



# How to Start Promoting Digital Skills and Know-how in Toddlers' Groups

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# How to Start Promoting Digital Skills and Know-how in Toddlers' Groups

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The purpose of this functional thesis was to create a manual with some ideas to help educators to implement ICT and develop the children's digital skills in toddlers' groups. This topic was based on compliance with the curriculum and working life needs and implemented in ICEC Pilke Kauniainen. Hence, the product was made for the use of the teachers of this specific daycare. The aim of the thesis is to present some ideas to help toddlers develop their digital skills and know-how. Moreover, the aim was also to help to shed some light on the current situation related to this topic in kindergartens, specifically in ICEC Pilke Kauniainen.

In the theoretical framework of the thesis, digital skills and multiliteracy, children's age specific development and the teachers' and children's use of technology were considered. Extensive background research was conducted, and source criticism was carried out in this thesis. Information given in this section and previous knowledge gain from work experience were used in order to implement the functional part of this thesis. This thesis's research was carried out firstly throughout interviews to teachers from ICEC Pilke Kauniainen and followed by the creation and implementation of four lesson plans.

Based on the feedback from two teachers and the daycare manager, the final product is useful and successful. The manual will help teachers to start implementing activities to contribute to the development of digital skills. Moreover, this research has had a great impact in ICEC Pilke Kauniainen since it has worked as a step forward in the company's project related to making a stronger training program for digi-skills and ICT knowledge and confidence of the teachers. Particularly, this thesis has contributed to the appointment of a new digi-tutor in the daycare, who is now in charge of promoting the use of digital skills in all the groups and developing the teachers' digital skill even further.

This research could be expanded by implementing the lesson plans in more daycares in order to have a broader view of how children learn and whether the lesson plans work for all the toddlers' groups. Additionally, involving the families would also be the next natural step, which would involve working with them on helping children to learn digital skills or giving them some useful tips and advice on the topic.

Keywords: digital skills, toddlers, ICT, manual

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Tämän toiminnallisen opinnäytetyön tarkoituksena oli luoda opaskirja, joka auttaa varhaiskasvatuksen opettajia opettamaan lapsille tieto- ja viestintätaitoja sekä kehittämään taaperoikäisten lasten digitaalista osaamista. Opinnäytetyö on linjassa niin opetussuunnitelman kuin työelämän tarpeiden kanssa, ja se toteutettiin päiväkotia ICEC Pilke Kauniaisissa. Näin ollen opaskirja tehtiin tietyn päiväkodin opettajien käyttöön. Opinnäytetyön tarkoituksena on esittää ideoita, joilla kehitetään taaperoiden digitaalista osaamista. Lisäksi tarkoituksena oli kartoittaa päiväkotien, erityisesti ICEC Pilke Kauniaisien, nykytilannetta tähän aiheeseen liittyen.

Opinnäytetyön teoreettisessa viitekehyksessä käsitellään digitaalista osaamista, monilukutaitoa, lasten ikäkohtaista kehitystä sekä opettajien ja lasten teknologiankäyttöä. Aiheesta tehtiin laajaa taustatutkimusta lähdekritiikki huomioon. Toiminnallisen osan toteuttamisessa hyödynnettiin teoreettisessa viitekehyksessä kuvattua tietoa sekä työkokemuksen perusteella saatua käytännön kokemusta. Opinnäytetyön tutkimusosuus tehtiin haastatteleamalla ICEC Pilke Kauniaisien opettajia, minkä jälkeen luotiin ja toteutettiin neljä tuntisuunnitelmaa.

Kahdelta opettajalta sekä päiväkodin johtajalta saadun palautteen mukaan lopputulos on hyödyllinen ja onnistunut. Opaskirja auttaa opettajia toteuttamaan aktiviteetteja, jotka kehittävät digitaalista osaamista. Lisäksi tällä tutkimuksella on ollut suuri vaikutus ICEC Pilke Kauniaisissa, sillä se on edistänyt yrityksen koulutusohjelmaa, jolla kehitetään digitaalista osaamista, tieto- ja viestintätaitoja sekä opettajien itseluottamusta. Tämän opinnäytetyön ansiosta ICEC Pilke Kauniaisiiin nimettiin digituutori, joka on vastuussa siitä, että digitaalisen osaamisen käyttöön kannustetaan kaikissa ryhmissä sekä siitä, että opettajien digitaalinen osaaminen parantuu entisestään.

Tätä tutkimusta voitaisiin laajentaa toteuttamalla tuntisuunnitelmat useammassa päiväkodissa. Näin saataisiin laajempi kuva siitä, miten lapset oppivat sekä nähtäisiin, toimivatko tuntisuunnitelmat kaikissa taaperoryhmissä. Lisäksi perheiden osallistaminen olisi seuraava luonnollinen askel. Vanhempien kanssa voitaisiin työstää lasten digitaalisten taitojen kehittymistä tai vanhemmille voitaisiin antaa vinkkejä ja neuvoja aiheeseen liittyen.

Avainsanat: Digitaalinen osaaminen, taaperot, tieto- ja viestintätaidot, opaskirja

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## 1 Introduction

The use of information and communication technology (ICT) has developed and increased dramatically in the last decade in all aspects of our life. It can be seen everywhere; from the use of virtual reality at home or young children playing with ICT devices, to talking to a robot when you need a doctor's appointment, parents enrolling their child to kindergarten using digital applications or people staring at their screens in public transports. Our society has become very dependable on technology, and it would be very difficult to imagine our world without it. Accordingly, it is important to be able to use technology appropriately, safely, and confidently, which can only be achieved if we are taught from the beginning how to use it. Therefore, the teaching and learning of digital skills and know-how should be started already in kindergarten when children are in a safe and controlled environment.

However, the pedagogical use of ICT devices or media is still not fully developed among younger children, who are used to only being passively staring at the television or smartphone. On the one hand, children who are younger than two years old are spending already more than an hour per day in front of a screen, increasing to almost every child who is five years old (Terveyden ja hyvinvoinnin laitos 2021). On the other hand, it can also be noted that kindergarten educators are not trained enough to be able to help children to develop digital skills and know-how. According to Bountri (2021), the lack of training and professional development related to technology is the cause for the absence of its implementation in Early Childhood Education.

The lack of research about this topic for the toddlers' age and some of my colleagues' comments from ICEC Kauniainen about the lack of training helped me to choose the topic and create a manual with ideas on how to promote digital skills and know-how for toddlers. In order to do so, I will conduct a group interview with some kindergarten teachers and carers, and I will implement different lesson plans aimed at promoting digital skills in a toddlers' group. As for this thesis, I will first introduce its objectives and make a brief description of my working-life partner (Section 2). Then, I will present the theoretical background focusing on the definition of important terms related to technologies, child development, and the children's and teachers' use of technologies (Section 3). In Section 4, the methodology and results from the interview will be explained, followed by the planning and implementation of the lesson plans (Section 5). Section 6 will show the evaluation made at the workplace. Finally, in Section 7 I will comment on the thesis ethics, followed by some concluding remarks (Section 8).

## 2 Background of the Thesis

In this chapter, I will first make a brief description of the type of thesis this is and its objectives, followed by a brief introduction of my working-life partner, trying to focus on the physical place and its values and curriculum.

### 2.1 Functional Thesis

The main objective of a functional or activity-based thesis is to help an organization to solve a problem that has been previously identified. In order to do so, the problem has to be first recognized and a plan needs to be presented, which needs to be put into practice and evaluated afterwards (Business Research Methodology n.d.).

