

IPADS IN INCLUSIVE CLASSROOMS: ECOLOGIES OF LEARNING

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ABSTRACT

This paper builds on data from a project where iPads were used in a lower secondary school in Denmark to support school development and inclusive learning environments. The paper explores how iPads enter into and work as part of an ecology of learning in five classes in lower secondary school. The paper argues that we should disengage approaches to the iPad in education from ideas of what the properties of these technologies are, and see the device as a more relational and situated actor, avoiding the definition of properties of technologies outside the contexts specific to their use.

KEYWORDS

Learning with tablets, inclusive learning environments, ecologies of learning

1. INTRODUCTION

Though iPads were originally intended for consumption and entertainment, they are increasingly used for learning in formal education. This brings new challenges and potentials to classrooms, where the use of technology has often been associated with computer labs and with ‘learning in a bubble’ (Traxler 2010, 5). With the advent of the iPad technology is increasingly taking center stage in the daily life of pupils, including how they can learn, interact and create content in formal educational settings. The promise of the iPad therefore seems to be the liberation and transformation of education at a time where mobile technology is defining most out of school activities of young learners. Consequently, the so-called affordances of the iPad, i.e. mobility, intuitive navigation and personalized content creation, has been the focus of many accounts of how the iPad can contribute to education and learning (e.g. Burden et al 2012).

However, though the tablet seems to be an innovative and promising platform for 21st century learning environments, discussions about its affordances should focus on educational practice and not its ‘inherent’ qualities. This paper will argue that tablets, as emergent mobile devices, may contribute to enhancing inclusive educational settings by creating new relationships between existing technologies and learning resources for mobile learning. A general ‘affordance’ of the iPad therefore seems to be its flexibility and ability to enter into relationships with a variety of resources and learning contexts that make up a learning ecology for schools.

The paper builds on data from a project where iPads were used in a lower secondary school in Denmark for school development. The research discussed in the paper focuses on how the integration of iPads in teaching and learning can support inclusive educational settings in lower secondary schools. The paper draws on data from fieldwork in five classes of seven graders (age 13-14), who were given iPads in the school year 2012-13. Two of these classes were special needs classes.

2. IPADS IN EDUCATION

Since the iPad was introduced on the market in January 2010 it has received extensive attention for its role as a “game changer” (Furfie 2010) in the media field as well as in education. iPads can in this regard be compared to other mobile devices that are increasingly transforming the ways in which we access and create knowledge, communicate and collaborate and learn (Pachler 2007).

However, contrary to other mobile technologies, iPads have generally been admitted into educational settings, where they have become central to learning and to the development and transformation of schools. In this sense iPads promise to ‘revolutionise’ education.

Though extensive empirical knowledge about the value of tablets is still lacking, several recent studies have confirmed the educational value of the iPad at different levels of education (Burden et al. 2012, Melhuish & Faloon 2010, Heinrich 2012, Kinash, Brand, Mathew 2012). Generally, these studies argue that the significance of the iPad for teaching and learning resides in two significant affordances of the device, i.e. 1) providing new forms of personal ownership and 2) ubiquitous and easy access to technology.

Ownership is central to learning in that it allows the user to personalize devices and to support learners’ own knowledge and conceptual frameworks (Melhuish & Falloon 2010). Mobile devices may in this sense support ‘constructivist’ learner-centred approaches to learning and be useful to young learners who are already immersed in technology through every day uses of for instance smartphone devices. In addition to this the use of app-based teaching promises a shift from content based, skill and drill learning to web 2.0 approaches to learning where the learner is more creative and independent. Finally, the low tech, intuitive and multimodal feel of the iPad targets a variety of learners and learning styles, which may support more inclusive classrooms and learning environments.

