TEACHERS' EXPECTATIONS REGARDING POSSIBILITIES AND CHALLENGES OF LEARNING PRACTICES AND PROCESSSES IN TWO SCHOOLS IN A 1:1 COMPUTER INITIVATIVE

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Abstract

The uptake and use of digital technologies in the classroom will be studied in Unos Umeå, a joint 1:1 project between Umeå University and the municipality of Umeå in Sweden. This paper presents some preliminary findings of the first survey completed by 25 teachers in one school in the project. Questions posed regarded expectations concerning preparedness, professional training, work methods and new forms of teaching. The 1:1 initiative provides both possibilities and challenges, as teachers' expectations appear to be optimistic, although somewhat reserved, realizing the importance and the necessity of the uptake and use of digital technologies in the classroom.

Introduction

The shift towards techno-classrooms is hoped to enhance learning, as well as meeting what appears to be a "growing tendency to student disengagement and eventually disaffection, and consequentially educational failure" (OECD, 2009, p. 6). However, the simple picture of a student group with computers and a teacher to help, when examined more closely, unfolds a number of intricate processes which technology has brought into the classroom, putting focus on the role of technology in society, learning processes for the individual, the role of the teacher and learning in the context of school as an institution. However, the implementation of computers in a school culture of traditional methods is perhaps the first step into solving a new set of issues, within a system that "is struggling to optimize its limited resources and inherited skills set to respond to technological change" (Dickinson & Stewart, 2001, p. 196) with the target of enhancing learning. This, in turn, requires changes for students, teachers and schools as organizations. Otherwise, new technologies and information networks are no more than a "new kind of chalk and overhead projector" (Mällinen, 2001, p. 141) with no effect in change on classroom-based teaching: "new technologies, however effective in other fields, don't inevitably lead to major change in education" (Mayes, 2001, p. 17).

The 2011 Horizon Report describes key trends in teaching and Technology Enhanced Learning (TEL). Challenges will comprise increasing Information

and Communication Technology (ICT) competence in the classroom with technologies that have and will continue to have impact on teaching and learning such as: electronic books and mobiles, augmented reality, game-based learning, gesture-based computing and learning analytics (Johnson et al., 2011). This level of technological change in the classroom along with the related effects can perhaps not alone be explained by "a deficit model that assumes failure to be caused at the levels of the school and the classroom, and teachers' 'resistance' to be the core obstacle to overcome" (Somekh, 2008, p. 448) but a recognition that the uptake and use of digital technologies in the classroom "requires an integration of vision, system-wide experimentation and new roles and relationships for teachers and students" (Somekh, 2008, p.148). For the Swedish school system, projects to increase ICT use in the classroom have been initiated by the Swedish National Agency for Education through teacher training with the help of interactive resources and websites. Practical ICT and Media competence for teachers (PIM) is an online resource offering 5 different levels of ICT-competence, of which level 3 is the recommended level. The agency strongly recommends continued work in developing ICT-competence for students and teachers (National Agency of Education, 2007), suggesting that digital competence be included and integrated into policy and curriculum documents in line with the European Union's intention of technology innovations as life-long learning for all (EU, 2008). This effort would give digital competence the same status as reading, writing and arithmetic, as is the case in Norway, where ICT as a skill has been compulsory since 2002/2003 (Krumsvik, 2006, p. 240). The most recent step of ICT-immersion is the initiative in One-to-One efforts, involving the distribution of an individual laptop to students and teachers, as some 160 of 290 municipalities in Sweden at present have some form of a 1:1 project in progress or in an implementation phase (National Agency of Education, 2011).

In order to study the uptake and use of digital technologies in the classroom the project Unos Umeå was initiated as a joint project between Umeå University and the municipality of Umeå in Sweden. The project will involve two schools in Umeå through a 1:1 initiative over a period of four years. The aim of this paper is to present some of the preliminary findings of the first online survey regarding teachers' expectations, possibilities and challenges in digital technologies posted to teachers in one school in the Unos Umeå project. The disposition of this paper will be as follows: a research review in 1:1, method, preliminary findings and conclusions.

