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Imagined and actual practices using ICT: incongruity and consequences for inclusion

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Abstract
Information and Communication Technologies (ICT) play an increasing role in public schools as a whole; at the same time, ICT is championed as part of a proposed solution (in Danish educational policies) to strengthen inclusion of children with various difficulties in ordinary classes. However, the vision of ICT as a solution rests upon the teachers' ability to implement ICT into their teaching methods in ways that are supportive and inclusive. Furthermore, the general perspective on ICT is that it is a tool that mediates between a user and that user's intention to achieve some specific aim. In relation to inclusion, this means that ICT is used as a tool to bridge the gap produced by a child's disability and mediate between the child and learning. However, recent research shows that ICT has multiple representations and also emerges as an actor in its own right in educational practices. Another research trend characterizes included children as being in difficult situations and contexts rather than having inherent disabilities. From this perspective, ICT becomes one element of a contextual modification that alters the difficult situation and allows the child to participate in ordinary class activities. Working from these premises, this paper presents the context, methodology, and findings of a case study into ICTs role as an actor in the inclusion and exclusion of children in grade one. In the case study, we find an incongruity between the teachers understanding of technology when interviewed and the teachers actual teaching use of technology under observation; what may be described as a tool on the theoretical plane becomes a dynamic force in the social structure of the real-world classroom. We also find that this incongruity goes unnoticed by the teacher. We argue that the failure to notice this discrepancy may lead to a lack of guidelines and scaffolding of the pupils' collaborative work using ICT, ironically leading to exclusion rather than inclusion. Finally, we discuss possible interventions that may support the teachers' reflections on ICT in practice and alleviate ICT incongruities.

Keywords
Inclusion, exclusion, ICT, children in difficulties, perception of technology, primary school

1. Introduction

In Denmark the concept *inclusion* of children in difficulties into ordinary public school classes, has become increasingly central and dominating in Danish school policies over the last 20 years due to the Danish Governments obligation after signing The Salamanca Statement in 1994 (UNESCO 1994). Alongside the implementation of inclusion, a widespread critical discussion and debate has emerged within public schools, at the political and pedagogically academic arena and in the public media. Leading pedagogic researchers in the Danish academic field claim that the way inclusion is being implemented in Danish schools, results in deteriorated conditions for children challenged by various difficulties. Accordingly many Danish public school teachers debate and object in public to further inclusion (Aisinger 2013, Danmarks Evalueringsinstitut 2013). On the other hand leading pedagogic researchers also argue in public for inclusion of children with difficulties into ordinary classes, since research show that pupils who earlier was taken out of the ordinary teaching and given a special needs education often considered themselves as outsiders (Hesselager 2004).

ICT is often presented as an element in proposed solutions to strengthen inclusion of children in various difficulties in ordinary classes and the Danish Government likewise proposes ICT as a part of the solution to successfully implement inclusion in Danish public schools (Danish Government 2003). However, various problems are associated with the implementation of ICT. Among others, the digital technology has led to changes in the school practice, but hardly had any impact on the design for learning approach or the learning goals (Langager 2009). A report from the Danish Counsel of Technology finds that in general teachers express that integration of ICT into their teaching practice is problematic and they feel a lack of time to prioritize a meaningful integration of ICT (Teknologirådet 2011).

Whether ICT becomes a lever or a solution in inclusion or not rests upon the individual teachers' ability to implement ICT. This makes it interesting to explore the individual teachers' approach to ICT and their approach to ICT in relation to inclusion. We conducted a case study in this field and our findings revealed an incongruity between the teachers' imagined approach to ICT and technology when spoken of, compared to the actual teaching practice. We found this incongruity stayed unnoticed by the teacher during our case study and we argue that this discrepancy between the imagined and actual practice contains a risk of missing guidelines and scaffolding of the pupils' collaborative work using ICT and the risk of exclusion rather than inclusion.

2. Literature study

The researchers' and teachers' understanding of learning difficulties, inclusion and ICT rest on the Salamanca Statement, which according to Dyson (1999) offers a weak definition and therefore leaves the concept *inclusion* open for various interpretations which are mutually incompatible. As a consequence the research literature displays two main theoretical perspectives on learning difficulties, inclusion and ICT that unfolds in separate or opposing discourses (Kotsik & Tokareva 2007). The two perspectives originate from respectively social constructivism and a cognitive science when it comes to learning difficulties related to psychical disabilities (Rustemier 2002, Levinsen K. T. 2008, Tetler & Langager 2009).