Ubiquitous access to technology may likewise revolutionise education as it allows teachers and learners to redefine learning spaces in moving technology use from confined, fixed places and times to situated, just in time usage, where technology is “Woven into all the times and places of students’ lives” (Traxler 2010, 5). Thus, Burden et al (2012) argue that the shift in technology use in schools linked directly to the allocation of the iPad can be characterized as a shift from a ‘just in case’ model where technology is made available from a remote location from the location itself to a ‘just in time’ model where technology is on hand, immediately accessible to the pupil.

Though the affordances of the iPad accounted for and explored by the studies mentioned above are highly relevant in understanding how iPads and other emergent mobile technologies can support education, the idea that iPads are isolated and unique actors in school development must and can be challenged. A recent study of the use of iPod touch devices in primary education in Australia thus underlines that in many cases teachers integrate mobile devices with other ICT technologies such as desktop computers and laptops, Nintendo Wiis, digital cameras, podcasting software, video editing suites, etc. (Murray & Sloan 2008). The mobile device in this way emerges as one of a range of tools that the teachers employ to motivate and stimulate student learning. Similarly, Burden et al. argue from their experience with the use of iPads in primary and secondary education in Scotland that “results suggest students use the device as part of a wider ecology of learning resources, integrating the iPad with existing tools such as the jotter” (2012, 51). If we are to understand the full potential of the iPad for teaching and learning, I therefore propose that we see the device not as an isolated actor in school development but as a more relational and situated actor, i.e. one that is “bound up with the specific material-discursive practices that constitute certain phenomena” (Orlikowski 2010). A relational and situated understanding of the iPad will attempt to avoid defining the properties of technologies outside the contexts specific to their use, contexts in which they contribute to constituting how learning can be enacted.

3. IPADS AND SCHOOL DEVELOPMENT

In Denmark, so-called ‘iPad-schools’ have become a growing phenomenon in the field of school development across the country. A number of schools and municipalities are thus investing in iPads on a one pupil one device basis. Earlier this year a municipality in the west of Denmark invested in iPads for all pupils and teachers in the municipality. Other municipalities and schools have followed, however, most schools have opted for a less costly investment, by for instance focusing on buying tablets for specific groups of learners or teachers. Therefore, ownership models may vary in different schools, and even within schools.

What seems to be the argument for investing in tablets for school development is complex, in that schools are seeing technology both as a way to improve their economy in a time of recession, a way to enhance the profiles and reputation of especially state financed schools and an approach to transforming teaching and learning in classrooms and beyond.

Economic considerations usually focus on the fact that ubiquitous technologies can help schools save money on resources such as paper copies and books, and that iPads require less maintenance than other technologies. In terms of school profiles and reputation the move in Denmark (as well as in other parts of the world, see for instance Anderson-Levitt 2003) towards decentralization has made it more urgent for schools to attract sufficient numbers of pupils by marketizing their pedagogical visions and principles. In this context, the use of iPads in education may contribute to connecting schools with 21st century approaches to learning.

In relation to education, a general political focus on basic education has underlined the need for school reform and for increased access to learning resources that can support the learning needs of different learners. A lot of political interest in Denmark has thus lately been focused on primary school and pre-school levels, in order to create more continuation between these levels of education, and in order to bring more learning into preschool levels, to prepare students for formal learning (Jensen, Broström & Hansen 2010). In formal learning, there has been an increased pressure on pupils' literacies in for instance Danish and Maths and in assessing pupils' competences at different levels of schooling. The role of iPads in this educational environment is, it can be argued, to support the general reform of schooling in making technology more accessible to students and more integrated into the everyday life of schooling. Giving tablets to children according to a one child one tablet principle is for instance thought to increase the engagement and participation of children in learning. In addition to this, mobile and personalized tablets support, it is argued, the transformation of learning spaces that will allow schools to be more inclusive of different learners and learners' needs, including children with cognitive challenges. These are some of the contextual realities for the research described below.

