CONTRASTING VIEWS: STUDENT AND TEACHER PERCEPTIONS ON ICT IN EDUCATION

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Abstract

This paper reports on a study of upper secondary school teachers' and students' perceptions of information and communication technologies (ICT) in education. Data for the study are interviews with teachers and students that are part of a Swedish four-year project concerned with the advanced use of ICT in education. The results show that teachers use ICT for several different purposes, and that students expressed an extensive use of ICT. Data reveals a difference between students' in- and out-of-school use of ICT, out of school they rely more on their smartphones than they do in school.

Introduction

This paper addresses the question of ICT in education from the perspective of upper secondary school teachers and students. Major expectations have been put on ICT in education, but according to research studies and evaluations, ICT has yet to prove its potential to improve education (Pedro, 2009; OECD, 2015; Wastiau, Blamire, Kearney, Quittre, Van de Gaer, & Monseur, 2013). Given this situation, several questions can be posed. For instance, could the uptake and use of ICT in education ever meet the expectations of policy-makers? And if so, what can be possible grounds for understanding the current situation? Is it, as is suggested by Schleicher in the foreword to the 2015 OECD report, a question of developing a way of thinking, a pedagogical design that makes the most of using ICT, or do we overestimate the digital competences of both teachers and students? This paper is limited to the perspectives of the teachers and the students.

ICT in Education – Complicated Expectations

Expectations on ICT to reform education have been around for several decades (Cuban, 2001). On a policy level, the expectations are often overrated (OECD, 2015), and they have been repeatedly questioned by research from different parts of the world (e.g., Håkansson Lindqvist, 2015). In a recent review of research, Olofsson, Lindberg, Fransson, and Hauge (2015) concluded that the uptake and use of ICT in education, both in theory and practice, can be understood from several different points of view and that there is a need for educational research to go beyond smaller case studies of what is described as successful implementation activities towards larger, longitudinal studies that have the potential to consider the potentials or difficulties in using ICT in a complex educational environment in a more thorough way. A reasonable assumption here is that the digital skills of teachers influence their use of ICT for teaching and learning (Sipilä, 2014). Another reasonable assumption is that the digital skills of students influence their possibilities of learning how to use ICT for educational purposes and that they are of equal importance for all students (Male & Burdon, 2014). To further complicate matters, students' use of ICT outside of schools might also

influence their view on the way they use ICT in schools for learning (Ben-David Kolikant, 2012). There seems to be relatively few studies that focus on both teachers' and students' perceptions of ICT targeting the same contexts and conditions (Ingleby, 2013). Given this backdrop, how teachers and students perceive ICT as a tool to support and develop the process of teaching and learning in education is therefore interesting to further explore.

Teachers' Use of ICT in Education

Recent research on teachers' use of ICT in education (Sipilä, 2014; Vrasidas, 2015; Ward & Parr, 2010; Wastiau et al., 2013) shows a concern for the difficulties teachers face when trying to use ICT in their daily educational practices. One way to frame these difficulties concerns the many and varying ways in which ICT can be used (Ward & Parr, 2010). Ward and Parr point out the necessity for teachers to feel a need for ICT in education and their readiness to use ICT as factors in need of consideration. Sipilä (2014) reports that teachers with advanced digital skills use ICT frequently in education, but there are differences in relation to gender, different forms of ICT and use in different school subjects. Vrasidas (2015) reports that challenges related to the use of ICT in Cyprus include lack of time, ICT and support, school curriculum, and the need to provide flexible teacher professional development. Similar recommendations on professional development and ICT support is reported by Wastiau et al. (2013) based on the *Survey of Schools: ICT in Education* commissioned by the EU.