Regarding inclusion, the social constructivist perspective is that children's learning difficulties are constructed in the social context. Therefore the children are perceived as *being in* difficulties that refer to the context and learning environment around the child and interventions that support inclusion are related to that specific context. In the cognitive science perspective, children's learning difficulties and behaviour are seen as immanent cognitive disabilities where the children's difficulties are originating from the individual child. In this perspective children are perceived as *having* difficulties and the focus for possible interventions becomes the individual.

The two perspectives courses different understandings of ICT in relation to inclusion. The traditional position sees ICT as a tool with build-in affordances specifically designed to compensate for a person's disability or handicap (Florian & Hegarty 2004, Sheehy 2005). This is called compensational ICT and aims at *changing the user.* Opposed to this, the social constructivist perspective sees ICT as a preventive and substitutional continuation of the person (Langager 2009, Levinsen 2010). In this perspective technology takes on multiple appearances and functions (de Laet & Mol 2000) such as tool, feature for and continuation of the child, personal identification marker, digital environment, and social actor. Thus, ICT plays an active role in *changing the practice and the context* around the individual and lets the child participate equally on the specific child's own terms. Levinsen found (2010) that the difference between compensating ICT and substituting ICT is not to be found in the technology itself but in the way the technology is perceived and approached by especially the responsible grownups (teachers, parents). That is, the difference emerges as a consequence of the users' technological understanding of the technology. Therefore, the same technology may take on either appearance.

3. Theory

We find that the above mentioned perspectives would benefit by being seen as complementary rather than opposites. There are people *having* immanent learning difficulties (physical or mental disabilities) and people who *are* in learning difficulties without having a disability (social conditions in school or family). Therefore, no matter the origin of the learning difficulties – immanent, socially constructed or a mix -, both perspectives are equally important if inclusion is to be successful. However, the research literature displays, that this complementary view is not what we may expect to find in the everyday practice. The research report from Danmarks Evalueringsinstitut (2011) found an underlying discrepancy between the imagined objectives and the actual inclusive practice. Avramidis and Norwich (2002) in their substantial literature study found that teachers attitude to inclusion is strongly influenced by the nature and severity of actual learning difficulties and by the availability of physical and human support. Similar, Brinkmann found that the social constructivist view has lost ground in ways where the meaning of *intervention* has turned into *treatment "… human characteristics or capacities, that earlier did not call diagnoses and treatment are now spoken of as treatment requiring diseases"* (Brinkmann 2010, p. 15, authors translation).

In order to clarify and to explore the teachers' approach to inclusion, technology and ICT we find it useful to distinguish between *being in* or *having* learning difficulties and their related technological understandings *substituting* or *compensating ICT*. In order to come closer to the teachers' actual perception of and approach to technology and ICT we find Orlikowski's two perspectives (Orlikowski 2009) on conceptual understanding of technology - *exogenous force* and *emergent process* -, and their impact of on the use of technology useful. The first perspective *exogenous force* sees technology as an externally imposed and autonomous driver of changes which have significant and predictable impact on human outcomes. The second perspective *emergent force* understands *technology* as material artifacts that are socially defined and neither fixed nor universal, and which emerges in multiple and dynamic ways from situated processes of interaction with the artifacts and which are with no predictability constitutively entangled in everyday life. Orlikowski's *exogenous force* corresponds with the perception of ICT as *compensating* and with specifically designed build-in affordances, while *emergent force* corresponds with the perception of ICT as multiple appearances of *substituting ICT* mentioned above.

4. Research context and methodology

As the teachers' role is central in relation to the success of inclusion with and without ICT and it means something to the inclusive practice, how the teacher understands inclusion and the role of ICT from respectively a social constructive, cognitive or mixed perspective, we designed the present research with the aim to capture as much of the complexity in the practice in relation to ICT and inclusion as possible.