4. MOBILE LEARNING IN AND OUTSIDE THE CLASSROOM

Middletown is a lower secondary school in the west of Denmark in a municipality that has a high profile in school development and integration of ICT into education. The school has recently been through a process of merge where pupils from an associated school for children with special needs were integrated into the school. The school has not had a prominent ICT profile before the project, mostly due to budget restrictions.

The school teaches pupils at three levels, i.e. 7th, 8th and 9th year of schooling. Pupils come to the school from other schools in the area, and it is therefore important for the school to accommodate pupils from different neighborhoods and backgrounds.

At the beginning of the school year (2012) all pupils in the 7th form (3 classes) as well as two special needs classes were given iPads to keep for the entire school year. Teachers in the seventh form were given iPads before the summer holiday, so that they would have time to explore the tablet before using it in classes with pupils. The municipality had decided that this initiative should be followed by research, in order to investigate the role and learning potential of iPads at this level of schooling. The research was aimed specifically at understanding how tablets can support the inclusion of pupils within a variety of learning environments and subjects, as inclusion is a challenge that is currently at the center of policy at both municipal and state levels. In this project inclusion is understood as a broad concept, i.e. with a focus on inclusive educational settings where all pupils are valuable and active participants in the learning community (Tetler & Baltzer 2011).

I followed pupils in all five classes for 3 months, observing them in their daily life in school and interviewing groups of pupils and teachers as well as the school leader in the process.

At the time when tablets were distributed to teachers, technology was, as mentioned above, not a widely used tool in the daily life of the school. What was available to pupils and teachers at this school was primarily two computer labs in the basement of the school as well as whiteboards in all classes. When the school decided to invest in iPads for the seventh grade pupils and teachers, it was however necessary to install wi-fi in major parts of the school, which immediately enhanced teachers' and pupils' access to the internet. The investment in iPads therefore initiated something the school had wanted for years, i.e. the opportunity to integrate technology on a more general basis in teaching and learning. The iPads therefore became significant actors in moving school development in the direction of a more innovative and ubiquitous use of technology.

In Middletown school both teachers and pupils were excited about the new technology and were open to the many ways in which it could be used in different subjects and different learning contexts.

However, knowledge of how the iPad can be used for education takes time, and has been mostly experiential for both teachers and pupils in this school, though teachers did have two courses in using the technology and using relevant apps before starting the school year with the pupils. This means that use of the iPad has to some extent been adapted to existing ways of organizing learning and that transformation of teaching and learning has been strongly linked with having the technology available in classrooms and at home. I shall proceed to describe how personal ownership and ubiquitous access influenced the ways in which teaching and learning were done and to some extent transformed during the three months that I was doing fieldwork at the school.

5. AFFORDANCES AND TABLETS IN THE ECOLOGY OF LEARNING

iPads can be conceptualised as technologies with specific affordances, i.e. as proposed by Melhoun and Fallon (2010), portability, affordable and ubiquitous access, situated, ‘just-in-time’ learning opportunities, connection and convergence and individualized and personalized experiences. However, as mentioned above, these affordances should be understood in the context of how technologies are embedded into specific practices of teaching and learning and how these contexts integrate different kinds of learning resources. One of the things that characterizes teaching and learning in Middletown School is for instance teachers’ use of a variety of resources for supporting learning, e.g. blackboards and whiteboards, books, paper, cardboard and colouring pencils, rulers, calculators etc. In this sense iPads are rarely singular and isolated learning tools used in learning, but take on meaning from – and give meaning to – a variety of practices in which it is entangled. A general ‘affordance’ of the iPad is therefore, I shall argue, its flexibility and ability to enter into relationships with a variety of resources and learning contexts that make up a learning ecology for pupils’ learning. Below, I shall give examples of how the iPad is entangled with practices that constitute the learning potentials of this technology.

5.1 Classroom Resources and iPad Usage

iPads are, as argued above, often seen as transformative technologies that replace or marginalize other technologies in order to redefine learning spaces and reform teaching and learning. However, as I followed teachers, pupils and iPads into the classrooms of Middletown school, it became immediately obvious that the iPad would have to make a place for itself in a space where many different learning materials and media had historically been significant for practice. In this sense the iPad was neither entering an empty space, nor entirely replacing tools that had been used for decades for different kinds of subjects.

