

Preschool Teachers on Implementation of Digital Technology in Norwegian Kindergartens

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Abstract

Digital technology is increasing in society today, also in the early childhood education. Accordingly, there is a need of research on this topic. In this article, a part of a study on digital technology in Norwegian kindergartens is presented. The focus is on preschool teacher's reasons for and experiences with application of the technology in their educational work in kindergarten. The overall aim is to shed light on, analyse and discuss aspects of implementation of digital technology in Norwegian kindergarten contexts. The research question is accordingly: *what are the preschool teacher's reasons for their implementations of digital technology*. The theoretical and conceptual framework is based on socio-cultural perspectives, using a mixed method approach. The empirical data are based on a national survey, focus group interviews and field conversations. The study draws upon phenomenological and hermeneutic perspectives, using grounded theory in the analysis. The discussion deals with two broad themes evolved from the analyses: *Questions on curriculum* and *issues of cultural formation*. Finally the results implications for policy and practice are problematized.

Introduction

In this article we focus on a theme of increasing interest in the field of early childhood education; digital technology in kindergarten (OECD 2012). More specific we will re-visit and discuss findings in an earlier study about Norwegian preschool teacher's perspectives on challenges and possibilities with digital technology in their kindergartens (Jernes, Alvestad, and Sinnerud 2010). The aim in the former study was to describe preschool teacher's experiences of digital technology as a phenomenon in their daily educational practices. Theoretically, the study was anchored in socio cultural perspectives on knowledge-building (Dewey 2008, 1997, Klafki 2005). The results were based on qualitative analyses of empirical data from group interviews carried out in collaboration with 16 preschool teachers in three different Norwegian kindergarten contexts (Cresswell 2007, Kvale 1997, Krueger and Casey 2000).

The study resulted in three categories (phenomenon): *knowledge*, *process* and *vision* (Jernes, Alvestad, and Sinnerud 2010). The category *knowledge* implies that the kindergarten teachers were situated in a tension between how they interpret the national curriculum and the freedom in relation to their own local plan. The category *process*, concerns the dilemma between giving room for children's exploring and the staffs need to regulate the activity. Finally, the category *vision*, concerns the tension between digital competence and pedagogical (educational) competence.

In this article, we will carry out a supplementary analysis with the former study and the empirical data as a basis.

The overall aim in this study is accordingly: *to go deeper into what kind of arguments the preschool teachers are using in implementing digital technology in Norwegian kindergartens*. The research question in this study is: *what are the preschool teacher's reasons for their implementation of digital technology?* The study is based on phenomenology, and the

qualitative analyses are based on a reflective hermeneutic approach (Alvesson and Sköldbberg 2008, Gadamer 2006). The theoretical foundation is within socio-cultural perspectives.

The Norwegian context

Norwegian kindergartens¹ have an integrated system services for children from birth to five, and there has been an increasingly extension of kindergarten during the 1990ies.

In 2005, the kindergartens as service, was transferred from the *Ministry of Child and Family Affairs* to the *Ministry of Education and Research*, and today approximately all (90 % of all children in 2013 numbers) are attending kindergartens (SSB, 2014). (Sentralbyrå 2014).

The costs for kindergartens are shared between parents, paying 20 % (maximum 2330 NOK per month), while the state and the municipalities are paying the rest.

Preschool teachers hold a bachelor degree (3 years at university). The proportion of qualified preschool teachers are 35% which OECD (2006) has pointed at as low compared to other Scandinavian countries like Sweden and Denmark. Key figures are saying a rate of capacity on 9 children under three years, and 18 children over three years per educated preschool teacher (Barnehageloven 2011, Nergård 2012).

The first national Framework plan was introduced in January 1996, and revised in 2006 and later in 2011.

In 2011 the concept *formation* (the term of the German notion *Bildung*, *danning* in Norwegian) was introduced and it is now regulated in the Kindergarten act. In these days it is under revision again. The plan is providing guidelines to all kindergartens in Norway, both private and public.

The Framework Plan for the Content and Tasks of Kindergartens consists of three parts. The *first* part deals with the kindergartens mandate, the objectives and values. The *second* part is about the content in kindergartens, introducing pedagogical approaches and curricular aims presented in seven subject areas: Communication, language and text - Body, movement and health – Art, culture and creativity - Nature, environment and technology - Ethics, religion and philosophy - Local community and society - Number, spaces and shapes. The *third* part concerns the aspects of planning, documentation, assessment including cooperation with other parts/institutions in society (Kunnskapsdepartementet 2011) (Ministry of Education and Research, 2011, p. 3).