Due to the unpredictable, dynamic and emerging nature of our research object the study takes on an explorative rather than a hypothesis driven approach. Therefore we choose to produce our empirics through a case study in a real life classroom setting. In order to sharpen the focus on our research interest, the case had to fulfil certain requirements: The teacher should be experienced in using ICT in everyday teaching practice and as a tool or actor in relation to inclusion. Some students in the class should be subjects to an inclusive practice due to learning difficulties. These requirements were fulfilled in the chosen class where some students were what Levinsen (2010) calls *potentially challenged*, as they display learning difficulties beyond average, but have no diagnosis.

We collected data in an average 1st grade class in a suburb to Copenhagen, the capital of Denmark with 24 students - boys and girls. We observed the students' use of ICT during Danish lessons over a period of two weeks at the end of a 5 week course where the class worked organized as pairs on their assignment with an average of 5 Danish lessons per week. The students used laptops and MS-Word to write about a specific animal of their own choice. They collected information about the animal using a website (danske-dyr.dk) where they could read text about the animal and listen to the same information as a sound file. The course included an introduction to laptops in general and to MS-Word specifically. As we observed during the last two weeks of the course, the students had gotten familiar with both hardware and software. The teacher in our case study had previously participated in a similar research and development project focusing on the contextual approach (children *in* difficulties) in relation to ICT and inclusion (Levinsen 2010).

There is strong critique of using cases and case studies in the way proposed in this paper (Yin 1994, Newby 2010). The critique claims the case study's inability to produce generalizable knowledge and subsequently, the inability to contribute to scientific knowledge, testing of hypothesis and theory-building. Flyvbjerg (2006) argues that the critique is paradigmatic and that most case theory relate to an epistemic and explanatory tradition in order to cope with the critique. However, the epistemic tradition out rules central aspects of the unpredictable and emerging lived practice that constitutes the core of both case and practice studies. Taking a critical approach to the pros and cons of case studies, Flyvbjerg discusses from a constructivist and interpretive position, to what extend and under which conditions, cases and case studies contributes to scientific knowledge.

Our research interest is to explore how ICT's role in relation to inclusion. According to Flyvbjerg "When the objective is to achieve the greatest possible amount of information on a given problem or phenomenon, a representative case or a random sample may not be the most appropriate strategy As it is often poor in

information. Atypical or extreme cases often reveal more information …"(Ibid p. 229). Flyvbjerg sets up a typology for cases and argues that a specific case may represent aspects of more than one type (ibid p. 230):

- Extreme: To obtain information on unusual cases, which can be especially problematic or especially good in a more closely defined sense
- Critical: To achieve information that permits logical deductions of the type, "If this is (not) valid for this case, then it applies to all (no) cases."
- Paradigmatic: To develop a metaphor or establish a school for the domain that the case concerns

Our case is atypical in the sense that it represents a single case and an in depth study into a limited context. It is therefore expected to produce more information than a literature study or a typical case study. Due to the specific set of requirements in the selection of the case, this study is atypical and matches both the extreme and the critical case. The case is extreme in the sense that the teacher is experienced in using ICT in the everyday teaching practice and has participated in a research and development project aiming at ICT and inclusion. Accordingly, arguments as: "if the teachers were more skilled"; "if we felt more comfortable with using ICT", which are often put into play (Danmarks Evalueringsinstitut 2011) are not important issues in this case. The case becomes critical due to its extreme qualities and we may argue that if teaching practise and inclusion works well or display problems or even collapse here, then it applies to other cases as well.

As mentioned, our research strategy aimed at an extensive capturing of the complex and unpredictable everyday practice in the classroom. In order to sustain an open and *explorative* approach we applied an *abductive research design* (Halkier 2001) where we systematically changed perspectives and approach to the collected data including an ongoing iterative process shifting between an empirically and theoretical perspective. The data collection was inspired by ethnographic methods such as observation meaning that we witnessed and experienced the context (ibid p. 141) while documenting through thick description notes, video and qualitative interviews.

