

# Digital technologies in day-care institutions – tracing different uses by children and pedagogues

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## Background of the project

During the last 3-4 years there has been an increasing focus - politically and pedagogically - on use of digital technologies in the Danish Day-care Centers. A substantial amount of new technologies have been purchased: Digital cameras, tablets and simple robots. However, there are big differences regionally and institution-wise in level of engagement with new technologies. In some regions and institutions there is hardly any engagement (Rambøll Management Consulting 2014).

The traditional critical viewpoint sees technologies as being opposed to the well-being of children. This view is challenged partly because children have access to digital tools in infant life, and partly because new technologies are designed with an intuitive and inviting user interface. Also, there is a political pressure for use of technologies in educational environments. (Beynon 1992, Schiølin 2014, Regeringen 2011).

It seems that the digital technologies have come to stay in infant live in institutions. This raises a lot of pedagogical, didactical and technological questions. To address this The Danish Ministry of Education have financed a one-year research project on 'Digital Tools in day-care institutions'.

The research project was decided to be participative in its construction, and the over-all research questions were concentrated on the role of digital tools in the well-being and learning possibilities for the children (Schrøder 2015).

In this paper we will present and discuss two of the findings from the project: 1) Children and adults seems to handle technologies in different ways 2) The professionals are to a large degree lacking a professional understanding and language of technologies in pedagogical contexts. Before going into this, I will give a brief outline of the theory and method of the project.

## Theory

Our overall approach to the pedagogical activities with technologies studied, is informed by theories of technology, theories of children and theories of professional expertise.

At the outset we see technologies as socio-material artefacts, a viewpoint expressed paradigmatically by Deleuze, when he states that: *The machine is always social before being technical. There is always a social machine, which selects or assigns the technical elements used.* (Deleuze 2006, p. 52).

Machines – and technologies – are developed in social contexts and are products of human needs, ideas and conceptions of possible contributions to better the future. Being social, the technologies functions as social agents.

Alfred Borgmann defines this agency as a cultural force – taking part in the agenda for the social context in which they participate. This is in opposition to a classical STEM definition of technologies, which understands technologies as neutral isolated tools, acting in their own right (Borgmann 2006).

Moving closer into the cultural forces of the technologies we get help from notions of design, affordance and multistability. Being aware of the design of the technologies implies understanding the processes and intentions built into the material shaping and planned function of a technology. The concrete design possesses some specific affordances, specific invitations for use. But due to the fact that machines are social, the use will always be a negotiation between design and user. The affordances express a range of possibilities of use, and the actual use will always be decided in situated practice (Gibson 1979, Hasse 2015, Wallace 2015). Alternative uses of technologies might be expressed as pressing the affordances to the limits of the design.

The use of technologies stabilizes in actual practice. In this way technologies are characterized by multistability (Ihde 2002). They stabilize as *different* technologies in different situated practices: Slightly different or maybe oppositional, dependent on the context and the use. This is part of the explanation why technologies may take different forms and lead to different forms of uses in children's communities and in activities involving both children and pedagogues.

The life of children and professionals in day-care institutions are characterized by several cultures living together. The children's concerns center on their fellow children and a great part of their institutional life is occupied by play and being together in children's communities. These communities develop a specific culture with specific cultural norms for language and body use. A culture where play is preferred activity (Andersen 2002, Gulløv 1999, Løkken 2005, Højholt 2011).

The professionals in the institutions act as responsible caregivers and organizers of development- and learning environments. As grown-ups they are defining the frames of the institutional culture and act as maintainers of the institutional logics (Gulløv 2004).

The modernization of the public sphere has added new competences to the classical competences of the pedagogues: Competences of documentation, evaluation and communication (Hjort 2001, Andersen 2002b). From the point of view of the professions these new forms of knowledge are defined as *relational expertise*. Relational expertise describes an expertise developed through a constitution of a common language that contains the common knowledge developed in professional communities (Edwards 2011, Edwards 2012).

## **Method**

The preconditions for the methodological framework were established by the Danish Ministry of Children, Education and Equity. The design was asked to be collaborative and 'close to practice'. And the project should be carried out in collaboration with a pre-established network consisting of 30 pedagogues and municipal consultants from eight municipalities from all over the country. The network was established on the basis of shared interest in the relations between use of technology and children's possibilities of participation in learning environments and children's communities.

The research project was carried out as a case-study (Ramian 2012). Together with the network participants we developed cases to investigate assumptions regarding the role of technologies in pedagogical activities. The themes of the cases concentrated on creating pedagogical activities over time where participation of digital technologies might create new possibilities of participation and learning for the children involved. The activities were continuously video-documented by the pedagogues. And video-documented by us on occasions when we visited the institutions and participated in the case activities. Additional data comprises logbooks and reflections written by pedagogues, and common discussions of assumptions and data during our visits and at skype-meetings. Finally, data and preliminary findings have been discussed by all participants on two common network meetings.

The data sample consists of 71 videos of case activities (of duration from few minutes to about an hour), 8 audio-recordings of conversations between pedagogues and researchers, and 16 written documents with case-descriptions, logbooks and reflections.

Working with technologies understood as cultural forces, we have also had a focus on our participation in day-care institutions and the network as a learning process, using ourselves and our bodies as a research-apparatus (Hasse 2011).

## **Analysis**

### *Children's use of technologies*

The case investigations in the project were focused on planned pedagogical activities with technologies. The activities are planned with specific goals centered on participation and learning. In this perspective specific ways of acting with technologies are anticipated on behalf of the children. (For example, using the app reverse cam in couples pairing specific children to cooperate with a purpose of possible match-making)

Going through the videos we became aware of smaller or bigger incidents of children's alternative use of the involved technologies. Most often the children followed the cultural scripts prescribed by the pedagogues and by the immediate affordances of the technologies. When the children leave the scripts they initiate their own common physical investigation of the use and possibilities of the technologies. They push, turn and shake them to investigate possible relations and to wrench new meaningful interactions from the technologies. Often the investigations also involved moving around with the technology.