Depending on the type of problem identified, functional theses could be categorized into two groups: product-oriented and guidance-oriented. The former refers to the creation of a product which would help to solve the identified problem, and the latter concerns the production of guidelines or instruction to improve the working process or the professional practice (Ravolainen 2020, 7.) In this case, my thesis is included in the product-oriented type since its aim is to produce a manual. With the help of my colleagues, I realized that there is a gap of knowledge and research concerning this topic, so this manual would help my colleagues and other kindergarten teachers to improve their working practice concerning digital skills in the toddlers' groups.

### 2.2 Aims and Objectives

The main objective of this thesis is to create a manual (see Appendix 1) with ideas on how to implement ICT and develop the children's digital skills in the toddler groups. The reason why this topic was selected is, firstly, because the Finnish National Curriculum for Early Childhood Education and Care (FNAE 2022) requires the teaching of digital skills and know-how for all age groups, and it actually puts all the time more and more emphasis on this topic. Secondly, according to my own experience working in kindergartens, my colleagues' and friends' experiences and the literature that has been published, there is a lack of knowledge on how to help children at this early age to develop their digital skills. Thirdly, this topic was discussed together with ICEC Pilke Kauniainen's manager and it was agreed that the kindergarten's groups could benefit from my knowledge about ICT and from the ideas drawn from this thesis. Therefore, this thesis aims at presenting some ideas that educators can use with the toddlers in their own kindergartens. Moreover, it will also help to shed some light on the current situation related to this topic in kindergartens, specifically in ICEC Pilke Kauniainen.

### 2.3 Working-life Partner - “ICEC Pilke Kauniainen”

My working-life partner is ICEC Pilke Kauniainen. It is a new English-speaking private daycare which opened in August 2021 in the city of Kauniainen. It is open from Monday to Friday from 7:00 to 17:00. It has space for 120 children divided into seven different groups. Apart from the groups' classes, this kindergarten also has a gym, a children's toilet for each class, five adult toilets (including two wheelchair accessible), an office, a staff room, a kitchen, an elevator, four cloakrooms and five different doors to access the kindergarten. At the time of the research, there were 70 children, 12 educators (7 kindergarten teachers and 5 childminders), one general assistant, one deputy manager also working as a teacher, and the daycare manager. The division of the groups is made according to the children's age and development. Therefore, there are the Bunnies, Owls and Bears (1-3 years old), the Swans (3 years old), the Squirrels (4 years old) and the Foxes (5 years old). The pre-school group is not yet available but was just granted permission by the city of Kauniainen to start as a bilingual pre-school (English-Finnish) in August 2023.

The outdoor spaces are also included within the kindergarten's perimeter, including a small park for younger children, a big park for older children, a small forest area and two sheds where toys and strollers are kept. The surrounding areas are also often used, so some groups go almost weekly to nearby forests, public playgrounds, the public swimming pool, the city's library or a football field.

As for the pedagogical background, this kindergarten follows all the national-level laws and guidelines (see Act on Early Childhood Education and Care 2018; FNAE 2022), the municipal curriculum and Pilke's curriculum. According to the center's Pedagogical Operating Plan (2022, 4-13), children are the center of the learning and are active builders of their own knowledge. They are involved from the beginning of the planning of the day and are able to influence and make changes to what is done. Since this is an English-speaking kindergarten with children with different backgrounds, one of its priorities is to expose children to different cultures and languages through different events and types of music, for example. Moreover, children are provided with opportunities to wonder and discover in their own group and together with other groups, interacting as well with the different environments in the kindergarten and its surroundings in Kauniainen.

### 2.4 Feedback Collection

In order to be able to know if this thesis is of any use for my colleagues and has reached its original goals (abovementioned), feedback will be collected from the teachers in the class where the activities were implemented and from the daycare manager who will read this thesis. This feedback collection will be done through a short questionnaire (see questions in Appendix 2) and analyzed in Section 6 of this document.



### 3 Theoretical Background

In this chapter, I will shortly clarify some important terms related to technology, followed by a description of the main points regarding child development, and finally I will describe how children currently use technology.

#### 3.1 Digital Skills vs. Digital Competence vs. Multiliteracy

The world has changed drastically in the last decades and the use and need for technology has changed with it. In the last years there has been a lot of debate about new terms that have appeared with the development of technology (e.g. digital competence, digital skills, multiliteracy, etc). Despite the similarity of these terms, they are not exactly the same.

First, the most used term in relation to technologies is “digital skills”. It refers to the “abilities to use digital devices, communication applications, and networks to access and manage information” (Unesco 2018). For example, if we aim at developing these skills, we could focus on teaching how to take a picture, how to insert a picture in a PowerPoint presentation, or which application we would use to look for information online.

Second, the term “digital competence” makes reference to “the ability to apply [...] digital skills (knowledge and attitude) in a confident, critical and responsible way in a defined context” (Brolpito 2018, 25). For example, teachers might want to identify quality resources for their students using digital tools, or they may want to share those resources with their colleagues while respecting data protection and the author’s rights.

Third, “multiliteracy” relates to “the ability to identify, interpret, create, and communicate meaning across a variety of visual, oral, corporal, musical and alphabetical forms of communication” (Bratitsis 2022). Reading no longer means getting a paperback book and reading; it also means reading on an electronic book, on a website or listening to an audio book. Moreover, when making a presentation, you no longer go to the library to get information about it; nowadays it is possible to browse the internet, to brainstorm online with other people using Google Docs, or to present the materials using a projector.

Both digital competence and multiliteracy are included in the transversal competences section of the Finnish National Curriculum for Early Childhood Education and Care (2022, 23-24). According to it, multiliteracy include different forms of literacy, like numerical, media or visual. This transversal competence should be promoted and developed in the ECEC settings in order for children to be able to culturally understand their surrounding world. Moreover, since digitalization is advancing in all parts of our lives, children should be introduced to digital tools, environments and applications and encouraged to use them in a safe and responsible way.

### 3.2 Child Development

Child development is a complex process that could be defined as “systematic changes and continuities in the individual that occur between conception and death” (Sigelman & Rider 2012, 14). It encompasses different areas of development: physical, social, emotional, cognitive, language, etc. However, these areas are not isolated, and changes in one of them also affects the others. Moreover, not everyone develops the same way and at the same pace, which means that some areas might be more developed than others at the same age, making children’s development very characteristic to each individual. Not only that, but there are also different factors that affect this development, namely society, economics, family, health, or culture (O’Brien & Langmack n.d.).

There are many theories related to the different areas of development that help us to understand the development of children (i.e. cognitive, social, language, etc.). Nevertheless, it is important to always consider a holistic approach that interconnects all the different areas of development and allows us to assess the child as an individual.

When it comes to cognitive development, Jean Piaget explained that the way we think changes as we grow and that children use different schemas to understand the world around them. These schemas would undergo different phases: assimilation (i.e. new information is added to a pre-existing schema) and accommodation (i.e. the pre-existing schemas are modified according to new information and experiences or new schemas are created) (The Prime and Specific Areas of Development 2022). Moreover, he divided the child’s cognitive development into four different stages: sensorimotor stage, preoperational stage, concrete operations stage, and formal operations stage. In this thesis, we are focusing only on the sensorimotor stage (0-2 years old) and the beginning of the preoperational stage (2-7 years old) since this research is focused on toddlers under the age of three. During the former, babies and toddlers manipulate objects and learn through different sensory experiences, which leads them to always discover new things about how the world around them works. During this stage children also set the basis for language development by listening to all the people around them. During the latter, children keep developing their language, but also start using pretend play in their games and start to be able to represent the world symbolically (Cherry 2022a.)