Student Use of ICT in Education

Lately, a large body of research concerning the way students use ICT in education and at home has been published (Beavis, Muspratt, & Thompson, 2015; Beckman, Bennett, & Lockyer, 2014; Crook, 2012; Gronn, Scott, Edwards, & Henderson, 2014; Hinostroza, Matamala, Labbé, Claro, & Cabello, 2015; Ben-David Kolikant, 2012; Plowman & McPake, 2013; Vekiri, 2010a, 2010b). Vekiri (2010a) studied how socioeconomic factors correlated with students' views of ICT for learning and their confidence in their ICT skills. Vekiri found that all students shared a positive view on ICT, but that students from low socioeconomic backgrounds tended to rate their skills lower, partly as a question of access. Hinostroza et al. (2015) found surprisingly similar student user profiles in ICT use outside of school among different groups of secondary students. Once students have access, they seem to use ICT in very similar manners. Vekiri (2010b) also studied the relation between student efficacy and value beliefs regarding ICT and teacher expectations and found that teachers' expectations matter regardless of gender. Considering students' use of digital games out of school and in school, Beavis et al. (2015) reported positive student responses towards using such games for learning, but the researchers also note that it is important to listen to students' experiences and meet students where they are. This is stressed further by Beckman et al. (2014) who argued for including student use in and outside of school in order to better understand students' technological practices within which the usage occurs. Ben-David Kolikant (2012) also found that students were enthusiastic for using ICT outside of school but much more ambivalent towards ICT being integrated into their school curriculum. Crook (2012) identified tension between in-school and out-of-school cultures when it came to Web 2.0 use in education, tensions reflecting different ambitions and expectations on the use. Gronn et al. (2014), on the other hand, found in their study that students use similar technologies at home and in school, suggesting that the digital divide or digital disconnect between home and school is a simplified explanation to a more complex dilemma. Plowman and McPake (2013) further

scrutinize seven myths about children and technology, providing arguments to question several assumptions about children's use of technology, including the idea of children being digital natives or hindered in social interaction by technology.

Purpose

The purpose of this paper is to investigate upper secondary school teachers' and students' views on ICT in education. What are their perceptions on the challenges and possibilities in using ICT in education? Are they in agreement, or do they hold contrasting views that might be restricting the use of ICT in education?

Methodology

This study is conducted within a four-year national research project concerning the use of ICT in Swedish upper secondary schools. The project is multi-dimensional, meaning that it includes managers at a municipality level, school leaders, teachers and students. The project runs between the years of 2015-2018, and it is carried out in three schools that are all known for their advanced use of ICT. It includes both theoretical and vocational programmes. Students in all three schools have their own laptops that they bring to each class. The data for this paper consists of interviews with 25 teachers and 46 students. The teachers were interviewed individually and the students as part of 11 focus-group interviews. The individual interviews with the teachers lasted between 40 minutes and 90 minutes; the group interviews between 30 minutes and 60 minutes. The number of respondents in each group interview varied from 3 to 6 students. All 36 interviews took place within any of the three school buildings and were recorded using a sound recording smartphone app called "Diktafon." The interviews were semi-structured, and, for both teachers and students, they concerned issues such as challenges and opportunities related to the use of ICT in education. All interviews were transcribed before analysis. The analysis was made using content analysis (Krippendorff, 2004) and concerned teachers' and students' perceptions of using ICT in education. The results from the analysis are presented in a qualitative manner.

Results

In this section, the results from the study will be presented. The results are based on the major themes that emerged in the analysis. First, the teachers' perceptions will be presented, followed by the students' perceptions.

Teachers' Perceptions of ICT in Education

Preliminary analyses show that the teachers hold a rather uniform view on both ICT in education and on the students' abilities to use ICT for learning purposes. The students are regarded by the teachers as having the skills necessary to use ICT at schools based on how they perceived the students to use digital technology at home. The analyses also show that the teachers use ICT for a number of reasons, administrative as well as educational.

Teachers' views on the use of ICT in education. According to the empirical material, the teachers use ICT for different purposes. Both for teaching in different forms of software (e.g., Geogebra) and for administrative purposes, such as providing information through the learning management system (LMS) of the school and communicating with other teachers, students or parents through email. ICT is also used

for taking attendance and communication with parents concerning students' progress in school. As one teacher puts it:

> [I] use our XX [software] a lot in the teaching. That's how I communicate with the students. Work is distributed, presentations, planning they have them in their rooms. Feedback and responses on what they have done are also in the XX [software].

Some teachers provide links to websites through the LMS, as well as links to lectures and lecture-notes uploaded on sites such as YouTube. This is in addition to other digital learning resources that the teachers find useful for the students, such as web-based dictionaries, wikis, blogs, and newspapers. Some teachers use Facebook for continuous teacher professional development and for seeking discussions concerning teaching and lesson-plans in their subjects. Some teachers use ICT for test and examination purposes.

