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8. EXPLORING WHAT TOUCH-SCREENS OFFER FROM THE PERSPECTIVES OF CHILDREN

Methodological Challenges

INTRODUCTION

How can we study children's interaction in a technology-rich environment from the perspectives of children? How can children's perspectives shine a light on the teacher's designs for activities and materials in a technology-rich environment? One approach to address these questions could be using questionnaires or survey data. For example, we could send out questionnaires to school management or teachers asking about children's use of information and communication technologies (ICT) in schools and classrooms. Potential questions could include: Do children have access to ICT in classrooms? Is ICT a tool that supports children in their learning activities? We would probably receive a sufficient number of responses to make generalisations about the level of children's use of ICT in an individual school or classroom. These results could be compared across schools on various parameters, such as the number of computers in classrooms, children's access to computers and types of activities carried out using computers. We might conclude that teachers need further training to better integrate ICT in their pedagogical thinking and activities, and that every child should have access to ICT on a daily basis. Nevertheless, this kind of research approach cannot describe and represent how children actually use ICT in learning activities or how teachers guide children. More precisely, questionnaires provide information on the more general level, whereas a micro multimodal perspective focuses on the nano curriculum level (Akker, Kuiper, & Hameyer, 2003), referring to the level of the individual learner. This means an analysis on how children actually learn and collaborate supported by ICT. To put differently, by studying the nano curriculum level in a micro multimodal perspective, we orient our analysis towards how pairs of children collaborate through language, gestures and the material.

Selwyn, Potter and Cranmer (2010) argued that taking children's views could play an important role in informing the future use of ICT in classrooms. They suggested that focusing on children's perspectives could shed light on how children actually use ICT, and further, that this perspective could inform a bottom-up technology innovation and integration process. By using questionnaires, interviews and drawing activities with children, Selwyn et al. (2010) provided a rich understanding of children's perspectives on ICT in the context of British primary schools. Nevertheless, the research design applied by Selwyn et al. (2010)

distanced itself from studying what children actually do with ICT in learning activities. To put differently, there is a difference between analysing what children *say they do* and analysing how their learning activities with ICT actually unfolds. Consequently, we argue that researchers need to get closer to the phenomenon in question: children's everyday interaction with ICT in classroom environments. The methodological orientation towards studying children's actions in practice is grounded in the work of Goodwin (2000), Koschmann and LeBaron (2002), and Streeck, Goodwin and LeBaron (2011). Findings from such studies illustrate the power of studying how participants make sense in the situation by using language, gestures and the material at hand. From a curriculum perspective, this is called the nano level (Akker, Kuiper, & Hameyer, 2003), pointing at the level of the individual learner. Overall, ICT researchers are challenged to shift their perspective from the system, school and teacher level to a detailed interactional level taking children's natural activities, interactions and experiences into account. This situated and micro-analytic perspective on children's use of ICT in classroom settings contrasts with the perspective of the questionnaires usually sent to school management and teachers.

On this basis, we make a plea for researchers to study how children actually construct meaningful trajectories with ICT in collaborative learning activities. By applying a micro multimodal perspective, a more in-depth and situated understanding of children's use of ICT in practice is offered. Hence, we present a research design for exploring educational ICT use at the nano curriculum level and from the perspectives of the children. This design is based on methodological traditions such as conversation analysis (Goodwin, 2000; Streeck, Goodwin, & LeBaron, 2011) and interaction analysis (Jordan & Henderson, 1995), and relates to ethnomethodology (Heritage, 1984). The underlying assumption across these different methodological perspectives is that human interaction is situated, and that participants show their understanding of each other's actions through their continued orientation to the shared construction of meaning through language, gestures and the use of materials. Ivarsson (2003), Klerfelt (2007), Koschmann and LeBaron (2002), Roth (2001), and Ryberg (2007) – to name some researchers applying a similar design – have shown the power of doing micro analytic studies of interaction. For instance, Klerfelt (2007) showed the importance of studying and understanding children's gestures while using computers by presenting and analysing small excerpts of interaction. Similarly, Roth (2001) claimed that gestures reveal children's understanding of a concept prior to verbal articulation. In other words, previous micro analytic studies of children have taught us to pay attention to their gestures, body, language and the materials at hand.

Consequently, the concept of the children's perspectives in this chapter focuses on how the children actually collaborate with ICT, materialised as touch-screens in this case. Whereas Selwyn, Potter and Cranmer (2010) focussed on children's interpretation of the use of ICT, we study what they actually do (Blomberg, Giacomi, Mosher, & Swenton-Wall, 1993; Goodwin, 2000; Heritage, 1984) with ICT. Essentially, a distinction can be made between what people say they do and what they actually do (Blomberg et al., 1993). As Christensen and James (2008)

suggested, researchers need to change their approach from conducting research *on* children to researching *with* children – thereby promoting the voice of children. Overall, this type of analysis is rather unusual in ICT integration research and curriculum studies, where the majority of studies have focussed on schools and teachers (Vanderlinde, 2011) and thus ignored the children.