Like Piaget, Lev Vygotsky also believed that children learn by doing. However, he suggested that the child’s surroundings and people around him/her also have an influence on his/her development and learning. Therefore, learning is a social process. Children learn through their interactions with others since they learn from conversations and collaborations with others. Moreover, in his Social Learning Theory, Albert Bandura added that children can also learn by just observing the actions of others or listening to instructions, not only by

interacting with the surroundings (Cherry 2020). He believed that children observe the behavior of others and learn from what they see and the consequences of that action. Bandura proposed four processes related to modeling behavior: attention (children need to pay attention to the behavior being modeled), retention (children need to keep that information in their memory), reproduction (children need to be able to perform the seen behavior), and motivation (children need to have some kind of internal or external motivation to want to copy that behavior) (McLeod 2023.) Furthermore, Urie Bronfenbrenner went one step further than Bandura and proposed the Ecological Approach in which he includes not only the closest environment to the child, but also the social system, different attitudes and ideologies, the mass media, the culture or even the current economic policy also have an influence on the development of the child (Lindon 2012).

Continuing from social theories and including emotional development, it is important to note John Bowlby's Attachment Theory. According to him, children are born with a need to form attachments, first with the primary caregivers and then with other caregivers like educators. Attachments make children feel safe and protected, so caregivers provide a safe place for children and a secure base to start exploring the surroundings (Cherry 2022b). This idea can be observed when a child starts new in a kindergarten since that is the moment when children start creating attachments with the educators, which continue throughout the period of time when children are in the kindergarten with that same caregiver.

Language is another important area of development. Children learn a language in different stages, which means that first they will start with the sounds (0-1 years old). Then, children will begin to learn the syntax and start putting two words together (2 years old). Moreover, between 1-2 years old, children will start understanding instructions and naming things, as well as asking questions. After this, at the age of 3, children will begin to notice and understand time (days of the weeks, adverbs of time, etc.) (The Prime and Specific Areas of Development 2022.)

### 3.3 Teachers' and Children's Use of Technology

As mentioned before, digital skills and know-how are crucial in today's world. Governments all over the world are now trying to adapt their education curricula to the 21<sup>st</sup>-century world. For example, the Finnish National Agency for Education has recently published a new updated National Core Curriculum for Early Childhood Education and Care (FNAE 2022) which puts more emphasis on digital competence and multiliteracy. Compared to the 2018 Early Childhood Education curriculum, the new one's transversal competences are divided into "multiliteracy" and "digital competence" (compared to "multiliteracy and competence in information and communication technology" from the 2018 curriculum). Therefore, the

current curriculum is more focused on the development of certain skills related to media education in early childhood education centers.

Although media education has a great importance in the new curriculum, teachers do not seem to be fully trained or prepared to apply technology in their daily lives in the kindergarten. According to Lindeman, Sevansson & Enochsson's study, "teachers lack in-service training, which makes it more difficult to domesticate the digital tools" (2021, 18). Even though teachers would find digital technology beneficial for the children's development, the lack of knowledge and skills hampers its implementation (Bountri 2021, 35). Teachers do not feel confident enough about their skills in order to be able to teach children how to use digital tools or applications in a pedagogical way. Moreover, technology is crucial in all levels of a teacher's job. It is not only about being able to teach children, but also about planning, implementing, and evaluating activities, methods, and the teaching process; going to meetings; or having VASU discussions with parents. All of this happens mainly through different applications, online or by using technological devices to some extent. Therefore, it is important to note that it is currently not possible to provide quality education and effective teaching without well-trained and digitally capable teachers.

Moreover, the use of digital technology in kindergartens has been a controversial topic. It has been noticed that children are now more exposed to digital media and tools than some years ago, both at home and in schools. Tablets, smartphones, applications like YouTube or even games like Minecraft are present in children's daily lives. Ofcom (2019), the United Kingdom's communications regulator, published a report on children's and parent's media use and attitudes. One of the aspects they analyzed is the use of media devices and services by children of different ages (see Figure 1).

## Media Lives by age: a snapshot

Below is a snapshot of how children use and interact with media devices and services, split by age.

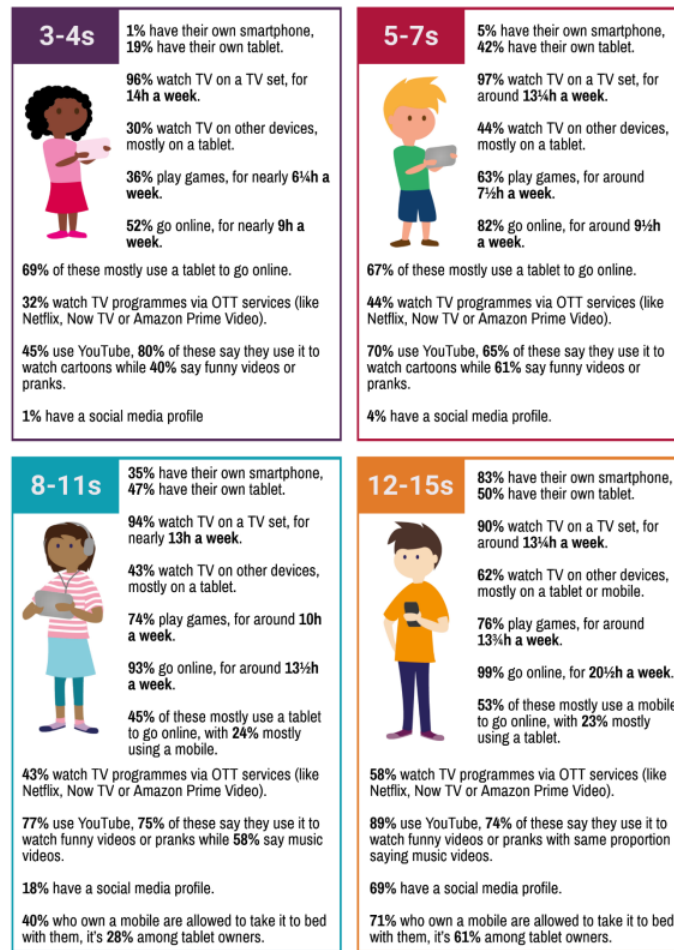


Figure 1. Snapshot of children's use of media devices and services (Ofcom 2019)

According to Figure 1, children are online more than nine hours a week when they are only three years old, increasing exponentially until more than 20 hours a week when they are between twelve and fifteen years old. Already at the age of 3, almost half of the children use YouTube, raising to 90% when they are teenagers. Furthermore, almost all children regardless of their age watch television for more than 13 hours a week.

When looking at these figures, it could be stated that children already spend too much time in front of a screen at home and, thus, they should not be doing the same thing at school or at the kindergarten. Some studies argue that the use of technology with small children is detrimental for their development. For instance, McHarg, Ribner, Devine & Hughes (2020, 6) suggests that the executive functioning of 2-3-year-old children is negatively affected by technology attributed to the “increased screen use replacing activities that are important for cognitive development, such as playing with manipulatives and engaging in imaginative play”. Even though there are some studies and articles against the use of technology with younger

children, there are also many others that highlight its benefits. For example, Lindeman, Svensson & Enochsson (2021, 6) and Courage, Frizzell, Walsh & Smith (2021, 2) argue that by using ICT children not only learn contents such as letters or numbers, but they also practice other skills like collaboration, solving problems or showing respect to others. Similarly, Marsh, Lahmar, Plowman, Yamada-Rice, Bishop & Scott (2021, 285) also analyze the benefits of the use of digital tools with small children, putting more emphasis on electronic devices fostering play and creativity in under threes. Thus, although children seem to spend quite a lot of time in front of a screen at home, when used properly and in a controlled manner, technology could actually help children's development in many ways. Therefore, the use of technology in kindergartens, with trained teachers and with limited time, can be only beneficial for the children's development and their skills.

#### 4 Planning, Implementation and Analysis of Group Interview

In this chapter, the planning and preparation for the interview will be explained. After that, an analysis of the interview will be carried out, from which some useful conclusions for the design of the lesson plans will be drawn.