At two of the upper secondary schools in this study the main part of one of the programmes uses digital teaching materials that cover almost all of the courses within the programme. Students work through lessons with materials and assessments online and are supported by the teacher at the school in their work. This is considered by several teachers to be convenient, or as one teacher says:

> I think that XX [software] works fine, but you need to use it in a reasonable way. It mustn't be too much just sitting with it, then the students get tired. But I still think that the students find it ok. You need to balance the practical with XX [software]. And they are rather independent when working with it.

The use of ICT in general seems to depend on which subjects the teachers are teaching. For example, teachers in English use ICT to support communication and writing practices, whereas teachers in mathematics use ICT as a tool to visualise different mathematical relations. In the more practical programmes, for instance, students studying to become electricians, ICT is used to simulate practices that students might meet when they are working as electricians. Some teachers have started to experiment with clickers, and there are a few teachers who use smartboards in their teaching.

According to data, teachers in general seem to perceive ICT with a kind of ambivalence. For some purposes, ICT is easy to use, for others it is unnecessary and difficult. LMS are considered useful but not that intuitive and easy for teachers to design and use. The different rooms teachers are required to design and maintain for their teaching in the LMS require digital skills and time, which are both something that teachers report a lack of. This is apparent when teachers move their material from a traditional way of teaching to digital rooms. As one teacher says:

> But rooms… I have such a heritage, that needs to be digitalised. And certain assignments I need to scan and such examples when I find a text. Then I have to scan and scan and then put it in the rooms, and I am not there yet.

Another example of ICT not being easy to use is smartboards. They have functionalities that teachers have trouble learning, and technology is often referred to as unpredictable. Using ICT requires a plan B for situations where the technology fails.

Teachers' views on possibilities with ICT in education. Considering possibilities with ICT data reveals that some teachers refer to the way simulations are possible in school settings, something that was previously not as easy to accomplish. ICT is also considered to provide flexibility in time and space, giving students online access to

lectures and lecture notes at all times. Documenting students' learning and assessment is also considered by some teachers to be easier and less time consuming with ICT. Having students do audio-visual recordings of their learning progress instead of always relying on written text is also mentioned by some teachers as a possibility. By one teacher, this was expressed as:

> So I like to use this with filming a sequence and they work, out here we have done this with the workstations. They get to film and document it and comment on how it works. Can you film this and show me?

The possibility to use ICT for drills and rote learning is also mentioned by some teachers, giving accounts of rather simple use with effective learning potentials. Using online search engines to get access to new and relevant information, as well as helping with spelling, are two other possibilities mentioned by teachers.

Teachers' views on challenges with ICT in education. Challenges reported by teachers mainly seem to concern time, curriculum and subject. The time given the subject in the curriculum is by some teachers perceived as too restricted to be used with the support of ICT, it is time not well enough spent. Time is also an issue for some teachers when it comes to designing and preparing lessons with support of ICT. In short, it takes too much time to find relevant digital teaching and learning resources. Connecting interesting use of ICT to school subjects is too time consuming. One example here put forth by the teachers is to find relevant YouTube links for certain contents. As one teacher put it:

> There are lots of possibilities. The problem is rather finding the time to sit down and find good software and good webpages to use.

Challenges are also formulated by teachers in relation to local policies that restrict certain uses that the students might need. Several teachers here mention challenges in relation to their own knowledge of how to use ICT in education. Their technological as well as pedagogical knowledge is lacking, and they sometimes have difficulties in identifying how ICT can be used in a well thought through pedagogical way in their subject. This is also mentioned by several teachers as a difficult area for continuous professional development, keeping pace with technological development and at the same time keeping pace with the demands of teaching and of the students. Challenges in relation to technological infrastructure are also present for the teachers in the three schools. Some teachers put forth that they would like the technology to be more transparent and consistent. As one teacher said:

> No, it is… next…problem you would wish, for example if I should enter, if I am in the attendance view and is to enter these rooms for collaboration as they are called, so I should have to click there and loose contact with… wherever I am. I should just have to place the mouse there and get a view and click.

