"We just click!"

ICT from preschool children's perspectives.

Master thesis in Early Childhood Education and Care
Liv Inger Hansen

European Masters in
Early Childhood Education and Care (EMEC)

Oslo University College, Norway
2009

Contents

Preface

The completion of this master thesis marks the end of my participation in the master program 'European Masters in Early Childhood Education and Care' (EMEC). Thanks to all the professors and my fellow students in Malta, Sweden, Germany, Ireland, Scotland and Norway who together managed to create a vibrant international online community and make this learning experience unique.

Vibeke Bjarnø has been my supervisor, and her support in this writing process has been invaluable. She definitely deserves a 'thank you' for her enthusiasm and all the constructive feedback she has given me. Also, thanks to my co-supervisor Nina Bølgan for useful input and for showing a sound interest in my work.

Finally, I wish to thank all the early childhood practitioners and the preschool children who took part in my study and shared their digital experiences with me.

Oslo, May 2009
Liv Inger Hansen

Abstract

"We just click! ICT from preschool children's perspectives" is the title I chose for this master thesis in Early Childhood Education and Care. The first part of the title "We just click!" is a quote from a child interview and indicates the exploratory aspects of children's use of digital tools. The second part reflects the aim of the study which was to explore how preschool children experience digital tools in their everyday lives in kindergarten.

The study is a qualitative micro-ethnographic study inspired by social constructive theories. The research is based on a triangulation of methods, where participant observations and child interviews were the most significant. A group of five-year-olds in a Norwegian kindergarten were observed over a period of two months.

The study shows how children's use of digital tools in the kindergarten seemed to be more restricted than other activities, even though multiple digital tools were available and the staff held overall positive attitudes towards technology. The study also indicates a divide between adult initiated digital activities, such as digital photography and the use of Internet, and activities managed mainly by the children themselves, such as the use of computer-games and drawing programs. More adult involvement is called for.

Despite environmental restrictions an active use of ICT is documented. The study provides examples on how children created their own digital communities of practice and how skilled peers 'scaffold' other children's learning. It points at ICT in kindergarten as an overall social activity where interaction and communication play an important role.

The use of digital tools in relation to pedagogical documentation, creativity, play and learning is discussed in the thesis. Multiple examples of how children expressed themselves in playful and creative ways through digital tools are presented, and similarities between children's use of computer-games and their play with dolls and figures are indicated. Further the study shows how children seemed to gain digital skills mainly through exploratory play in interaction with peers.

The study provides many good examples of children demonstrating well developed skills and knowledge in their use of digital tools. It does however also indicate significant individual differences among the children, both when it comes to access and use. The question is raised whether or not the use of digital tools in kindergartens may contribute to decrease these patterns of divide.

1 Introduction

1.1 Choice of topic

The topic of this master thesis is the use of digital tools in preschool children's everyday lives. My reason for choosing this topic is not that I have particular competences or experiences with ICT, but rather the result of a general curiosity. As an early childhood practitioner I have experienced how the digital world is reflected in the ways children communicate, play and learn, and I find the digital skills and knowledge many preschool children possess today intriguing. I also think it is highly interesting to see how a new and untraditional area such as ICT is met in the Norwegian kindergarten. Moreover there seems to be a demand for more research in this area as current research is said to be insufficient and fragmented (Norwegian Ministry of Government Administration and Reform, 2007; Borg, Kristiansen & Backe-Hansen, 2008).

The Framework plan states that "children should have the opportunity to experience how digital tools can be used for play, communication and the gathering of information" (Norwegian Ministry of Education and Research, 2006a, p.14). It may however seem as if many kindergartens struggle to include digital tools into their pedagogical practices (Bølgan, 2009), and there seems to be a remaining resistance towards digital technology in early childhood, both among parents, kindergarten practitioners and in society generally. The Minister of Government Administration and Reform, Grande Røys, emphasises in a press release that "adults may like the development or not, but we have to give our children the best prerequisite to meet the future and the development in a constructive, creative, learning and critical way" (Norwegian Ministry of Government Administration and Reform, 2007, my translation). Increased knowledge of children's actual digital practices and their thoughts on this is, as I see it, a necessity in order to create a well functioning digital play and learning environment in kindergartens.

Children's everyday use of digital tools and their perspectives on ICT is the main focus of this thesis. It does however seem natural to touch upon the roles of the early childhood practitioners as well, since they to a large extent are the ones who control children's digital experiences in kindergarten. They are the ones who decide what type of activities children get access to.

1.2 The aim of the research

The aim of my research thesis is to explore how preschool children experience information and communication technology (ICT) in their everyday lives in

kindergarten. Through participant observations and interviews with children, I attempt to gain more insight in a rather undocumented area. I seek to present good examples of preschool children's use of digital tools and illuminate some challenges which may emerge when implementing ICT in kindergartens as well.

1.3 The content of the master thesis

This master thesis consists of five main chapters; *Introduction, Theoretical approach, Methodology, Findings and discussion* and *Summary of findings and final remarks*.

The first chapter, *Introduction*, contains a short introduction to the topic and presents the aim of the research.

In the second chapter, *Theoretical approach*, theoretical ideas, which have influenced my research, are presented. Firstly the social constructive paradigm, in which the study has been conducted, is explained, and some main concepts which will be central throughout the thesis are introduced. The notion of a digital childhood and the kindergarten's influence on children's digital experiences is then discussed as well as some selected topics relating to ICT, play and learning. These discussions are based on international contemporary research on preschool children's use of ICT. I have however also made use of sources which not directly are related to ICT but still may enlighten the topic and place the use of ICT into a broader context. Finally the thesis' research question is further clarified.

The third chapter, *Methodology*, presents and discusses the underlying reasons for my choice of sampling and methods. Further the methods for collection of data are described, namely participant observation, interviews with children, documentary sources and informal conversations with the staff. Some ethical considerations in relation to the research are then brought up. Finally, clarifications concerning transcriptions and analyses are made, and the study's validity and reliability is discussed.

Chapter four, *Findings and discussion,* contains a presentation of my research findings, including extracts from my data material. The findings are sorted under topics and deal with the digital context, children's interaction and communication, and the use of digital tools in relation to creativity, learning and play. The findings are discussed under each headline. Finally three archetypal descriptions of digital everyday lives are presented to visualise how the children's use of ICT varied individually, and the concept digital divides is discussed.

In chapter five, *Summary of findings and final remarks,* the main findings are summarised and some suggestions on further research on preschool children's use of digital tools are made.

2 Theoretical approach

In this part of the thesis concepts and ideas which I find may be particularly significant to my research will be presented. The limited size of the study makes it necessary to make some choices. The ideas of Vygotsky (1978) and scholars who pursue his concepts (for instance Lave & Wenger, 1991; Säljö, 2001) provide a frame for this study and will be introduced. In addition a selection of topics related to ICT and children will be discussed. The rapid change of technology makes it essential for this literature to be contemporary. A further exploration of the thesis' research question concludes the chapter.

2.1 Research paradigm

A paradigm is, according to Hughes (2001, p. 32), "a specific collection of beliefs about knowledge and about our relationships with knowledge, together with practices based upon those beliefs". The way I as a researcher view the world will undoubtedly be reflected in the way I approach my research. My views on children and childhood as well as the ways I believe knowledge is constructed will affect all parts of the process.

The entry of ICT in early years may be looked upon in many ways depending on the positioning of the researcher, for instance as a potential threat to the concept of childhood or a necessity in order to prepare children for a digital world. My starting point is rather to acknowledge ICT as a natural part of children's daily lives and something we need to relate to in one way or another.

I would describe my research as being conducted within a social constructive paradigm (Postholm, 2005; Säljö, 2001). From a social constructive point of view children are considered to be active participants who gain knowledge through all their experiences and in social interaction with other people. Knowledge is not considered something constant but always changing in the way that new knowledge is added to our previous knowledge and changes our thinking. The contexts we live in also constantly influence our understandings (Postholm, 2005).

Vygotsky (1978) considers social interaction to be the source of all development and learning. He emphasises the importance of the cultural and historical context and the way tools, or 'artefacts' as he calls them, are developed and used within a culture. Lave and Wenger (1991) build upon Vygotsky's ideas of learning as a social process. However while Vygotsky focused on the child's cognitive development, Lave and Wenger draw attention to the social structures which make it possible for learning to occur. Learning is seen as an integral part of social practices and dependent on the conditions under which it is being carried out. Lave and Wenger's ideas of 'situated

learning' and 'Legitimate Peripheral Participation' as well as Vygotsky's concepts of the 'More Knowledgeable Other' and the 'Zone of Proximal Development' will be further described later in this study in relation to ICT in kindergarten.

Taking up a social constructive perspective on development and learning, indisputably mean that I will approach my research with certain presumptions. With Vygosky's (1978) view of learning as an active and social process in mind, I do for instance believe that children interpret and re-create what they experience which prevent them from being solely passive consumers or receivers of digital technology. I also assume the use of ICT in kindergarten to be primarily a social activity where meaning is negotiated within the peer group.

2.2 Definitions

2.2.1 ICT / digital tools

The terms 'ICT' and 'digital tools' will both be frequently used throughout my study. ICT is short for information- and communication-technology, which involves aspects of obtaining information as well as communication. The term 'digital tools' implies an indication of the use of ICT as a tool, something we may use to achieve something else, and might be a more suitable term to use in kindergarten (Bølgan, 2008).

While researching the use of ICT in Scottish preschool settings, Plowman and Stephen (2005) found that early childhood practitioners connected ICT mainly to the use of computers even in settings where other digital tools, such as digital cameras, were available. A lot of research concerning ICT in early childhood education has also focused upon children's use of computers solely. There are however researchers advocating a broader definition of ICT (Bølgan, 2006; Plowman & Stephen, 2005; O`Hara, 2008). According to Bølgan (2006) ICT may among other things encompass digital tools such as computers, printers, scanners, digital cameras, various computer software, telephones, electronic toys, sound equipment and Internet. Plowman & Stephen (2005, p. 147), who present a similar definition of ICT, also include "toys that simulate appliances such as mobile phones, laptops, cash registers, microwave ovens, and barcode readers as well as computers and their peripheral devices".

My research will be based on a broad definition of ICT which, in my opinion, seems to be the most appropriate in early childhood education. My intention is to provide a rich description of children's various use of digital tools in their everyday lives in kindergarten and also capture how ICT relates to other activities.

2.2.2 Early childhood education and care / the Norwegian kindergarten

Early childhood education and care is the worldwide term for different day care provision outside the home for children under school age. My study is based on the pedagogy and ideas of the western world solely, but even here there are various traditions and approaches within the sector. Generally one may say that France, and the English-speaking world seem to have chosen a "readiness for school" approach, focusing on the development of cognitive and academic skills. This approach involves many similarities with primary school. In the Nordic and Central European countries, which have more of a social pedagogical tradition, the focus seems to be on early childhood education as preparation for life rather than school, which involves a pedagogy uniting care, upbringing and education. The focus is on supporting children in their development and build on their abilities and interests (OECD, 2006).

The different traditions within early childhood education will, as I see it, make an impact on how ICT is implemented in early childhood settings and on how children make use of ICT within the preschool environment. Whereas presenting ICT as a tool to develop numeracy and literacy may be adequate in some European countries, it would probably not be considered as a very strong argument for implementing ICT in a Norwegian kindergarten.

Since my research project takes place in a Norwegian context, I find it necessary to give a brief description of some of the important features of the Norwegian kindergarten. The Norwegian word 'barnehage' is a direct translation from the German word 'kindergarten' and is the common term for the different types of early childhood institutions children attend before they start compulsory school at the age of six. All Norwegian kindergartens are regulated by the Day Care Institution Act (Norwegian Ministry of Education and Research, 2005) and the Framework plan (Norwegian Ministry of Education and Research, 2006a), which provides binding guidelines to the values and content of kindergartens.

The Norwegian framework plan (2006a) takes a holistic view of care, upbringing, play, everyday activities and learning. Childhood is seen as a phase of life with an intrinsic value, and children are seen as active participants in their own and others development. Based on the UN Convention on the Rights of the Child (UNCRC) it is stated that children are entitled to express their views on and influence all aspects of their lives at kindergartens. There is a clear emphasis placed on outdoor and indoor play and informal activities. In addition seven learning areas which children should get familiar with are presented. The importance of achieving a balance between children's own initiated activities and adult regulation is pointed out (Norwegian Ministry of Education and Research, 2006a).

My study is based on a range of international literature which makes it natural to use the terms 'early childhood education and care', 'preschool' and 'kindergarten' interchangeably. Even if the various contexts in which the studies are conducted must be taken into consideration, I believe this may provide a richer perspective on the topic.

2.3 Perspectives on children and childhoods

Different ways of seeing childhood and children will not only influence the way we interact with children but also to what degree they are allowed to participate in society. Over the last decades there has been a shift of paradigm in Europe as regards discourses concerning children. The dominance of the old developmental theories seems to be fading, and the focus is no longer only on children's needs but also on their rights (Woodhead, 2005). In this part of my study I will discuss some aspects of being a child in today's digital world and how kindergarten contributes to children's experiences in this matter. I will also look at how children's right to participate has become an important feature in documents considering early childhood education and care and how ICT may be used as a tool to fulfil children's rights.

2.3.1 Digital childhoods

'Digital childhood' has become an accepted term (Frønes & Haldar, 1998; Endestad, Brandtzæg, Heim, Torgersen, & Kaare, 2004), and there is an ongoing debate concerning the affect new media technology may have on children and child culture. Prensky (2001) calls children who grow up in today's technological society the 'digital natives'. The rest of the population, who have met digital tools mainly as grown-ups, are referred to as 'digital immigrants'. According to Prensky, digital immigrants may also learn how to master the technology but with considerable more effort. He compares this to the learning of languages where the knowledge of the native language is the easiest to acquire and the one we prefer using.

Numbers from Statistics Norway (2008b) show that as many as 98 per cent of households with children have both a computer and Internet access. This is somewhat higher than for the total population. These numbers tell us something about the families' access to computers and Internet but nothing about how and by whom it is being used or what it may mean to the everyday lives of the individuals. The media use by adults and school children has however been frequently mapped. These studies indicate that even if access to digital technology is widespread in the Norwegian society, there is a great variety when it comes to use. These differences seem again to be embedded in traditional patterns and related to education, economy and gender (Endestad et al., 2004; Rønning, Sølvberg & Tønseth, 2005; Vox, 2008). An

interesting question in this matter is whether or not kindergartens may contribute to prevent these differences from emerging.

Information on preschool children's use of digital tools seems to be limited, both nationally and internationally (Borg, Kristiansen & Backe-Hansen, 2008; Plowman & Stephen, 2005). The natural position of technology in the lives of today's preschool children is however indicated in several studies (Moberg & Lindén, 2008; Olesen, 2000). During their research in a group of children in a Norwegian kindergarten, Moberg and Lindèn (2008, p.131) found for instance that the children seemed to "own the technology". They didn't ask if digital tools should be used or not but seemed to consider them as a natural part of their everyday lives.

Lave and Wenger (1991, p. 98) explain how all individuals belong to a variety of 'communities of practice' which may be described as "a set of relations among persons, activity and world, over time and in relation to other tangential or overlapping communities of practice". Their concept 'Legitimate Peripheral Participation' includes an assumption of multiple more-or-less engaged ways to participate in a community. A person may move gradually from being a new-comer to achieving full participation, and all stages are considered valuable. A condition for participating in a legitimate peripheral way is however to have access to arenas of mature practice (Lave & Wenger, 1991). Even if preschool children's direct use of ICT may vary, they are all part of a digital community. Digital tools are part of their home environment and the world they live in, whether they use them themselves or watch others using them. This indicates that ICT is something early childhood practitioners and researchers need to relate to in one way or another. In the next section I will look at how the digital society is reflected in kindergarten.

2.3.2 Kindergarten as part of children's digital experiences

Numbers from Statistics Norway (2008a), concerning the number of children in kindergartens, show that 84.3 per cent of children aged 1-5 attended kindergarten by the end of 2007. For children aged 5 the number was 95.9 per cent. Eighty per cent of the children had a weekly attendance in kindergarten of more than 41 hours. This makes kindergarten a significant part of many children's everyday lives and increases the importance to see how it corresponds to children's lives at home. Klerfelt (2007, p.74) claims that " if the pre-school positions itself outside the media culture in which the children live and maybe even work against it, there is a risk that adults will repudiate the world the children live in".

In the Norwegian primary school curriculum (Norwegian Ministry of Education and Research, 2006b) the ability to make use of digital tools is being described as a basic skill, on a level with the ability to express oneself orally, the ability to express oneself in writing, the ability to read and the ability to do arithmetic. In the Framework Plan

for the contents of kindergarten (Norwegian Ministry of Education and Research, 2006a) digital tools are however hardly mentioned. The plan does state that "children should have the opportunity to experience how digital tools can be used for play, communication and the gathering of information" (Ibid., p14), but there are few indications on how this should be done. There are seven learning areas in the Framework plan which resembles the subjects in primary school. The term 'technology' is used only in connection with two of them, respectively 'Nature, environment and technology' and 'Numbers, spaces and shapes'. Here it is stated that kindergartens shall "ensure that children experience how technology can be used in play and in everyday life" and that "staff must build on and develop the children's experiences of technological toys and technology in everyday life" (Ibid., p. 25). The fact that technology is not mentioned in relation to the other learning areas, for instance 'Art, culture and creativity', may, as I see it, indicate a limited view on ICT and technology in general where the creative aspects and opportunities are being neglected. A booklet on ICT in kindergartens (Bølgan, 2006) has however been initiated and published by the Government. The booklet provides a much broader perspective on the use of digital tools than what seems to be expressed in the Framework plan. It also presents some concrete ideas on how digital tools may be used. This is one of a series of theme booklets which were published in order to support kindergartens in their work implementing the Framework plan, and it is supposed to serve as an inspiration to kindergarten staffs.

The Framework plan's formulations regarding digital tools in kindergarten may seem limited and vague; still they express kindergartens' responsibility to relate to modern technology. As I see it, the increased focus on the use of digital tools in Primary school (Norwegian Ministry of Education and Research, 2006b) makes it even more relevant to ensure that all children get experiences with the use of digital tools in early years.

A report from the first nationwide study of access, accessibility and use of digital tools in kindergartens was presented in February this year (Bølgan, 2009). The study was financed by the Norwegian Ministry of Government Administration and Reform and involved telephone interviews with 1012 kindergarten practitioners from all over the country. The report shows among others that CD-players, digital cameras, computers and printers are by far the most common digital tools available. They are to be found in more than 90 percent of all kindergartens. However in less than half of the kindergartens the computer is placed in the children's play area, which may mean that it is not necessarily accessible to children. Where the children have access to the computer it is mainly used for computer games. Half of the respondents say they have computer games in their kindergarten. In three out of four kindergartens the children

use digital cameras. What functions their photos may have and to what extent the children use cameras is not answered in the study, however only three percent of the respondents state that children take part in documenting. The study indicates an overall limited use of digital tools in kindergartens, even in kindergartens where the practitioners are generally positive to the use of ICT. As an example only one out of five practitioners let children use drawing programs, and less than three percent use ICT to create animations and sound or to illustrate stories. The report concludes that there is an urgent need for practitioners to raise both their interests and competences in order to use digital tools in more creative and constructive ways (Bølgan, 2009).

In a press release on the Government's homepage the Minister Grande Røys comments on the report:

> "We must ensure that children's use of ICT does not become equivalent with passive computer-games. If children are given the opportunity to use for instance digital cameras and computers in active play and learning, children will be given the best premises to develop digital judgement and to use the technology creatively and explorative" (Norwegian Ministry of Government Administration and Reform, 2009, my translation).

I agree that the use of ICT in kindergartens should be expanded. Based on contemporary research on preschool children's use of ICT (Brooker and Siraj-Blatchford, 2002; Jessen, 2003; Moberg & Linden, 2008) as well as my own observations, I do however believe Grande Røys' description of computer-games as passive should be discussed. I will come back to this later in the thesis.

I think there is a need to look closer into preschool children's actual use of digital tools and provide examples of good practices. As I see it, my study may contribute to this.