##### 4.1 Starting Point

First of all, it was important for me to know how the state of affairs was in my kindergarten in order to plan and prepare the lesson plans that would then help my colleagues in their daily work. In order to do that, I first had to know their starting point regarding this topic. Therefore, I decided to ask my colleagues how they implement activities aimed at promoting digital skills, digital competences and multiliteracy in the toddlers' groups.

It is important to mention that I decided to carry out a group interview and not different individual interviews because I believe that group interviews help the interviewees to explore and evaluate their own points of view. Group interviews also "give insights into how several people differ, comment and interact referring to an issue or a question" (Flick 2021, 258). Group interviews usually tend to create conversation around the topic and new ideas come up which can later be explored when analyzing the interview.

##### 4.2 Participants

Firstly, it is important to mention that, for privacy reasons, their names or other details that could identify them will not be revealed throughout this thesis. However, I will give random names to the participants, so it is easier to follow the analysis of the four interviewees.

Four daycare workers participated in this study. One is a qualified kindergarten and preschool teacher (Laura), and the three others are working as unqualified teachers, although two of them are qualified nursery nurses (Julia and Maria). The last one is a qualified music teacher for compulsory education (Heidi). Moreover, all of them worked in ICEC Pilke Kauniainen at the time of the interview, which was carried out in October 2022. Three of them were working in toddlers' groups and the other one had worked for many years in one, although at the time of the interview she was working with 5-year-old children. All of them were women aged between 33 and 57. They have been working in a daycare as kindergarten teachers or nursery nurses from 2 to 20 years.

#### 4.3 Data Collection

When I decided to write my thesis and do some research about digital skills in the toddler's groups, I wanted to first get to know the level of knowledge, activity implementation and disposition of the teachers in the different toddler groups in the kindergarten I work. In order to start working, I contacted them one by one and asked if they would be willing to participate in a group interview. I explained the topic of my thesis, although not much in detail, since I wanted to give them a chance to think about what they do in their classes, but I also did not want them to overthink it.

This group interview was carried out in October 2022 in the kindergarten (i.e. ICEC Pilke Kauniainen). It was very difficult to make time for it during working hours since we were five people from different groups, so the interview was done during the weekend. The workplace was chosen as the place to do the interview since it was not too far for any of us, and we knew it was going to be quiet during the weekend. I had planned ten questions for the interview (see Appendix 2), which were aimed to be asked in order, although some of the questions were answered already when the interviewees were talking and discussing about a different question. The interview was recorded with the interviewer's phone. All the interviewees were asked beforehand whether the interview could be recorded, and they were also informed about confidentiality issues. I reserved 45 minutes for the interview, which in the end lasted one hour.

#### 4.4 Analysis of the Interview's Data

As mentioned before, the interview was made as a conversation between four kindergarten workers, which led to talking about many topics and going around some others. It is worth noting that teachers' training and safety when using ICT were major topics during the whole interview, all linked to the fact that they are not using much ICT in their current classes.

Firstly, it is important to note that all of them were aware of the fact that the National Core Curriculum for Early Childhood Education and Care includes the ICT as part of the transversal

competences. Nevertheless, only two of them realized that it is mandatory for everyone in every group to include these competences, including the toddlers' groups. They were somehow surprised to know that this part of the curriculum also applies to the groups of under three years old.

Secondly, I would like to point out that only Laura started introducing different devices and applications to the children in her group because her former colleague in her class showed her how it could be done. However, the others do not know how they could do that with small children. For example, Julia pointed out that “[she doesn’t] know enough to do ICT in the classes”, a statement with which both Heidi and Maria agreed. They admitted that they only use the group’s tablet to put music during nap time, but they are not giving it to the children to use at any point. Moreover, Maria also admitted that with her 5-year-old group they watch movies from time to time together as a reward, meaning that if children have behaved properly, the prize would be watching a movie.

As it was mentioned already in the theoretical part with Bountri’s and Lindeman, Sevansson & Enochsson’s studies, one of the reasons for the lack of ICT implementation is the absence of training. The interviewees feel that they are not well-trained in this topic, which causes them to be insecure with technology and with the families too. Julia, Heidi and Maria pointed out that they “wouldn’t feel really confident if [parents] questioned them because they wouldn’t have the right answers”. For instance, they did not know how to explain to the parents the reason(s) behind children making puzzles in a tablet and not with an actual puzzle. Another reason that was brought up in order not to implement ICT in the classes was that they do not know the “benefits of putting children in front of a screen at that short age”, and that they would love to know the reasons behind it. Maria highlighted that ICT could be “a fashion now, because it is something that is new and everyone has to do, without knowing the reasons behind it”. She continued by admitting that if she has to do it, she will do it, but she would prefer to understand why she would be doing it.

Another important topic that was brought up is the level of importance of ICT at a young age, which is also linked to the teachers’ lack of knowledge. Two of the interviewees questioned the idea of starting to teach ICT skills to children when there are other skills that they should learn first (e.g. social skills or communication skills). For example, Maria mentioned that “children will learn ICT, but they do not need to be so young”, so for her it would be enough if they learn how to use technology when they get to primary school. In kindergarten the teaching should be focused on “other skills” and on tackling behavioral issues. However, Laura and Julia countered by bringing up the topic of security. Children will learn how to use a phone and a tablet before they get to compulsory education, even if it is not taught in kindergarten. However, when not learnt in a controlled environment, ICT can get very dangerous, and addictions can start to appear.



At the end of this conversation, they all agreed that children need to start learning about technology and devices during the kindergarten years, in a controlled environment and with teachers who can explain them how to use the technology in a proper and safe way. Laura ended by proposing some activities for the younger groups, like giving the children some devices in order to get familiar with them. Moreover, those interviewees who were against using technology the most were convinced that ICT needs to be started semi-early, so they were going to start introducing different devices, applications and other activities that include ICT.

## 5 Planning and Implementation of Lesson Plans

This chapter includes a description of the planning and implementation stages of the four lesson plans, including a thorough explanation of each one of them.

### 5.1 Planning Stage

As it could be read in the previous section of this thesis, most of the interviewees do not have the specific training or concrete ideas on how to even start implementing technology in their own classes. Therefore, in order to help my colleagues to implement activities that promote digital skills in the toddlers' groups, I created four lesson plans that were implemented in the daycare in a toddler group. These lesson plans are based on the Finnish National Core Curriculum for Early Childhood Education and Care, and more specifically on its transversal competences (FNAE 2022, 21-24), which include "multiliteracy" and "digital competence". According to them, children should practice and experiment with digital tools, applications and environments during different types of activities (e.g. games, play, exploration, etc.), as well as to produce different types of texts, like audiovisual and digital texts. Therefore, all the lesson plans are focused on promoting the digital skills of the children in the group from the beginning. Each lesson plan includes its title, the name of the activity, a short description of the activity, its objectives, a justification for the implementation of this activity, materials that are needed to carry out the activity, and the amount of time allotted for the activity. Table 1 illustrates the first lesson plan with all its categories.

Table 1: Lesson plan 1. Approach to technology and digital tools

LESSON PLAN 1: APPROACH TO TECHNOLOGY AND DIGITAL TOOLS			
	Activity 1: Approach to a smartphone	Activity 2: Approach to a tablet	Activity 3: Approach to a laptop

Description	For these activities, children are provided with four old smartphones and two laptops that do not work, and one tablet that is switched off. First, children are shown the devices during circle time, when teachers explain what each device is and pretends to use them. Those devices are then given to the children to be included in their free play		
Objective(s)	<ol style="list-style-type: none"> <li>1. To get familiar with digital devices (smartphone, tablet, and laptop)</li> <li>2. To learn how to take turns</li> </ol>		
Justification	Getting familiar with digital devices is the first step to start learning and developing digital skills.		
Materials	Smartphones	Tablet	Laptops
Time allotted	Since it is not a direct exposure to screens, the time allotted for the activities is not too controlled. Children are allowed as much time as they want to use the devices based on their interest.		

