäni varten, joka keskittyy talvisen luontokasvatuksen haasteisiin ja mahdollisuuksiin Suomen päiväkodeissa. Kokemuksesi ja näkemyksesi ovat korvaamattomia, jotta voidaan ymmärtää, miten päiväkodit hallitsevat ulkoiluaktiviteetteja ja luontokasvatusta kylmempinä kuukausina.⁴

⁴

Kyselyn tarkoitus:⁴

Tämän kyselyn tarkoituksena on kerätä tietoa varhaiskasvatuksessa suoraan mukana olevilta ammattilaisilta. Vastauksesi auttavat tunnistamaan talvisen luontokasvatuksen haasteet ja mahdollisuudet ja ohjaamaan tulevien käytäntöjen parantamista.⁴

⁴

Luottamuksellisuuden varmistaminen:⁴

Haluan vakuuttaa, että kaikki tässä kyselyssä jaettu tieto pidetään luottamuksellisena. Henkilötietoja ei käytetä missään tutkimuksesta syntyvissä raporteissa tai julkaisuissa, ja esitetään vain koottua tietoa.⁴

⁴

Tietojen käyttö:⁴

Antamiasi tietoja käytetään ainoastaan akateemisiin tarkoituksiin, erityisesti tukemaan opinnäytetyöni tuloksia.⁴

⁴

Osallistujan oikeudet:⁴

Muistathan, että osallistumisesi on täysin vapaaehtoista. Sinulla on oikeus vetäytyä milloin tahansa tai olla vastaamatta tiettyihin kysymyksiin.⁴

⁴

Kysymykset:⁴

⁴

1. → Voisitko kuvailla, miten talvi vaikuttaa luontokasvatusaktiviteetteihin teidän päiväkodissanne?⁴

⁴

2. → Mikä on suurin haaste, kun järjestätte ulkoiluaktiviteetteja lapsille talvikuukausina?⁴

⁴

3. → Miten mukautatte opetustapoja talven haasteisiin vastaamiseksi?⁴

⁴

4. → Mitä ainutlaatuisia kasvatusmahdollisuuksia talvi tarjoaa, joita muina vuodenaikoina ei ole saatavilla?⁴

⁴

5. → Minkälaista lisätukea tai resursseja tarvitsitte parantaaksenne luontokasvatusta talven aikana?⁴

⁴

6. → Onko talviseen luontokasvatukseen liittyvä näkökohta, jonka koet tärkeäksi mutta joka usein unohtetaan?⁴

⁴

Kiitos, että käytät aikaa tämän kyselyn täyttämiseen. Näkemyksesi ovat erittäin arvokkaita ja vaikuttavat merkittävästi tämän tutkimuksen onnistumiseen.⁴

⁴

Appendix 2: Interview outline

Haastattelurunko tutkimukseen talvisesta luontokasvatuksesta Suomen päiväkodeissa

↵

Olen Laurea-ammattikorkeakoulun opiskelija. Teen parhaillaan tutkimusta opinnäytetyötäni varten, joka keskittyy talvisen luontokasvatuksen haasteisiin ja mahdollisuuksiin Suomen päiväkodeissa.

↵

Haastattelun tarkoitus:

Tämän haastattelun tarkoituksena on kerätä tietoa ammattilaisilta, kuten sinä, jotka ovat suoraan mukana varhaiskasvatuksessa. Kokemuksesi ja näkökulmasi ovat korvaamattomia ymmärtämään, kuinka päiväkodit järjestävät ulkoiluaktiviteetteja ja luontokasvatusta kylmempien kuukausien aikana.

↵

Luottamuksellisuuden varmistaminen:

Haluaisin vakuuttaa, että kaikki haastattelun aikana jaettu tieto pidetään luottamuksellisena. Henkilötietoja ei käytetä missään raporteissa tai julkaisuissa, jotka syntyvät tämän tutkimuksen seurauksena, ja esitetään vain koottua tietoa.

↵

Tiedon käyttö:

Antamiasi tietoja käytetään ainoastaan akateemisiin tarkoituksiin, erityisesti tukemaan opinnäytetyöni tuloksia.

↵

Tallennuksen lupa:

Luvallasi haluaisin tallentaa tämän haastattelun. Tallennusta käytetään vain tiedon tarkkuuden varmistamiseen, ja se litteroidaan luottamuksellisesti. Sinulla on oikeus tarkastella litterointia pyydettyäsi.

↵

Osallistujan oikeudet:

Muistathan, että osallistumisesi on täysin vapaaehtoista. Sinulla on oikeus milloin tahansa vetäytyä pois tai olla vastaamatta mihin tahansa tiettyyn kysymykseen haastattelun aikana.

↵

Haastattelukysymykset:

1. Voisitko kuvailla, miten talvi vaikuttaa luontokasvatusaktiviteetteihin teidän päiväkodissanne?
2. Mikä on suurin haaste, kun järjestätte ulkoiluaktiviteetteja lapsille talvikuukausina?
3. Miten mukautatte opetustapoja talven haasteisiin vastaamiseksi?
4. Mitä ainutlaatuisia kasvatusmahdollisuuksia talvi tarjoaa, joita muina vuodenaikoina ei ole saatavilla?
5. Minkälaista lisätukea tai resursseja tarvitsitte parantaaksenne luontokasvatusta talven aikana?
6. Onko talviseen luontokasvatukseen liittyvä näkökohta, jonka koet tärkeäksi mutta joka usein unohdetaan?