The overall theme of this book is to highlight and discuss the methodological challenges faced when exploring digital learning spaces in education. This chapter presents specific challenges from a single case-study school that has integrated touch-screens. The digital learning space in this case is the technology-rich environment with touch-screens at the school. In this environment, researchers and teachers explored how pairs of children interacted with touch-screens in peer-to-peer learning activities. Furthermore, the study explored if mutual engagement and co-learning between teachers and researchers could inform both researchers' and teachers' understanding of children's actual use of ICT.

FOCUS OF THIS STUDY

Recently, a number of publications (e.g. Luckin et al., 2012; Selwyn, 2011) suggested studying the use of ICT in classrooms in more integrative ways. This approach is combinatory by nature, and utilises a variety of research perspectives in the analysis of a given phenomenon. This is in contrast to a pure technical evaluation or a heuristic evaluation of the learning material. Hence, the overall argument is that this form of integrative research approach can provide a more holistic understanding of the use and needs of ICT in schools.

Luckin et al. (2012) referred to a gap between the researcher's knowledge and the practitioner's operationalisation of this knowledge in practice. For example, they stated that "good ideas developed in academic research are not yet filtering through to the classroom" (Luckin et al., 2012, p. 19). In a similar fashion, Selwyn (2011) argued that a change of vocabulary is required to avoid a technical-oriented debate about the future of education, and proposed that learners, teachers and others involved in the daily life of education should be given a voice in the debate about the future of educational technology. Consequently, research should empower the learners and teachers in the discussion and decision-making process regarding ICT in schools. In other words, understanding technology in itself is simply not sufficient; we need to understand technology in use. This demands a nano perspective on curriculum development that takes the voices of children and teachers into account. Hence, the purpose of this chapter is to present and discuss two intertwined methodological challenges to conducting research at the nano curriculum level in ICT integration studies:

- Challenge one: How can researchers obtain children's perspectives on ICT integration research?
- Challenge two: How can researchers inform teacher's designs for activities and materials relating to children's collaboration with ICT?

First, we present a research design with the intention of describing how researchers and teachers can get closer to an understanding of children's actions in peer-to-peer

learning activities in a touch-screen environment. To illustrate this we provide a micro multimodal analysis (Norris, 2004; Streeck et al., 2011) of two children working together in front of a touch-screen. This kind of analysis is in contrast to recent findings from experimental and design related studies of children's collaboration with interactive touch-screens (see for instance Davidsen & Christiansen, 2013). In our analysis, we present what actually happens between the two children using pictures and transcripts of language and gestures. This analysis extends to the second methodological challenge: how best to describe and present children's collaborative action to facilitate dialogue and reflection among teachers and inform their process of designing activities and materials for the touch-screens. In other words, we show that video excerpts and multimodal transcripts can provide teachers with "boundary objects" (Derry et al., 2010; Star, 1989), referring to objects that can facilitate dialogue and knowledge building about one's own practice. Experiences from this research project show that the use of video data and multimodal renderings can bring researchers and teachers closer to a mutual understanding of how children's activities in a touch-screen environment actually unfold. Consequently, this research design can inform teachers' designs for materials and activities.

We should clarify a few concepts before presenting the touch-screen environment. Inspired by Suthers' (2006) notion of an intersubjective epistemology and Stahl's (2006) theoretical orientation of group cognition, we refer to children's situated sense-making when using the term "collaboration" (Davidsen & Christiansen, 2013). Following this, the level of collaboration cannot be decoded by comparing specific types of speech acts, or by looking at the number of utterances or gestures produced by the individual child in peer work. Stahl (2006) referred to this as a coding and counting approach, and concluded that such an approach overlooked the essential characteristics of collaborative learning. Hence, the analysis of the children's collaboration and use of the touch-screens in this research project is oriented towards the children's situated negotiation of meaning in language, gestures and materials. Crook (1994) provided a similar argument, and stated that although effective collaboration among young children is strikingly rare, computers and the concept of collaboration holds an intriguing, yet unexplored, potential for learning. Additionally, Crook argued for viewing the computer as a resource for collaboration, not just a technical fix. Recently, Luckin et al. (2012) concluded that collaboration, or what they term "learning with others", is integrated less frequently into classrooms because it is an unclear concept for teachers.

Furthermore, we should comment on the concept of "children's perspectives". As noted by Selwyn, Potter and Cranmer (2010), children's perspectives is often neglected in the discussion about the past, present and future use and integration of educational ICT. However, taking the perspectives of children is not simply a matter of asking them questions about their use of ICT in and out of schools. Interviews, questionnaires and experiments provide useful insights, but as Blomberg et al. (1993) argued, children (users in general) often know more than they can articulate, which is referred to as a say/do problem of ethnographic work.