Apart from the above mentioned whiteboards, what was significant for teachers was for instance to use books and paper (for teaching Danish and literacy), jotters, rulers and calculators (for maths), flasks and burners (for chemistry) and maps (for geography). These learning materials were not easily replaced by the iPad, though some of them might change their function over time, as pupils and teachers became more familiar with the technology. For instance, many pupils quickly learned to use their iPads to take notes, and therefore made some uses of jotters superfluous. Similarly, some teachers insisted that pupils should pick up and hand in their assignments through for instance Dropbox, activities that might change the ways in which paper and paper copies were used.

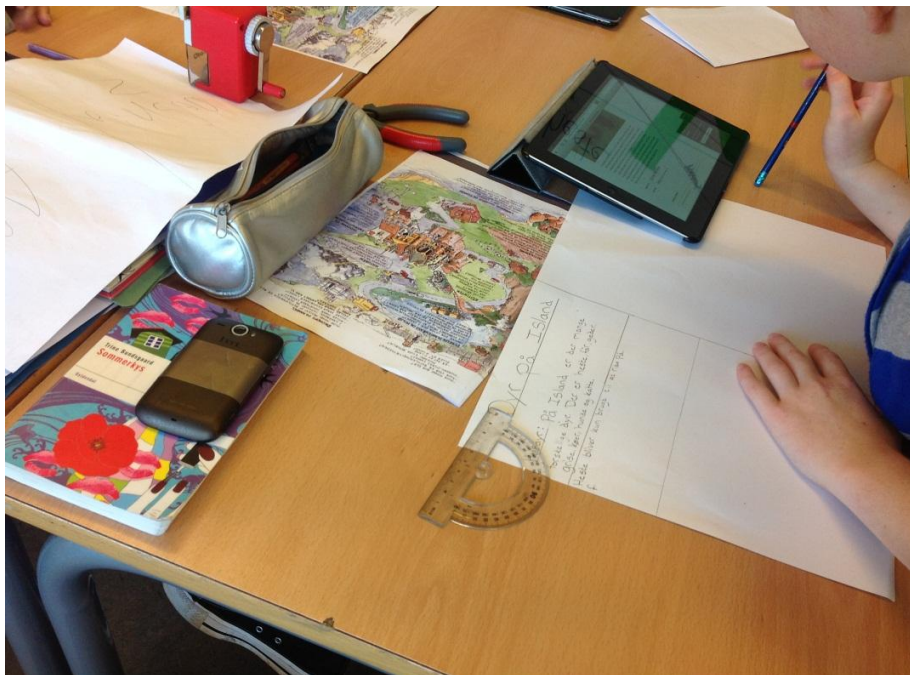
Though the presence of the iPad in the classroom did therefore generally change and redefine uses of and relationships between used learning tools and resources, my observations also showed that teachers and pupils persisted in using a number of different learning materials with their iPads, implying that the tablet technology had not replaced but rather interacted with other learning tools and resources. Pupils for instance often connected the use of their iPads for various kinds of learning with checking their books, copies that the teacher had given them or even using calculators or pencils. In fact, pupils were in a number of cases assembling their personal combination of learning materials, when they were working on assignments. In these combinations of learning resources the iPad often had a central position as a tool that would allow them to for instance read tasks that the teacher had posted in Dropbox, check Google or record German vocabulary. I call these personal assemblages and combinations of learning materials installations, and will provide some illustrations of how pupils constructed these below.

I am arguing that these installations, in which pupils explore the relational affordances of the iPad and its multifunctionality, are significant for the ways in which pupils and teachers can use iPads for teaching and learning.