5. Findings and discussion

Our analysis revealed discrepancies between the teachers imagined teaching practice and use of ICT, mainly stated though the teachers articulation during the interview and the teachers actual teaching practice observed in the classroom. With reference to Orlikowski (2009) and her distinction between the two perspectives on conceptual understanding of technology - *exogenous force* and *emergent process* – and the impact of these on their holders attitude and practice regarding ICT, we find these discrepancies of great importance. The importance of this finding is strengthened as we found in several instances, that these discrepancies displayed a negative influence on specific students' collaboration in the classroom and on the inclusion of children *in* learning difficulties. In the following we will present the discrepancies and elaborate on an explanatory perspective on 'why' these discrepancies occur.

To unfold this aspect, we explored the teacher's approach to inclusion of children as either *having* or *being in* learning difficulties and how the teacher perceived the origin of a specific child's learning difficulties as either *contextual* or *immanent*. In the case study, the teacher was well reflected and stated in the interview that she perceived children's learning difficulties as constructed and influenced by the context, that is, as mainly situated and constructed in the social arena. Accordingly, the teacher felt that she approached children's different learning difficulties with the attitude: children *in* learning difficulties; but without neglecting, that some children might *have* learning difficulties. However, the video analysis of the teacher's practice shows a dominant perception of student's learning difficulties, actions and behavior as immanent and belonging to that specific student. For example in the practice, the teacher did not research the situation, context or background before intervening and directed her interventions and scolding towards the individual student displaying learning difficulties instead of both students in a pair. In these instances we discovered through our filmed data that prior to the teacher's interventions occurred disagreements and conflicts between the two students sharing a computer.

As the literature showed the importance of the teacher's attitude to inclusion and conceptual understanding of technology to how the teacher implements ICT into the teaching practice, we combined these specific approaches with an ICT-perspective using the concepts *compensating* and *substituting ICT*. As introduced earlier, the *compensating* approach to ICT aligns with children *having* learning difficulties that are perceived

as immanent and 'owned' by the individual child. Our analysis showed that the teacher primarily perceived the students' learning difficulties as immanent and not as social constructed and performed a *compensating* teaching practice.

To further clarify the teachers approach to ICT and inclusion, we applied Orlikowski's two conceptual understandings of technology as an additional perspective. Our study revealed a dominant *exogenous force* perspective in the teachers practice. This became apparent in the teacher's handling of ICT in collaborative situations and in the teacher's handling of students that appeared to be inactive in the class. In relation to the teachers handling of ICT in relation to collaborations, the teacher introduced the laptops without introducing learning design-frame or social guidelines regarding the use of the computers. Therefore, the students had to find their own way when negotiating collaborative strategies. This omission of the learning design suggests that the teacher expected the computer to function in the same way for all pairs, which we interpreted as perceiving the computer as a predictable and autonomous driver of the learning process and the social teamwork between the students. Our analyses revealed problematic consequences of this approach to ICT. We found in several cases students who intentionally excluded their learning-buddy from the activities at the computer and we found unproductive quarrels or what Littleton and colleagues (2005) names *Disputational Talk* among the students.

When looking at the teachers handling of apparently inactive students, the *exogenous force*-perspective became even clearer. The teacher physically moved students *in* learning difficulties on their chair and placed them in front of the computer, apparently wanting them to be *hooked up* to the computer. The teacher did not research the situation by questioning the student(s) about the lack of participation and did not include the surrounding context in evaluating the situation. This reaction points toward the *compensating* approach to ICT that focuses on the technology as a predictable driver of a change due to the build in affordances and towards seeing the learning difficulties and the child's behaviour - in this case a lack of participation - as originating from the individual child. This is why the teacher only directs interventions towards the individual child *in* learning difficulties. Thus, being *hooked up* to the computer points to the teachers perception of the computer as an autonomous driver of the learning process and that the computer in itself can produce the wanted change and learning in the student.

The teachers handling of apparently inactive pupils and the teachers striving to get these pupils *hooked up* to the computer, revealed yet another discrepancy between the imagined and actual practices using ICT. In the interview the teacher stated that students could contribute to the collaboration not only through being active at the computer. For example students could contribute by getting ideas and comment on the activities at the computer. However, the actual practice showed that in order to be perceived as participating and active by the teacher, students had to be *hooked up* to the computer. Our study documented that this focus on students as *hooked up* to the computer, produced a narrow arena for collaborative activity. We saw students considered as active by the teacher, because they appeared to be active on the computer, but in fact they were not active in the way the teacher expected. For example one student typed the letter A and filled out an entire page with A's.