Orr (1996) stressed and extended this point by, claiming that “Of course, those of whom the ethnographer is trying to make sense may be in the act of making sense of their situation for themselves” (1996, p. 13). Hence, it is an illusion that interviews and surveys alone can contribute to an understanding of the complexities of a practice from the participant’s perspectives. Consequently, we argue that video analysis provides a profound opportunity to study and present children’s perspectives of technology-rich environments.

In summary, the focus of this chapter is to present the methodological underpinnings of the children’s perspectives, and illustrate and discuss how teachers can design activities and materials based on this perspective.

A PEEK INTO THE TOUCH-SCREEN ENVIRONMENT

The methodological challenges explored in this chapter arise from a broader PhD project at a Danish primary school.¹ Throughout a year-long project (2009–2010) called “Move and Learn” (Davidsen & Georgsen, 2010), children, teachers and researchers explored the affordances of touch-screens in collaborative learning activities. In two classrooms, eight 23-inch interactive touch-screens were integrated into the daily activities of children aged eight and nine. Moreover, one interactive whiteboard (IWB) was provided for teachers and children in both classrooms (Davidsen & Georgsen, 2010).

In total, forty-one children and three teachers participated in the research project. These teachers (Anne, Ben and Claire) did not have any prior experience with the touch-screen technology, but had used traditional computers in their teaching for a couple of years. An illustration of the physical arrangement of the touch-screen environment is provided below:

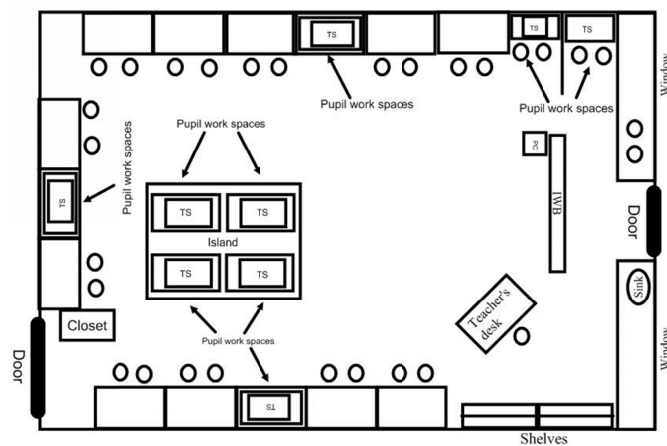


Figure 1. Touch-screen (TS) environment

As stated, the touch-screens were introduced into the classroom environment as a tool for the children to use in various learning activities. Hence, ICT was not a subject on its own (e.g. learning to handle the computer), but was integrated across subjects in a variety of activities and learning materials. In other words, the children were not just learning to use the computers in dedicated labs, but they learned to use the computers in relation to specific subjects in their classrooms. In this innovative “learning space”, the children were encouraged to collaborate, negotiate and communicate in pairs while working with the touch-screens. Moreover, the teachers took a position as a guide or a coach (Davidsen & Georgsen, 2010) to scaffold children’s collaboration, interaction and dialogue.

OVERALL RESEARCH DESIGN

This particular research project sought to establish a “co-learning agreement” (Wagner, 1997) between the teachers and the researchers guided by the principal of mutual learning through dialogue (Nielsen, Dirckinck-Holmfeld, & Danielsen, 2003). To establish such a relationship, the researchers participated in the daily classroom activities, interviewed the children and the teachers, photographed a variety of situations and collected the digital learning materials designed by the teachers. In addition, the teachers reflected on the project on a collective blog. Most importantly, the data collection encompassed more than 150 hours of video footage captured from seven different positions in the two classrooms. We positioned the cameras above the children to capture their interaction with each other and the touch-screens in their peer-to-peer learning activities.

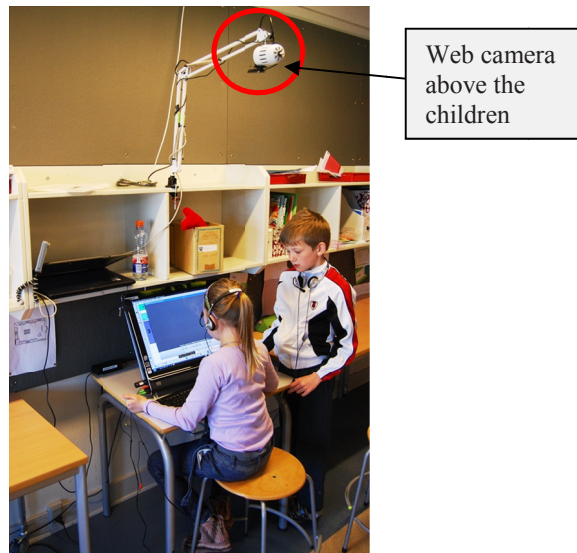


Figure 2. Camera setup

On a daily basis, the teachers turned on the cameras when the children were working with the single touch-screens. This video data represents the nano curriculum level – the individual learner in practice – and is the primary data source enabling researchers to analyse the children’s interaction. Furthermore, the video data was used to facilitate dialogue and learning between researchers and teachers during video feedback sessions, in which the researchers showed the teachers selected video footage and provided transcripts (Davidsen & Vanderlinde, 2014). Together, the researchers and teachers discussed what happened between the children to better understand and redesign the learning materials and activities.