Installation 1. Using the iPad with paper and colouring pens for geography

This boy was very particular in getting the facts right when doing a collage for geography about Ecuador. He used Google for checking the colours and patterns of the flag, which he then translated into his own, naturalistic expression on cardboard, using colouring pencils and supporting images with pencil written textual explanations. The interaction between iPad usage and cardboard usage in this way allowed him to both find and understand information about Ecuador, and translate and organize his knowledge onto a different material, the cardboard.



Installation 2. Using the iPad for Project Work

For this girl, learning about geography became a process of finding and selecting relevant facts about Iceland to present on her poster. She used her iPad to access Google and Wikipedia and focused on reading through information which she then copied onto her poster. Like the boy above, she was essentially engaged in processes of understanding information and then translating and copying it onto a paper display, her own expression of knowledge and content. Her use of the iPad together with paper and pen allowed her to access different kinds of information about her chosen theme as well as to translate it into something that could be presented to the class.



Installation 3. Using the iPad for Learning German

These two girls were collaborating on practicing German sentences by asking each other questions in German. They used their iPads for writing down vocabulary and for recording their pronunciation of the sentences in the PuppetPals app. They used their books to check spelling and vocabulary, as the teacher had asked them to practice specific areas of vocabulary in the book. They constructed their unique combination of books and iPads to be able to check information, record, listen and write down while they were working on their task.

It can be concluded from the examples above that in a number of cases pupils built their unique installations, i.e. relationships between iPads and other resources such as books, pens and paper, to find and understand information, copy and translate it into their own context and in turn produce their own presentations of the knowledge, for instance as German sentences or geographical area knowledge. The processes involved in constructing these unique installations of resources for learning were therefore about translating, processing and disseminating knowledge. In building these installations the iPad acted as a flexible technology in terms of both size, form and functionality, allowing pupils to for instance use it as a tape recorder, a jotter, a dictionary, a display etc. In this way the iPad became part of pupils' emergent and relational uses of different kinds of resources that were relevant for their specific learning needs.

5.2 Whiteboard to iPad: Small Screen To Big Screen Relationships

As mentioned above Middletown school is a school that for a long time has relied on whiteboards, computer labs and occasionally pupils' personal laptops to support teaching and learning. These technologies have to some extent been connected with a more fragmented, occasional, use of the technology.

The iPad project promised an immediate change in the occasional use of technology in the school transforming technology use from a 'just in case' approach to a ubiquitous activity by supplying teachers and pupils with respectively a stable wireless connection and the portable, personal technology of the iPad.

For teachers and pupils the iPad project was generally an opportunity to integrate technology on a more daily basis into teaching and learning as well as making connections between school learning and out of school learning and entertainment. Pupils' choice of apps and other personal resources such as photos and desktop images would for instance illustrate their entertainment and leisure time preferences, family relations etc. – in the same way that they would generally use their smartphones for easy access to social media, games etc. out of school.

However, in the case of Middletown School the move from whiteboards, notebooks and computer labs was a more complex situation than could initially be anticipated by the transition to 'just in time' approaches. First of all, whiteboards and other kinds of resources remained in the space where pupils were learning, i.e. in classrooms, and some pupils would still prefer to use their laptops or other resources for reasons explained below. Also, on occasion the computer lab would have to be used for printing out material that could not be printed from the iPad itself. In effect, what had appeared was not a new situation where iPads and mobile technology had entirely replaced prior technologies, but a situation where the availability of technologies had multiplied and new relationships had been established between 'old' and 'new' uses of technology. These relationships created new opportunities for teaching and for tailoring learning processes to individual pupils, i.e. for inclusive educational settings.