The Framework plan emphasizes holistic learning and free play. Digital tools are mentioned explicit once in the second part, when informing on everyday situations, play and learning. It says that “*Children should have the opportunity to experience how digital tools can be used for play, communication and the gathering of information*” (KD, 2011:24 in the intro. part II). In some parts, the plan uses the notion “shall”, while when talking about digital tools, the concept “should” is used. A booklet concerning ICT in kindergarten is also published by the Ministry in relation to the Framework plan (Bølgan 2006).

1 «Norway, a country of 4.8 million inhabitants described as one of the Nordic social welfare states, is today known for an integrated system of services for all children between the ages of zero and five years, with a well established and extensive system of publicly funded kindergartens and having high quality standards (OECD 2006). The kindergarten tradition in Norway can be traced back to 1837 when the first asylum for young children – mainly from poor families – was established in the city of Trondheim. From 1920, institutions for young children were called daghjem (daynurseries) and the responsibility was transferred from the central authority to the municipalities. The ideal for the pre-schools educational establishment at that time was the ‘good commonly home’ (Balke 1995)” (Alvestad, 2009, p. 416f).

Research of current interest

Children in today's society has met technology since they were born (Prensky 2001b, a). Figures from various statistical studies show that access to technology and the Internet are present in most households with children, as well as in most kindergartens in Norway (Vaage 2012, Kvinge et al. 2010, Bølgan 2009). Still, there is little research done in Norway on this matter, either on the practice of using technology nor the teachers attitude to this issue (Borg, Kristiansen, and Backe-Hansen 2008).

International research on ICT in the kindergarten has revolved around topics like the child's education, health, social and cultural issues (cf. Plowman, Stephen, and McPake 2010, p. 26f). Studies also points at different attitude and approaches to technology (Sheridan and Pramling Samuelsson 2003, Tingstad 2006, Plowman, Stephen, and McPake 2010, Moinian 2011). The Swedish researcher Ljung-Djärf (2004), identified three approaches in justifying the use of technology; *care*, *upbringing* and *education*. In the first approach, *care*, ICT activities were organized as free play, with the need of regulation. In the second, *upbringing*, the preschool teacher considered the values of using technology to get social experiences. The third approach, *education*, was connected to using technology for the children's future. Plowman and Stephen (2007) has in their research pointed at teachers in early childhood services appearing in two different approaches within guided interaction when using technology; either in a *proximal* approach being active in advising and regulating the activity or a more *distal* approach, focusing mostly on facilitating the activity and letting the children do technological activities by their own. It seems like preschool teachers might abdicate the arena, not being aware of the activity with technology (Plowman and Stephen 2006). According to Haugland (2000), teacher's support has an essential impact for the children's learning outcomes. She emphasize that "drill and practice" using computer games, might not be good enough in a professional educational context. This is in line with research form Greek context. Tsitouridou and Vryzas (2004) found contradictions in preschool teachers view on ICT in kindergarten. Teachers' view on the use of computer is anchored in their own knowledge and ICT training, not of their pedagogy gained from education. High technological competence is a factor for introducing computers for children in kindergarten, while those with little experience think this is not very important. The teacher's guidance and support determines whether the computer act as a tool in the learning process for the children. Also the exclusion issue seems to need reflection in digital context (Jernes & Engelsen, 2012).

The attitude to technology is in a continually change, and in the Norwegian national survey on ICT from 2010, an overweight of positive approaches to technology in kindergarten was evident (Kvinge et al. 2010, Engelsen et al. 2012). This is in line with a small-scale study from school context (Deaney, Ruthven, and Hennessy 2003). The students felt it was important to master the technology in terms of future employment. They believed that if the technology were to be used in school, the teacher ought to have more expertise and security in both the technological and scientific issues. The researchers pointed out that one should carefully examine when and how technology can be used in educational communication to achieve good learning.

This brings us to the essential point in our former study, searching for the preschool teacher's groundings for using technology (Jernes, Alvestad, and Sinnerud 2010).

Theoretical perspectives

Theoretical, the study is grounded in social, cultural and critical perspectives, including perspectives on socialization, distribution; mediation; language and participation in practise (Dewey 2008, 1997, Vygotsky 1978, Dysthe 2001). The issues of education and learning are

understood within a holistic learning perspective. Framed in Biestas (2011) concepts, learning concerns subjectification, socialisation and qualification. A critical-constructive perspectives based on Klafkis (2004, 1998) theory is further seen as relevant. In this perspective six central aspects is drawn to consider in education: cultural perspectives; relative/relational autonomy; *bildung* (self-determination, co-determination and solidarity (cultural formation)); democratic education; communication/interaction and the relation between pedagogical theory and practice.