In brief, the study described in this chapter is characterised by its iterative design and its engagement of the practitioners in the research process (see McKenney & Reeves, 2012), with an emphasis on the children’s perspectives of peer-to-peer learning activities with touch-screens. Hence, this is not an evaluative study on the effect of touch-screens on learning outcomes; rather it provides a perspective on what played out in the children’s everyday activities in the touch-screen environment. We used the video data to provide illustrative multimodal renderings of children’s collaboration with the touch-screen as a mediating tool.

A FRAGMENT OF INTERACTION FROM A TOUCH-SCREEN ENVIRONMENT

We present and analyse a short video fragment to demonstrate how the children collaborated while supported by the touch-screens. In total, we provide and analyse 22 seconds of footage with a multimodal transcript to serve a twofold purpose. The first is to show how the children interacted and collaborated in front of the touch-screen, and the second is to show how a multimodal rendering can provide the children’s perspectives. This fragment serves as a powerful illustration of how the children collaborated, supported by the touch-screen, and further it provides a background for presenting the two methodological challenges explored in the next section. This brief analysis shows how embodied meaning-making plays out between Iris and Vince, both nine years old and working on a shared touch-screen with the teacher’s material (Davidsen & Christiansen, 2013).



Figure 3. Iris and Vince in front of the touch-screen

In this situation, the two children displayed, produced and maintained a mutual understanding of the activity using language, gestures and the manipulation of objects on the touch-screen. This specific situation formed part of an overall activity about the Christian religious tradition of Easter. Initially, the whole class talked about what characterises this religious tradition before, in pairs, the children read about Good Friday, tested their knowledge in a multiple choice quiz and rewrote the story in their own words. To show what they have learned, the children had to make a video using the collaborative software (e.g. Smart Notebook™) on the touch-screen. The children wore headsets with microphones to record and listen to their video. The teacher had instructed the children in video production, e.g. how to use the video screen recorder and how to construct a multimodal story. In this selected fragment, the children should produce a video story using the figures on the screen:

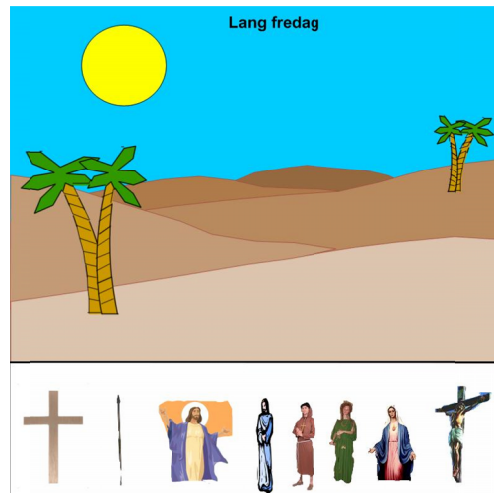
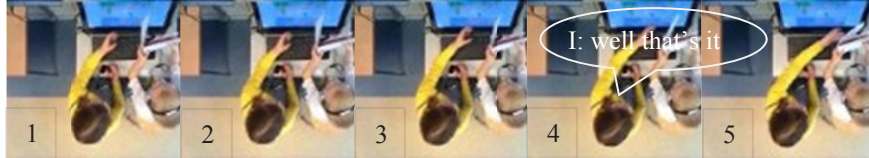


Figure 4. Scenery and figures for the video story

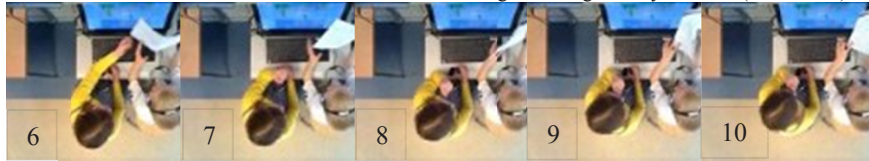
The children were actually rehearsing their video production in this fragment. Beforehand, the children had written their retelling of the story of Good Friday in the booklet in Vince's right hand. The children should then produce a video story with the figures and scenery (Figure 4) provided by the teacher. Vince and Iris, initially began to discuss who should read the text and who should move the figures. After a short discussion, they decided to divide the work between them and agreed to change after the first trial so that both of them got to try moving around the objects and reading the story aloud. Figure 5 provides the fragment of 22 seconds as a series of still photos including transcribed talk in speech bubbles and movement described above the photos. Each frame is numbered and three frames are equal to one second of timeⁱⁱ:

EXPLORING WHAT TOUCH-SCREENS OFFER

Iris moves her left hand towards the booklet and turns her head to the right looking at the booklet in Vince' hand (frame 1-5)