During the first lesson, it is important to get children familiar with digital devices, so they start learning about the digital world at their own level. In order to do that, the devices need to be first introduced to the children and the best way to do that is during circle time, when they are focused and engaged with what is being said. Children get to touch, manipulate, and play with old phones, tablets and laptops that do not work anymore or are switched off. Since the aim of the lesson is for them to get children familiar with the devices, they can have them and use them as much as they want. However, there are not enough devices for every child in the class, so they would need to take turns and share the devices with their friends. This way they will also train other skills like taking turns and sharing with others.

After having played with the devices, it is important to show them how to actually start using them. Table 2 shows the second lesson plan, with which children will start learning how to switch on the devices and unlock them.

Table 2: Lesson plan 2. Basic use of digital devices

LESSON PLAN 2: BASIC USE OF DIGITAL DEVICES			
	Activity 1: Basic use of a smartphone	Activity 2: Basic use of a tablet	Activity 3: Basic use of a laptop

Description	During circle time, children will be explained and shown how to switch on a smartphone, tablet, and laptop and how to switch off the first two devices. They will also be shown how to swipe their finger on the screen to unlock the tablet and the smartphone.		
Objective(s)	<ol style="list-style-type: none"> <li>1. To get familiar with some basic uses of digital devices</li> <li>2. To train fine motor skills</li> </ol>		
Justification	After having gotten familiar with the devices, it is important to teach children the basic uses of the devices, so they are able to switch them on and off and unlock them.		
Materials	Smartphones	Tablets	Laptops
Time allotted	15 minutes per day for one week		

During session 2, children move forward in their knowledge of digital devices. This time children started learning basic uses of a smartphone, tablet, and laptop, like how to switch on and off the devices or how to unlock them. This lesson plan focuses on showing children the basic use of some digital devices, but it will also help them to develop their fine motor skills. Children will be developing their fine motor skills by clicking, pressing, and swiping. Since this is a lesson plan that asks children to be in front of a screen, the allotted time is more controlled and also reduced. Moreover, the teachers will also be more focused on what and how children use the devices; not only to help the children but also for safety reasons. Compared to the first lesson plan where children could get familiar with the devices as free play for as long as they wanted, in this lesson children will have 15 minutes per day for one week to learn and practice switching on and off and unlocking the devices. Each device will be introduced separately during different circle times, so children can focus on one device at a time. There will be two days for the smartphone, two days for the tablet and one day for the laptop since it is more difficult and less intuitive to use.

After having learnt and practiced how to switch on and off some devices and how to unlock them, it is time to learn how to use basic applications like the camera, or how to open and close them (see Table 3).

Table 3: Lesson plan 3. Basic use of applications

LESSON PLAN 3: BASIC USE OF APPLICATIONS
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	Activity 1: Open and close of smartphone's applications	Activity 2: Use of smartphone's camera
Description	Children are taught individually how to open and close applications on a smartphone.	Children are shown how to take pictures with the camera and how to swap cameras (front and back cameras).
Objective(s)	<ol style="list-style-type: none"> <li>1. To get familiar with the smartphone's applications</li> <li>2. To keep developing fine motor skills</li> </ol>	<ol style="list-style-type: none"> <li>1. To be able to start using the smartphone's cameras</li> <li>2. To practice hand-eye coordination</li> </ol>
Justification	<p>In order to start using a smartphone, children should start learning basic uses of main applications. Opening and closing applications is a basic skill that everyone needs in order to use a smartphone.</p> <p>Moreover, children love to take pictures of themselves and of things they create, so they need to learn the skills that allow them to use the camera.</p>	
Materials	Smartphone	Smartphone
Time allotted	15 min per day for three days	15 min per day for three days

Session 3 will focus solely on smartphones, since it is usually the device that children see more often and would want to use. This session will offer children the opportunity to start learning how to open and close smartphone applications and how to take photos with the camera. First, the way how to open and close applications will be explained, showed, and practiced during circle time. After that, under the teacher's supervision, children will be able to practice by themselves and open the applications that they want on the different phones that we provide them with. This will be done for 15 minutes every day for three days, so all the children have the time to practice. Second, after having learnt how to open and close applications, we will focus on the camera. They would already know how to open it, but now its use will be explained during circle time (i.e. where to click, how to hold the phone, etc.). Children will have 15 minutes per day for three days to practice under the teacher's supervision. They will be encouraged to take pictures of what they do, of their friends, selfies, etc. During this session, not only fine motor skills and hand-eye coordination will be practice, but also following instructions and memory since they need to remember what to do.

After this session, children will be able to use devices and use the camera, as well as to open and close other applications. After this more advanced session, it is important to practice all they have learnt during these sessions (see Table 4).

Table 4: Lesson plan 4. Use of digital devices and applications

LESSON PLAN 4: USE OF DIGITAL DEVICES AND APPLICATIONS	
	Activity 1: To get a device and be able to use it
Description	Children will be given different smartphones and tablets for them to switch them on, unlock them, open and close applications, and use the camera. They will also be given a laptop to open and close it and to be switched on.
Objective(s)	1. To revise everything that children have learnt in the previous lesson plans.
Justification	After having practiced in a scaffolded way how to use different devices, children will have the opportunity to practice what they have learnt during the previous sessions.
Materials	Smartphone, tablet, and laptop
Time allotted	1-2 hours depending on the children's interest

As the last lesson plan, children will be able to revise everything that they learnt during the previous lesson plans. They will be given the different devices to use with the teacher's supervision. They will put into practice everything that they learnt during all the sessions, from switching on and off the devices to taking pictures with the smartphone. This will be done for one or two hours depending on whether children are interested. Children will be encouraged to take pictures, to open different applications, or to unlock the devices, among others.

## 5.2 Implementation Stage

At the beginning, I started talking to the daycare's manager and asking whether the study I was preparing about ICT could be implemented in one of the toddlers' groups. Since I was working in one of them (Owls group), it was a bit easier to start the process. Once I had given and received all the permission forms from the parents, I was able to start planning the activities according to the children's level and interests. However, there were some changes in groups, and I was moved to another toddlers group (Bears group), so the process had to be

started again. In that group there were 9 children at the time of the study, and all parents gave the authorization to carry out the research. I needed some time to get to know the group, their routines and even their timetable, which will be presented in Table 5, so the planning of the lesson plans did not start until I was familiar with all the aspects of the class and the children.

Table 5: Bears' Daily Routine

7:00	The daycare opens. Children have free time play
8:00	Breakfast time
9:00	Outdoor time. Children start to get ready to spend one hour at the daycare's park
10:00	Circle time
10:15	Different learning activities (i.e. arts and crafts, sensory, music, gym, cognitive activities), and free play
11:00	Lunch time
11:30	Free play
12:00	Nap time
14:00	Afternoon snack
14:30	Free play
15:30	Outdoor time
17:00	Daycare closes

After having got familiar with the main aspects of the group's routine and the children, I started planning the different lesson plans according to the age of the children (1.5-2.5 years old) and their development level. Some of the oldest children in this group seemed to know how to click on icons and applications, for example, but some others did not really understand how the screen is turned on. Some of the smallest children placed the phones next to their ear to call someone, without noticing that that device could be used for some other things. Therefore, it was important to start from the very beginning, that is, by showing them different devices, how to do basic actions with them (e.g. switching on and off or opening the camera).