To implement a National Curriculum, like the Norwegian Framework plan is a complex task raising varied questions on many levels, from the implementation process via the ideological to the interpreted and implemented plan into practice (Goodlad 1988, Alvestad 2001). The curriculums five levels of appearance are according to Goodlad: the ideological, the formal, the interpreted, the implemented and the experienced curriculum (Goodlad 1988, Alvestad 2001, Gudem 1990). The fact that a national curriculum is implemented does not mean that it necessarily achieves the 'desired outcome.' Theoretical perspectives on curriculum issues are accordingly also relevant to take into theoretical as well as practical considerations.

Methodology

In this qualitative study (Denzin and Lincoln 2000, Alvesson and Sköldbberg 2008) we are searching for new more in depth results than what occurred in the earlier as presented in the introduction. It can be seen as a *supplementary analysis*, which Heaton (2004) describes as a "more in-depth investigation of an emergent issue or aspect of the data which was not considered or fully addressed in the primary study" (ibid, p. 38)². So the empirical data are also re-visited. In the analysing process, we are moving from the empirical data to the theory and back again repeatedly, which can be described as a circular, hermeneutic approach (Gadamer 2006, Cresswell 2007).

Looking at the former study (Jernes, Alvestad, and Sinnerud 2010), it was anchored in a phenomenological hermeneutic tradition (van Manen 1990, Alvesson and Sköldbberg 2008). Hermeneutics as a philosophy is strongly linked to Hans-Georg Gadamer (f. 1900-2000) (Gadamer 2006) in developing the doctrine of interpretation and seeing the hermeneutics as more than an art learning (Wittusen 2000). A central concept is the term *horizon*; which indicate how we interpret what we see, on the basis of our own world and position. Therefore our pre-understanding must be transcendental in research. Moreover, in the last century, the combining of the philosophy of phenomenology with hermeneutical understanding was developed by several philosophers from different areas as Alfred Schütz, Paul Ricouer and Maurice Merleau-Ponty to mention someone (Alvesson and Sköldbberg 2008). As we understand this, the hermeneutic approach involves the interpretation and description of the interpretation researcher does on the phenomena being researched in. This follows by the other central concept of Heidegger; the *hermeneutic circle*(Gadamer 2006, p. 269). This is

² "Types of secondary analysis of qualitative data

- Supra analysis: Transcends the focus of the primary study from which the data were derived, examining new empirical, theoretical or methodological questions.
- Supplementary analysis: A more in-depth investigation of an emergent issue or aspect of the data which was not considered or fully addressed in the primary study.
- Re-analysis: Data are re-analysed to verify and corroborate primary analyses of qualitative data sets.
- Amplified analysis: Combines data from two or more primary studies for purposes of comparison or in order to enlarge a sample.
- Assorted analysis: Combines secondary analysis of research data with primary research and/or analysis of naturalistic qualitative data"(Heaton, 2004, p. 38).

used as a metaphor for the researching process, where we are trying to interpret the parts to understand the whole, and vice versa.

The qualitative interviews were carried out as semi structured focus-group interviews with 16 preschool teachers in three kindergartens (Kvale 1997, Krueger and Casey 2000). The analysing process was complex, and inspired by grounded theory (Corbin and Strauss 1998). Ethical implications as informed consent, anonymising and information about how the results was to be presented, was taken care of.

Results

This supplementary analysing process resulted in two broad themes or categories we want to present and discuss. First we present and discuss *i) Questions on Curriculum* which deals with the possible discrepancy between the prescribed curricula and practitioner's interpretation. Second we will present and discuss *ii) Issues of Cultural Formation*. In this theme we see a challenge to hold both visions for the future and the moment of here-and-now as arguments for implementing technology in kindergarten.

Questions on Curriculum

In the Norwegian Framework plan, digital technology is talked about in rather general terms as *media*. This kind of general description seems to be interpreted by the preschool teachers as if ICT and digital tools are coming up in a broad sense. But this is not necessarily so, as we read it. As mentioned earlier, statements on ICT is explicit described once in the national curriculum (Department of Education and Research, 2011, p. 24). Further on, the official booklet on ICT in kindergartens (Department of Education and Research, 2006), is not referred to by the teachers in our data. The national survey support this finding in a way, as it is there referred to be used to in a minor degree (Kvinge et al. 2010, Engelsen et al.). A question is whether the plan is clear enough when it comes to implementation of technology into practice, when expressing: "Children should have the opportunity to experience how digital tools can be used for play, communication and the gathering of information" (Department of Education and Research, 2006, p. 24). In other parts, the curriculum is using the notion "shall", which appears stronger, as we interpret it. The notion "shall" is in use four times more often than "should". According to Goodlad's (1988) theory on curriculum, also the process from a teachers interpretation of the ideological and formal curriculum, the implementation of the curriculum in practice, might change.