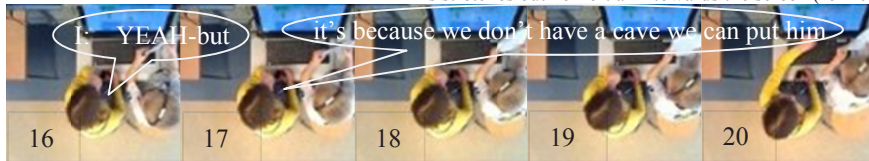
Iris retracts her left hand to her mouth and turns her head right looking directly at Vince (frame 6-10)



Iris keeps her left hand close to her mouth and the right hand on the table, while she slowly turns her head left looking directly at the screen (frame 12-15)

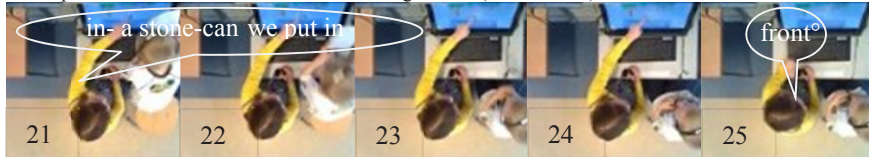


Iris stretches out her left arm towards the screen (19-20)



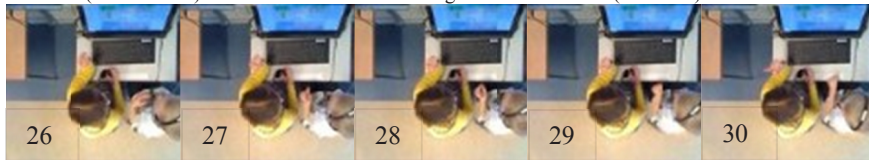
Iris touches the screen with her left index finger and moves Jesus to the left (frame 21-24)

Vince places the booklet on the table with his right hand (frame 21-23)

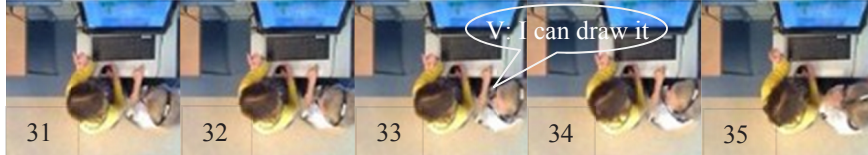


Iris turns her head, gazes towards Vince with her left elbow on the table (frame 26-30)

Vince moves his left hand towards his upper torso grabbing the headset line, then he snaps twice with his left hand (frame 28-29) Iris stretches out her index finger on her left hand (frame 30)



Iris holds that position (frame 30-35) while Vince positions his left hand on the table (frame 31-34)



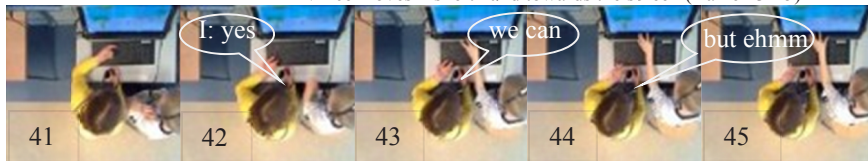
Iris leans slowly forward towards the screen - the body follows her finger – and moves the scrollbar up and as a consequence the figure of Jesus disappears from the screen (frame 36-39)

Vince lifts both his hands up to his head and lifts the headset from his ears twice, but ends up letting it sit on his head (frame 36-40)



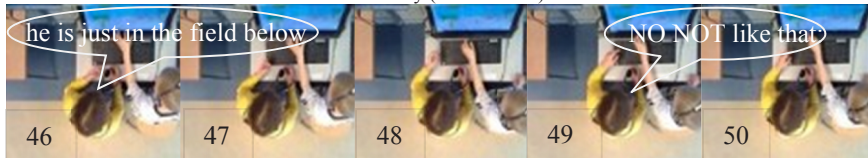
Iris removes her finger from the screen and turns her palm up as she retracts her hand from the screen (frame 41-44)

Vince moves his left hand towards the screen (frame 43-45)



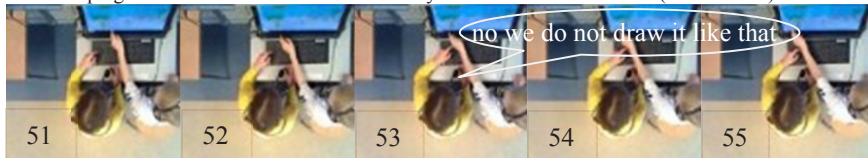
and selects the free hand drawing tool - fingers are spread and right hand is placed on the table (frame 46-50)

Iris moves her left hand towards the screen slowly (frame 47-53)