2.3.3 Children's right to participate

The United Nation's Convention on the Rights of the Child (UNCRC) was incorporated into Norwegian law in 2003, and takes precedence over other laws in a possible conflict. Based on the UNCRC, paragraphs 12 and 13, children's participation has become an important value in the Norwegian Day Care Institution Act (Norwegian Ministry of Education and Research, 2005) and the Norwegian Framework plan (Norwegian Ministry of Education and Research, 2006a).

In relation to my research topic, preschool children's everyday experiences of ICT, some issues related to children's participation emerge. Children's access to digital tools in kindergarten has already been mentioned and will be further discussed later in

the thesis as well. Another interesting aspect is if children's use of digital tools, for instance digital cameras, may make an impact on their participation in kindergarten.

The Framework plan (Norwegian Ministry of Education and Research, 2006a, pp. 8-12) emphasises that children are entitled to "express their views on, and to influence, all aspects of their lives at kindergartens" and that the right to participate is a right for all children, regardless of age, gender, ethnic background and ability level. It states that "everyday life at kindergartens shall be characterised by social interaction that involves staff in listening to, supporting and challenging the children" and that children shall have a large degree of freedom in terms of choosing activities.

According to Woodhead (2005) the UNCRC challenges us because it tampers with the core of the conventional relationship between children and adults. Children's lives can no longer be regulated by adults only. He indicates that "implementing the Convention does not just alter the status of children. It also alters the status of adults. Respecting the rights of young children changes the way we think about ourselves" (Woodhead, 2005, p.16).

When it comes to the implementation of the curriculum in kindergartens, children's participation seems to depend on the values and practices of the staff. In order for children's rights to be fulfilled the child must be considered as an active and competent human being. It is only through continuous reflection, discussion and assessment changes are made (Kristoffersen, 2006; Berthelsen & Brownlee, 2005). This means that ensuring children's participation cannot be perceived through specific projects solely, but should be considered more as a certain way to interact. There are however many methods which may raise the awareness of early childhood practitioners and help them to work more systematically. This thesis will only be concerned with pedagogical documentation and the use of the digital camera as a tool to ensure children's participation in kindergarten.

In the world known Reggio Emilia kindergartens children are seen as subjects of rights and considered to be competent and active participants in their own learning (Rinaldi, 2005). This demands a practice where children are listened to and different kind of expressions are encouraged. The design of the physical environment and the use of pedagogical documentation are considered important methods to achieve this. Many Norwegian kindergartens seem to be inspired by the practice of the Reggio Emilia kindergartens and are engaged in pedagogical documentation as part of their practice. Digital photography seems to be a frequently used tool in this matter.

Allowing children to photograph might contribute to give them an opportunity to express their views on the kindergarten curriculum, as they are entitled to in the Framework plan (2006a). Children's photos may serve as valuable documentation of kindergarten's everyday life. By looking at the photographs and listening to the

children's comments staff may gain new knowledge of children and their interests (Moberg & Lindèn, 2008; Bølgan, 2008).

Bølgan (2008) emphasises the importance of separating between historical documentation and pedagogical documentation. When it comes to using the camera as a tool in pedagogical documentation, letting the children photograph can only be considered as a first step. An important issue to be raised is how practitioners relate to the photos subsequently and if this influences their thinking and practices.

A good example on how systematic use of children's photography may ensure their participation is provided by Clark (2007) who describes children's involvement in designing a nursery in the UK. The study was based on the Mosaic approach which is a framework for listening to children, creating democracy in practice and increase communication between young children and adults.

2.4 ICT, play and learning

2.4.1 ICT and social interaction

The notion of the lonely child in front of the computer has been disproved by several researchers (Brooker & Siraj-Blatchford, 2002; Moberg & Lindén, 2008; Bølgan, 2004). ICT in kindergarten seems in most cases to involve groups of children interacting. Brooker and Siraj-Blatchford (2002) found that even children who normally tended towards different friendship groups could share on-screen experiences. The combination of pictures, sound and language seemed to create a collective focus which eased language barriers and provided inclusion.

Research shows that there tend to be lots of communication going on when preschool children are gathered around the computer. Collaboration seems to emerge from different aspects of the software. When problems occur, different solutions are discussed within the group, and the more skilled children share from their competences. Joy and humour is an important part of this peer-culture as well (Bølgan, 2004; Brooker & Siraj-Blatchford, 2002). From a socio-cultural perspective this kind of peer interaction bears a close resemblance to Vygotsky's (1978) concepts of the More Knowledgeable Other (MKO) and The Zone of Proximal Development (ZPD). Within these concepts there is an underlying belief that learning takes place in interaction with other people. Vygotsky (1978, p. 86) defines the ZPD as the distance between the "actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers".

Learning from a socio-cultural perspective becomes a collective aspect. What a person may struggle to achieve alone may be accomplished within a group of people, because we all have different experiences and knowledge (Säljö, 2001).

I consider the social interaction between the children gathering around digital tools to be an interesting aspect of my study, especially when it comes to the various roles of the spectators. The role of the MKO's who scaffold others learning has been mentioned, but there are also other ways of participating. Taking Lave and Wenger's (1991) 'Legitimate Peripheral Participation' (LPP) into consideration, being a more passive spectator may also result in learning and should be seen as a natural step on the way to being a more active participant. If this is the case, it makes children's collaboration on the use of digital tools highly meaningful. However I assume children's roles as spectators may not always be valued by practitioners and parents.

2.4.2 New ways to express

The statement of the Framework plan (2006a, p.19) that "children must have the opportunity to express themselves through a number of 'languages' and to combine them in playful interaction and with different aesthetic modes of expression" gives associations to the pedagogy of Reggio Emilia and the well known notion of the hundred languages children possess. The question is if ICT is to be found among them.

Bølgan (2004), who argues for a more creative and playful way of using ICT in kindergarten, claims that there is a tension within the preschool teacher education between traditional ways of teaching and new areas of knowledge such as ICT. She states that there seems to be a particular "clash of interest between the aesthetic subjects, which are of high educational value in Norway, and the introduction of ICT" (Ibid., p. 116). There are however, as I see it, reasons to believe that just a creative use of ICT may be the way to get more acceptance of the use of digital tools within a Nordic kindergarten tradition, and that ICT might serve to complement traditional art activities. Contemporary Nordic research on children and ICT indicates this as well, even if the area cannot be said to be well documented. Klerfelt's (2007) exploration of how the computer may be used as a tool for staff and children to create stories together may serve as an example. Klerfelt found that basing the use of technology on storytelling could ease the encounter between the media culture and the traditional preschool culture, because storytelling is something highly valued in the Swedish preschool system. She emphasises that the possibilities of combining digital drawings, sound, words and movement in the stories added new dimensions to a traditional activity and enhanced children's learning.

Digital drawing has also been explored in a few studies (Jørgensen, Havn Petersen & Hansen, 2005; Moberg and Lindèn, 2008). Moberg and Lindèn (2008) experienced for instance the drawing program *Tux Paint*[1] to be a useful addition to traditional drawing. They found that digital drawing seemed to provide children with other

---

[1] Tux Paint is free computer drawing software for children. It may be downloaded from www.tuxpaint.org

opportunities than paper and pencils. With the digital tools they could for instance easily go one step back in the process by pushing the undo-key. This gave them more opportunities to experiment. They could also compose their picture differently by moving the various elements around. Zevenbergen (2007) points at another benefit with digital drawing, namely that it enables children to create objects which they could not have done with pen and paper. They can for instance write letters and draw a straight line or a circle without having the fine motor skills needed.

As mentioned in the section on children's participation, digital cameras seem to be frequently used in relation to pedagogical documentation. Photography is however also a well established form of art. The digital technology has opened up for new possibilities such as an instant review and deletion of photos. The pictures may be edited, manipulated and put into new a context which gives the children more opportunities to play and explore.

The photos children take are often very different from those taken by adults, and it is important that their expressions and intentions are acknowledged (Moberg & Lindèn, 2008; Bølgan, 2008).

Even if my research study is focused on how children make creative use of ICT, it will, as I see it, also reflect the staff's ability to include new technology into the kindergarten's methods. The adults are after all to a great extent the ones constructing the premises by providing the tools through which children are allowed to express themselves. This means they need to have knowledge in order to exploit the creative opportunities made available by ICT. Hopefully my study may add something to existing research by providing more examples of creative use of digital tools.

2.4.3 ICT and learning

'Mediation' is a central concept in social constructive theories. The ability of using language and tools and our ability to elaborate and create new dimensions is according to Vygotsky (1978) an important aspect of what distinguishes humans from animals. This is what makes human development a continuous process. New knowledge builds upon previous knowledge and more complex structures of activity are formed. In consequence of learning being mediated by more advanced tools the human cognition will gradually change (Vygotsky, 1978). This means technology not only affects our daily lives but also changes the ways we think and learn. The tools provide us with ways to become more efficient learners. Today's children are likely to be different learners than previous generations as a result of growing up in a digital society.

One of the features of these digital learners is said to be their preference of a nonlinear way of learning. As opposed to a book, which mainly consists of black text on white sheets, digital technology provides a diversity of colours, images, text and hyperlinks. The links provide numerous ways to attain information depending on the

user's needs and preferences. Symbols and icons are important parts of this way of searching for information, and research shows that many children prefer graphics to text, which may indicate a new form of literacy (Prensky, 2001; Veen & Vracking, 2006; Zevenbergen, 2007). Computer games for preschool children often rest on open hyper structures similar to the Internet. The children may for instance move forwards and backwards within the game and make a variety of choices by using available links. According to Sheridan and Pramling Samuelsson (2003) this could make thinking become "more liberated and creative since the answer to a question can vary, depending on where and from what perspective the child finds the information".

The fact that children have been forced to deal with multitude impressions and information sources their whole lives has made them more capable of doing more things at the same time. This is referred to as 'multitasking skills' and is said to be another characteristic of the digital learners (Prensky, 2001).

A differentiation between play and learning may be inappropriate since children today appear to learn through exploratory play. This seems as a more active, collaborative and creative way of learning in which ICT is an important tool for knowledge construction (Veen & Vracking, 2006). The knowledge of this new generation of learners should indicate that the learning experiences and challenges children are offered in their everyday lives are changing. Whether or not the existing educational system is suitable for this new generation of learners has however been questioned. There is a strong indication that teaching methods are not being adjusted to contemporary contexts but seem to be stuck in the past (Prensky, 2001; Veen & Vracking, 2006; Zevenbergen, 2007).

2.4.4 Reconceptualising play

This section will not contain a definition of play or indicate what may or may not be considered as play. My intension is rather to focus on the necessity of reflecting upon important aspects of early childhood education and care and adjust them according to a contemporary context.

An emphasis on play as important is a common feature in European early childhood curricula. Numerous discussions with my European colleagues during this master program has however shown that even if we agree on the importance of play, our conceptions of what play may mean vary a lot. The values as expressed in the curricula may appear similar, but the way these ideas are implemented in practice seems to be highly dependent on existing discourses and values embedded in our cultures. Dominant discourses occur as regimes of truth and make values invisible. Subjective understandings are in this way turned into objective realities which regulates our practices (Dahlberg & Moss, 2005). A certain tendency to romanticise one's own childhood and view today's childhood through the memories of a completely different

childhood adheres to this (Olesen, 2000; Sutton-Smith 1997; Sandberg & Pramling Samuelsson, 2003). From this perspective relating ICT to play becomes very complicated for many early childhood practitioners since it did not have a significant influence on their own childhoods. As a result, I believe the use of digital tools may often be excluded from what practitioners consider to be play or even meaningful activities.

Unlike other activities in Norwegian kindergartens, children's use of time by the computer often seems to be restricted by adults, sometimes by the use of a timer (Bølgan, 2006). Even if there may be a variety of reasons for this kind of practices, it may, in my opinion, indicate a low appreciation of ICT. Does playing a board game have a higher value than playing a computer game? Is drawing on a sheet more valuable than drawing on a screen? Zevenbergen (2007) states that the entry of technology in children's lives is a reason to reconceptualise play and be open to the idea that play may have a different meaning in a digital age. She questions if manipulation of objects need to be manual to be called play or if it may be digital. According to Brooker and Siraj-Blatchford's (2002) research findings children do tend to treat screen images in a matter which resembles their use of concrete toys, for instance by pretending to eat and share images of food. They argue that this "manipulation of symbols and images on the computer screen represents a new form of symbolic play" (Ibid, p. 19).

Play is undoubtedly a significant feature of the Norwegian kindergarten and will be an essential part of my study as well. It seems important to reflect upon the position of ICT in kindergarten and how it relates to play.

2.5 A further clarification of the research question

The aim of my research has been broadly described as exploring how preschool children experience information and communication technology (ICT) in their everyday lives in kindergarten. In order to do so a broad definition of ICT seems necessary and a variety of use must be included. Based on the presented theories and research, these are some of the topics which may be relevant and some questions which may inspire my research:

- **The digital context**

Today's children are said to be part of a digital world (Frønes & Haldar, 1998; Prensky, 2001). How is this reflected in the lives of preschool children? To what extent do preschool children have access to digital tools in kindergarten? How digital is the everyday life of a five-year-old and to what extent is the digital society reflected in kindergarten?

- **Digital peer interaction and communication**

The thesis underlying paradigm indicates that learning is a collective aspect (Säljö, 2001). How do children interact and communicate while using digital tools in kindergarten? What strategies do they use when problems occur?

- **Digital expressions**

It has been stated that ICT often is seen as a contradiction to creativity, even if there are examples of the opposite (Bølgan, 2004). In what ways are digital tools used creatively by children as ways to express? Are there any links to be found between the use of digital tools and children's participation in kindergarten?

- **New ways to learn**

It is said that today's children learn in different ways than previous generations due to their experiences with ICT (Prensky, 2001; Veen & Vracking, 2006). How do children gain ICT skills? How does the use of digital tools affect the way children learn?

- **Reconceptualising play**

Play is considered to be an important feature in Norwegian kindergartens (Norwegian Ministry of Education and Research, 2006a). Is the use of digital tools play? How are the adults views on ICT reflected in the kindergarten's play environment? How does ICT affect and relate to other kinds of play activities?

All these questions may, as I see it, elucidate my research question and contribute to a broad description of ICT's position in children's everyday lives in kindergarten.

3 Methodology

According to Rhedding-Jones (2005) methodology is about how research is conducted. It is not only about the methods being used but also about the theoretical approaches, ontology and epistemology which form the basis of the research as well as the process of analysis.

This part of the thesis will contain a description of some of the methodological and ethical choices and considerations of my study.

3.1 Ethnography

Taking the aim of my research as well as the young age of the children into consideration, an ethnographic approach seemed, in my opinion, to be the most suitable for my research. I did not want to describe extraordinary happenings or projects in relation to the use of digital tools but rather what ICT may mean to children on a daily basis. The best way to explore this seemed to be to spend time with children in play and everyday activities (Olesen, 2000).

In ethnography the researcher is immersed in the specific culture which he or she aims to describe. Traditionally foreign cultures were portrayed, but the last couple of decades it has become common to study familiar cultures and sub-cultures as well. It is people's daily lives and actions which are the focus of ethnography (Postholm, 2005). Wolcott (2008) describes it as studying real behaviour in real settings. How real the behaviour of the research participants is, may of course be discussed as the researcher's presence always will influence the environment and the participants in one way or another (Rhedding-Jones, 2005). Anyhow the researcher has to spend enough time within the culture so that he or she may have a fair chance to understand the culture from the participants' perspectives, and be able to describe it in a rich and detailed way (Hammersley & Atkinson, 1996). Due to the limited time and extent of my research, I think it is more appropriate to use the term micro-ethnography in relation to my study (Postholm, 2005; Rhedding-Jones, 2005).

There is no recipe to ethnography. It is however implicit that one should not start with a lot of set questions but rather with a curiosity and desire to find out more about the culture studied (Rhedding-Jones, 2005). To start the fieldwork with an open mind does, as I understand it, not disagree with positioning oneself within a paradigm. On the contrary a reflected view on ones influences may, as I see it, contribute to prevent subjective biases and assumptions. There is however the necessity to be open to certain unpredictability as unexpected findings and patterns may appear (Bae, 2005). The general lack of research on the role of ICT in early childhood education (Borg,

Kristiansen & Backe-Hansen, 2008; Plowman & Stephen, 2002) caused me to have few predisposed predictions of what my fieldwork would produce.

3.2 Sampling

Sampling may be described as "the process of selecting a portion of a defined category, usually people but can be applied to other aspects of the research design such as settings or events, that is in some way representative of the defined category as a whole (the 'population')" (Mac Naughton, Rolfe & Siraj-Blatchford, 2001, p. 273). Postholm (2005) claims the purpose of the research is what guides the selection of a research field within qualitative research. The researchers have a certain presumption of what they will focus on and choose settings which are likely to exemplify their topic. This was also the case when it comes to my sampling process. My purpose was as mentioned to find out more about how preschool children experience ICT in their everyday lives. I had therefore two criteria in mind when selecting a kindergarten; 1) a variety of digital tools had to be available to the children and 2) the staff had to have a certain interest in the use of ICT in kindergarten. I believed ensuring these criteria would increase the possibility of providing good examples of the use of ICT in kindergartens. Existing research of preschool children's use of ICT is as previously mentioned limited, so I considered this to be an important aspect of my study.

In order to find a suitable kindergarten I made a phone call to the local kindergarten consultant responsible for developing ICT-solutions for all the city's kindergartens. He recommended three kindergartens which particularly seemed to suit my research study. After a short telephone conversation with the manager of one of the kindergartens, I arranged a visit the following day. I had a meeting with the manager and one of the preschool teachers who immediately expressed an interest in my project. Due to the fact that this seemed to be a suitable kindergarten for my research as well as the enthusiasm of the leaders, I chose this kindergarten without contacting the remaining kindergartens suggested by the kindergarten consultant.

The kindergarten is a well established public kindergarten situated just outside the city centre of a small Norwegian town. It receives approximately[2] 60 children from the age 1 to 6. I chose to follow a group of around twenty children. They were attending their final year in kindergarten, which means that most of them were five years old and a few had just turned six. The group consisted of children of both genders, but there was a clear majority of boys. I selected this group because it seemed to be the one which most actively involved ICT in daily activities. The consequences of doing my research in a homogenous age group were considered carefully. Research has

---

[2] The descriptions of the kindergarten, the group and the staff are vague to ensure the confidentiality of the research participants.

however indicated a considerable variety in both adults and older children's interest and knowledge in relations to ICT (Bølgan, 2008; Endestad et al., 2004). My assumption was that this most likely would be the case in this group of five-year-olds as well, depending on their individualities, interests, previous experiences and the different cultures they were part of.

There were four practitioners, both males and females, working with the group. Some were trained[3] professionals and some were unskilled[4], as is common in Norwegian kindergartens. To ensure their confidentiality, I will not go into further details when it comes to their exact positions.

The kindergarten had worked actively using ICT with children for a little less than two years when I did my research there. It had been appointed by the local government to be one of several ICT pilot-kindergartens, kindergartens focusing on the use of digital tools in order to develop good ICT-solutions for all kindergartens in the city. Due to this the kindergarten had been given some extra funding to buy equipment and raise the staff's digital competence.

3.3 Researching children's perspectives

The aim of my research project was to gain insight into preschool children's perspectives on ICT. I write perspectives in plural and I will continue to do so throughout my thesis as I believe it is not one childhood or one child perspective, but rather several childhoods and perspectives. Bae (2005) emphasises the importance for the researcher to capture the complexity and adhering to the diversity existing within a preschool group.

Taking someone else's perspective means to try to see a situation or an experience from the other's point of view. When an outsider, for instance a researcher, enters an existing culture it is easy to draw hasty conclusions of people's behaviour without fully understanding their intensions. A sensitive and careful approach therefore becomes extremely important (Eide & Winger, 2003).

Eide and Winger (2003) emphasise that certain requirements should be met when researchers try to capture children's perspectives. Firstly the researcher must have a view on children which admits children having valuable competence and knowledge. Secondly the researcher must have an awareness of his/her own position and be able to reflect upon his/her actions. Finally he or she should have knowledge of children in

---

[3] The trained professionals in Norwegian kindergartens are "pedagogical leaders" and "child and youth workers". Pedagogical leaders are the leaders of the group. He/she must have a bachelor degree in early childhood education. Child- and youth-workers (in Norwegian: barne- og ungdoms-arbeider) have knowledge of children and youth as a major subject in their college education.