During the first week of implementation, children were very excited to have so many devices that they could actually use in the class. I started with showing the devices during circle time, talking about them, and showing them how to use them (see Figure 2). They were already playing with them during circle time, and they would not let them be moved to the class, so they could play with them.



Figure 2: Pictures from the circle time where children are presented the devices

During circle time, children are presented with the first developmental activities. Circle time is done every morning and children are used to singing and dancing, identifying colors, playing games, and sharing their opinions. When children saw me coming with the devices, they got very excited, because they realized that we were going to play with them. I first started showing them the laptop since it was the biggest and it was the one that they had seen first. We opened it and I showed the screen and the buttons by pointing and them. Children were eager to press the buttons and some of them were even fighting to get to the laptop. I explained that we were going to take turns and that everyone was going to be able to play with the device, so they all calmed down. After a while of discovering this device, I took the tablet out and started showing it to them. I opened it and showed them were to click to switch it on. After it, I gave it to them, and they started exploring it. You could tell that some of them already knew from before how to switch it on and even how to unlock the screen by scrolling the finger up. Last but not least, I showed them different old phones that do not work anymore and gave them to the children to manipulate. After a while, we went to

the main room, and we set the laptops on a small table where children play and gave the phones and tablet to other children who asked for them (see Figure 3).



Figure 3: Children discovering different devices in the class

As it can be seen in Figure 3, children were very interested in playing and pretending with the different devices. They all spend a long time checking the laptops and phones, although they were not that interested in the tablet. Moreover, there were some children who would play for some time with one device and then change to another activity or game, and then they would go back to the devices. Some others wanted to be all the time in front of the devices and figure out how they work. After a while, you could tell that the phones were the devices that caught the children's attention for a longer time. During the week, they had all the devices for them to use, and the phones were the ones that everyone wanted. They would walk through the class pretending they were calling someone or unlocking the phone. After the third day, children lost interest in the laptops and wanted to focus only on the smartphones. Older children were the ones who loved to pretend play with the phones and with their friends, whereas younger children would take the phone, play with it for a bit, and lose interest quite fast. Furthermore, since there were not enough phones for everyone, they learnt that they would play for a bit with the phone and then it would be another child's turn. There were barely any conflicts among them, and they were able to share the devices with their friends.



After the great success during the first week, children had already the first contact with laptops, tablets, and smartphones. As mentioned before in Table 2, during the second week, the plan was to get children to learn how to switch on and off different devices and how to swipe the fingers on the screen to unlock it. The structure was the same as during the same week, that is, first we made a circle where I explained how to use the devices, and then I gave the devices to the children who could put into practice with an adult's help what they had seen during circle time (see Figure 4).



Figure 4: Children trying to unlock and to switch on and off different devices

This time, children were more enthusiastic and engaged with the devices, most likely because the screens were on and they could interact more, as shown in Figure 4. Children were shown during circle time where to press and how to slide a finger to unlock the screen on a smartphone and on a tablet. Moreover, I also switched on a laptop so children could see what to do. When we left the circle room, children were given the different devices to discover and practice what we had just see during circle time.

When it comes to using the smartphone, at the beginning, younger children had some difficulties even finding the button on the phone to switch it on and off. However, they learnt fast, and soon they were able to press it multiple times, so the screen would go on and off all the time. With the older children's and the adult's help, they managed to learn where the button is and how to click it. After only one day of using the phones, all the children were already able to switch it on and off. However, unlocking was a bit more difficult. Older

children were able to understand that in order to unlock a screen they need to swipe one finger on it. Nevertheless, at first, children did not swipe the finger long enough to be able to unlock it, and some of them got frustrated. After couple days trying and practicing, they finally managed to do it long enough and to unlock the screen. The younger children, however, had more difficulties unlocking the screen, and most of them had not still managed at the end of this week. Their fine motor skills are not as developed, so it was hard for them to use only one finger. They tended to use all the fingers or even the whole hand to unlock the screen, so it did not work. However, these children did not get frustrated, they just kept going repeatedly until they managed with some help, or they got bored of trying.

As for the use of the tablet, it was a bit more difficult for everyone. At first, not many children knew where to switch it on or off, because they were trying to do it in the same place as on phone, and they button was not there. Many went to ask help from an adult, who showed them again where the button was and how to press it. Since the tablet was bigger than the phone, younger children had some difficulties holding it, and it was hard for them to move around while carrying the tablet and trying to press the button. Therefore, many of them decided to place the tablet on the floor and work with it that way. It is worth mentioning that older children were more interested in the tablet than in the phone, probably because the screen was bigger, and they could see better what was on the screen.

Regarding the use of the laptop, children were not too interested on it. We had the laptop on the small table that children use to play, but children only wanted to press the keys, so the switching on and off was not a success. Many of them were not patient enough to let the laptop finish turning on and they kept pressing the on/off button because they did not see that much happening. Therefore, many times throughout the week the laptop was left untouched on the table or children were just pressing all the keys on it.

During the third week of this study, we focused more on one device: the smartphone. It was the device that children were more interested in and the one they see every day everywhere. Therefore, it was important to show them how to develop their skills a bit further using the phone. This time the focus was on learning how to open and close some applications, especially the camera, and how to take pictures with the front and rear cameras (see Figure 5).



Figure 5: Children opening applications and using the smartphone's cameras

During this week, children were already able to switch on the phone, which means that they still remembered what was done during the previous week. This allowed us to continue exploring other features on the smartphone. These children have always been very interested in looking at videos and pictures on the phone, so I assumed that they would also be interested in taking pictures. As it happened with the unlocking on the phone on the previous week, the younger children still found it hard to use only one finger to swipe the screen. However, surprisingly, older children knew how to start the camera without unlocking the phone, and they even knew how to take pictures. These children needed some support when trying to point the camera at the objective of the picture. At first, they did not understand that they needed to move the phone in order to have the camera in the correct position for the picture. However, once they were shown how to do it, it was easy for them to learn and do it the right way. After that, they went around the class taking pictures of everything and everyone, mainly of their friends. When they finished taking pictures, they were able to go to the gallery from the camera without any help, which tells us that they had done that before. Younger children preferred the front camera, so they placed the phone on the floor, and they took pictures of the ceiling and of themselves. When some more friends joined, they would take a picture together with their friends. In Figure 6 it can be seen how children were taking pictures of themselves and the ceiling with the front camera of the phone.



Figure 6: Pictures taken by children with the front camera of a smartphone

After having taking pictures of themselves, as shown in Figure 6, children loved to check the pictures they had taken and to show them to their friends and teachers. They felt very proud of what they had done and their accomplishment, so they wanted to show to everyone.

The last week of the research was meant for children to practice what they had learnt during the previous weeks. I wanted to check if they remembered everything that we had been learning, and at that moment I had the impression they would. They were a lot more interested in technology and devices, they were asking every day if they could see the pictures that the teachers took, and some of them would even cry or get upset if they did not get a device to play. During this last week, some children were still very interested in discovering new things and taking pictures with the phone, but some others also wanted to do those things with the tablet (see Figures 7 and 8).





Figure 7: Children with the devices during the last week of research



Figure 8: Children practicing with different devices during the last week of research

Children were still enjoying the phones, but the older children wanted to also take pictures with the tablet. Without me saying anything about its use, they were able to swipe the button for the camera, take the tablet with them and take pictures with it. They were able to extrapolate the knowledge they had acquired with the phone to the tablet, open applications and take pictures with it. When younger children noticed that they could do the same things with the tablet than with the phone, they also started to get interested in the tablet. They first went to check how the older children were playing with it and which buttons they were pressing, and then they started using it themselves.