It can be argued that the presence of iPads in the classrooms of Middletown School to a great extent moved the use of technology from the bounded space of the computer lab into classrooms, but that the presence of iPads in the classroom did not necessarily make the use of other resources in the classroom, such as e.g. the whiteboard superfluous. What emerged from this situation where a new technology had found a place in the classroom was therefore not a replacement of existing resources by a new technology, but a novel and possibly innovative relationship between resources such as for instance the whiteboard and the mobile technology. The whiteboard was one of the significant technologies involved in this new relationship, because the whiteboard had been available to teachers for some time, and because it was placed in a dominant position in the classroom and generally acted as an integrated tool in many teachers' planning and classroom performance. In effect, the role of the whiteboard was largely maintained in the classroom when iPads entered the learning space.

Whiteboards are to some extent tools that support the role of the teacher in the classroom, and situate the teacher as the authority of the learning space and of disseminating knowledge (Jensen 2010). In the special education classes in particular, teachers had been accustomed to using the whiteboard as a point of reference and connection in the classroom, where different kinds of relevant information, presentations, multimedia etc. could be displayed. The teachers would for instance use the whiteboard to display tasks that all pupils had to solve, show films and websites and summarize discussions.

According to a teacher in one of the special education classes, the whiteboard was a good tool for focusing students' attention on tasks, help them memorize and give instructions for assignments. In this way the big screen could support teachers in managing curriculum activities and assessment. However, this teacher also told me that for some pupils it might be difficult due to cognitive challenges to keep track of and focus attention on what was going on on the big screen. These pupils had, prior to the introduction of the iPad in the school, often worked on their own or with the teacher on their laptops where they could work on assignments in their own pace and for instance have text read aloud to them by software on their device.

When the iPad entered this classroom it however became evident that the iPad could contribute to making access to the internet and the relevant software much more easy for the pupils, and on top of this that the tablet could act as a personalized small screen for pupils who had cognitive and other kinds of challenges. In the class I observed how for some of the pupils it would be useful to sit with the teacher or on their own and use the iPad as a smaller screen that could help them learn in a more self-directed way. The tablet could be used as a personal screen, the pupil's own screen or a screen that could be shared between the teacher and the pupil. In this way the smaller screen helped pupils and teachers to display, interact with or produce relevant knowledge.

This is not to say that teaching in this class took place primarily as an activity where the whiteboard would dominate and the iPad would act as a supplementary tool to the whiteboard screen – very often it would be the other way around, or the big screen might not be used at all.

Sometimes pupils would for instance produce presentations on their tablets that would then be displayed from the iPad onto the whiteboard, in order to share with the class. At other times, pupils would get their instructions for assignments from Dropbox or from the internet rather than from the whiteboard screen. What emerges from this analysis of how iPads were integrated into the classroom is, that teachers and pupils were able to use the technologies available to them in ways that made sense to them for specific learning purposes and contexts at specific times. There is no doubt that the advent of the tablet enhanced the learning processes in this classroom considerably, for instance by providing pupils with a personal device that could support them in producing context, accessing information and managing tasks. However, the experience that emerges from these activities is that the presence of the iPad generally enhanced relationships between teachers and learners, between learners as well as between learning resources available to teachers and learners rather than acting 'on its own' as a separate device in teaching and learning.

6. CONCLUSIONS: EMERGENT TRANSFORMATIONS AND MOBILE TECHNOLOGIES IN THE CLASSROOM

In this paper I have argued that research in the educational value of iPads can be qualified by understanding their situated contribution to learning, i.e. the complexities of how the technology is embedded into the contexts specific to its use. iPads, understood as technologies that are not clearly bounded by 'affordances' but participate in various ways in educational activities, contribute to school development and the transformation of learning, as described above. iPads for instance participate in transformative teaching and learning processes in the sense that they become part of the ecologies of learning constituted by teachers, learners and schools. In the cases described above the iPad becomes part of the dynamics of classrooms in which many kinds of resources are used, for instance whiteboards, paper, books, pens, jotters and laptops. As a flexible technology, the iPad allows pupils to construct their own systems of related resources or resource installations that suit their particular and shifting learning needs. In this sense the iPad contributes to inclusive uses of technologies and educational resources that may enhance inclusive educational settings.

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