[4] Approximately 60% of the staffs in Norwegian kindergartens work as assistants. There are no formal educational requirements for this group.

general and of the children involved in the research in particular. In order to achieve this, the researcher needs to spend time and interact with the children.

Through my educational background, as a preschool teacher and special educator, and my work practice, I have gained a lot of knowledge of children and childhoods in general, and I do have a lot of experience when it comes to interacting with children. Whether or not it is possible for an adult researcher to get children's perspectives may be discussed. Irrespective what the answer might be, I believe it is worth trying, and I do think taking up an ethnographic approach may be a good method to achieve it. After having spent approximately 60 hours in the kindergarten over a period of two months, I felt I did know a lot about the children in my research kindergarten, even if they had been completely unknown to me in advance.

According to Rhedding-Jones (2005) choosing an ethnographic approach does not put the researcher in a particularly high status positioning. The researcher must identify with the people in their research environment and hold ethical responsibilities and obligations to them. There is a need to be let into the group which includes being humble and often quiet (Rhedding-Jones, 2005). This has, as I see it, some benefits. My position as a researcher allowed me to focus more or less uninterrupted on the children all the time I was there. Unlike the staff I had no other duties in the kindergarten, and there were few expectations to my role. The fact that I have worked 15 years in various kindergartens made it easy for me to blend in.

Researching children's perspectives on ICT brings along an additional challenge as well. Most researchers, including myself, are definitely what Prensky (2001) would call "digital immigrants" which means that we have not even been close to experiencing technology the way children do today. This might, in my opinion, be a disadvantage and make it harder to understand the intentions of children's actions and utterances in regards to ICT. On the other hand it may be an advantage in the way that the researcher may meet children with less presumptions and prejudices and be more willing to learn from them. During this research process I have not only learned about how children use digital tools but also improved my own ICT skills. I was for instance not familiar with the program *Tux Paint* or with *Nintendo DS*, but the children were always ready to explain. There was no doubt about who the experts were in these situations.

3.4 The collection of data

I decided on a triangulation of methods in order to reach a better understanding of my research topic (Edwards, 2001). In this part of the assignment I will describe the methods I ended up using, respectively participant observation, semi-structured

interviews with children, documentary sources and informal conversations with the staff.

3.4.1 Participant observation

Participant observation is probably the most central way of gathering data in ethnographic research (Postholm, 2005) and was chosen to be the major source of evidence in my study. I followed a group of five-year-olds in their daily activities in kindergarten two half days a week over a period of approximately two months (in 2009). The total amount of hours spent in kindergarten was 60, spread over 19 days. There were mainly two reasons why I chose to spread my observations over a period as long as possible within my time limit. Firstly I assumed it would offer more variation in my data material, as the children's experiences, skills and interests would develop throughout the period. This turned out to be correct. I experienced that the children were often involved in the same activity over a period of time before they moved on to the next. They did for example rarely change the CD-ROM in the computer during the day but continued each others' games. The CD-player was most frequently used as part of children's play at the beginning of my fieldwork, whereas the use of Nintendo DS and GameBoy was only observed during the last two weeks. Secondly, having a couple of days between my visits also allowed me time for continuous reflection, reading and writing. According to Fangen (2004) frequent field breaks may be important to keep the necessary distance in order to see if there is a need to adjust one's approaches.

Participant observation turned out to be a time consuming process. There were periods of time where no ICT related activities took place, and I spent my time participating in other activities such as indoor- and outdoor-play, meals, birthday-celebrations, circle-times, field trips and so on. However I did manage to get some relevant observations every day I was there.

My extent of participation was varied. Sometimes I was actively involved and focused on getting to know the children. This turned out to be an advantage later when I was interviewing the children. Other times I was a passive observer, just watching and listening. Wolcott (2008) claims that even if the ethnographic tradition may encourage an active role, there is nothing wrong in taking a passive role as a researcher. In his opinion the researcher should only become as involved as necessary to obtain the desired information. Sometimes I got a little more involved than I wished to, mainly because of the lack of other adults' presence. There were some examples of this in my log book:

The morning felt a little chaotic due to sickness absence among the staff. Only an adult from another group was present. The children turned to me a lot, among others to communicate that other children disturbed their play.

My role was at first kind of a passive observer. Later, when the adult suddenly left in the middle of the activity, I got a more active role. I don't really know why he left. Phone call?

I think even if the staff knew that I was there to observe, they still considered me a responsible adult which could help out in some situations. I did not perceive this as very problematic at the time, but I assume it might have become an issue if I were to spend more time there.

I had a notebook where I made continuous field notes. The book was small enough to fit into my hip pocket so it was always available to me. Sometimes, for instance when I was sitting next to children playing on the computer, I found it natural to make notes of the situation as it took place. The children then seemed to pay little attention to me writing, as their focus was on the computer screen. In other situations, for instance in conversations with children or when I was more actively involved in an activity, I took notes of the episodes subsequently. In the beginning my notebook got a lot of attention from the children. They wondered what I was writing, and some asked if I could write about them. One child suggested I could call it my diary. After a while it seemed as if they got accustomed to me writing.

Photos and sound recordings were used to supplement my field notes, especially when children were playing computer games or drawing on the computer. Taking photographs of the computer screen while the children were using digital drawing programs made it easier for me to recall and describe the processes later. By placing a recorder, MP3-player, next to the computer I could go back and correct my field notes to capture children's utterances more accurate. The children were curious about the MP-3 player, but never asked about the digital camera, possibly because this was a frequently used device in their kindergarten.

To be able to write and submit my master thesis in time I had a set date when I intended to finish my fieldwork. When the observation period was coming close to its end, I found however that I had reached a saturation point. The observations I made did not seem to add something significantly new to my data material. I also felt that I had got a good overview of the children's use of digital tools. For these reasons I decided to finish my observations two weeks earlier than my original plan.

3.4.2 Interviews with children

Another method used in my study was semi-structured group interviews with the children. This allowed me as researcher to further explore the meaning behind the observed behaviours (Siraj-Blatchford & Siraj-Blatchford, 2001), and it contributed to maintain my focus on children's perspectives. It also gave me more insight into children's digital experiences at home. Originally I had planned to make a questionnaire for the parents to fill out in order to obtain information about the children's home experiences with ICT. Due to time limitations and the already gained amount of data, I chose however to include some questions on children's use of digital tools at home in my interview guide instead

Semi structured interviews are kind of open-ended in the way that the interview takes shape as it progresses and are frequently used when interviewing children (Wolcott, 2008; Eide & Winger, 2005). A set of topics and keywords was prepared in advance of my interviews (Appendix C). These were however just to be considered as guidance, and I was open to the possibility that new and valuable aspects could be brought up by the children.

The decision whether or not they wanted to take part in the interviews was up to the children. This was also pointed out to the staff and in the written information to the parents (Appendix B). Ethical questions with regard to consent and confidentiality will be further discussed later in the thesis.

According to Eide and Winger (2005) understanding children's utterances may sometimes be a challenge for the interviewer. Knowledge of the context might however make it easier. At the time when the interviews were conducted I had spent approximately 40 hours with the children. I was not only familiar with the children but also with their context and the various ways they used digital tools. I had gained the children's trust, and I could refer to concrete observed situations. I also knew some of the digital terms the children used. Since they were unfamiliar with the real name of the frequently used arts program *Tux Paint*, they had for instance their own names for it. Some called it the 'painting game', while others called it the 'Penguin-game' or 'Pingu' due to the picture of a penguin on the desktop shortcut. This kind of knowledge turned out to be helpful in the interviews.

I chose to interview the children in groups of two or three for several reasons. Even if this may have some disadvantages, such as the children's answers being affected by each other's (Eide & Winger, 2003), I thought it might provide the children with some kind of security to have a peer with them. I also believed that the children could expand on each other's thoughts. I wanted to interfere as little as possible with the children's play, so I tried to catch hold of them in between activities. The composition

of groups was therefore random, mainly consisting of children playing together at the time.

A total of seven interviews were conducted. Each interview lasted from 13 to 20 minutes, depending on the number of children taking part. Even though I tried to keep to open-ended questions, I cannot exclude that the way I chose to formulate my questions may have affected the children's answers.

During the interviews a number of non-related topics also emerged, such as a detailed description of birthday celebrations in kindergarten, a girl's wish to have a pet rabbit and an older sibling's fear of starting at a new school. In addition there was a lot of physical activity, for instance where computer-games were demonstrated on the floor. Sometimes I became surprised that the audio-recordings contained so much information, because I felt that there had been so much activity going on.

Eide & Winger (2003) discuss the benefits and disadvantages of using video clips/photos as collective focus for the conversations. I had put together a series of photos showing the children's various use of digital tool in kindergarten. I used them for my first interview, and although I did get a lot of information in this interview, I experienced that the children became more focused on the actual picture than on the topic in general. As an example showing a photo of a computer screen from a colouring task in a computer game, resulted in the following conversation:

> *Andreas[5]: Oh, it becomes all black. Maybe they are going to make him vanish?*
> *Mathias: Hey…maybe that's me playing?*
> *Daniel: Have you ever coloured like that, Mathias?*
> *Andreas: Why is the computer inside the computer?*
> *I: Yes, that is a bit strange... a picture of the computer on the computer.*

The children were also very eager to shift to the next picture. For these reasons I decided to conduct the subsequent interviews without the photos. Some of the children did however have a look at them after their interviews, and we had a little chat about them.

3.4.3 Documentary sources

Documentary sources have also informed my research and served as a supplement to participant observations and interviews. Following are short descriptions of my most important sources in this matter.

According to the Act on Daycare Institutions (Norwegian Ministry of Education and Research, 2005) all kindergartens must establish an annual plan for their activities

---

[5] All the children's names are fictive to ensure their anonymity.

based on the national framework plan. The annual plan is, as I see it, the kindergarten's official profile as well as a working tool. Together with the more detailed plans for the group, it says something about the intentions of the staff and what they considered should be core of kindergarten activities at the time they developed the plan. To what degree this is reflected in daily life may vary.

Notices and documentation on the kindergarten walls may, as I see it, mirror ongoing activities. My focus was on how the kindergarten's emphasis on digital tools as part of their pedagogy was reflected in news letters to the parents, posters, displays of children's artworks and so on.

Finally, the kindergarten computers also served as valuable sources of information. Through the computers I could for instance study available programs and software, find out how and to what extent they were being used, get a certain impression of preferred web-pages and access amounts of digital documentation.

3.4.4 Informal conversations with the kindergarten staff

The time I spent in kindergarten was limited, which meant that I was only able to observe fragments of the everyday life in kindergarten. Informal conversations with the staff helped me however to get a more complete picture of the kindergarten context. They provided me with background information on the kindergarten's previous work with ICT and their own experiences. They also informed me of episodes which happened in between my visits and clarified some questions related to my observations. Even though my conversations with the staff may not be considered a very significant source of evidence in my study, they still contributed to fill some information gaps.

3.5 Ethical considerations

3.5.1 Research with children

Society's focus on children's rights is also reflected in early childhood research. The view on children as reliable informants has been strengthened, and as a consequence of this not only parents and practitioners are being consulted but also children themselves (Eide & Winger, 2003). There is however, as I see it, always a risk that researchers in their eagerness to document children's daily lives intrude on children's right to privacy. Even if children should be considered important informants in research, great caution is needed. The National Committee for Research Ethics in Norway (2005, p.16) states in its guidelines that "when children and young people participate in research, they are entitled to special protection that should be commensurate with their age and needs." It emphasises among others the importance

of researchers having enough knowledge about children to be able to adapt their methods to the age of the participants.

Suitable research methods are, as I see it, crucial in research with children and knowledge of children is a way to achieve this. Interviewing children is for instance significantly different from interviewing adults. The researcher's knowledge may however also be used to manipulate children. The inequalities of power between researchers and research subjects must therefore always be carefully considered and identified (Bae, 2005). Even if the relationship between me as researcher and the children as research subjects was asymmetrical, I tried to shape relations built on respect and acceptance (Eide & Winger, 2005). As I see it, my whole research process was dependent on this. Requirements regarding consent and confidentiality are also applicable when children are involved in research, which will be the topic in the following section.

3.5.2 Consent and confidentiality

Since my research project involved preschool children, it was necessary to obtain consent from their parents/superiors. This is required in Norway when children under the age of 15 are taking part in research (National Committee for Research Ethics in Norway, 2005). Before starting my observations an information letter (Appendix B), which briefly described the aim of the project and the proposed methods, was handed out to the parents/superiors of all children in the group. Confidentiality was promised, including an assurance that handling of data would be in accordance with existing regulations and that the finished product would be free of identifying material. The voluntary aspect of participating was pointed out, as well as the right to withdraw at any point of the research process. Finally the letter included a reply form for written consent. All parents consented in that their children could take part in the project.

Obtaining consent from the children's parents does not make getting the children's consent less important. Providing age-specific information about the project and its consequences is crucial in this matter (National Committee for Research Ethics in Norway, 2005). During the first days I spent in the kindergarten I got a lot of questions from the children regarding my presence. I told them I was a student and that I was there to see how the children used computers, digital cameras etc. because I wanted to write about it. Some weeks later when the children were interviewed they were asked directly if they knew why I was in their kindergarten. Even if I felt this had been explained to them previously, I found that most of them had difficulties answering my question. There may, as I see it, be several reasons for this. It might have been related to my information being insufficient or to the way the question was formulated, or it may be that they experienced my purpose and presence as little intrusive to them. Whatever the reason might be, it reflects some of the

complications in regards to getting the children's consent. I think the researcher may never be sure that the children fully understand the aim and the implications of the research.

Within the consent there is also the subject's right to withdraw at any time of the research process. In relation to children it is important to note that this may also be communicated nonverbally (Cullen, Hedges and Bone, 2005). While observing I experienced some situations where I sensed that my presence was not wanted as well as a few situations where children told me directly that they wanted to be alone.

According to Brooker (2001) interviews may be seen as a greater interference in children's lives than for instance observations. It is therefore extremely important that clarifications are made to guarantee the consent and voluntariness of the children. The children in my research study were asked if they wanted to be interviewed. Only one child chose not to take part at all. However three other children left before the interview was finished. In two cases this was my decision as I felt that the children were not comfortable with the situation, and in the last case the child decided to leave himself. I did not ask him why. The interviews continued with the rest of the children in the groups.

Before starting the interviews I also explained to the children how the interviews were recorded and that they were the ones deciding what they wanted to share with me.

> *I: There is one important thing, that is that you children are the ones to decide what you would like to tell me. If there is something you don't want to tell, you don't have to (From my interview with Christian and Julian).*

According to Eide and Winger (2003) the end of the interview is as important as its beginning and may contribute to the feeling of having mastered the situation. After finishing the interviews I thanked the children and told them that their answers were very valuable to me. Most of them looked quite happy with themselves and some expressed this as in the following example:

> *I : Ok, then we are finished. Good work, boys! Thank you for telling me so much.*
> *Simon: Yes, we are quite good at telling.*
> *I: Yes, you are. It was very useful. Thank you very much!*

To ensure confidentiality some of the information presented in the text, such as the number of children and the specific composition of the staff, is vague. All the

children's names as they occur in my thesis are fictive, and all members of the staff are referred to as 'adults' or 'practitioners' regardless of their professional titles. The existing data material will be handled in accordance with the Norwegian Social Science Data Services' recommendation (Appendix A).

3.6 Transcriptions and analyses

The situations and settings described through an ethnographer's text is not an objective reality but rather the researcher's construction of the social world he or she tries to describe (Hammersley & Atkinson, 1996). My theoretical background and my methods have influenced my focus and the choices I have made throughout the process. One result of this is that there is very little in my data-material which may be transformed into numbers and statistic. I have mainly used what Edwards (2001) refers to as anecdotal observation, which means that I have made descriptive notes of situations I felt could illuminate my research question.

I selected some episodes from the rather unstructured notes I managed to make in the field and transcribed them in more details later on the same day. This resulted in 30 transcribed episodes of children in ICT related activities. The seven interviews were directly transcribed from the audio recordings, and consist of 32 written pages. My knowledge of the kindergarten and the children is of course much more extensive than what my transcriptions may indicate. Field notes alone may never give a full description of the setting being researched (Hammersley & Atkinson, 1996).

One of the challenges of doing research in a Norwegian environment and writing my master thesis in English language is of course the translation of data. Even if I have put a lot of effort into it, I cannot exclude that the meaning has been changed to some extent. I found it particularly difficult to translate the children's utterances as my knowledge of how English speaking children express themselves is limited. The reason why I still have decided on including quotations from children in my thesis is that I think they may serve as a way to make children's voices 'heard'.

When it comes to data-analysis this is in ethnography not something following the field work but something that takes place throughout the whole research process, starting with the formulation and definition of the research question (Hammersley and Atkinson, 1996). During the whole fieldwork period I analysed the data material continuously by adding my comments, thoughts and questions to the descriptions of the observed situations. This again influenced the focus of my observations, as well as the theories I chose to read. When the fieldwork was closer to its end, I read through all the observations and sorted them in broad categories based on my research questions. Some observations were duplicated as they seemed to fit into more than one category. Children's utterances from the transcribed interviews were also sorted by

themes in a similar way. After finishing my fieldwork, I went through each category searching for patterns and tendencies, and the existing categories were divided into more concrete subcategories. I also looked for relations between the various categories. My focus throughout the whole process was on the group and their collective activities and competences rather than on individual children. This was also reflected in my choice of categories. Even so, individual differences in children's use of digital tools became apparent when analysing the data material, and I felt that this was an aspect which needed to be addressed as well. In order to visualise these tendencies in my data material, I chose to construct three archetypal descriptions of digital everyday lives.

Based on all the data material and analyses, the researcher finally has to select some features and characteristics to describe the setting in text (Hammersley & Atkinson, 1996). This was a troublesome process as I knew a lot of information would get lost. Nevertheless it is in this "interactive process between theories and data the invisible daily life may become visible" (Postholm, 2005, p. 32, my translation).

3.7 Validity and reliability

The terms reliability and validity originate from quantitative research. Due to the fact that the data produced by qualitative researchers significantly differentiate from quantitative research, suggestions have been made to replace them with terms like credibility, transferability and trustworthiness (Fangen, 2004; Golafshani, 2003). I have however chosen to use the terms, as they seem to be the most common, well aware that they may encompass different meanings depending on the researcher choice of paradigm and methodology.

Validity in qualitative research involves having integrity throughout the process. Edwards (2001, p. 122) describes it as " a matter of being able to offer as sound a representation of the field of study as the research methods allow". Triangulation may be seen as a method to achieve this (Edwards, 2001; Golafshani, 2003). Even if participant observation was the main source of data in my research, the child interviews, the documentary sources and the informal conversations with the staff provided me with adequate information as well. In some cases, for example in relation to children's access to digital tools, my observations were confirmed by children in the interviews. Other times children's utterances in the interviews opened my eyes to aspects which I could easily have ignored. This was for instance the case in the way they expressed mixed feelings about having spectators while playing on the computer.

Reliability in quantitative research usually refers to the consistency, accuracy and the stability of the measurements used and the results are valid if they can be

replicated under other circumstances as well (Hughes, 2001). The methods chosen in my research make it both impossible and pointless to try to replicate it. By giving an account of the methods used and of the choices and reflections which forms the basis of the research, the reader may however gain insight in how the data have been collected (Fangen, 2004; Eide & Winger, 2003). I have described my sampling, the methods I chose as well as the ethical challenges I faced. In addition a number of possible sources of error have been addressed, for instance how my presence might have affected the environment, the way information and interview-questions may have been inaccurate and the possibilities of meaning getting lost in the translation of data into English.

My findings must be seen in relation to the specific context and group in which the research has been conducted and cannot be generalised. The aim of my research has been to illuminate and describe how this group of five-year-olds experience ICT in their everyday lives. By this I hope to provide good examples which may serve as inspiration to practitioners in other kindergartens as well.

4 Findings and discussion

In this part of the thesis my research findings will be presented, including extracts from my observations and interviews. The findings are sorted by topics and will be discussed under each headline. At the end of the chapter three archetypal descriptions of digital childhoods will be described and some aspects in relation to digital divides will be discussed. To avoid extensive descriptions of the computer programmes referred to in the text and still make my observations understandable for those who have limited experience with them, I have made use of screenshots[6].