After having analyzed the four weeks of research, it is important to mention that children were incredibly interested in technology and were very proud of all the things they could do, especially taking pictures. The first they did when parents came to pick them up was to tell them that they had taken some pictures with a phone. These children were very fast learners and what I showed at the beginning of each week was mastered at the end of that week by almost every child. Moreover, it was also very interesting to notice which children were used to having screens at home and which ones had it in the kindergarten for the first time. On the one hand, there were some children, both older and younger, who already knew how to turn on a phone, and every time they saw a device, they would run towards it. They would get anxious when it was someone else's turn, and they wouldn't share the device. Every time the device was on the table, they would go there to get it. On the other hand, there were some other children who were fascinated and astonished when a screen was turned on and were even a bit scared to touch it. Some of these children needed a bit of encouragement from the adults in the class and from other children in order to touch the screen and play with it. Once they had learnt how to switch on a phone, they wanted to just switch it on and off all the time to see what happened.

## 6 Assessment from Workplace

During the planning process of the lesson plans, I discussed with the other teacher in the group about the appropriateness of the activities and we discussed about the children's interests. We agreed together to start from the very beginning since many children did not know anything about technology or devices. Moreover, during this first process I also consulted with other teachers from different toddlers' groups. They agreed that all the groups would benefit from the most basic digital skills, so in that moment I decided that I would plan activities that would help children to develop the very first ICT skills related to devices. Everyone in the toddler's groups and the center's manager were very interested in this study and wanted to follow the process closely.

During the implementation process I also involved other groups and borrowed and lent some of the devices to be used by the children in other classes. Everyone was somehow involved in promoting digital skills and planning new ICT activities in their own groups. It could be noticed that teachers were more interested in the topic and started to be more aware of the fact that digital skills are important for children and need to be included in our plans. At that time, teachers started asking more questions about the planning, implementation, and age appropriateness of different ICT activities.

The main written feedback from the people who were more involved in this process (i.e. two teachers and the daycare's manager) was collected after this thesis was written (see Appendix 3). However, they were also encouraged to give verbal feedback during the whole planning and implementation processes. Most of the feedback was positive, with some constructive points at the end to improve mostly the written thesis.

According to the teachers, the activities carried out in the group were a good start for children to learn their first digital skills. They praised the fact that the activities were planned in accordance with the children's interests and age, and that the teachers were somehow involved in the process by giving ideas on the timing of the implementation, for example. Furthermore, some teachers were very thankful for receiving some ideas on how to work the digital skills with the toddlers and are looking forward the publication of the complete thesis. Moreover, according to the group's teacher, children have gotten more interested in technologies and devices and they now continue to use different devices. Children are now able to take pictures and do so more often, and they will soon start using some new applications on the tablet and the phone. The teacher felt that this project was very important for that group since they had never had any activity or project related to it before. It was a motivation to start helping children to develop their digital skills and keep doing it afterwards.

When it comes to the daycare's manager, she found surprising that there were such strong opinions and attitudes among the teaching staff regarding ICT skills, specifically when applied to the youngest children. However, in the results with the children, she mentioned that there were not so many unexpected or surprising results, but she found it very valuable to see the different reactions and ways of dealing with ICT. In her opinion, this will make it easier for future projects to understand and predict children's reactions and learning curves.

The constructive feedback was mainly about the writing of the thesis, although they also gave some ideas to use for future projects. They gave some useful tips about the thesis structure, content and writing style that I took into consideration and applied to this thesis. Additionally, the teacher's and the daycare manager proposed some ideas for future research. For instance, the inclusion of more groups in the study, collaboration with families

or the integration of the use of different applications once children have acquired the basic digital skills.

Finally, this thesis has worked as a step forward in the company's project related to making a stronger training program for digi-skills and ICT knowledge and confidence. Particularly, this thesis has contributed to the appointment of a new digi-tutor in the daycare, who is now in charge of promoting the use of digital skills in all the groups. This person is also responsible for the daycare's employees' training in digital matters and is the one who provides guidance and supervision regarding technology in the daycare. There are now digi-meetings once a month with the employees where new ideas are presented and discussed, and questions and doubts about the implementation of digital skills are answered.

## 7 Thesis Ethics

While doing research and writing a thesis, it is important to take into consideration the ethical part of it. In this section of this thesis, I would like to focus on the ethical issues that I faced during the planning and implementation of the research and the writing of this thesis.

First, I would like to mention that this thesis and all its processes comply with the relevant ethical principles of research of The Finnish National Board on Research Integrity (TENK). All the research, from the interviews with the teachers to the observation of children, have been carried out in accordance with these guidelines, as well as the writing of this thesis.

Second, when it comes to research part of this thesis, the main goal was to produce some ideas on how to implement ICT with toddlers' groups in a kindergarten. All of this was done after having implemented different activities in a toddlers' group. In order to do this, first written permission was asked and granted from all the group's parents and from the daycare's manager. As it was written in the permission form and agreed with the manager, all children have remained anonymous throughout the process without giving any information that would make the children recognizable. They have also remained anonymous during the thesis written process (e.g. no names have been mentioned and pictures do not contain any faces or they have been blurred). Furthermore, in order to carry out the interview with some kindergarten's employees, permission was also asked and granted, although their anonymity has also been maintained during the whole process of research and thesis writing.

Third, the source materials are another aspect that needs to be considered when analyzing the ethical component of this thesis. During the whole process I tried to find and use credible and suitable sources. Since any topic related to technologies evolves quite rapidly, I aimed at looking for up-to-date sources that would not go back more than five years like scientific articles, legal documents, and relevant books. Since this is a bachelor's thesis and the time



that is allotted to it is quite limited, most of the sources that I retrieved are electronic, even though some printed books were also used. Moreover, as mentioned by Vilkkä and Airaksinen (2003, 73), it is of great importance to use original sources as they provide you with direct evidence of the research topic. Thus, during this thesis process, I have always aimed at using primary sources.

Finally, during this whole process plagiarism was avoided by referencing all the sources and materials. Plagiarism involves stealing contents or ideas that others have published or using them as your own without mentioning the source. It is treated as a serious violation of ethical standards. To avoid any kind of plagiarism, I used Laurea's guidelines for referencing, which helped me quote and cite all the information and sources that were useful for this thesis.

## 8 Concluding Remarks

The use of technologies has dramatically increased in the last decades and nowadays we cannot imagine a world without them. In order to be able to use technologies in a safely and appropriately, people need to learn from the very beginning, that is, from a young age. School and daycares are essential places where children can start learning ICT and developing their digital and know-how skills. However, in order to do that, teachers need to have some basic knowledge so as to help children with their own skills. This thesis wanted to present some ideas that educators can use in kindergartens, specifically in toddlers' groups, when starting to use digital devices.

In order to understand how to help teachers and where to start from, it was important to know the teachers' perspectives on this topic and their knowledge about it. As a way to know what their thoughts were, some of the teachers from Pilke ICEC Kauniainen, the daycare where the research would be conducted, were interviewed together. After realizing that many of them had strong opinions against the implementation of ICT with toddlers and that their knowledge of technology was limited, it was decided that some basic ideas on this topic would be needed. Four lesson plans were created, which ranged from helping children know the basic use of a smartphone, tablet and computer (e.g. switching them on and off), to helping them in the use of some applications like the smartphone's camera.

For four weeks, the lesson plans were put into practice in a toddlers' group in Pilke ICEC Kauniainen. Children were engaged and interested, and the use of technology continued even after the research time had finished, mostly taking pictures of the things they do in the park (e.g. sand castles, sand cakes, etc.) and when they create something with blocks as well. Children learnt how to switch on and off different devices, they now know how to open and close applications and even how to take pictures. Even though some older children already

knew some of these things, they got more interested and prouder of themselves when they were able to do everything. Therefore, the final product of this thesis has not only given ideas to other teachers on how to start the implementation of ICT with toddlers, but it has also motivated the group's children and educators to continue learning digital skills from where this thesis has left it.