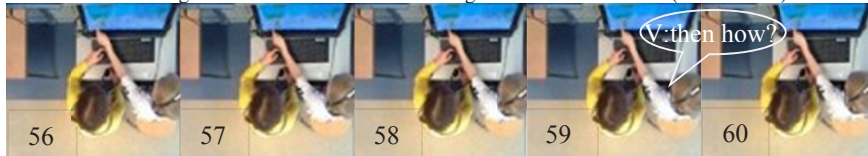


Vince retracts his hand a little from the screen and moves it left - points the palm tree (frame 51-55) - see *Figure 4*

Iris is keeping her hand close to the screen and very close to Vince's left hand (frame 52-61)



Vince moves his finger in a circular movement drawing his version of the rock (frame 56-60)



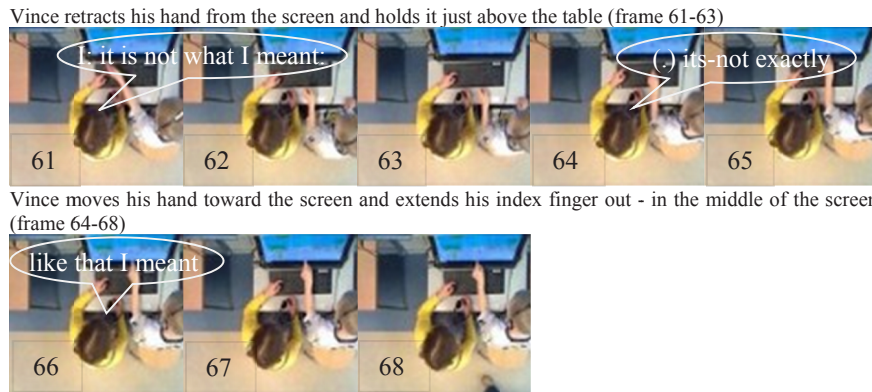


Figure 5. Multimodal rendering of the children's interactions

Without going into a complete analysis, we present a short overview of this multimodal rendering that serves as an illustration and definition of the children's perspectives.

In frame 4-5, Vince turned the booklet around and Iris said, "well that's it". This comment marked the end of their rehearsal. One-and-a-half seconds later, Iris and Vince turned their heads towards each other (frame 11-12). Then, in frame 12-14 Vince asked, "didn't it sound fine?". By using "didn't", Vince showed some uncertainty about his own reading. To put it differently, Vince was asking Iris to evaluate his reading, or he acknowledged some kind of problem and now wanted to know more about it. Iris turned her head around facing the screen before answering Vince (frame 12-16). This movement towards the screen amplified her interest in something else than Vince's reading aloud. In other words, Iris stressed her interest in the missing object through language, but certainly also through her bodily orientation towards the screen. This body movement also served as a way of expressing that Iris at this point in time had no interest in Vince's reading. Iris first started speaking when Vince was looking at the screen. Then, Iris commented on Vince's reading with two words "YEAH but" (frame 16-17). These two words, worked as a way of changing the direction of the activity. Iris was not completely satisfied with his reading, but there were more important things to consider first.

Later, (frame 17-25) Iris elaborated on this matter, saying "it's because we don't have a cave we can put him in-a stone-can we put in front", and moved the figure of Jesus around on the screen while she was talking. By combining talk and movement, Iris was building a multimodal argument. By using Goodwin's (2000) terminology, Iris was making use of different semiotic resources to build a stronger argument. Furthermore, it became easier for Vince to understand her concerns and provide the necessary feedback. Vince replied with a gesture in frame 28-29, snapping with his left hand twice. Afterwards, Vince turned his head to the left looking directly at Iris and said, "I can draw it (.) NO WE CAN DRAW IT OF

course” in frames 33-34 and 36-38. Interestingly, Vince selected himself at first; however, he changed his allocation of agency and coordination of contributions to the dyad by then using “we”. This illustrated an understanding of how the two children had agreed to work together. It was not a spoken rule, but something inherently embedded in their collaborative work. In the final part of his turn, Vince said “of course”. This can be understood on two levels; as a correction of himself and as way of saying “no problem, we can easily draw this rock together”.

In the next part of the situation, Vince sat with his hands on top of his head while Iris moved her left hand towards the screen, and finally she moved the scrollbar up. Afterwards, Iris retracted her hand from the screen and turned her hand around; her palm faced up and she said “yes of course, we can (0.3) but ehmm he is in the field below” (frame 42-47). This was a confirmation of Vince’s suggestion to draw a rock and Vince accepted what looked like a gestural invitation from Iris prior to her verbal turn. Vince performed the action of drawing a rock to cover Jesus with the freehand drawing tool. In the same second, Iris showed her disagreement with the way Vince drew the rock; first saying “NO NOT LIKE THAT” and then “no we don’t draw it like that” (frame 49-50 and 53-55). Interestingly, Vince continued drawing the rock for a few seconds, actually finishing his freehand drawing. Vince asked for a clarification from Iris, saying “then how?” (frame 59-60). Iris replied “it is not what I meant: (.) it’s not exactly like that I meant” immediately after she agreed on the drawing of the rock. At this point in time Iris was not approving Vince’ drawing, but on the other hand she could not articulate what she actually wanted. While Vince drew his version of the rock, Iris showed her disagreement in language. Additionally, she stretched out her left arm towards the screen. Interestingly, she only kept her hand close to the screen and Vince’s arm (frame 49-61) without interrupting what Vince was doing. It seemed Iris reserved the next turn at the touch-screen without interrupting Vince’s movement physically.