Others claim that the current limits in broadband and Wi-Fi are real challenges for teachers who plan to use ICT in their teaching. This is especially the situation when teachers have an ambition to provide teaching situations that are simulations of a real life setting that students might meet in working life. Infrastructure for learning is a real challenge for these situations. Yet another challenge teachers see when students use ICT is trouble keeping them on task. Access to the Web provides possible distractions for students, and the teachers have to consider this when planning to use ICT for learning,

as well as challenges related to the trustworthiness of different sources on the Web. A final major challenge according to data is the efficient use of the local LMS.

Students' Perceptions of ICT in Education

Students view their teachers' use of ICT in education in a similar way as teachers view the students'. Some teachers use ICT in more advanced ways than others. A main difference with students' use of ICT in and out of school is their use of smartphones.

Students' views on the use of ICT in and out of school. According to data, the students in all three schools seem to use ICT in education on an everyday basis. The students also report that in some of their school subjects it is difficult to use ICT for learning purposes. Some even say that ICT is not at all needed in their learning activities. For example, when talking about using ICT in mathematics one student put it:

> The feeling is that it is unnecessary to spend time on it [ICT] now when we work with rather challenging mathematics, [as it is] something that will be time-consuming and demand a lot of work in order to learn.

It shall also be mentioned that the case can also be completely different, that in some subjects the students consider it impossible to follow the lesson without using their laptop. Student are in general positive about the use of ICT in education, and they are in general aware of the potential distractions provided through the Web and through different apps on their smartphones. When talking about the potential of using smartphones as a learning tool, one student said:

> No, I really don't think that is a good idea. As you [the interviewer] noticed when visiting our class, there are many of us [students] who have a hard time concentrating…. some are looking at streams or are playing some kind of game [on the smartphone]. They don't concentrate, they do their own things resulting in them not understanding.

Students also report differences in use depending on the teachers' preferred style of teaching. Students report that teachers provide lectures and lecture notes through the local LMS, but that they also use YouTube to search for resources on their own. Only a few students report using ordinary computer-based games for learning. Students report using the local LMS on a regular basis, but find it in general unnecessarily difficult and time consuming. In school, students are mainly restricted from using smartphones unless the teacher specifically allows them. Students' out of school use of ICT is, according to data, to a large extent divided into games and use of smartphones. Online computer gaming dominates in some of the student groups. Smartphone use for social media and watching movies and video clips are common for all students. When students use ICT at home for school purposes, it seems to be a mix of laptop use and smartphone use depending on the software being used or if there are any apps available that can support their work. Students also talk about using ICT for student collaboration when doing school assignments at home. One student, though, went beyond seeking support among her classmates and consulted her father, who was located in a different geographical location. She says that they:

> …mostly use the phone or Facetime. Sometimes we also use SMS. I send him a mathematical problem that he first solves by himself and thereafter sends it [the solution] to me. When that is done, he phones me so we then can discuss how he solved it [the mathematical problem] and what the right answer is.

Students' views on possibilities with ICT in education. Some of the possibilities students see with ICT in education are related to future use and purposes, using ICT for simulations and programming. Students also talk about ICT as a means to visualise complex relations and to provide structure in their everyday schoolwork. When talking about Google Docs, one student says:

> It is a really good place for collecting your work. I can create folders and I am sure that everything is stored in them. When using the computer [e.g., the hard drive], it can end up anywhere. I use that [Google Docs] and then I write all my assignments on the computer.

The use of a local LMS is considered to be positive for administrative issues, collaborating on shared documents and communicating with teachers and other students. In all three schools, the LMS especially functions as a container for handing in assignments. One of the students put forth that:

> We hand in all our school assignments through Fronter [one of the LMS used]. Well, I even think that the written assignments provided [by the teachers] in a different way are possible to count on one hand.

The laptop is considered to be a good tool for writing and communicating, searching, using different forms of software for educational purposes, and collaborating.

Students' views on challenges with ICT in education. Challenges that the students see for ICT in education can be related to teacher digital competencies. Teachers teach different age ranges and have different motivations and enthusiasms for integrating ICT in education, and students can see that the use varies. One of the students reflects upon this issue in terms of:

> Many teachers really don't know how it [the LMS used at the school] works or why it works. My feeling is they [the teachers] are already in teacher training and need to learn how and why it works so they can use the LMS properly.