4.1 The digital context

The following sections will briefly describe the kindergarten as digital context and how available the digital tools were to the five-year-olds. It will also discuss the adult's roles in the use of digital tools. The description of the kindergarten environment is based on my observations, my interviews with the children, documentary sources and conversations with the staff.

4.1.1 The digital kindergarten environment

The pedagogical use of digital tools in my observation kindergarten started less than two years ago. If we go a couple of years further back, hand written information to parents was not unusual. In the kindergarten's annual plan (2008/2009) four pedagogical priority areas are presented; the physical environment, children's participation, pedagogical documentation and pedagogical use of digital tools. The latter two are described as long-term focus areas which means that there is a time-frame of several years.

The kindergarten possessed a number of digital tools; among others three stationary computers, three laptops, four CD-players, four digital cameras, a digital video-camera, a colour-printer, a scanner, a projector and two headsets with microphone. There was an Internet connection in the staff room as well as in one of the children's play rooms. A variety of software was installed on the computers, for instance several drawing programmes, computer-games and image processing programs.

In addition to the kindergarten's digital devices children brought with them their private handheld game consoles, such as GameBoy and Nintendo DS, even if there seemed to be mixed feelings about this both among parents and staff. I was told that the use of these portable game consoles had been a discussion topic on the parents

---

[6] Snapshots of the computer screen.

meeting. An agreement to ban them had been made, but for various reasons this seemed to have been abandoned.

Seen in relation to numbers from the recently conducted nationwide study of access, accessibility and use of digital tools in Norwegian kindergartens (Bølgan, 2009), this kindergarten's ICT resources as well as their use may be said to be above average. I believe however it cannot be described as extraordinary. As mentioned above, the process of including ICT in the kindergarten's daily activities had just started a couple of years ago, and the kindergarten still had a long way to go before digital tools could be regarded as a natural part of the kindergarten's daily life. I consider this to have been beneficial to my research. There were sufficient ICT related activities going on to provide good examples, and at the same time some of the challenges emerging when trying to implement digital tools in an established kindergarten environment were elucidated. One of the challenges seemed to be making the digital tools accessible to the children as I will describe next.

4.1.2 The children's access to digital tools in the kindergarten

The digital tools used by children on a regular basis were laptop, CD-player, digital camera, GameBoy/Nintendo DS and printer. There were some examples of the use of other digital tools in the kindergarten as well, for instance audio recording devices, but they have to be considered as isolated incidences rather than part of children's everyday lives. In this thesis I have chosen to focus on the most frequently occurring activities.

The CD-player seemed to be the only digital device children could use whenever they wanted to. It was placed on a high shelf, but the five-year-olds could reach it and were allowed to operate it on their own. The CD-player was basically used to play music, and children sometimes brought their own CDs from home.

The laptop was mainly used for computer-games of the edutainment[7] type (for instance *Reader Rabbit*[8] and *Frankie*[9]), various drawing programs (*Paint*, *Drawing for children* and *Tux Paint*) and to save and edit photographs. For security reasons all the kindergarten's laptops were locked in a cupboard at night. They were not automatically brought into the playrooms in the morning, and the initiative to get a laptop up and running was often taken by children asking for it. Occasionally the response to their request was negative. In the interviews children expressed very clearly how they considered the adults to be in charge of the computer and the digital

---

[7] Edutainment is used to describe software meant to both educate and entertain. In Norwegian these games are often marked as "Lek og Lær" (Play and Learn).

[8] The Norwegian title of the Reader Rabbit game referred to in the text is: "Labbe Langøres Lek og Lær. Eventyr på Tivoli".

[9] The Norwegian title of the Frankie game referred to in the text is: "Lek og lær barnehage. Dine yndlingsdyr".

camera. The children had to ask if they could use the computer as explained in this interview with Sara and Ingrid:

I: May children use the computer whenever they want to?
Ingrid: No.
Sara: No.
I: What do you have to do if you want to use the computer?
Ingrid: Then we have to ask. If we are not allowed, they say no.
I: Why is it that you are not allowed sometimes?
Sara: How should we know?

In this example Sara did not have any idea of why she sometimes was denied the use of the computer, and she was not the only one to express this. Some children did however have rather creative explanations, for instance Christian and Nora:

Christian: "So that we are not going to use up all the electricity."
Nora: "Maybe the adults use both the computers and look on Internet or do boring things for children."

I also observed on several occasions that adults refused children's requests without giving a reason.

There seemed to be no need to ask adults for permission to use the computer when it first had been positioned in the playroom. The children then just wrote their names on a list on the whiteboard next to the computer. There was however certain time restrictions involved as explained by Mathias and Andreas in the following example:

I: You have a list where you write your names...
Mathias: Yes.
I: But when you are playing, can you play as long as you like?
Both: No.
I: So for how long do you play then?
Andreas: The adults will tell.
I: Ok, so the adults tell and then the next on the list gets to play?
Mathias: And then we can write again if we want to.
I: Ok, so then you can put your name at the bottom of the list again?
Mathias: Yes.

Restrictions were also connected to the use of the kindergarten's digital cameras. My observations showed that the digital cameras were used by the children only when

they were going on fieldtrips and when someone in the group celebrated his/her birthday. This was confirmed by the children in the interviews:

I: You do photograph as well. When do children take pictures?
Philip: When we're going on trips.
I: Yes, I have seen that. Is there any other times?
Philip: Yes, on birthdays.

It was quite interesting to see how the children's use of digital tools was restricted. After all, ICT was a priority area in this kindergarten, and these restrictive practices seemed to contradict the kindergarten's overall principles. The importance of children having daily access to various materials was for instance pointed out in the kindergarten's annual plan 2008/2009, and it was also visible in the way the physical kindergarten environment was designed. This is in accordance with the Framework plan which states that children shall have a large degree of freedom in terms of choosing activities (Norwegian Ministry of Education and Research, 2006a).

It must be said that this kindergarten is not alone when it comes to limiting children's access and use of digital tools. Bølgan (2009) states that regardless of the kindergarten staffs views on ICT, children seem to take part in limited digital activities. This means that in most Norwegian kindergartens there is still a long way to go before digital tools may be said to be a natural part of kindergarten's daily lives.

So why is it that kindergartens have clear limitations for playing a game or drawing on the computer whereas children may play board-games or draw with pencils at almost any time and as long as they want to? As I see it, there may be several explanations. One reason might be that the use of digital tools in kindergarten is still a controversial topic (Moberg & Lindèn, 2008; Bølgan, 2009). Kindergartens and preschool children are rarely mentioned in governmental documents dealing with the importance of ICT in lifelong learning (Bølgan, 2008). I believe the vague signals from the Ministry of Education and Research as well as ongoing public debates on whether or not preschool children shall engage in ICT related activities at all contribute to bring about insecurity among kindergarten practitioners. Interesting in this matter is also the tendency to defend the use of digital tools in kindergartens by ensuring that there is more to it than 'passive' computer-games (Norwegian Ministry of Government Administration and Reform, 2009). Even if I do advocate a broader use of digital tools, I think banning computer-games may not necessarily be a wise strategy. By dissociating themselves from computer-games kindergarten practitioners, in my opinion, devalue an important aspect of children's own play cultures. A reason for doing so may be the tendency of adults to idealise their own childhood and play

activities. The use of computer games may be seen as unhealthy and something which distracts children from other kinds of play (Sandberg & Pramling Samuelsson, 2003). My observations showed that some of the practitioners had bad conscience if children spent too much time on computer-games, mainly because they were worried about how parents would react. This may also be the rationale why the laptop sometimes stayed in the cupboard.

The staff's digital competence is another important issue and is emphasised as a necessity in order to achieve a successful implementation of digital tools in kindergartens (Bølgan, 2008). The digital competences and experiences of the staff in my observation kindergarten seemed to vary a lot. A plan on how to raise the staff's competences in this area, mainly through organised courses, was however available. These courses may, as I see it, be a beginning. Interest and time to practice newly acquired skills may however be just as important. Uncertainties about some activities, for instance image processing, were expressed in my study as some of the staff members felt that they did not get time to practice them regularly. All the adults working with the five-year-olds were however engaged in digital activities. Mostly their engagement was related to digital photographing and the use of Internet, whereas computer-games and digital drawing programs more often were used by children alone while the adults kept an eye on it.

4.2 Peer interaction and communication

There was a lot of ongoing peer interaction and communication when children gathered around the computer or a GameBoy, and I am going to provide some examples under this headline. Some initial thoughts on the different roles children took up as players and spectators will be presented. I will further discuss how children communicated about digital tools and how they solved problems that occurred. In connection to this I will look more specifically into the role of the more knowledgeable peer and describe how children shared their experiences with each other. Finally I will point out some of the practical issues of the children's digital community as expressed by the children themselves.

4.2.1 The player and the spectators

I have chosen to use the terms player and spectators. Play (In Norwegian "spille") was the term children used whether they were playing computer-games, drawing or writing on the computer. There was always only one player, which may be described as the one who controlled the mouse. In addition there were a number of spectators, normally from one to four or five. The spectators were more or less involved in the

activities. Their participation ranged from having great influence on the ongoing activities to being silent observers.

In her doctoral dissertation Ljung-Djärf (2004) divides the children's positioning around the computer into three categories; 1) The 'owner' is the one playing and controlling the game. He/she may accept or reject the other children's suggestions. 2) The 'participant' is placed close to the player and contributes through making suggestions and offering help. In order to keep the role as a participant the suggestions have to be considered as good and be accepted by the player. 3) The 'spectator' is an audience to the game. He/she may watch and learn without any risks.

My own observations and Ljung-Djärf's (2004) categories may be seen in relation to Lave and Wenger's (1991) ideas of 'Legitimate Peripheral Participation', which involves an understanding of multiple more-or-less engaged ways of being part of a community of learners. Important in this matter is that being a spectator may be seen as a valuable way of participating. This is often the initial stage of becoming a more active participant in the community of practice. Inexperience is also considered important to the group since a newcomer may ask questions which increase the reflection level of the other participants (Lave & Wenger, 1991).

The roles of the children were not static but depended on the ongoing activity and changed as the children gained new knowledge. Some children were especially skilled at the use of certain computer-games, while others were more competent when it came to the use of drawing programmes. In addition there was an ongoing sharing of knowledge which spread rapidly in the group, both among those who were engaged in the specific activity and those who were not. Even so, there is reason to ask if these patterns will always change within the existing context or if more active initiatives from adults are needed. Ljung-Djärf (2004) states that it may be difficult to act as a 'participator' if one is lacking the necessary skills to help out or make suggestions, and being in the owner-position without much experience may involve a risk to be considered incompetent. Children's previous experiences must be considered as important in this matter.

4.2.2 Communication

Even if there was a lot of ongoing communication when children gathered around the computer, it is important to notice that not all children were equally talkative. The player was sometimes commenting on his/her own actions or asking the spectators for help or suggestions, other times he/she was relatively quiet and seemed to be very focused on the on-screen activities. The spectators seemed more communicative than the player, but their roles varied a lot and ranged, as previously mentioned, from being very directly involved to being silent observers. Being silent in this connection was not

equal to being inactive, as knowledge seemed to be transferred to all spectators. There were also various types of communication from which I will give a few examples here.

- **Commenting on the ongoing action**

The action on the screen was frequently commented on both by the player and by the spectators. This could for instance be immediate reactions to the action, such as *"That was really funny!",* descriptions of what was going on or anticipations of what was going to happen.

In the observation below Andreas is making a piece of music, and Elias and Julian are commenting on the musical score:

> *Andreas is playing the computer-game "Frankie. Your favourite animals". He is making music. By clicking and dragging he places instruments on the lines (See figure 1 below). When he is finished he clicks on the on-screen play-button to listen to the music. Elias and Julian are commenting on his composition while listening to it.*
>
> *Elias: "It is only those two who play now because those are the ones you chose."*
>
> *Julian: "If you choose all, they'll all play."*
>
> *Julian "Soon only the drums will be playing."*
>
> *Elias: "The drums play the most."*

Figure 1: Making music. Screenshot from the computer-game *Frankie-your favourite animals*.

Children often seemed to have some difficulties understanding this specific task. Instead of placing the instruments according to their own choices, they often seemed to believe that they should copy the already existing first column, which resulted in all instrument playing the entire time. Julian and Elias' comments show however a clear

understanding of how a musical score functions, and their explanation contributes to make this apparent to Andreas and the other spectators as well.

- **Suggestions and advices**

There were lots of suggestions made by the spectators. These could be specific activities that they wanted the player to choose, for example: *"Click the red one! Do you want to click the red one?"* Sometimes suggestions were also asked for by the player like: *"Which pet do you think I should choose?"*

Concrete advice was also frequently given by the spectators. These were often related to solving specific tasks, for instance: *"You mustn't jump **away from** them. You have to jump **on** them!"* Running advice was common when there was a certain demand for keeping up the speed in the game as in the next observation:

> *Philip has brought his GameBoy with him. He is sitting on the sofa with Andreas, Julian, Elias and Mathias. They are sitting really close together in order to see the small screen. Philip makes sure everyone gets their turn playing. Julian is the one playing at the moment. He tries to get Mario (the main character of the game) past all the obstacles.*
> *Julian: "Oh, another mushroom."*
> *Philip: "Listen, if you had held that mushroom all the time then you would have had a flower now, and then you get to shoot."*
> *Philip: "It is wise to open all the boxes, because there may be something inside them."*
> *Julian: "I got a flower! I got a flower!"*
> *Philip: "Then you can shoot. You can shoot at everything in front of you."*
> *Andreas: "And then you shoot with B."*
> *Elias: "Jump on that on! Then you'll make it."*

It was up to the player to decide whether or not suggestions and advice should be followed or not. Sometimes they were approved, other times they were declined or ignored. There seemed to be an apparent understanding among the children that the child playing was the one making the final decisions. This was sometimes expressed clearly by the player as well. Once Sara was drawing with *Tux Paint* she seemed to feel that all the spectators' suggestions became too much and stated loudly: *"You are not the ones to decide!"* According to Ljung-Djärf (2004) being in the position as the player, or as the owner as she calls it, implies a certain amount of power within the group and may affect the spectators' positions.

- **Encouragement and praise**

Comments made by the spectators in order to encourage the player were also common. These could for instance be spontaneous cheers like: *"Come on, you'll make*

it". Positive comments were also uttered when the player managed to solve a task or made something which the spectators considered as nice. Ingrid's comment to Sara's drawing below may be an example of this:

> *Sara has chosen a task where you can make an animal mask and colour it (See figure 2 below). She puts the different parts together and chooses a pair of eyes with long lashes. Ingrid immediately says: "Oh...she is going to be so pretty!"*

Figure 2: Making an animal mask. Screenshot from the computer -game *Frankie - your favourite animals*.

Whereas praises and encouragements were common, negative comments were rare. When someone failed to do a task, the spectators were more likely to offer help or suggestions than to criticise.

- **Expanded discussions**

With what I have chosen to call expanded discussions I mean conversations which originated in the digital activity but were further developed. The 'ABC diner' in the *Reader Rabbit*-game did for instance often result in discussions on food. The children expressed their likes and dislikes and shared their own food experiences. The use of images of military airplanes in the arts program *Tux Paint* started a discussion on the benefits and disadvantages of military helicopters compared to airplanes. A colour task resulted in a closer investigation of eye colours as described in the next example:

> *While Sara is colouring an animal mask (see figure 2 above) she frequently turns to Ingrid searching advices for which colours to choose. She asks Ingrid what colour she should choose for the eyes. "Blue", says Ingrid "Because I have blue eyes. My eyes are blue, right?" Sara looks at her eyes: "Yes, they are. Are my eyes blue?" Ingrid looks closely into Sara's eyes and answers:*

"Yes." Afterwards they check mine and some of the nearby children's eye colour as well and conclude that most of us have blue eyes.

'Artefacts' can be described as the intellectual or physical tools we have access to and use in order to act and understand the world. Communication may be seen as the most important artefact through which resources are created and pursued (Säljö, 2001). All these examples of children's communication as presented in this section contribute, as I see it, to illustrate how ICT in kindergarten is highly related to the use of language and social interaction. Through the common exchange of ideas and explanations the children as a group achieved a lot more than they could have done individually. There exists what Lave and Wenger (1991) describe as a community of practice; a digital community where children meet and learn in shared activity. The screen provides a common focus and the tasks that should be solved become a common agenda.

There are reasons to believe that these forms of digital peer communities are less likely to appear in preschool children's home environments. In the interviews children told that they sometimes played with parents, older siblings and occasionally friends at home. They did however also express that they often played alone. As I see it, the social interaction which emerges in consequence of the use of ICT is an important reason why digital tools, including computer-games, should hold a natural position in kindergartens. It may be that the kindergarten's digital peer community might add something significantly different to the use of digital tools than that provided in a home environment.

4.2.3 Problem solving strategies

The children seemed to have various strategies when they got stuck in a computer program. One of the most common was to try to click something. Unlike many adults the children were not concerned about causing errors. In my interview with Simon and David this strategy is expressed:

I: What do you do if you struggle with something on the computer?
David: We just press 'end'.
I: You press 'end'?
Simon: No, we press 'wants more'.
I: Do you ask for help then?
David: No, we just click.
I: And then you manage. Maybe you don't get stuck very often?
David: I find computers easy.
Simon: Me too.

When clicking turned out to be unsuccessful asking for help was quite common, even if children sometimes chose another activity or task instead. Asking adults for help was mentioned by several children in the interviews, and they generally seemed to believe that adults had a lot of digital competence. My observations showed however that turning to adults was most common when children were on Internet or used digital cameras as in the following example:

> *Before a trip two children are always appointed as trip leaders. The leaders' tasks are among others to decide the destination and to document the trip by taking photos. Mathias is one of the trip leaders this day. After playing for a while he gets the camera from one of the adults. The camera has a string attached to it and the adult hangs it around Mathias' neck. He looks at the camera for a while, and then he asks "How do I get it bigger?" The adult says: "You wonder where the zoom is?" She shows him, and he walks away.*

Asking other children seemed to be the most common when it came to using computer-games and drawing programmes. It could for instance be that they wanted to copy something they had seen another child doing, which was the case in the following example where Christian was drawing on the computer. He wanted to use some images of busses that he had seen David use the other day, but he struggled to find them:

> *Christian is drawing with Tux Paint. He finds the stamp section and skips through the stamps for quite a while. He turns to David who is playing with Lego in the same room. "David!" he says. "Can you show me where you found the busses?" David continues to build Lego. Christian tries again: "David! Were you the one doing that once? Do you remember the busses? Where you the one who did that? The busses?" David answers: "Yes." Christian says: "Can you please show me how you did it?" "No, I don't know where they are", David answers. Christian and I look through the stamps together and manage to find the busses.*

In this example David was not engaged in the computer but busy playing with Lego. A more common tactic seemed to be to ask those who were gathered around the computer at the time:

> *Alexander enters the "ABC Diner"" in the Reader Rabbit game (figure 3). The aim is to open the cupboards, find the food starting with the letter called for and put it in the cook's bowl.*

The game: "Find something which starts with the letter M."
Anna: "M!"
Alexander opens the first cupboard which contains milk.
Alexander: "Is it this one?"
Anna nods: "Yes!"
Alexander clicks on the bowl.

Figure 3: The ABC-diner. Screenshot from the computer-game *Reader Rabbit. Fun in the amusement park.*

These examples show that whether children turned to adults or children for help seemed to be determined by the activity. There are, as I see it, several possible reasons for this. Whereas adults rarely engaged in computer-games and drawing-programmes, they were always available when the children used Internet or digital cameras. For security reasons the children were not allowed to log on to the Internet on their own, and the digital cameras were only used in activities where there was a high adult presence, respectively on fieldtrips and birthday celebrations. A reason why children turned to each other when it came to the use of the computer-games and drawing programmes may also be that children in some cases turned out to have just as much, or even more, competence than the adults in these areas. The implementation of digital tools in kindergarten challenges in this way the adults' role as the experts. Provisional results from a comprehensive Norwegian study on how technology affects children's social and linguistic kindergarten education indicate that the use of digital tools in kindergarten contribute to change the relations between adults and children. The head of the research study, Engelsen, states in an interview (Svennevig, 2009) that children in some situations become the teacher while the adults position themselves on the sideline. He claims that this is highly interesting because it rarely happens in other situations in kindergarten.