In contrast to the majority of studies of children’s collaboration with interactive tabletops and touch-screens which emphasis equality in terms of verbal and physical participation (see Davidsen and Christiansen, 2013, for a review), the study presented in this chapter differs. Not only because of its emphasis on the nano curriculum level, but most importantly in its methodological and theoretical orientation. As shown in Davidsen and Christiansen (2013), the single-touch screen affords a positive disturbance supporting the children’s collaboration. This conclusion was brought to light conducting a micro multimodal analysis of the children’s intersubjective sense-making. To put differently, the theoretical orientation and micro multimodal approach offered another interpretation framework compared to the experimental and design related studies.

To summarise, this multimodal rendering and analysis showed how the children make sense of each other’s contributions through language, gestures and by utilising the material. The fragment of interaction also illustrated the children’s perspectives situated in practice. The following sections deal with the challenges faced in the different phases of obtaining the children’s perspectives in this way, and how it can play a role in helping teachers understand what the children are

actually doing in technology rich classroom environments, and in the end inform the teacher' actions and design of materials.

CHALLENGE ONE

As stated in the introduction, the nano level, and particularly the children's perspectives, in ICT integration research is rather uncommon. Consequently, we decided to make use of video footage as a data source to capture the children's perspectives, as opposed to interviews, questionnaires or drawings. The primary reason for using video footage was to allow a closer look at the children's perspectives and grasp the nano level of ICT curriculum development. However, selecting and analysing video data with children's perspectives in mind has both practical and methodological consequences.

Selecting Video Data

According to Heath, Hindmarsh and Luff (2010), researchers began to use video recordings to grasp the participant's perspectives in the middle of the last century. Recently, the use of video footage has become even more common as technological equipment is becoming more affordable and accessible (Derry et al., 2010). It might seem of less importance to discuss the position of the camera, but in order to capture the children's perspectives it actually requires some attention. In this project, we positioned the cameras above the children to capture their interaction with the touch-screen. We decided to focus on the children, not the classroom or the teacher's instruction at the interactive whiteboard. With this camera position the children's gestures and use of materials was visible and the local microphone recorded their dialogue. In other words, the position of the camera framed our perspective on the children's collaboration.

In the process of selecting and analysing the data, we have followed the three principles formulated by Krummheuer (2009) when doing micro analytic studies: 1) Data analysis is based upon recordings of naturally occurring events; 2) The recorded interactions are transcribed; and 3) The analysis is based upon the sequential development of situated activities. In this project the three-steps unfolded as an iterative process between the second and third step. Basically, initial transcripts were orientated towards what was said, but as we experienced the importance that gestures played in the children's interactions we developed a micro multimodal transcription (see page 10-12) including language, gestures and the material at hand. As we are inspired by ethnomethodology in our selection process of the excerpts, we did not pursue any "probabilistic concepts of frequency and representativeness" (Derry et al., 2010, p. 14). Instead, the selection of the excerpts was based "on their significance and meaning within a narrative account" (Derry et al., 2010, p. 14). The selected excerpt for this chapter was chosen to serve as an illustration of how we render children's embodied interaction. Moreover, the micro multimodal rendering showed what this type of analysis can tell about children's interaction with touch-screens from their perspectives. The primary challenge of

using video data to grasp the children's perspectives is not to capture video footage or to transcribe what they say and do, but to understand their embodied intersubjective sense making.

Video Analysis

In this research project, we applied micro multimodal analysis as a tool for a detailed study of children's "actual" interaction with touch-screens in peer-to-peer learning activities. This is based on methodological lines from conversation analysis (Goodwin, 2000; Streeck, Goodwin, & LeBaron, 2011), interaction analysis (Jordan & Henderson, 1995) and multimodal analysis (Norris, 2004). By combining these interrelated theoretical perspectives, we could explore and develop a fine-grained lens for understanding children's actions in touch-screen environments. To emphasise how children actually interact with touch-screens, we have produced detailed multimodal renderings to provide the most nuanced and context-dependent view from the perspectives of the children. The process of analysing the excerpt represents this main challenge in taking the children's perspectives. As Goodwin (1994) has showed, our professional vision influences our interpretation framework e.g. you see different things depending on your professional vision. In other words, instead of interpreting the children's collaboration supported by the touch-screen based on our professional vision as researchers, we should try to "bracket our vision" in our interpretation to see the situation from the children's perspectives. Hence, as we have argued throughout the chapter, the children's perspectives can only be obtained by orienting our analysis to how the children make sense in the situation. However, whereas conversation analysis, interaction analysis and multimodal analysis are oriented towards descriptions of *what* happens and *how* it happens, we used these two levels of description as a basis to inform teachers' knowledge of their own practice. Consequently, they can use this knowledge to design activities and materials based on the video analyses.