The feedback from the teachers and the daycare's manager was positive and constructive. They agreed that this final product will help other teachers to start the implementation of ICT in the groups, which will in turn improve the children's digital skills in the whole daycare. As a result of this thesis, Pilke ICEC Kauniainen has assigned a digi-tutor to help to implement digital skills in all the groups and to improve digital competences among the staff members. Therefore, this thesis has not only fulfilled its original goal of presenting some initial ideas on how to start promoting ICT and know-how skills with toddlers, but it has also helped to create a team that aims at assisting on the implementation of digital skills at the daycare level and at the training of educators on this matter.

During this whole process, it was very interesting to get to know some other educators' opinions. I have to say, I would have never imagined that there was so much criticism against the implementation of ICT in the kindergarten. I would have imagined that people understood that it is important since we need to use technology for everything. Another learning point during this process was the response from the children when provided with digital devices. I had previously thought that they would be interested for just a moment and then would go to play with something else, as it is typical in that age. However, I was surprised to learn that children really enjoy digital devices, so if practiced well and regularly, they could learn so many things in very little time. The thesis writing process was something that I had done before in a more theoretical way, but this time it had a more practical approach with an implementation in a workplace. This approach was completely new to me, and it was sometimes hard to understand what the next step would be. However, with the help of previous literature, the thesis coordinator, and some colleagues from work, I was able to figure out how to make it work.

This thesis has only focused on giving some ideas on how to start introducing ICT devices and learning the first digital skills with toddlers. However, it would be very interesting to be able to continue even further and study how children learn when using different games in the devices or how they use the devices as a tool for something else. Moreover, this research was only based in one daycare, so it would be useful to expand it to more daycares in order to have a broader view of how children learn and whether the lesson plans work for all the toddlers' groups. Furthermore, I believe that involving the families would also be the next natural step, which would involve working with them on helping children to learn digital skills or giving them some useful tips and advice on the topic.

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## Appendices

## Appendix 1: Manual

# DIGITAL SKILLS

National Core Curriculum of Early Childhood Education and Care

Multiliteracy

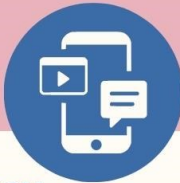
Teamwork skills

Creative thinking



## Digital Competence

Digital competence is part of our society and is needed everywhere. ECEC centers need to support the children's understanding of digitalization. Together with the children, digital tools and applications are used for documentation, interaction, play, games exploration, etc.



## Multiliteracy

Refers to skills in interpreting and producing different types of messages. This competence helps children to understand culturally diverse messages and their surrounding world. In order to promote this competence, children are encouraged to explore, use, and produce messages in different environments, including digital ones. Types of texts: written, spoken, audiovisual or digital.

Numerical literacy

Media literacy

Visual literacy

Basic literacy

## Useful links with more information and ideas

### Finnish Ministry of Education on Digital Competence:

<https://www.oph.fi/fi/digiosaaminen> (in Finnish)

### Media literacy:

<https://www.mediataitokoulu.fi/media-literacy/> (in English)

### Useful materials:

<https://www.mediataitokoulu.fi/tehtavat/uudetlukutaidot/> (in Finnish)



# HOW TO START digital learning WITH TODDLERS



**BASIC USE OF DEVICES**  
to get familiar with basic uses of digital devices

---

It is important to teach children the basic uses of devices (switching on and off, unlocking) before dealing with applications.

1



**APPROACH TO TECHNOLOGY**  
to get familiar with digital devices

---

It is important to get familiar with the different digital devices (smartphone, tablet and laptop) before learning how to use them

2



**BASIC USE OF APPLICATIONS**  
to get familiar with basic uses of digital devices

---

It is important to teach children the basic uses of applications (opening and closing applications, using the camera) before fully using the smartphones.

3



**USE OF DIGITAL DEVICES AND APPLICATIONS**  
to revise the use of digital devices and applications

---

It is important to revise what children have learnt to ensure a significant learning.

4

Andrea Sofía Bernárdez López



# APPROACH TO technology

TO GET FAMILIAR WITH DIGITAL DEVICES  
TO LEARN HOW TO TAKE TURNS



## DESCRIPTION

Children are provided with switched off digital devices.  
First, children are shown the devices during circle time, when teachers explain what each device is and pretends to use them.  
Those devices are then given to the children to be included in their free play.



## JUSTIFICATION

Getting familiar with digital devices is the first step to start learning and developing digital skills.



## MATERIALS

Smartphones  
Tablets  
Laptops



## TIMING

Since it is not a direct exposure to screens, the time allotted for the activities is not too controlled.  
Children are allowed as much time as they want to use the devices based on their interest.

# BASIC USE OF devices

TO GET FAMILIAR WITH BASIC USES OF DIGITAL DEVICES  
TO TRAIN FINE MOTOR SKILLS



## DESCRIPTION

During circle time, children will be explained and shown how to switch on a smartphone, tablet, and laptop and how to switch off the first two devices. They will also be shown how to swipe their finger on the screen to unlock the tablet and the smartphone.



## JUSTIFICATION

In order to start using a smartphone, children should start learning basic uses of main applications. Opening and closing applications is a basic skill that everyone needs in order to use a smartphone. Moreover, children love to take pictures of themselves and of things they create, so they need to learn the skills that allow them to use the camera.



## MATERIALS

Smartphones  
Tablets  
Laptops



## TIMING

15' per day for one week

# BASIC USE OF applications

TO GET FAMILIAR WITH THE SMARTPHONE'S APPLICATIONS  
TO BE ABLE TO START USING THE SMARTPHONE'S CAMERAS  
TO PRACTICE HAND-EYE COORDINATION



## DESCRIPTION

Children are taught individually how to open and close applications on a smartphone. Moreover, children are also shown individually how to take pictures with the camera and how to swap cameras (front and back cameras).



## JUSTIFICATION

After having gotten familiar with the devices, it is important to teach children the basic uses of the devices, so they are able to switch them on and off and unlock them.



## MATERIALS

Smartphones



## TIMING

Applications: 15' per day for three days

Camera: 15' per day for three days

# USE OF digital devices and applications

TO REVISE THE USE OF DIGITAL DEVICES AND APPLICATIONS



## DESCRIPTION

Children will be given different smartphones and tablets for them to switch them on, unlock them, open and close applications, and use the camera. They will also be given a laptop to open and close it and to be switched on.



## JUSTIFICATION

After having practiced in a scaffolded way how to use different devices, children will have the opportunity to practice what they have learnt before.



## MATERIALS

Smartphones  
Tablets  
Laptops



## TIMING

1-2 hours depending on the children's interest

## Appendix 2: Interview Questions

1. Briefly tell us your name, short description of studies, profession and years of experience working in a kindergarten.
2. When we talk about teaching ICT for toddlers, what does it include in your opinion?
3. What about interactive toys like phones, remote controls, walkie-talkies, keyboards... do you consider them ICT?
4. Based on this conversation, how much and how do you incorporate ICT in your classroom?
5. What kind of challenges do you see when incorporating ICT in the group?
6. How important do you think it is to teach ICT to toddlers?
7. How do you see role of ICT in the curriculum?
8. How has the role of ICT in the toddler groups developed during your career?
9. What kind of support would teachers need in order to implement ICT with toddlers?
10. How could teachers be trained in order to teach ICT to toddlers?

## Appendix 3: Feedback Questions

**Feedback from the workplace**

How does your company/organisation utilise the completed thesis?
Did something new and/or unexpected emerge during the thesis process or in its results?
How would you describe your cooperation with the student/students completing the thesis?