As a consequence of this the peer community become an important source of learning, and learning becomes a collective aspect. What a child may struggle to

achieve alone may be accomplished within a group of children, because they all have different experiences and knowledge (Säljö, 2001). Closely connected to this kind of collective learning are the children which may be described as more knowledgeable peers. This will be further described in the next section.

4.2.4 The more knowledgeable peer

I have presented various strategies children seemed to make use of to solve problems, including asking for help. Often there was no need to ask for help, because it was offered spontaneously by the spectators. There are many examples in my data material of children helping each other, not only to solve the various tasks in the computer-games but also to manage technical problems emerging. Something which happened quite often was for instance that a child accidently closed a game or moved a frame out of its position. Most of the times there was another child showing them how to get back on track. In the following observation Andreas assists Nora:

> *Nora is playing the Frankie-game when she accidently closes the game. She looks at the desktop. There are two shortcuts to the game there. Andreas says: "You have to click one of those... twice." He points at the shortcuts. Nora tries but ends up marking the text underneath the icon instead. I say: "Try clicking on the picture." Nora: "Ok!" She does, but nothing happens. Andreas adds: "Twice!" Nora double-clicks on the icon and the game starts again. They both join in on the opening song.*

Vygotsky's (1978) concepts of the 'More Knowledgeable Other' (MKO) and 'The Zone of Proximal Development' have been presented earlier in this thesis. Within these concepts there is an underlying belief that learning takes place in interaction with other people and that the individual may reach a higher potential of development through adult guidance or in collaboration with more capable peers.

Elias was one of the children who distinguished themselves in being more knowledgeable peers. There were several examples in my field notes of Elias willingly sharing his knowledge. This is one situation:

> *Sara starts to write letters in Tux Paint. She uses the keyboard. The letters appear small, and she expresses that she would like capital letters instead.*
> *Elias: "Press that one!" He points.*
> *Sara: "This one?" She points at a key and looks at Elias.*
> *Elias: "No, the one underneath."*
> *Sara presses the Caps Lock key.*
> *Elias: "Yes, that's the one."*

49

When I interviewed Elias a couple of weeks later I reminded him of this episode. I was quite surprised when he stated that the reason why he knew this was that I had showed him the other day:

> *I: I have noticed that you use to teach the other children as well. You know a lot about computers...a lot of good tricks.*
> *Elias: Yes.*
> *I: Once I saw you showing Sara how to write capital letters.*
> *Elias: Yes, because you showed it to me the other day*
> *I: Oh, I did? And you remembered it?*
> *Elias: Yes, and then I showed it to Sara. And I showed Ingrid how to enter the drawing program...I said that one should click twice.*
> *I: That was clever.*

In the interview Elias expressed that he enjoyed this role as a more knowledgeable peer. On my question why he liked watching other children play on the computer he quickly replied: *"Then I can show them where to click and such"*. It seemed to me as if being able to share all his digital skills with others really strengthened Elias' self confidence.

The knowledge transferred from other children did in many examples result in new skills as in the next example:

> *Sara is drawing with the rainbow paint. She moves the mouse very fast back and forth, and accidentally she moves the whole window out of position. "Oh..." she says and looks at the others. She tries clicking on the part of the window which is still visible on the screen, but nothing happens. "You just have to click there", says Elias and points at the dark blue part on the top of the window, "and then you drag it." Sara does as he tells her, and she gets the window back in position. She continues drawing, but a little later the same thing happens again. This time she manages to fix it herself.*

These findings indicate that children are capable of assisting each other and learn from each other when using digital tools. This is also supported by other studies (Brooker & Siraj-Blatchford, 2002; Jessen, 2003; Klerfelt, 2007; Moberg & Lindèn, 2008). However, in their study of the use of ICT in seven Scottish early childhood settings Plowman and Stephen (2004) came to another conclusion. They observed that due to the absence of adult assistance, children often left the computer because they were unable to solve problems. They found that boredom and frustration were

common consequences when children were using the computer and that peer support was rare, as they express in the following way:

"Children sometimes worked together, helping each other to interpret error messages or discussing which option to select, but we did not observe any child offering others explicit help that would enable them to learn what to do when they encountered such difficulties again" (Plowman & Stephen, 2005, p. 150).

Why is it that Plowman and Stephen's (2005) findings differ from the other studies? One possible explanation is that the children's general computer knowledge in the observed Scottish settings may have been so limited that the children were unable to support each other. Another reason may be that the staff distanced themselves even more from the use of the computers. There is, as I see it, also reason to question if the time the researchers spent in each setting was sufficient to get a good impression of the children's interaction. Each setting was only observed during two half-day sessions, and the authors state that during some of the sessions the computer was not used at all. My own experience is that it took some time to get into the children's culture and get an insight into their various patterns of interaction.

In any case, acknowledging children as competent does not mean that adults may disclaim responsibility for the use of digital tools. The staff must ensure that the use of digital tools is in coherence with the kindergarten's overall pedagogical principles. In order to do so they need to show interest and strengthen their own digital competences, or else the resistance against digital tools may be maintained and legitimised (Bølgan, 2006). It is also worth noticing that children's shared knowledge may originate in interaction with adults, such as Elias' knowledge on how to write capital letters in one of my examples. Adults might add something different to children's activities, and develop their competencies. They may contribute to expand children's digital play and thereby increase the complexity in the situation (Klerfelt, 2007).

4.2.5 Sharing discoveries

Interaction with more knowledgeable peers was an important aspect of learning in the digital peer community. Another reason why knowledge was spread rapidly among these five-year-olds was that they seemed to enjoy sharing their discoveries. When someone had done something new or solved a problem, he or she was eager to share it. In the following example Andreas is sitting next to Nora who is drawing in *Tux Paint:*

Nora has just opened a blank sheet. Andreas wants to show her something. He asks her to click the magic wand, and she does. Andreas says: "Click there!" and points at the rainbow-button, "I'm going to show you how beautiful the rainbow is!" Nora clicks the button and moves the cursor to the sheet. She clicks ones and makes a red dot. Andreas: "No, you have to keep it down and drag it." Nora tries. Andreas repeats: "Keep it down and drag it." Nora holds the right mouse-button and moves the mouse. A thick line of different colours appears. Andreas: "Yes, now you're making rainbows, wonderful rainbows. It's magic!"(Figure4)
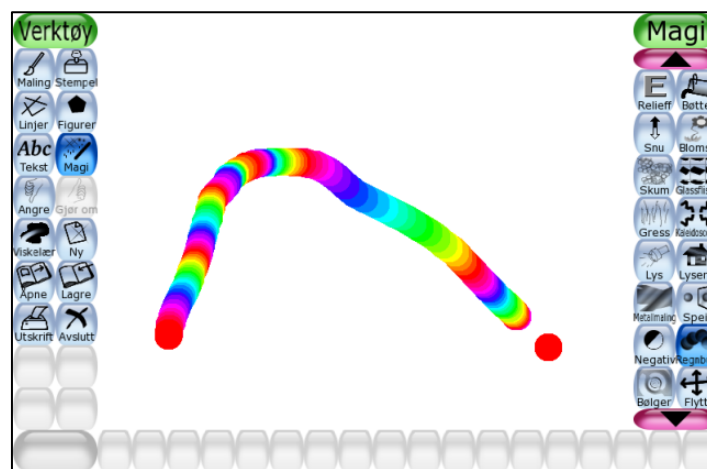

Figure 4: Rainbow-making in Tux Paint. "It's magic!"

Andreas shared with Nora something he had done many times before. Other times discoveries were shared as they emerged, as was the case when Philip made a totally new experience in *Tux Paint*:

Philip has been drawing for a little while. "Look here!" he says eagerly. "Look!" Both the other children and I pay full attention to Philip. "I kept this down (he clicks the left mouse button) and then I moved the mouse (he moves the mouse and let go of the button) and then there are a lot of squirrels!" A straight line of squirrels appear (Figure 5). "Cool!" I say "I didn't know that was possible. Have you tried it before?" Philip: "No.....never."
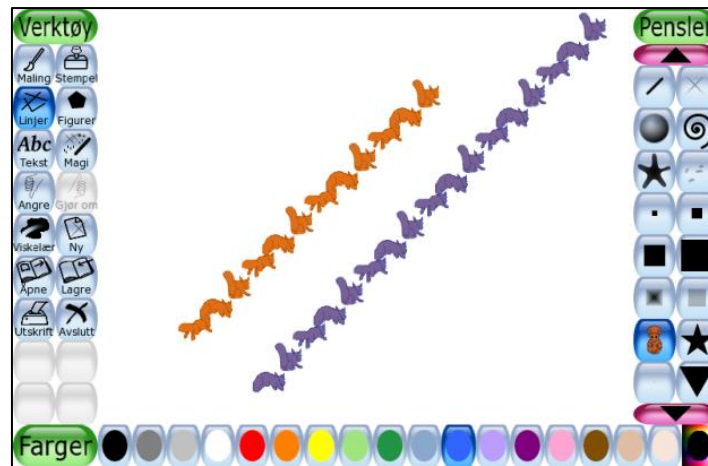
Figure 5: A line of squirrels. Screenshot from the arts programme *Tux Paint*.

These examples do, as I see it, show that the children not only offered each other help when needed but also taught each other skills unasked. The children quickly seemed to pick up these new skills and pass them on. Lave and Wenger (1991) describe this kind of learning as situated, as it occurs in a natural physical and social context. They claim that this kind of practical learning resembles the many ways an apprentice will learn by taking part in various situations occurring.

4.2.6 The children's digital working environment

The use of digital tools as social activities and the benefits of being part of a digital community have been pointed out through the previous examples. In the interviews some children, like Nora and Anna in the following example, expressed that they enjoyed when other children watched them play on the computer:

> *I: When you're playing on the computer, other children often watch. What do you think about that?*
> *Nora: It may be some of those who are on the computer-list and then someone maybe.....and then someone ask those who stand next to them... they ask if they may play, and then they are written on the list.*
> *I: And then they watch?*
> *Nora: Yes, until it's their turn.*
> *I: So what do you think about that?*
> *Anna: We think that's ok.*
> *Nora: I think it is fun. It is a bit boring at home because no one watches.*

There were however also several children who pointed at difficulties emerging when several children were engaged in the use of one laptop. One of the issues brought up by the children was noise problems:

> *I: When you're playing, Andreas, do you like it when there are many other children watching you?*
> *Andreas: No, because then they talk so loud that I can't hear, and then I click on the wrong things.*

Andreas often experienced this particular problem. One of his favourite games was the shape-chase in the *Frankie-game*, where one is asked to click on certain shapes moving around, for instance all the blue triangles. When he had difficulties hearing the instructions from the computer, he did not know what to click.

Another complaint expressed by some children was that it sometimes could become too crowded in the computer area, which made it difficult to handle the computer. This was for instance articulated by David who stated: *"They make so the mouse can't move".*

As I see it, many of these problems were embedded in the design of the physical environment. First of all the computer was placed in a playroom where there were lots of other activities going on, including the use of the CD-player. When I listened to my audio-recordings the high noise level in the room became very obvious. Secondly the computer used by the children was a laptop with a relatively small screen, which was not very suitable when several people were involved. In addition the laptop was placed on a corner table, and there was usually only one suitable chair available. The other chairs in the room were far too low, and the children were often standing around the player. Occasionally someone bumped into someone else in order to get a better look at the screen. If we add the adult's time restrictions to this picture the children's digital working environment must be considered as relatively poor.

The social aspects of using ICT in kindergarten have been pointed out in this thesis, and I think there are reasons to consider them closer, also as regards the choice of equipment and the design of the environment. Maybe an interactive board would be a good investment, or maybe the kindergarten's existing projector could have been connected to the laptop?

Another important issue which emerge from this is the importance of the staff taking notice of the children who for some reason may struggle when the number of children involved gets high, and arranging for them to get experiences with digital tools as well.

4.3 Digital expressions

ICT is seen by many as an opposite to creativity (Bølgan, 2004). My findings indicate however that the use of digital tools may give children other opportunities to express themselves in creative ways than traditional tools. In this section I will provide some examples.

4.3.1 Digital drawing

There were several drawing programmes installed on the kindergarten's computers. The most frequently used was *Tux Paint*, which is a drawing program for young children which may be downloaded free from the Internet. It contains among others brushes, text, lines, shapes, stamps and special effects. The way children used *Tux Paint* seemed to vary. Some children were very busy scribbling and testing out all the effects, while other carefully planned their actions.

The process often seemed to be more important than the product. Rather than saving their pictures the children often used the eraser tool to remove them. One of the reasons for this may be that most of the time there was no printer connected to the laptop they were working on. Even if the drawings could be printed out later on, this was rarely done. I did not see any digital drawings among the children's artworks displayed on the walls. Another reason may be that the drawings were not necessarily finished when the sheet was covered, as it most likely would have been if drawing with pencils on paper. Parts of the original drawing were often covered as it developed. In this way the drawings were built up by multiple layers which sometimes could bear a close resemblance to the making of collages, especially when stamps were used.

Digital drawing seems to provide other opportunities than traditional drawings. As drawing on the computer is not as dependent on the children's fine motor skills as traditional drawing, it offers children opportunities to design more complicated shapes and write letters (Moberg & Lindén, 2008; Zevenbergen, 2007). The special effects contributed to this as they could be used to manipulate the picture, for instance by making it blurry, lighter or darker, make it look like glass tiles or be covered by foam. The undo-button was frequently used by the children and increased their possibilities to experiment as they were able to remove their last actions with a simple click if they were unhappy with them.

As pointed out by Jørgensen, Havn Petersen and Hansen (2005) the computer may not replace the more traditional art tools and materials, but contribute to new ways to produce pictures. The children get a different opportunity to express themselves through colours, structures and shapes. These computer-expressions are however based on familiar skills achieved by using traditional tools.

4.3.2 Associative narratives

Associative narratives are here to be understood as the expressions or stories which emerged spontaneously when the children were drawing on the computer.

In her doctoral dissertation Klerfelt (2007) focuses on the interaction between children and preschool teachers when creating stories on the computer. The adult's task is to support the child to make up her/his own stories. In some of Klerfelt's examples the stories are created in interaction with the adult and subsequently illustrated by digital drawings. In other examples the adult has a more peripheral position for instance by prompting a process which is further developed by the children themselves. The stories then seem to develop more interchangeably with the pictures. My examples are most similar to the latter, but differ to Klerfelt's examples as there was no adult involvement at all. The stories seemed to emerge from the pictures created. In the following two examples children get certain associations while drawing, but the stories are not further developed. In the first observation Marcus is the one drawing:

Marcus is drawing. He uses the laptop's touchpad even if there is a mouse connected. He selects a green sheet to start with. He then chooses the rainbow paint and moves the mouse until most of the screen is filled with thick lines of different colours. He says: "It is an amusement park, and this is the roller coaster" (see figure 6 below).
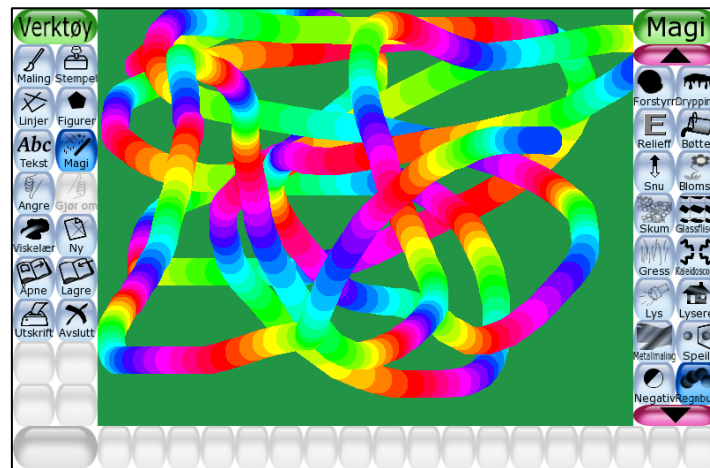

Figure 6: The roller coaster. Screenshot from *Tux Paint*.

Marcus did not pursue the topic but continued by drawing something else. The same was the case with Simon in the next example:

Simon is writing letters in Tux Paint (figure 7). He uses both his index fingers and types by using the keyboard. He turns the sound on the laptop down a bit

56

*and continues to write. He doesn't write very fast but studies the keyboard carefully. When the whole row is full of letters, I show him how to shift to a new line. He writes _Æævææb'''lbænls and looks at it. "It's a picture of my teeth", he says and point at the apostrophes he just wrote (In Tux Paint they look like small triangles). "Yes, it **is** almost like a picture of your teeth!" I say. Simon continues: "This one is on this side (he points at the screen and then in his moth). That's the one I lost today. And here (pointing) is the side where the big tooth is."*
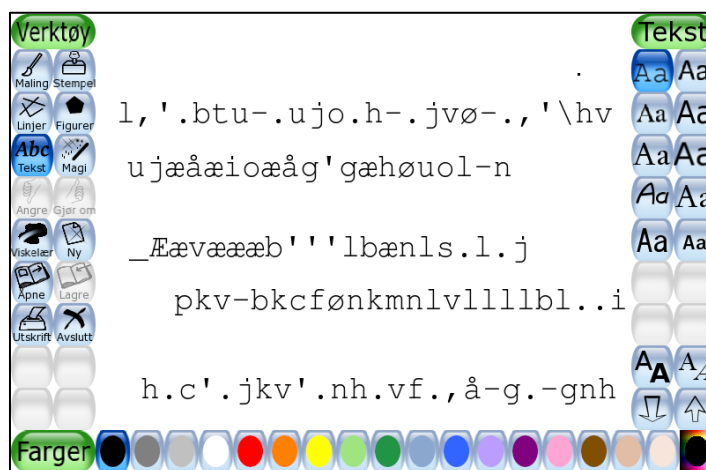

Figure 7: "It's a picture of my teeth!" Screenshot from *Tux Paint*.

As the story shows Simon had lost a tooth earlier on the same day. It was the second milk tooth he lost, and his explaining about the "big tooth" refers to the new tooth appearing.

The previous examples show how pictures may give associations which result in short narratives. Sometimes the drawings turned into slightly longer stories as well. Anna's story in the following example emerges from her experiments with the various effects in *Tux Paint*:

Anna chooses a big paint brush and draws thick blue lines. Then she changes the colour and draws red lines. "It looks like lava!" she says. Then she chooses the squirrel-paint. She left-clicks while moving the mouse, and a lot of red squirrels appear. "More squirrels! It's full with squirrels!" she says. She changes the colour: "Blue squirrels!", "Pink squirrels!" She continues until the screen is all covered by squirrels in different colours. Then she paints with a black brush until she has covered all the squirrels, and the whole screen is entirely black. "Good night, squirrels!" she says. She prints blue and yellow stars on the black screen. Then she chooses the squirrel-paint again: "And now I'll make squirrels again". Soon the whole screen again is covered with colourful squirrels (figures 8a-8d).
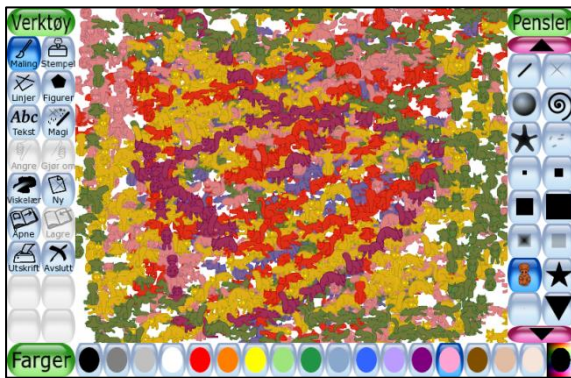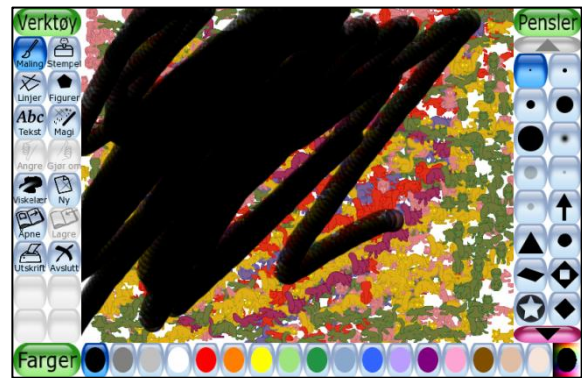
Figure 8a: "It's full with squirrels!"