Looking at the teacher training, the preschool teachers describe their experiences with digital technology as missing/absent (Jernes, Alvestad, and Sinnerud 2010, p. 122). Interestingly they talk about a wide range of digital knowledge from their experiences in their own home contexts. The preschool teachers mention the use of technology at home in general, but it seems that they are not much able to make use of it, or be aware of this in relation to the kindergarten contexts. When this is not discussed and made aware of in connection to an educational context, this is understandable. As we interpret it, this is giving some thoughts of the implications for teacher education in Norway, when it comes to digital technology.

The fact that Norway has introduced a national curriculum does not mean that it necessarily achieves the desired outcome, especially if a control system is transferred from one country's educational system to another different system (Alvestad 2004b, p. 85-86). If a control system or other educational frames are transferred from one system without any reflection upon educational differences and national guidelines, tools like this could be even more central in practice than the content of the National Curricula itself.

In line with this one question related to the ICT topic, is weather different “control systems” or rather market operators, (commercial forces, software offered for free/at low cost) or educational frames might become even more influencing and central in the educational practices than the intentions and the content of the national curricula? When it comes to curriculum practice the teachers have a key role in the realization of the intentions into practice. In this regard competence and adequate knowledge is an important part of it.

Issues of Cultural formation

The preschool teachers’ arguments for learning in relation to the ICT, is seen as important for the children’s distant future as grown up members of society, but also for the near future in school preparation. One of the preschool teachers says:

“I think that it is a preparation for the rest of their lives; they get first-hand experiences in kindergarten, early. Accordingly this is not what they will need to spend most of the time at when they start school. They do not need to be familiar with ICT, because it is already familiar to them. The children can rather use the software they meet at school, and then they can focus on the knowledge content. They are already familiar with the keyboard, the letters and how it all works (RIV12:426-432). Related to the school context another teacher expresses: “I think that working on ICT is a school preparatory activity”(RIV12:606 -607).

The justification on learning appears as multifaceted and goes beyond the school and the future itself. The preschool teachers talk about children’s joy of mastering the technology in a here-and-now perspective (Jernes, Alvestad, and Sinnerud 2010, p. 123). By the pleasure of playing with ICT, the children also develop skills in using the technology for the future (Jernes, Alvestad, and Sinnerud 2010, p. 123, Alvestad 2004a). It is not an ‘either or perspective’, it is more like a ‘here-and-now *and* future perspective’, according to the teachers. They see the mastering of ICT as qualification for life, as we interpret it. This is one of three important aspects in learning, according to Biesta (2011).

In the former study, the preschool teachers were using technology in a wide range of activities, for example using computer games and software for writing and drawing. They distinguished between two ways of using technology; for simple computer games, learning to press the buttons, *and* using technology for specific learning of different knowledge content. However, the problem of focusing more on technics than on content (materiality) appeared. According to Klafki (2005), this can make the school practices poor, lacking the emphasis on cultural formation (*bildung* in Klafkis terminology) for the individual in relation to the developing of solidarity. Looking at the empirical data, we cannot trace specific examples of the teachers’ state of the reason for the use of ICT connected to the subject content. But of course this might be due to the questions asked or not asked. As we see it though, the preschool teachers seem to lack digital, as well as pedagogical competence, and not at least to see the connection between them.

However so, it seems that their state of the reason for implementing technology in kindergartens was connected to the children’s learning of awareness regarding their own choices and critical thinking (Jernes, Alvestad, and Sinnerud 2010, p. 123). In a process of cultural formation, or *bildung* (Klafki 2005), this is very important when it comes to make the children aware of their own rights and choices in becoming democratic citizens regarding the media within a consumer society (Tingstad and Buckingham 2010, Buckingham 2011).

Final comment

In this presentation we have addressed some key aspects from the (ongoing) supplementary analyzing of how Norwegian preschool teachers state the reason for implementing digital technology in Norwegian kindergartens. To sum up it seems that there is a lack of educational (didactical, curriculum) competence as well as digital competence. Accordingly there is a need for more knowledge and competence about these aspects both in the teacher training at university as well as in further education for the practitioners. Finally there is a need to develop more knowledge about ICT and digital tools related more clearly to children's cultural formation, *bildung*, connected to the content, the strategies (working design) as well as values related to the society of tomorrow.

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