In summary, video analysis can provide a detailed view of the children's perspectives in a natural setting. Moreover, it is possible to study how the children make sense through language, gestures and the materials, which can inform teachers' designs for future activities and materials. Further, the video analysis shows that observations from practice provide another type of story than survey studies or experimental studies.

CHALLENGE TWO

As researchers of ICT in learning and teaching practices, we do not only aim to understand how ICT can support learning and teaching in practice. Hence, a basic activity in this project was to support the teachers' reflection on their teaching and learning through video feedback sessions. Throughout the entire project, researchers and teachers met several times for such sessions, during which the researchers provided the teachers with multimodal renderings of situations from

the classrooms. Specifically, we provided short video clips with multimodal transcripts for every video feedback session. The teachers and researchers viewed and discussed these together during two-hour sessions. The researchers did not pursue a theoretical agenda during these sessions, but tried to facilitate dialogue between the teachers with regard to their analyses of the video clips e.g. their professional vision was sought on the excerpts. Consequently, we found treating the teachers as experts in their practice, with a unique knowledge of the children and activities, was essential to the approach. First of all, we find it important to stress the position of the teacher as a professional and not as an executor of a given curriculum. Secondly, we underline that teachers' opinions can provide important contextual knowledge to our understanding of the children's interaction. In other words, to validate our interpretation with the teacher's professional vision. As a result, the video feedback sessions facilitated mutual learning between researchers and teachers, and as a result the teachers became researchers of their own practice. To give an example of how this type of activity – “looking in the mirror” – can help teachers become researchers of their everyday teaching practice, we will briefly touch upon one of the teachers' blogs posted after a video session. Teacher Ben produced and shared a short video about how the video feedback sessions had changed his behaviour in the touch-screen environment. Initially, Ben moved around quickly between the pairs solving primarily technical matters, whereas he began to engage in a conversation with the pairs and ask questions about their work. Ben termed this as a transition from zapping around the room to a state of immersion in the children's learning activities. This illustrates how the detailed analysis can inform both teachers and researchers in understanding children's use of ICT in peer-to-peer learning projects with touch-mediated computers. By showing the teachers short video extracts of the children's interaction with the touch-screens, we mirrored their practice. Hence, we provided the teachers with an opportunity to replay what had happened in their classrooms. In this case, the teachers used these video extracts as a tool for reflection on action and design. To sum up, the teachers reflected on and revised their actions and designs. Furthermore, the teachers also confirmed some of the researchers' interpretations and added important contextual cues and information about the learners.

On a general level, the experiences from this project illustrate that video and multimodal renderings of children's activities can be a tool to allow teachers to become researchers of their own practice at the nano curriculum level. In Schön's (1991) terminology, the children's perspectives captured in the recordings became a tool supporting the teachers in becoming reflective practitioners in their own practice. Ultimately, the teachers obtained a “researcherly disposition” (Munn, 2008), recording, analysing and designing based on the video data collected in their classrooms.

DISCUSSION

An underlying question running through this chapter is whether the nano level of analysis has a role to play in the development of the future of schools, and as such

in the field of educational research. The process of rendering and analysing children's perspectives is bound to the situation and context of the classroom. This fact is in many ways problematic if the aim is to generalise the findings. However, this kind of "co-learning agreement" (Wagner, 1997) seems to have potential for local and school-based curriculum development. Vanderlinde and Van Braak (2010) described a gap between the "world" of the researcher and the "world" of the practitioner. Overall, this gap is generated by a lack of shared language between research and practice. In contrast, the research and practice relationship in this project illustrated that video data has the potential to build a shared language, and possibly bridge the gap between practitioners and researchers. This can facilitate and develop better learning opportunities for children, because teachers have gained a more informed vision into what actually happens when children collaborate with the touch-screens.

CONCLUSION

In this chapter, we have highlighted the challenges and potentials of using micro multimodal video analysis of children's collaboration processes supported by touch-screens. Most importantly, the chapter shows how to conduct research on children's perspectives, and how it can inform both teachers' pedagogical thinking and qualify our scientific understanding of how children act in a digital 'learning space'. Working with video is in general an extremely time consuming activity, but it provides a situated perspective on how children actually interact with each other and with computers. Consequently, it is arguable that video provides a more real and nuanced understanding of children's perspectives than questionnaires and surveys, which can guide teachers' design of activities and materials in the future.

NOTES

- ⁱ The names of the school and participants have been changed by the authors.
- ⁱⁱ The transcription style is a modified version of the Jeffersonian notation style: pauses shorter than 0.2 seconds are indicated like this (.), longer pauses (0.3), raised voices are shown with CAPITAL letters, colon : indicates a prolongation of a word and finally ° indicates an audible breath.

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DAVIDSEN & VANDERLINDE

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