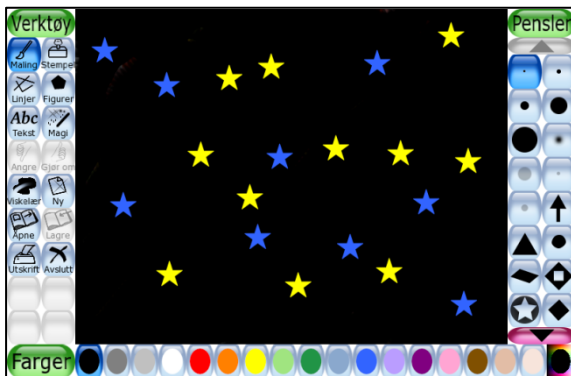**Figure 8b: "Good night squirrels!"**
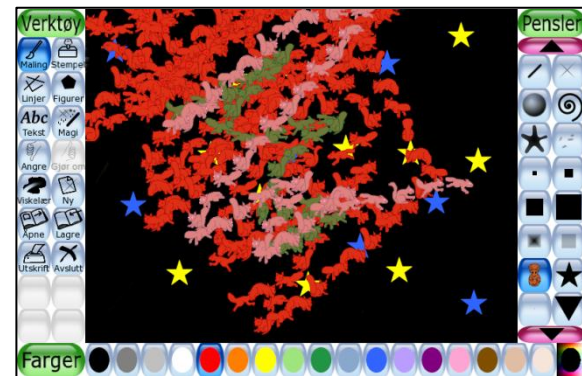

Figure 8c: Blue and yellow stars.

Figure 8d: "And now I'll make squirrels again."

These examples show, as I see it, how the use of digital drawing programmes may trigger the children's creativity. Again there is a need to question the absence of adults. Klerfelt (2007) indicates that adults may play an important role in supporting children's storytelling skills. As I see, there were lots of learning opportunities in regards to communication and language occurring in children's interaction with the computer. These could have been further developed and extended by adults.

4.3.3 Photographing - documentation or pedagogical documentation?

In the Framework plan documentation is mentioned as a basis for learning and reflection, as well as a way to provide information of children's experiences and activities in kindergarten (Norwegian Ministry of Education and Research, 2006a).

As previously mentioned, field trips were the occasions when the children in the kindergarten used the digital camera regularly. Fieldtrips were arranged twice a week, mostly to places in the local environment. Sometimes the group was divided and sometimes they all went together. There were always two children being assigned as trip leaders. Their tasks included among others making the decision on where to go, leading the way, help lighting the fire and taking pictures to document the trip. All observations exemplifying digital photography in this section are from the day Marcus

and Mathias were trip leaders, because this was one of the few occasions when I spent a full day, approximately eight hours, in kindergarten. I was able to follow these boys through the whole process of documentation, whereas I normally only observed parts of it. In the following observation Mathias was taking pictures:

Mathias looks around and points the camera towards a heap of snow some meters from where he is standing. Alexander comes along and looks over Mathias's shoulder into the display. Then he runs towards the heap. "Alexander! Do you want to be in the picture?" shouts Mathias. Alexander shouts back: "Yes, but I have to climb up first." Mathias waits until Alexander is on the top of the heap, and then he takes the picture. He asks me if I can help him put his mittens back on (It is minus 7 degrees Celsius and a bit windy).
A little later he walks towards the heap, climbs on top of it and takes his mittens off again. He turns around while looking into the display and finally decides on taking pictures of the cars on the parking area of a nearby public building. He zooms in on a red car and takes a picture. A blue car is just parking. "That's cool. I want to take a picture of it", he says and zooms in.

The children seemed to photograph things they liked and appreciated, as Mathias when he chooses to take pictures of the cars nearby. In the interviews friends were mentioned as popular photo objects, but also elements from the nature were described in details. Insects were mentioned by several children even if the interviews were conducted in the middle of winter, among others by Simon:

I: What do you take pictures of?
Simon: The fire and insects and such….and strawberries and leaves and mussels and sand.
I: Yes, when it is summer...
David: I love summer!
Simon: And we take pictures of water…and sometimes of crabs.
David: Do you know why I love summer? We get to go swimming and fishing.
I: Yes, that's nice.

One of the reasons why all these different photo objects related to a different season were brought up may of course be the fact that the children seldom took pictures, as they were trip leaders only approximately every fifth week. They referred to their own experiences as photographers which might have been some time ago. The children seemed to have a strong memory of the things they had photographed themselves.

When I asked Mathias about photographing three weeks after the fieldtrip, he not only remembered taking pictures of cars, but also that it was a blue Mazda.

The limited use of the cameras did not only provide the children with few experiences as photographers. The adults did not take many photos either, so there seemed to be an overall lack of pictures from kindergarten's daily life. This was confirmed by the kindergarten's manager who could tell that she had experienced difficulties when she needed photos to illustrate documents, since most photos were taken on special occasions or fieldtrips.

Letting children photograph may, in my opinion, be a way for them to express themselves. Another issue is what happens to the photos later. This seemed to vary a lot. The intention was that the photographers should take part in the image processing as well. Sometimes this seemed however to be omitted, mainly due to time issues or lack of staff. According to a newly released evaluation report on the current Framework plan, conducted by Vestfold University College (Østrem et al., 2009), documentation is experienced by kindergarten practitioners as one of the most demanding topics in the Framework plan. An important reason for this is that it is considered to be time consuming, both when it comes to the practical implementation and the following reflection.

There were however a few good examples of children participating in picture processing and the writing of texts in my data material:

Marcus and Mathias have been the photographers on today's fieldtrip. They are sitting together with an adult by the computer to have a look at their photos. The adult puts the memory card into the computer. There are other pictures on the card as well, and Mathias marks all the pictures he and Marcus have taken today. The adult says they cannot print them all and asks them to choose a couple each. Marcus looks through his photos. Most of them, approximately 15, are of his friend Thea. He chooses two of them; one close-up of Thea's face and one of her taken from a distance. "I chose the one where she has her face turned the most towards me", he explains. There is also a photo of snow only there, and the adult asks him about it. "That should have been a photo of Thea as well", he explains, "but she slid away".

Mathias chooses two pictures of cars and one of Alexander on the top of a snow heap. The adult pastes their chosen photographs into a word document. It takes her quite a while, and she tells the boys to go and play for a while; "I'll tell you when it's ready for you to write your comments."

The boys are back. They tell the adult what they would like the text to say. The adult then spells the words, one letter at a time, and the boys find the right

keys on the keyboard and write the sentences. Under his picture of the blue car Mathias writes: "Mathias has taken a picture of a blue Mazda." Under one of Marcus' pictures it says: "Thea and I were playing on the snow heap." They then print the document and laminate the sheet. Mathias takes the sheet and hangs it up on the parents' notice board.

In this example the two boys were involved in many steps of the documentation process; they took the pictures, selected the ones they would like to present, composed and wrote the text to go with them, printed them out, laminated the sheet and hung it up on the board. There are, as I see it, several topics emerging in this process which could have been developed to reach further reflection and learning both by the children and the adult, for instance the technical aspects of taking pictures, Marcus' relationship with Thea and Mathias' interest in cars. I cannot say whether or not this was done at a later point of time. The printed pictures were however gathered in a loose-leaf binder, and I did on several occasions observe children and adults looking at them together, discussing them and recalling their experiences.

This connection between children's photos and documentation does not seem evident in all kindergartens as 66 % of the respondents in a national research study (Bølgan, 2009) states that children get to photograph in kindergarten whereas only 3 % agree that the children participate in documentation work. According to Bølgan (2009) this makes it necessary to question the function of children's photographs in kindergarten's daily life. The low number of respondents stating that children take part in documentation might however, as I see it, also indicate the different understandings of what documentation may be. Documentation seems to be frequently connected to the mapping of children and making the kindergartens work visible to others. It seems to a lesser extent to function as a basis for reflection and learning as intended in the Framework plan. It is also interesting that many practitioners are uncertain whether it is the Framework plan or the increased access to digital tools which serves as inspiration for the documentation work (Østrem et al., 2009).

The increasing tendency of documenting children's play and learning also bring about some ethical issues. The Framework plan states that "both children and parents may react if too much of what children say and do becomes the subject of written observations and assessments" (Norwegian Ministry of Education and Research, 2006a, p. 30).

4.4 New ways to learn

In the following sections the children's ideas on how they have gained their ICT skills will be presented. The coherence between play and learning will be pointed at,

and the adults' absence in children's digital play activities will be questioned. Finally, the children's ability to navigate by the images on the Internet and their digital vocabulary will be briefly described.

4.4.1 Learning in the digital community

From a social constructivist perspective learning is viewed as a situated activity which occurs in interaction with other people and the environment. "Learning is an integral and inseparable aspect of social practise" (Lave & Wenger, 1991, p. 31). This view is also reflected in the Framework plan which states:

"Learning takes place in everyday interaction with other people and with the community, and is closely related to play, upbringing and care. Children can learn from everything they experience in all areas of life" (Norwegian Ministry of Education and Research, 2006a, p. 17)

The close relationship between learning and everyday activities was reflected in the children's comments on how they have learned to use digital tools. Even if some said in their interviews that they had learned from parents or adults, most of them stated that they "just learned it" as in the following example:

I: I have seen that you know a lot about computers. You know how to draw and play games and many other things. How did you learn it all?
Ingrid: We just learned it!
Sara: Anyhow, we didn't go to school.
I: No, because you're not in school yet.
Sara: When you start school the teacher has to show.
I: So you didn't learn using computers from anyone?
Sara: No, we just make it up in our head.
Ingrid: Me too.
I: And then you practice and become this good?
Ingrid: Yes.
I: Well done!

It seems as if the children were relatively unconscious of how they learned. Interesting in this example is also that they associate learning with school rather than with kindergarten. The significantly different traditions of kindergarten and school may be a reason for this. "One of the features of the Norwegian kindergarten tradition is that it takes a holistic view of care, upbringing, play, everyday activities and learning (Norwegian Ministry of Education and Research, 2006a, p. 7)".

Learning through exploratory play with peers seemed to be the way children gained most of their practical ICT skills. If they wondered about how something worked, they simply tried it out, like Nora and Andreas do in the next observation:

> *Nora is playing the game "Frankie, your favourite animals", and Andreas is watching her. Nora points at the door-icon on the bar at the bottom of the screen.*
> *Nora: "What happens if I click on that one?" Andreas: "I don't know."*
> *Nora clicks on the door-icon and the game-voice says: "Are you sure you want to quit the game?" Two squares with Frankie in them appear on the screen. The green one says yes and the red one says no. Andreas points at the red one: "Click on that one!" Nora does and they are back in the game.*

The fact that children's play culture also is a learning culture is according to Jessen (2003) often neglected in studies of children and interactive media. A number of skills, social, communicative and practical are required to take part in digital activities. The overall motivation to learn lies however in being part of a play community. "At school children participate in order to learn, whereas in play culture, they learn in order to participate" (Jessen, 2003, p. 13).

As previous examples used in this thesis show, the children learned together and from each other, while adults often dissociated themselves from certain computer activities. As a participant observer I did however spend a lot of time by the computer and experienced that there were situations where adult support was wanted. One of the frequently asked questions asked by the children was if I could read to them. It could be signs which emerged in the computer game, something written on a characters T-shirt or text they had written themselves as in the following example:

> *Simon writes letters in Tux Paint: "Where are the dots....oh..there they are." He continues to write until he has four rows with letters. Julian turns to me: "Can you read it?" I try to read "uuuhhgskjkdkhfjhdjgfjdjdakjsy..." and so on.*
> *Simon and Julian laugh. "What does that mean?" asks Simon. "I don't know", I say, "You were the one writing it." They both laugh again.*

A recently conducted pilot study indicates that adults' involvement in children's use of ICT, for instance computer games, is surprisingly limited compared to other types of play (Svennevig, 2009). This is in accordance with the findings of my study as well. There seemed to be a clear difference between adult lead ICT-related activities, such as the use of digital cameras and the Internet, and the children's own initiated use of

digital tools in forms of computer-games, drawing programmes and hand held game consoles. Adults' absence in children's interaction with digital tools is, in my opinion, problematic for several reasons. The Daycare Institution Act (Norwegian Ministry of Education and Research, 2005, p. 1) states that "kindergartens shall give children basic knowledge of central and topical fields". ICT has been pointed out as a central field in today's society, as well as an important part of children's cultures and should therefore not be neglected by kindergartens (Bølgan, 2006; Klerfelt, 2007).

The Daycare Institution Act (Norwegian Ministry of Education and Research, 2005, p. 1) also says: "Kindergartens shall nurture children's curiosity, creativity and desire to learn and offer challenges based on the children's interests, knowledge and skills". For children's digital play cultures to exist and develop, the available software must be on an adequate level. If the programs are too difficult they are likely not to be chosen. If they are too easy there is no knowledge to exchange (Jessen, 2003). My question is if it is possible for adults to provide the children with adequate challenges if they do not participate in these activities themselves. Do they know enough about children's interests, knowledge and skills? Bølgan (2006) claims that as well as in other areas of kindergarten practice, the practitioners need to be engaged, creative and critical when it comes to the use of digital tools.

4.4.2 A new type of literacy

Previously in this thesis the concept of mediated learning was introduced. According to Vygotsky (1978) the human cognition will gradually change due to learning being mediated by more advanced tools. This means technology not only changes our daily lives but also affects the ways we think and learn. The way children tend to read symbols in addition to letters is an example of this. Zevenbergen (2007) claims that children's use of computers pose a new literacy where the icons serve as a new language.

The five-year-olds in my research study had not yet learned to write and read, even if most of them did recognise certain letters and words and were able to write their names. This did not seem to be a problem when using digital tools as they oriented themselves by the use of the icons; they sort of read the images. The next observation may serve as an example of this:

> *Robin is building Lego. He asks the adult sitting next to him: "Can you build a Ben 10[10] for me?" The adult first answers that he doesn't know what Ben 10 looks like, but then he says: "Maybe we can look it up on the Internet?"*

---

[10] Ben 10 is an American animated televisions series shown on Cartoon Network

Robin agrees and they go to the computer. Robin turns on the screen and the computer and waits for the computer to start. The adult types the access codes. Robin clicks on the Internet icon. The start page, which is Google search, comes up, and Robin types Ben 10 (with a little help from the adult). Links to lot of web pages occur. Robin clicks on one of them (a wiki) but it contains text only. The adult tells him to click on image search. Robin does as he is told, and a lot of images from the Ben 10 series appear. He moves the cursor to the scroll bar and moves it to see all the images. Then he clicks at the arrow at the bottom of the page to turn to the next page. He clicks on some of the images to have a closer look at them and clicks on enlarge to make them bigger. Finally he decides on a picture to print and clicks on the print icon.

In this situation the adult initiates the use of Internet as a source of information, which is in accordance with the Framework (Norwegian Ministry of Education and Research, 2006a). Robin has apparently few problems manoeuvring on the Internet as the functions are made clear by images and colours. He also seems to be acquainted with how the Internet is built up by a system of links. According to Prensky (2001) experiences like this make children more effective in reading images and not text only and strengthen their ability to think nonlinear.

The use of digital tools also seemed to have an influence on children's vocabulary. The terminology children used when talking about the computer shows how ICT is part of their everyday lives. Words like *printer*, *keyboard*, *computer-mouse*, *log in*, *copy* and *laptop* were all used by the five-year-olds in my interviews with them. My observations also indicated that technological terms were used with the greatest obviousness by the children as in the following example:

Elias is borrowing Philip's GameBoy. He looks at the screen where there are images of two game-screens.
Elias: "What am I going to do here?"
Philip: "You need to have two GameBoys. I don't have that."
Elias: "Oh, that's linking."

Even if Elias did not immediately understand the images on the screen, he was clearly aware of the possibilities of connecting two handheld game consoles, in technological terminology referred to as linking. Philip's short explanation was sufficient for him to make this association. Interesting in this matter is that Elias used the English word *linking*. English terms were frequently used by the children when talking about digital tools. For instance the English word *printer* was used

interchangeably with the Norwegian term *skriver,* and the laptop was referred to as both *computer*, *PC*, *laptop* and *datamaskin* (Norwegian). This shows how the Norwegian language seems to be highly influenced by English in this area, and may also reflect a general lack of consistency when it comes to the use of computer terms among the Norwegian population.

4.5 Reconceptualising play

Play is seen as an important part of the kindergarten's content, but still the concept seems to be somehow vague and indefinable. In the following sections similarities between children's use of digital tools and their play with other objects will be described and discussed.

4.5.1 On-screen pretend play

Sutton-Smith (1997) claims that we all have some conception of what it means to play, but it is not easy to define, as play seems to be a highly ambiguous concept. Numerous theories of play have been presented throughout history. It is difficult to tell whether or not digital activities could have a place in these theories as digital play is a modern concept. Based on Sutton-Smith's broad conception of play, I will imply that some digital activities should be considered as play.

Playing a computer-game seemed, in my opinion, to have many similarities to the children's imaginary play with dolls or figures. I will here present three characteristics underlining this:

1) The children were in role, as they pretended to be the main character.
2) The children interacted with characters in the game.
3) Images of objects were treated as if they were real objects.

That the children identified with the main characters was made visible by the way they referred to the characters. Both when children played themselves and when they were watching others play they seemed to use personal pronouns instead of using the names of the characters. Here is one example:

> *Thea has just finished the matching task in the Reader Rabbit game. She gets the fourth ticket which allows Mat the Mouse (the main character in the game) to go for a ride on the merry-go-round in the amusement park. There are several animals there in addition to Mat the Mouse.*
> *Anna who is watching says: "Look! There are all your friends. And there you are." She points at the screen.*

66

Anna does not say 'Mat the Mouse's friends' or 'Mat the Mouse', but uses 'your friends' and 'you'. To her Thea, who is playing, is the main character. She is the one making things happen.

Interacting with the characters in the game was also common. In the game *Frankie-Your favourite animals* the aim is to win four prizes for your chosen pet. All the prizes have to be presented to the animal once in order to complete the game. The children often spent a lot more time with the animal than necessary. They combed it, played with it and fed it as in the following example:

> *Nora is playing 'Frankie. Your favourite animal' Andreas is watching her.*
> *Nora has chosen a rabbit for her pet. She is in the rabbit's playroom. She gives the rabbit a carrot, and the rabbit eats it. Andreas says: "He has to be nice and fat." "Yes, nice and fat", says Nora and feeds the rabbit more carrots (Figure 9).*

Figure 9: "He needs to be nice and fat!" Screenshot from the computer-game *Frankie. Your favourite animals*.

The children also treated images of objects as if they were real objects. This was often the case when there where images of food on screen. The children pretended to grab the images on the screen and eat them. They shared the food and commented on the taste. This kind of action has been observed by other researchers as well (Brooker & Siraj-Blatchford, 2002). In addition to food there could also be valuable objects that the children tried to catch, often with an element of competition in it as in this case:

> *Elias is in the ABC Diner in the Reader Rabbit game. He opens a cupboard and there is an oyster with a pearl in it. He quickly touches the screen and says: "I took the pearl." Thea who did the same thing says: "I took it too!" "No, I grabbed it before you", Elias says.*

This arguing about who grabbed an object that they cannot really touch show how the children treat images as if they were real objects. This was also the case when Andreas made a Christmas drawing in *Tux Paint* (Figures 10a and 10b):

Andreas pastes an image of a sweet on the screen. Then he takes an image of a present and places it so that it covers the sweet. He does this several times. Then he asks us to close our eyes, and does it once more. When he is finished, we can open them again and he asks us to guess what's inside the present. After all of us having a guess the "paper" is removed by clicking the undo-button, and the right answer is revealed.
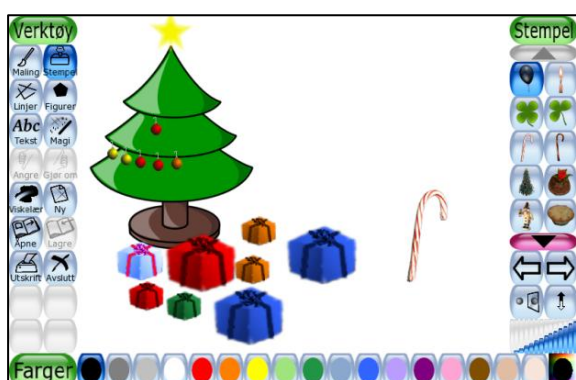

Figure 10a: Pasting an image of a sweet.