Here is one of the more elaborated examples of alternative use from our data: a pedagogue have developed a case to create new possibilities of participation for a boy lacking constructive company. Using different technologies for activities with the whole group of children she pairs two specific boys – hoping to create a community the boys will seek again when the technologies are no longer participating. In one of the activities I pads are used for store-playing. The two boys are handed an Ipad, asked to document the store activities.

However, the task does not engage the boys. They start to use the Ipad for their own purposes. They start moving around filming each other. They withdraw to the entrance-hall making small videos of their bottoms, showing them to each other and having a great time with laughter, fun and silly sounds.

The boys use the technologies in a playful way, as a possibility for creating child humour with technology.

We found the same sense of humour in video-clips from a case working with skype communication for cultural exchanges between children.

This clip is from the initial use of skype. The pedagogues want to train the use of the media. One portable computer is placed outside on a table close to the sandbox, and one portable computer is placed inside the institution. One pedagogue is facilitating the process inside, one outside. The children outside are loosely attached to the activity while inside three boys age 4-5 is gathered in front of the screen. The video-recording focuses on the three inside-boys.

*The pedagogue outside initiates the process by asking the boys inside what they are doing – ‘nothing’ they answer. The pedagogue continues – ‘here outside, we are making a cake’. A child from the outside asks the boys sitting inside: ‘Are you making a cake?’ ‘Noooo’ the boys answer in a choir. Then the pedagogue questions the boys inside what they can tell about the sand-cakes made outside? ‘They are made from sand’ they answer. She goes on, asking ‘Who is inside?’ The children outside give her the names of the boys. A child outside breaks the routine and says to one of the boys inside ‘You are sweet’. One of the boys inside replies ‘You are sweet, too’. Another boy inside takes the conversation further by stating: ‘my name is ‘klaptorsk’ (fish-metaphor for idiot). The two other boys pick it up and play with the word – prosodic and semantic: ‘klapyv, klapyvbabi, klaptorsk....’(Schrøder 2015).*

We see two types of communication going on through the media. The pedagogues initiate classical grown-up communication with questions and answers, some of the questions asking for quite specific answers (Mehan 1979, Palludan 2002). The children on their part initiate communication of a more playful and silly type. They give each other compliments and play with the semantic and prosodic parts of the language. Again they find alternative and meaningful use of the technology by investigating it’s latent possibilities.

#### *Professional use of technologies*

The pedagogues working with this case became well aware themselves of the different forms of use of the technology by children and grown-ups. In a skype-session with another kindergarten at lunchtime the children started a fantasy-play wording food ingredients in alternative ways. In retrospect the pedagogues would have liked to facilitate this form of communication which was partly restricted by the quality of the technology.

Another pedagogue says:

*‘Well, governing as a grown-up is not a problem, you just need to be very conscious about the way you do it. You should not freeze them into one specific thing or stick to your own expectations about what they are to do, because it might develop into something quite different which is actually more appropriate for them’* (Schrøder 2015)

In fact, observations and common reflections repeatedly disclosed patterns of grown-up dominance.

A repeated feature of the observations and common reflections was occupied by incidents of a grown-up practice of dominance. It was an often seen feature that the pedagogues overruled the intentions of the children when their actions did not follow the prescription of the activity as defined by the pedagogues.

The pedagogues tended to follow the immediate affordances of the technologies and if the children took sideways, the pedagogues often brought the activities back to the main road – either by verbal or physical intervention.

This ‘main road’ was often influenced by the immediate affordances of the technology – using an ipad for storytelling should for example result in a story, not in other forms of play with the features of the app. Or, as in the skype example: skype should be used for conversation, not for childish word babbling. You may say that the governance is produced by the cultural force of the technology as well as the cultural force of the conceptions of relevant pedagogical activities.

While the pedagogues are highly professional in their evaluation of their practice regarding the power relations in the institutional practice, their attention at the role of the technologies are more vague. Their conception of technologies assemble the STEM- understanding of technologies as separate neutral objects – an understanding quite familiar to our every-day concept of technology.

One of the participating pedagogues expresses new knowledge of the agency of the technologies in this way:

*Pedagogue: “Yeah, this must be the most important experience, that even though you think that this app is really good, then it’s no necessarily good to exactly those children you happen to have in your care. I haven’t considered this before, I just thought, well, a quality app must be a quality app”.* (Schrøder 2015)

Digital technologies are newcomers in the day-care- institutions and in this perspective lack of professional knowledge of technologies is not a surprise. Further the lack of knowledge is reinforced by a general mistrust to digital technologies in the day-care field and a dominant view on technologies as neutral tools.

## **Findings**

Children and pedagogues interpret the affordances of digital technologies in quite different ways. The cultural forces of the technologies act differently in the children’s own communities and in the pedagogical activities governed by the pedagogues.

When children use digital technologies in their own way we may see creative and curious use of the artefacts. The children challenge the technologies.

When the grown-ups use digital technologies together with the children they tend to follow the immediate affordances of the technologies. Partly, this practice may be ascribed to a lack of socio-material knowledge of technologies, understanding the agency of the technologies.

We will therefore suggest that professional digital literacy in the day-care area may include: 1) Knowledge on children’s possibilities for a creative, playfull and investigative relation to digital technologies 2) Knowledge on technologies and their cultural influences 3) knowledge on the relation between technology, children and grown-ups in the pedagogical practice.

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