The striving for pupils to be connected to the computer also seemed to create other aspects of narrow perception and understanding of collaboration and situations. In several cases we noticed students who intentionally used their body to exclude learning-buddies from the computer and that this exclusion stayed unnoticed by the teacher. The excluding students was praised by the teacher for being active and participating at the computer while the excluded student, who now appeared inactive, was scolded for the missing participation. One could argue that the teachers missing research into the participation, is a result of the narrow focus on the connection to the computer as well as a result of the narrow perception of behavior, where behavior is perceived as immanent the pupil in the actual practice and not a result of social influence. In some cases we saw students object to the exclusion from their learning-buddy and to the teachers scolding. The students who managed to oppose were mostly considered by the teacher to be strong both socially and academically. On the other hand, the teacher perceived the students who did not manage to oppose scolding or exclusion as *having* both social challenges in the class as well as learning difficulties.

The teacher's *exogenous force*-approach became apparent in other ways for example in relation to the teachers understanding of collaboration between the students using ICT. In the interview the teacher expressed an overall positive interpretation of the collaborations by pairs around the computers and presented examples of well-functioning and efficient collaboration between the students. However, our observations and analyzes revealed examples of collaborative problems among the students. The teachers understanding of the collaborations around ICT as mainly well-functioning, effective and resourceful emphasized how the teachers perceived ICT as a positive mediator and a predictable and autonomous driver of the teamwork between the students. In practice, this understanding created a tendency to overlook conflicts in several collaborative situations involving ICT. In several instances we documented that the teacher did not notice conflicts and subtle battles about access to the computer. The fact that these conflicts were quite subtle and easy to miss could explain why they passed unseen by the teacher.

When we look at the *Disputational Talk* (Littleton et. al. 2005) that passed unnoticed by the teacher, we found that these conflicts often appeared in relation to the use of ICT. Especially we found that the disagreements were often directly related to the physical affordance of the digital devices and software in play. Numerous conflicts arose due to the circumstance that laptops are designed as a single-person tool and that the students had to work in pairs around the computers. (This use of laptops is typical in Danish public schools mainly because the access to computers in schools is limited). The teacher in our study did not guide or support the students' collaboration around the laptops, so the pupils had to negotiate their own strategies for the collaboration, which resulted in various types of quarrel. Typically both parties wanted to handle the computer and found it difficult to share the access to the computer once they had won the access. This points out the importance of the teacher providing guidelines and support in the use of ICT.

6. Conclusion

Because it rests upon the individual teachers' ability to implement ICT into their teaching methods in ways that are inclusive, the technological view and professional competencies of the individual teacher becomes crucial. This motivated our case study, were we researched the complex everyday life in a classroom around one teacher using ICT in the teaching sessions. Our research design strived to capture multiple aspects influencing a teachers approach and practice around ICT in relation to inclusion.

Our study revealed an incongruity between the teachers' imagined approach when interviewed and the actual teaching practice. The interview uncovered an approach towards children's difficulties, as being mainly socially influenced with a mainly substituting approach to ICT in relation to inclusion and an understanding of technology as an emergent and situated process and an unpredictable factor. The teachers practice however showed an approach towards children's difficulties, as being mainly immanent in the individual student with a mainly compensating approach to ICT in relation to inclusion and an understanding of technology as an exogenous force including a view upon ICT as being a predictable factor and an autonomous driver of a change.

We found that this discrepancy and a practice dominated by an exogenous approach to technology combined with a compensating use of ICT led to a *narrow* interpretation and understanding of the situations in the classroom. Furthermore, it led to a lack of guidelines around the collaborative work among the students using ICT and in some cases to exclusion where students in learning difficulties were excluded by their learning buddy from accessing the computer and were scolded for the missing participation by the teacher. The narrow approach overlooks important aspects. For example the fact that ICT (also) is a dynamic unpredictable force and important actor in the social structure of the real-world classroom.

As a recommendation we suggest that teachers' professional competence building in the future – both teacher education and in service training - includes broader and multiple perspectives in order to understand and deal with the variety of typical situations and behavior related to ICT and inclusion.

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