Figure 10b: Wrapping it up.

Even if it does not show on the picture that there is something inside the presents, Andreas knows and to him this is important. He wrapped the different items carefully as he would have done with real objects and made sure that the size of the parcel was adequate. Later he also made this into a guessing competition and involved all his spectators.

The coherence between ICT and play seems natural to the children, however when it comes to adults the link is not always as obvious. Sandberg and Pramling Samuelsson (2003) describe how the practitioners memories of their own childhoods tend to influence how they look at play today. They describe two different conceptions characterising Swedish preschool teachers' views, respectively "the idealized" and the "pragmatic". Preschool teachers with an idealized view tended to use their own childhoods as norm for what should be considered natural and perceived television and computers as a threat to play. The preschool teachers holding a pragmatic view regarded play as an expression of culture and therefore something which appears slightly different in different times. They were also more positive in regards to technology's influence on children's play. The idealized view seemed however to be the most common of the two (Sandberg & Pramling Samuelsson, 2003).

So is it really important to define whether or not digital activities should be considered as play? As long as play is seen as an important feature in Norwegian kindergartens it is likely to believe that viewing the use of digital tools as play would strengthen their position. On the other hand a one-sided focus on ICT as play would probably restrict its opportunities as a pedagogical tool. Of most significance to me has been to show how children may use computers in creative, active and playful ways. This is also reflected in the following section.

4.5.2 Creative use of computer-games

The computer-games the children were playing in kindergarten were of the edutainment type. These games are in my opinion relatively structured. Even if the children are allowed to choose from different types of activities within the game, the tasks must be solved correctly in order to get points. The children did however not always seem to be very concerned about gaining the points. In all the games there were objects that could be clicked in order for something funny to happen. You might for instance click on a rock on the ground and a tiny orchestra appears and play a melody. This does not give any points, but always called for a good laugh among the children. There were also times when they intentionally answered wrongly just to get the response from the game, as in the following example:

> *Elias is playing a Reader Rabbit game and is in the ABC diner. The task here is to get the right ingredients and put them into the cooks bowl. After playing for a while he makes some mistakes on purpose and says: "Listen! This is funny!" The game says: "This isn't what I ordered!" The voice is a female with a strong accent. All the children laugh! Elias tries to copy the voice.*

One of the more creative examples on how children went outside the intensions of the game is the creation of what the children called the invisibility-game:

> *In the Reader Rabbit there is a place where you can colour drawings of clowns. Elias chooses a picture of a clown on a tricycle (See figure 11a and 11b).*
> *First he colours the background black, then he says: "Now it's time to play the invisibility-game." He chooses the black colour and starts to click on the different parts on the clown. First his arms turn black and look as if they have disappeared, then his hat and after a while the whole clown is gone.*

Figure 11a: Time to play the invisibility-game

Figure 11b: The clown disappears.

4.5.3 Digital inspired play

I have previously presented examples of what I have called onscreen play and creative use of computer games. In the following I will provide three examples of how digital tools also turned out to be part of other kinds of play, either as an inspiration or more directly.

The CD "Children's classical favourites"[11] (my translation), was a selection of classical music frequently played by the children. Listening to this CD was often accompanied with the children playing trolls. The next observation begins with Christian dancing on his own and culminates in a collective troll-play:

> *Christian plugs in the CD player. He presses the power button and finds track 13 which is O Fortuna by Orff. When the track is finished he plays it once more. There are three benches which together with the wall makes a square. Christian dances in the middle. First he moves very gently, and then his movements get bigger as the music gets louder and more intense.*
> *Sara, Ingrid, Marcus, Thea and Julian join in. They sit on one of the benches watching Christian. The next melody is comedians gallop by Kabalevski. Julian dances real fast and the others clap their hands to the music. Christian says: "You may play the instruments". Julian pretends to play the drum and the others copy him. When the song is finished Christian is asked to put on track 02. "Ok", says Christian and finds track 02 which is Grieg's "In the hall of the mountain king". Ingrid and Sara now join Christian in the dance. They pretend to be trolls. When the music is close to the end Christian shouts: "Run out, run out!" Julian says: "No, you won't make it!" When the music stops they all hide under the benches. A new song begins. "We don't want to listen to that one",*

---

[11] Original Norwegian title: "Barnas klassiske favoritter".

says Christian. He goes to the CD-player and chooses "In the hall of the mountain king" again. The play is repeated four more times and more children join in.

This seemed to be a very popular game especially during the first weeks of my fieldwork. The fact that the children were able to operate the CD-player themselves made it possible for them to repeat it as many times as they wanted to, five or six times in a row was not uncommon.

In the second example there are no real digital tools involved but a cardboard TV and remote control is used. The background for this situation was explained to me by a staff member:

The previous day an adult and some of the children had made a TV from an old cardboard box. After cutting out the bottom, the adult had asked if they should have buttons on the TV. The children had just looked at her, and then one of them had replied: "Buttons on the TV? The buttons are on the remote control!"

The adult laughed as she told me this story. The way she used to make televisions from cardboard boxes as a child obviously needed some updating, so they had decided to make remote controls out of cardboard as well. The next day Marcus and Thea played with the TV as described in the following example:

Marcus and Thea are playing with the cardboard-TV. Marcus has a remote control. Thea holds the TV. Marcus says: "When I press the green button the nonsense-news comes on!" He pretends to press the button, and Thea dances around with the TV in front of her face and falls on the floor. Marcus laughs.
Later the TV becomes a boat. Marcus and Thea both sit inside the cardboard box. Marcus still has the remote control. " Press on sail!"says Thea. Marcus presses a button and they move the box around on the floor. They stop, and Thea says: "Oh no, we've run out of petrol. Press the petrol-button." Marcus presses a button and they continue to move. They move towards a bench, leaves their boat and climb on the bench. "This was land", Marcus says.

The last example shows how computer-games may serve as inspiration for the invention of new games:

The children are playing outdoors in the snow. David, Elias and Simon are throwing snowballs on a window. I stop and watch them for a while. The snow

is wet and the snowballs stick to the window before they slowly slide downwards. The boys try to throw snowballs just underneath the snowballs already stuck on the window to stop them from sliding. They all become quite busy as the window fills up with sliding snowballs.

Elias looks at me and says: "It is a game, you see. We have to stop the eggs so that they don't hatch before the mother comes home."

David: "The mother is on holiday."

Elias: "Yes and we are the babysitters. We have to watch the eggs." I: "Oh, it's almost like a computer-game". Elias: "Yes it is, but instead of clicking with the mouse we use snowballs."

The game continues until an adult shouts from a distance that they have to throw at the wall and not at the window. Elias wipes the snow off the window. "Now the mother is home", he says. The game is over and they start throwing at the wall instead.

All these examples are, as I see them, an indication that digital tools are an integrated part of these children's lives and that it serves as inspiration to their play. These digital experiences are something they share as group and because of that they may be used as basis for their play. Jessen (2003) states that the way media and technology influences children's play must be seen in a broader context. He claims that the social and cultural changes in society contribute to increased use of media. The institutionalising of childhood as well as an impairment of outdoor play environments has for instance lead to children today playing more in homogenous age groups than previous generations. This again leads to a weaker transfer of play culture from older to younger children. Media and digital toys may fill in for this, replace traditional games and serve as tools and inspiration for children's play (Jessen, 2003).

A research study of the media use of Norwegian seven to twelve-year-olds concludes that new media does not seem to displace outdoor play or sports activities. It is rather other indoor activities, for instance drawing and reading, which are replaced. There is no indication that children who are active users of digital tools are any less active in other arenas than those who are not (Endestad et al., 2004). There is reason to believe that this is the case in kindergarten too. Moberg and Lindén (2008) found, by interviewing five-year-olds in kindergarten, that most children preferred physical activities, even those who expressed an interest in computers. They also state that the daily routines in kindergarten, including trips, outdoor play, meals and other activities, in any case prevent children from spending a lot of time by the computer. This is in accordance with my findings as well.

4.6 Archetypal descriptions of digital everyday lives

The examples of use of ICT as presented in this thesis show some of the digital competence these five-year-olds have as a group. It is however important to note that the ways children experienced and used ICT, both at home and in kindergarten, seemed to vary a lot. To elucidate these empirical tendencies in my data material, I have constructed three archetypal examples of digital everyday lives; "the super-user", "the gamer" and "the restricted". The archetypal descriptions are created by putting together data from observations and interviews of several children. Both genders were represented in the construction of all archetypes. My limited data material prevents me from saying that some of the archetypes are more likely to be a boy or a girl, and I have therefore deliberately described all three archetypes as boys.

4.6.1 The super-user

What characterises the super-user is an extensive use of a wide range of digital tools. Digital tools have always been a natural part of the super-user's life. Not only has he spent his first years surrounded by digital tools, he has also been allowed to use them. The super-user tells that he got his own computer, inherited after his older sibling: *"I have my own computer. I got it from my big brother"*. He uses the family's digital camera frequently: *"I can use the camera as often as I like to"*. CD- and DVD-players are also to be found in the super-user's home as well as PlayStation and Nintendo DS, and the super-user uses them all. He plays games, makes digital drawings, listens to music and looks at pictures.

In kindergarten the super-user also uses multiple digital tools. He is regularly to be seen by the computer where he also shares his knowledge and assists other children. He enjoys drawing and playing computer-games, and he shows a great interest in photographing. He is more selective in his choice of motives than most children and makes more use of the cameras functions, for instance the zoom.

4.6.2 The gamer

The gamer's use of digital tools is marked by his specific interest in playing games. The gamer has both a computer and a game console at home, but he clearly prefers playing on game consoles. When asked in the interview what computer games he likes to play, the gamer immediately answers: *"I prefer to play Nintendo"*. He is familiar with a number of games.

The gamer frequently brings his Nintendo DS to kindergarten. Due to his detailed knowledge of the games he often becomes the centre of attention when children gather around this kind of handheld game consoles. He willingly lends other children his Nintendo DS, helps them to select games and offers advices as they are playing.

The gamer may also be seen by the kindergarten computer from time to time. He prefers however playing games on Internet to the edutainment games available in kindergarten. He shows limited interest in drawing programs and photographing.

The gamer is often on Internet where he plays games and looks up his favourite characters from television series. *"In Internet you may just write Ben10 or Lego Starwars or just Lego or just Starwars or Gormits",* he explains in the interview.

4.6.3 The restricted

The restricted has limited access to digital tools at home. Even if there is a computer in the household, he is not allowed to use it. In addition to the computer there is a digital camera, a DVD-player and a CD-player in the home, but no kinds of game consoles.

The restricted uses digital tools in kindergarten, but not very often. He is sometimes to be found on the playing-list next to the computer, but when it is his turn he is often too busy doing something else. As he has less experience than some of the other children he tends to work a bit slower. He sometimes finds the presence of the spectators disturbing. When asked in the interview what he thinks about having spectators while playing, he quickly replies: *"Not that good. They bother me."* The restricted prefers playing when there are fewer children present, but since this is rarely the case he seldom plays. He is however from time to time to be found among the spectators.

When the restricted first uses digital tools he seems to enjoy it, both when it comes to drawing programs, computer games and the digital camera.

4.7 Digital divides

As the archetypal descriptions indicate, there seems to be considerable differences in the children's access to and use of digital tools. A worldwide digital divide may be easily recognised as differences between various countries' infrastructure and economical situations are apparent. The fact that digital divides are something we need to address within our own country is less obvious as most people seem to have access to digital tools. This will be discussed in the following sections.

4.7.1 A digital gap

Digital competence may be described as the sum of various digital skills which makes it possible to take part in a technological society. These may encompass "definition of information need, access to information, technological self-reliance, information management, information assessment, integration of information, communication and information sharing, and ability to create and present new

information using ICT" (Vox, 2008, p. 8). What these skills may consist of in more detail will depend on the individual's needs and the context. ICT is moreover a rapidly changing field, which makes acquiring new digital skills into a continuous learning process.

The increasing digitalisation of information and public services in Norway, has connected social and democratic aspects to the individuals' digital competence, and the risk of a digital divide between those who master digital tools and those who do not has been pointed out (Vox, 2008; Norwegian Ministry of Government Administration and Reform, 2009). Even if computers and Internet to a great extent have become common property in Norway, research show that adults' frequency and type of use seem to vary depending on age, gender and education. This means that there is still a digital divide in the society and it follows traditional patterns (Rønning, Sølvberg & Tønseth, 2005; Vox, 2008). This also seems to be the case in a study concerning primary school children's use of media. The type of use tends to vary a lot and a large group of children seem to use digital tools to a very limited extent (Endestad et al., 2004). These studies indicate that when speaking of digital divides there is a need to go beyond access.

Preschool children's use of ICT has not been mapped in the same way as the use of adults and older children. As pointed out by the described archetypes above, my findings indicated considerable individual differences when it came to five-year-olds use of ICT as well. The attitudes and meanings held by adults, especially by parents, on the use of technology for children must be considered as important in this matter (Jessen, 2003). Digital cameras were for instance to be found in every household, but were rarely used by children, and some of the five-year-olds stated that they did not have access to the home computer.

An interesting pattern which appeared in my data material was the coherence between the use of digital tools at home and in kindergarten. Children who spoke of an active use of digital tools at home also seemed to be the most involved users in kindergarten, whereas some children who expressed that they did not have much access to digital tools at home rarely engaged in such activities in kindergarten either. The causes for this were not further explored in my study, it is however reason to question what adults may do to reduce the digital divides and capture the interest of all children. Until the use of digital tools is a more natural part of kindergartens pedagogical everyday activities I assume these patterns are likely to remain.

4.7.2 Gender differences in the use of digital tools

An interesting aspect of digital divides in society is the gender differences occurring. Research shows that, when it comes to schoolchildren, girls generally use ICT less than boys. This is most obvious in the first years of primary school which

likely has to do with the increased need for all to use computers as a tool for schoolwork and information seeking in higher classes. The research also shows that boys overall have a more varied and advanced type of media use, whereas girls are more likely to be utility users (Endestad et al., 2004).

I have not focused upon gender differences specifically in my research as I found my sampling to be too limited. The group in which I conducted my research consisted of a clear majority of boys, approximately two thirds. My data material does however not indicate any immediate differences regarding boys' and girls' use of digital tools in the kindergarten. Boys and girls often seemed to play together, and this was also the case when they engaged with the computer. They used the same computer games and drawing programmes, and there were both girls and boys amongst those who expressed comprehensive use of ICT at home and those who had limited access. The only apparent difference I observed was that privately owned handheld game consoles, such as GameBoy and Nintendo DS, were exclusively used by boys. This might have been a coincidence as my sampling was limited; nevertheless it makes me wonder if the use of digital tools may appear more gender neutral in kindergarten than in children's home environments.

My impression that there were limited differences between boys and girls use of digital tools in kindergarten is supported by other studies as well. Moberg & Lindén (2008) do not discuss this topic in their book on preschool children's use of ICT because they faced the same problem in their research as I did, namely an unequal ratio of boys to girls. They express however that they did not observe any significant gender differences. Appelberg and Erikson (2000) also state that preschool children's interest in ICT seems to be more individual than gender related. Research in this area is however limited and I think it should be further explored with the purpose to see if and how kindergarten may contribute to reduce digital gender differences emerging at a later stage. May a playful introduction to ICT in early years lead to a more advanced and varied use of digital tools by girls as they grow older?

The fact that ICT already is part of most children's daily lives, and will continue to be so in the future should not be ignored. Sheridan and Pramling Samuelsson (2003, p. 7) state that "to be able to master ICT early in life is not only a question of necessity, but also of democracy, rights, and equality; that is, there must be equal access for all children, irrespective of backgrounds and gender".

5 Summary of findings and final remarks

5.1 Main findings

The aim of the research was to explore how a group of five-year-olds in a Norwegian kindergarten experience ICT in their everyday lives.

The study shows that availability of digital tools in kindergarten not necessarily indicate the actual use. Children's access to digital tools in kindergarten may be restricted and limited even though multiple digital tools are available and the staff hold overall positive attitudes towards technology. Several possible reasons for this have been pointed out, for instance the controversy concerning use of digital tools in kindergarten, vague signals from the government and adults' tendency to romanticise their own childhoods.

Despite environmental restrictions an active use of ICT is documented in the study. Children's use of digital tools seemed overall to be a social activity. The ongoing communication when children where gathered around the computer was extensive and seemed to serve different purposes. Based on Vygotsky's (1978) concept of the 'Zone of Proximal Development' the study gives examples of how skilled peers may 'scaffold' other children's learning and act as 'More Knowledgeable Others'. It also shows how children eagerly shared their knowledge among them and how digital knowledge was rapidly spread in the group. This kind of digital peer interaction is in the study related to Lave and Wenger's (1991) ideas of communities of practice.

While many children seemed to enjoy digital activities in groups, there were also those who expressed concerns about crowdedness and noise. The study questions if the social aspects of children's use of ICT are mirrored in the design of the kindergarten's physical environment.

Children's problem solving strategies when using digital tools seemed primarily to be trying things out themselves. Secondary support was sought from other children as well as adults. In this matter the study indicates a divide between adult initiated digital activities, such as digital photography and the use of Internet, and child-led activities such as the use of computer-games and drawing programs. A more varied and comprehensive adult engagement is called for.

ICT is often seen as an opposite of creativity (Bølgan, 2004). Multiple examples of how children express themselves in playful and creative ways through digital tools are however presented in the study. The findings indicate that digital drawing seemed to trigger children's creativity and may serve as a valuable supplement to traditional art activities. Digital photography might also be a way for children to express themselves as well as a tool for reflection and learning for both children and adults. The study

indicates however that this can be a challenging and time consuming process, and that it ought to be used more consciously than was the case in this study's data material.

The assumption of learning as "an integral and inseparable aspect of social practice" (Lave & Wenger, 1991, p.31) has been strengthened by this study. Most of the children did not seem to have a clear understanding on how they had gained their digital competence. In the child interviews several children stated that no one had taught them the use ICT, they had just learned it. This may reflect the Norwegian kindergarten's holistic approach to play, learning and everyday activities (Norwegian Ministry of Education and Research, 2006a). Observations showed that exploratory play in interaction with peers seemed to be an important way for children to achieve digital skills.

The study also indicates the need for practitioners to reconceptualise play. The ways children responded to on-screen characters and images in computer-games were in the study compared to their imaginary play with dolls and figures, and the findings indicate certain similarities. Children also found their own ways to use certain computer programs and made up their own little games. Their digital experiences were reflected in other kinds of play as well, which may indicate that the use of digital tools is an integral part of their everyday lives and their play cultures.

The examples provided in the study show mainly the skills and knowledge these five-year-olds possess as a group. However, the findings also indicate great individual differences which are elucidated by the introduction of three archetypal descriptions of digital everyday lives. There seems to be a digital divide both when it comes to access and use. The question is raised whether or not the use of digital tools in kindergartens may contribute to decrease these patterns of divide.

5.2 Further research

During the research process several topics have emerged which, in my opinion, could be interesting for further research.

I find for instance the restrictions occurring when digital tools are implemented in kindergarten interesting. Preschool children seem to experience the same limited activities regardless of the practitioners stated view on ICT (Bølgan, 2009). An important aspect of this is the distance many adults seem to take to digital activities. I think the underlying reasons for this should be further explored. Is it only due to lack of digital competence or are there fundamental beliefs and attitudes affecting this as well? Why is it that adults seem to relate less to children's use of digital tools than to other play activities? How may children's digital learning and play experiences be extended through increased adult involvement?

Adults' and schoolchildren's media habits and use of digital tools has been frequently mapped by extensive surveys (Endestad et al., 2004; Statistics Norway, 2007; Vox, 2008). Preschool children have however not been part of this kind of studies. My findings indicate that preschool children as a group are active users of technology, and it is, as I see it, about time that this group is included in research concerning the population's use of ICT as well.