Another student exemplifies his opinion about the teachers' digital skills when saying that:

> My teacher in XX [subject] is always anguished when using ICT. Every lesson, when starting up the smartboard, he complains about it not running perfectly. For example, if he needs to re-start the smartboard, or if it has been on during the whole night and went to sleeping mode. People [e.g., the teachers] really don't know. Instead of learning how things work and solving the problem, they just see the difficulties and say that it is supposed to work. That might be one of the most stupid arguments: "I just want the technology to work." Technology is not some kind of magic that just works, it is often a kind of programme, a machine, which does something because it is told to do so. If you know how it works, you know what the problem is and are capable of solving it.

They perceive some teachers as being more digitally competent than others. Students also see that there are challenges related to software and to the development of an efficient LMS for schools. In schools, use of smartphones is not explicitly asked for by the students, other than for accessing the LMS in a more convenient way for administrative issues. As mentioned above, smartphones are recognized by some of the students at all three schools as distractions rather than useful digital learning tools.

Discussion

The possibilities and challenges of using ICT in education reported on in this study mirrors, to a large extent, earlier research on teachers' use (Sipilä, 2014; Vrasidas, 2015; Ward & Parr, 2010; Wastiau et al., 2013). Teachers' use is rather diverse, but, at the same time, restricted by factors and barriers identified by other studies. Students' use in and out of school is also similar to what was reported before (Beavis et al., 2015; Beckman et al., 2014; Crook, 2012; Gronn et al., 2014; Hinostroza et al., 2015; Ben-David Kolikant, 2012; Plowman & McPake, 2013; Vekiri, 2010a, 2010b). According to the results, teachers and students seem to perceive some similar challenges for using ICT in education. One of these challenges concerns time and subject. The time given to subjects in the curriculum is perceived by the teachers, on one hand, as too restricted in order to be taught with an appropriate and well thought through use of ICT. Put differently, it is time not well enough spent. Some students, on the other hand, often put forth that they would rather spend time learning the subject instead of spending that time on learning some kind of ICT that could support them in their learning process. But at the same time, other students provide examples of how, for instance, lectures uploaded on YouTube can serve as a supporting learning resource. Another challenge present at all three schools seems to be related to the use of the LMS. Both teachers and students talk about advantages in terms of educational issues related to providing or handing in assignments, the dissemination of information or leaving a message to a teacher through the LMS system. Thus, the students are not seldom critical when talking about the functionality of the LMS systems. In particular, this critique concerns the LMS systems in several aspects: being outdated, not user friendly enough and apps for mobile use of the LMS being missing. A third challenge that is shared between teachers and students relates to teachers' digital skills and the area of continuous professional development. The teachers talk in the interviews about the difficulty they perceive of keeping pace with the technological development and at the same time keeping pace with the demands of teaching and of the students. The students reveal thoughts about several teachers at their schools who need to develop their digital skills and that time from the lessons on and off is used in order for the teachers to make the classroom technology work as expected.

What also is noticeable is the discrepancy in the in and out of school use of smartphones by the students. Teachers use the ICT infrastructure that is provided for them to the best of their abilities, at least according to what data reveals, but the infrastructure is based on an ICT hardware that is a generation older than the one the students use. Students access their education using their smartphones in combination with their laptops, and teachers plan for the students to use their laptops under teacher surveillance. Students sometimes surprise teachers by Googling relevant information on their smartphones, and providing resources for themselves in their learning of which the teachers were unaware.

Conclusions

The main conclusion to be drawn from this study is that to some extent the teachers and students were in agreement with the way ICT was used and could be used in education. There is one large difference that stands out, and that is the potential for smartphones to hold educational purposes that can be predicted by the students' out of school use of ICT. If teachers were to plan lessons and make educational choices together with students, who seem quite aware of the potential pitfalls of using ICT in education, such

as distracting social media and computer games, it might be possible to plan for a more elaborate use of ICT in education that might include the use of smartphones as well as other parts of the students' everyday use of ICT.

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