Digital divides and the ways these are met in kindergarten is another area where I think more research is needed. In this matter I find the coherence between children's use at home and in kindergarten, as indicated in my study, worrying. How may practitioners work to reduce these digital gaps? In regards to this, gender difference in use of digital tools is an interesting aspect as well. How early do gender differences appear? How are they expressed at home and in kindergarten? May an introduction to ICT in early years contribute to decrease digital gender divides in school age?

Overall there seems to be a need for more research on preschool children and the use of digital tools. Even if there are ICT related activities to be found in many kindergartens, digital tools seem to a limited extent to have become an integral part of kindergarten's daily life and activities (Bølgan, 2009).

6 References

Appelberg, L. & Erikson, M.-L. (2000). *Barn erobrer datamaskinen: En utfordring for de voksne.* Oslo: Kommuneforlaget.

Bae, B. (2005). Troubling the identity of a researcher: methodological and ethical questions in co-operating with teacher carers in Norway. *Contemporary issues in early childhood education,* 6(3), 283-291.

Berthelsen, D. & Brownlee, J. (2005). Respecting Children's Agency for Learning and Rights to Participation in Child Care Programs. *International Journal of Early Childhood*, 37 (3) 49-59.

Borg, E., Kristiansen, I.-H. & Backe-Hansen, E. (2008). *Kvalitet og innhold i norske barnehager: En kunnskapsoversikt.* Nova-report 6/2008. Retrieved December 1, 2008, from http://www.nova.no/asset/3297/1/3297_1.pdf

Brooker L. (2001). Interviewing children. In Mac Naughton, G., Rolfe, S. and Siraj-Blatchford, I. (eds.), *Doing early Childhood research* (pp. 162-177). Buckingham: Open University.

Brooker L. & Siraj-Blatchford, J. (2002). 'Click on Miaow!': How children of three and four years experience the nursery computer. *Contemporary Issues in Early Childhood,* 3(2) 251-273

Bølgan, N. (2004). *Early Learners and the Use of Information and Communication Technology (ICT) in Kindergarten/Pre-school.* Paper presented at the 2nd NEOTHEMI Conference on Cultural Heritage and ICT. Theory and Practice, University of Helsinki, Finland, September 2003. Retrieved January 14, 2009, from http://www.edu.helsinki.fi/tt/neothemi/Neothemi2.pdf

Bølgan, N. (2006). *Temahefte om IKT i barnehagen.* Oslo: Ministry of Research and Education.

Bølgan, N. (2008). *Vil du være med så heng på!: Barnehagen som digital arena.* Bergen: Fagbokforlaget

Bølgan, N. (2009). *Barnehagens digitale tilstand. Nasjonal kartlegging av utstyr, tilgjengelighet og bruk av digitale verktøy i barnehagen.* Oslo: Ministry of Government Administration and Reform

Clark A. (2007). *Early Childhood Spaces. Involving children and practitioners in the designing process.* Retrieved January 20, 2009, from http://www.bernardvanleer.org/publication_store/publication_store_publications/early_childhood_spaces_involving_young_children_and_practitioners_in_the_design_process/file

Cullen, J., Hedges, H. & Bone, J. (2005). *Planning, undertaking and disseminating research in early childhood settings: An ethical framework.* Auckland, New Zealand: New Zealand Association of Early Childhood Education Research. Retrieved November 5, 2008, from http://www.childforum.com/publications.asp

Dahlberg, G. & Moss, P. (2005). *Ethics and politics in Early Childhood Education.* London: Falmer

Edwards, A. (2001). Qualitative designs and analyses. In Mac Naughton, G., Rolfe, S. and Siraj-Blatchford, I. (eds.), *Doing early Childhood research* (pp. 117-135). Buckingham: Open University.

Eide, B. J. & Winger, N. (2003). *Fra barns synsvinkel. Intervju med barn: Metodiske og etiske refleksjoner.* Oslo: Cappelen

Eide, B. J. & Winger, N. (2005). From the children's point of view: methodological and ethical challenges. In: Clark A., Kjørholt, A. T. & Moss P. (eds.), *Beyond listening*: *Children's perspectives on early childhood services* (pp. 71-90). Bristol: The Policy Press.

Endestad, T., Brandtzæg, P. B, Heim, J., Torgersen, L. & Kaare, B. H. (2004). *En digital barndom? En spørreundersøkelse om barns bruk av medieteknologi*: *Nova report 1 (2004).* Retrieved November 1, 2008, from http://www.reassess.no/asset/274/2/274_2.pdf

Fangen, K. (2004). *Deltagende observasjon.* Bergen: Fagbokforlaget

Frønes, I. & Haldar, M. (eds.) (1998). *Digital barndom.* Oslo: Gyldendahl

Golafshani, N. (2003). Understanding Reliability and Validity in Qualitative Research. *The Qualitative Report* 8 (4) 597-607. Retrieved November 5, 2008, from http://www.nova.edu/ssss/QR/QR8-4/golafshani.pdf

Hammersley, M. & Atkinson, P. (1996). *Feltmetodikk [Principles in practice].* Oslo: Gyldendahl

Hughes, P. (2001). Paradigms, methods and knowledge. In Mac Naughton, G., Rolfe, S. and Siraj-Blatchford, I. (eds.) *Doing early Childhood research* (pp. 31-55). Buckingham: Open University.

Jessen, C. (2003). *The changing face of children's play culture. Children's play, learning and communication in a technology driven world.* Retrieved October 10. 2008 from http://www.carsten-jessen.dk/Play_Culture.pdf

Jørgensen, L., Havn Pettersen, L. & Hansen, S. E. (2005). *Computerskaberi.* Esbjerg: CVU Vest Press

Klerfelt, A. (2007). *Barns multimediala berättande. En lank mellan mediakultur och pedagogisk praktik. [Children's digital storytelling and cultural meaning. A link between educational practice and mass media.].* Doctoral dissertation in Educational Science. Gothenburg: Gothenburg University

Kristoffersen, E. (2006). En forskjell som må føre til en forskjell. In *Temahefte om barns medvirkning* (pp.52-78). Oslo: Ministry of education and research

Lave, J. & Wenger, E. (1991). *Situated Learning: Legitimate Peripheral Participation.* Cambridge: Cambridge University Press

Ljung-Djärf, A. (2004). *Spelet rundt datorn: Datoranvändande som meningsskapande praktik i förskolan.* Doctoral dissertation in Educational science. Malmö University College. Retrieved December 8, 2008, from http://www.lub.lu.se/luft/diss/soc_486/soc_486.pdf

Mac Naughton, G., Rolfe, S. and Siraj-Blatchford, I. (eds.) (2001). Getting the terms right. In Mac Naughton, G., Rolfe, S. and Siraj-Blatchford, I. (eds.) *Doing early Childhood research* (pp. 264-274). Buckingham: Open University.

Moberg, L. M. & Lindén, N. (2008). *Barn og kommunikasjon. Om små barns bruk og utforsking av digitale verktøy.* Oslo: Gyldendal

National Committee for Research Ethics in Norway (2005). *Guidelines for research ethics in the social sciences, laws and the humanities.* Retrieved November 1, 2008, from http://www.etikkom.no/English/NESH/guidelines.

Norwegian Ministry of Education and Research (2005). *The Act on Daycare Institutions (The Day Care Institution Act).* Retrieved June 6, 2007, from http://www.regjeringen.no/en/dep/kd/Selected-topics/kindergarden.html?id=1029

Norwegian Ministry of Education and Research (2006a). *Framework Plan for the Content and Tasks of Kindergartens.* Retrieved June 6, 2007, from http://www.regjeringen.no/en/dep/kd/Selected-topics/kindergarden.html?id=1029 Oslo: Ministry of Education and Research

Norwegian Ministry of Education and Research (2006b). *Læreplanverket for kunnskapsløftet.* Oslo: Utdanningsdirektoratet

Norwegian Ministry of Government Administration and Reform (2007). Statsråd *Heidi Grande Røys ønsker økt bruk av IKT i barnehagen.* Press release published December 2. 2007. Retrieved from http://www.regjeringen.no/nb/dep/fad/pressesenter/pressemeldinger/2007/Heidi-Grande-Roys-onsker-okt-bruk-av-IKT.html?id=492540

Norwegian Ministry of Government Administration and Reform (2009). *Behov for økt digital kompetanse i barnehagen.* Press release published February 20. 2009. Retrieved from http://www.regjeringen.no/nb/dep/fad/pressesenter/pressemeldinger/2009/behov-for-okt-digital-kompetanse-i-barne.html?id=546515

OECD (2006.) *Starting Strong II. Early childhood education and care.* Retrieved September 20, 2007, from http://www.oecd.org/dataoecd/14/32/37425999.pdf

O`Hara, M. (2008). Young children, learning and ICT: a case study in the UK maintained sector. *Technology, Pedagogy and Education*, 17 (1), 29-40

Olesen, B. R. (2000) Et børnekulturelt perspektiv – eller hvordan kan voksne forske i børn? In Holm Sørensen, B. & Olesen, B, R. (eds.), *Børn i en digital kultur: Forskningsperspektiver* (pp. 125-145). Copenhagen: Gads

Plowman, L. & Stephen, C. (2005). Children, play and computers in pre-school education. *British Journal of Educational Technology*, 36 (2), 145-157

Postholm, M. B. (2005). *Kvalitativ metode: En innføring med fokus på fenomenologi, etnografi og kasusstudier.* Oslo: Universitetsforlaget

Prensky, M. (2001) *Digital Natives, Digital Immigrants - A New Way To Look At Ourselves and Our Kids*. Retrieved November 15, 2008, from http://www.marcprensky.com/writing/

Rhedding-Jones, J. (2005). *What is Research? Methodological practices and new approaches*. Oslo: Universitetsforlaget

Rinaldi, C. (2005). Documentation and assessment: what is the relationship? In Clark A., Kjørholt, A. T. & Moss P. (eds.), *Beyond listening*: *Children's perspectives on early childhood services* (pp. 29-50). Bristol: The Policy Press.

Rønning, W. M., Sølvberg, A. M. & Tønseth, C. (2005). Voksnes bruk av PC og Internett [online]. *Samfunnsspeilet/StatisticsNorway,* 19 (3) 21-28.

Sandberg, A. & Pramling Samuelsson, I (2003). Preschool Teachers' Play experiences Then and Now. *Early Childhood Research and Practice* 5 (1) [online]. Retrieved February 11, 2008, from http://ecrp.uiuc.edu/v5n1/sandberg.html

Sheridan, S. & Pramling Samuelsson, I. (2003). Learning through ICT in Swedish Early Childhood Education – from a pedagogical perspective of quality. *Childhood Education* 79(5), 276-282.

Siraj-Blatchford, I. & Siraj-Blatchford, J. (2001). Surveys and questionnaires: an evaluative case study. In Mac Naughton, G., Rolfe, S. and Siraj-Blatchford, I. (eds.), *Doing early Childhood research*. pp. 149-161. Buckingham: Open University.

Statistics Norway (2007). *Norwegian media barometer 2007*. Retrieved February 20, 2009, from http://www.ssb.no/medie_en/

Statistics Norway (2008a). *Children in kindergartens. Final figures, 2007*. Retrieved January 11, 2009, from http://www.ssb.no/english/subjects/04/02/10/barnehager_en/

Statistics Norway (2008b). *ICT in Households, 2nd quarter of 2008*. Retrieved January 11, 2009, from http://www.ssb.no/english/subjects/10/03/ikthus_en/

Sutton-Smith, B. (1997). *The ambiguity of play*. London: Harvard University Press

Svennevig, S. N. (2009, February 13). Digital lek gjør barn til lærere. Article [online]. *Forskning.no*. Retrieved February 16, 2009, from http://www.forskning.no/artikler/2009/februar/209432

Säljö, R. (2001). *Læring i praksis. Et sosiokulturelt perspektiv.* Oslo: Cappelen

Veen, W. & Vrakking, B. (2006). *Homo Zappiens. Growing up in a digital age.* London: Network Continuum Education

Vox (2008). *The Digital citizen: An analysis of the digital competence in the Norwegian population.* Retrieved April 26, 2009, from http://www.vox.no/upload/7903/The_Digital_Citizen_SEC.pdf

Vygotsky L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes.* London: Harvard University Press

Wolcott, H. F. (2008). *Ethnography, A Way of Seeing*. Plymoth: Alta Mira Press

Woodhead, M. (2005). Early Childhood Development: A Question of Rights. *International Journal of Early Childhood*, 37 (3), 79 – 95

Zevenbergen, R. (2007). Digital natives come to preschool: Implications for early childhood practice. *Contemporary Issues in Early Childhood ,* 8 (1), 19-29

Østrem, S., Bjar, H., Føsker, L. R., Hogsnes, H. D., Jansen, T. T., Nordtømme, S. Tholin, K. R. (2009). *Alle teller mer: En evaluering av hvordan Rammeplan for barnehagens innhold og oppgaver blir innført, brukt og erfart. Vestfold University college: Report 1/2009*. Retrieved April 2, 2009, from http://www.regjeringen.no/upload/KD/Vedlegg/Rammeplanen/Evaluering%20av%20rammeplanen.pdf

Appendices

Appendix A: Letter from the Norwegian Social Science Data Services

Norsk samfunnsvitenskapelig datatjeneste AS
NORWEGIAN SOCIAL SCIENCE DATA SERVICES

NSD

Harald Hårfagres gate 29
N-5007 Bergen
Norway
Tel: +47-55 58 21 17
Fax: +47-55 58 96 50
nsd@nsd.uib.no
www.nsd.uib.no
Org.nr. 985 321 884

Vibeke Bjarnø
Avdeling for lærerutdanning og internasjonale studier
Høgskolen i Oslo
Postboks 4 St. Olavs plass
0130 OSLO

Vår dato: 16.01.2009   Vår ref :20803 / 2 / LT   Deres dato: Deres ref:

KVITTERING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 18.12.2008. Meldingen gjelder prosjektet:

20803	*ICT from preschool children's perspectives*
Behandlingsansvarlig	*Høgskolen i Oslo, ved institusjonens øverste leder*
Daglig ansvarlig	*Vibeke Bjarnø*
Student	*Liv Inger Hansen*

Personvernombudet har vurdert prosjektet og finner at behandlingen av personopplysninger er meldepliktig i henhold til personopplysningsloven § 31. Behandlingen tilfredsstiller kravene i personopplysningsloven.

Personvernombudets vurdering forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i meldeskjemaet, korrespondanse med ombudet, eventuelle kommentarer samt personopplysningsloven/-helseregisterloven med forskrifter. Behandlingen av personopplysninger kan settes i gang.

Det gjøres oppmerksom på at det skal gis ny melding dersom behandlingen endres i forhold til de opplysninger som ligger til grunn for personvernombudets vurdering. Endringsmeldinger gis via et eget skjema, http://www.nsd.uib.no/personvern/forsk_stud/skjema.html. Det skal også gis melding etter tre år dersom prosjektet fortsatt pågår. Meldinger skal skje skriftlig til ombudet.

Personvernombudet har lagt ut opplysninger om prosjektet i en offentlig database, http://www.nsd.uib.no/personvern/prosjektoversikt.jsp.

Personvernombudet vil ved prosjektets avslutning, 15.07.2009, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen

Bjørn Henrichsen

Lis Tenold

Kontaktperson: Lis Tenold tlf: 55 58 33 77
Vedlegg: Prosjektvurdering
Kopi: Liv Inger Hansen, Øvre Langgate 25F, 3110 TØNSBERG

Personvernombudet for forskning

Prosjektvurdering - Kommentar

Personvernombudet finner opplegget for gjennomføringen av prosjektet tilfredsstillende og finner at behandlingen kan hjemles i personopplysningsloven § 8 første ledd (samtykke).

Det gis skriftlig informasjon og innhentes skriftlig samtykke fra foresatte for at barna deres kan delta. Personvernombudet finner skrivet tilfredsstillende.

Innsamlete opplysninger anonymiseres ved prosjektslutt, senest ved utgangen av juli 2009. Med anonymisering innebærer at navnelister slettes/makuleres, og ev. kategorisere eller slette indirekte personidentifiserbare opplysninger. Lyd- og videobåndopptak makuleres.

Appendix B: Letter to the parents

Til foreldre/foresatte i ………..   barnehage.

Etter å ha jobbet 15 år i barnehager, som pedagogisk leder og støttepedagog, er jeg for tiden masterstudent i Early Childhood Education and Care (barnehagepedagogikk) ved Høgskolen i Oslo. Jeg holder nå på med den avsluttende masteroppgaven og har valgt barnehagebarns perspektiver på IKT (informasjons og kommunikasjonsteknologi) som mitt tema. Hensikten med prosjektet er å lære mer om hvordan barnehagebarn oppfatter og bruker digitale verktøy som for eksempel datamaskin, digitale kameraer, elektroniske leker og spill, Internett, kreativ programvare (tegneprogrammer og lignende) og CD-/DVD-spillere i barnehagen og hjemme.

For å finne ut av dette, ønsker jeg først og fremst å tilbringe tid sammen med barna i barnehagen. Jeg tar sikte på å være i barnehagen to eller tre dager i uka fra midten av …….. 2009 til slutten av ……… 2009. Video-opptak, lydopptak og notater vil bli brukt for å samle informasjon. Dette materialet vil imidlertid bli slettet umiddelbart etter at masteroppgaven er ferdig skrevet, innen utgangen av juli 2009.

Når jeg har blitt kjent med barna og barna føler seg trygge på meg vil jeg ha uformelle samtaler med dem i små grupper. Det vil være barna som bestemmer hvorvidt de ønsker å delta i disse samtalene eller ikke.
For å få vite litt om barnas bruk av IKT hjemme vil jeg også utarbeide et spørreskjema som barna og dere foreldre/foresatte kan fylle ut i samarbeid.

Dersom du/dere kan tenke dere å la barnet ditt /deres delta i dette prosjektet, er det fint om du/dere skriver under på den vedlagte samtykkeerklæringen og leverer den til personalet i barnehagen innen ……....... 2009.

Det er frivillig å være med på prosjektet og du/dere har mulighet til å trekke deg/dere når som helst underveis, uten å måtte begrunne dette nærmere. Studien er meldt til Personvernombudet for forskning, Norsk samfunnsvitenskapelig datatjeneste A/S, og alle opplysninger vil bli behandlet konfidensielt og anonymisert. Ingen enkeltpersoner vil kunne kjennes igjen i den ferdige oppgaven.

Hvis det er noe du lurer på kan du ringe meg på tlf. 91696202 eller sende e-post til livingerhansen@hotmail.com. Du kan også ta kontakt med min hovedveileder Vibeke Bjarnø ved Høgskolen i Oslo på tlf. 22 45 22 28 eller e-post vibeke.bjarno@lui.no

Med vennlig hilsen Liv Inger Hansen

……………………………………………………………………………………………

Samtykkeerklæring (leveres til personalet innen …………):

Jeg har mottatt informasjon om studien av barnehagebarns perspektiver på IKT og samtykker i at mitt barn…………………………………………………………………… kan delta.

Signatur

Appendix C: Interview guide

TEMA	STIKKORD
Innledning Min rolle	• **Klargjøring av frivillig deltakelse. Barna som bestemmer hva de vil fortelle.** • **Min rolle i barnehagen. Hensikten med intervjuene.**
Spill	• **Preferanser mht. spill.** • **Tanker omkring det å samarbeide med andre barn. Fellesskap. Tilskuerrollen.** • **Bruk av PC-spill hjemme.** • **Bruk av spillkonsoller.**
Tegneprogrammer	• **Barnas tanker rundt det å bruke data til å tegne.** • **Utskrifter?**
Læring	• **Barnas formeninger om hvordan de har lært det de kan og av hvem.** • **Barns taktikker når de står fast i spill/tegneprogrammer.**
Tilgjengelighet	• **Tilgang til PC i barnehagen og hjemme.** • **Tidsbegrensninger** • **Listesystem**
Foto	• **Motiver. Hva tar barn bilder av?** • **Etterarbeid** • **Tilgang. Når får barn ta bilder?** • **Digital fotografering hjemme.**
Internett	• **Kunnskaper om Internett og hva man kan bruke Internett til.**
Diverse	• **Er det noe annet dere har lyst til å fortelle om?**
Avslutning	• **Husk å takke barna for intervjuet og påpeke at de har bidratt med viktig informasjon!**