Research in 1:1
Research in the One-to-One field is complex and somewhat difficult to interpret. This is mainly the result of the definition of what a One-to-One project comprises; it can be small handheld computers, joint computers, computers without access to the Internet, etc. Given this complexity and the vast number of interpretations, it is still possible to conclude that much of the research which has been published can be said to be more evaluation-oriented than empirically-based and peer-reviewed in line with academic standards (Penuel, 2006; Fleischman, 2011). Furthermore, studies of One-to-One initiatives can be based on motivational factors, learning results, effects on student and teacher collaboration, professional development for teachers as

well as organization issues such as the role of the school leader as a pedagogical leader and policy implementation. Therefore, research in One-to-One not only includes several organizational levels on the vertical axel, it also includes the horizontal axel of learning practices in the digital classroom (Olofsson, et al., 2011). Learning is a complex area: "One-to-One TEL may seek its philosophical and conceptual roots in social learning utilizing what we know such as discourse, communities of practice, collaborative learning, internalization of social processes, participation in joint activity as well as cognitive, cultural, and media perspectives" (Chan, 2006, p. 10).

A research synopsis of the effects of One-to-One initiatives (Penuel, 2006) shows that the motives behind implementation itself may be one of four factors: improved study results, increased access to computers and therefore equality of technology, more well-adapted students for the work market as well as improved quality in education. Results refer to computers in the classroom having minimal effects on academic results (Cuban, 2001), while other studies report improved results in digital competence and writing (Penuel, 2006). Such is the case for the largest 1:1 project initiated in the state of Maine in the northeastern part of the US, where the implementation and integration was reported as successful: "There is substantial self-reported evidence that student learning has increased and improved" (Silvernail & Lain, 2004, p. 34). Academic results are only one part when attempting to measure improvement in learning environments as work with digital technologies provides many opportunities which may lead to an increased interest in learning, motivation and involvement (Bebell & O'Dweyer, 2010).

When computers are introduced in the classroom in a 1:1 initiative, there are widespread changes in the competence of teachers (Kroksmark, 2010, p. 17l), leading to a number of areas of professional development for teachers. Access to technical support, teacher collaboration, making instruction more individualized and appears to make the classroom more constructivistic (Donovan, Hartley & Studler, 2007). The uptake and use of computers takes time. Teachers need time to discuss content, students' work, pedagogics and technology (Drayton et al., 2010). Professional development in this area requires a complex combination intertwining technical, pedagogical and subject-related didactic competences (Mishra & Koehler, 2006). Teachers also need clearly stated goals and support in order to the uptake and use of technologies in their pedagogical practices: "A holistic perspective is necessary for 1:1 initiatives to be drivers of educational change in schools" (Valiente, 2010, p. 16).

According to a Swedish One-to-One study by Hallerström & Tallvid, 2008, teachers experienced their planning work to be more organized, the classroom calmer and information more easily accessed. Initially, teachers reported a more stressful work environment in the transition from traditional planning to computer-based planning. However, students' work proved to be better, with teachers noting better quality in texts and that the students wrote longer texts. A higher level of motivation as well as performance was also noted, according to Tallvid and Hallerström (2009).

Method

The data in this study was collected using an online survey distributed to 25 teachers (17 women and eight men) on as the initial starting point of the 1:1 project. Although the project comprises two schools, the preliminary findings presented in this paper are based on the first initial survey with 25 teachers in the compulsory school at the start of the 1:1 initiative. The teachers filled out the web-based survey in connection with a staff meeting at the school. The online survey was based on five graded scales and open questions regarding *four themes*: preparedness for the 1:1 project, expectations prior to the 1:1 project, expectations regarding own learning and use of digital technologies, expectations for the future in regard to the uptake and use of digital technologies.

The questions within the *first theme* were related to ICT training, use of digital technologies in the classroom at present experienced level of training in technology and pedagogy, present practices in the classroom and experienced level of preparation. The *second theme*, expectations prior to the 1:1 project, posed questions regarded how computers were expected to be integrated in the classroom, expected use by students as well as effects of the use of computers on own practice. The *third theme*, expectations regarding own learning and use of digital technologies, comprised questions regarding expectations regarding improved ICT-competence, expected development in teaching as well as professional development. The final and *fourth theme*, expectations for the future in regard to the uptake and use of digital technologies, posed questions regarding effects on the school as an organization, work methods, effects on work in the classroom as well as possibilities and challenges within the framework of the 1:1 initiative.

Findings

In this section, some early findings from the online survey will be presented according to the four themes. Both quantitative and qualitative data are included.

Preparedness for the 1:1 initiative

The teachers who participated in this survey had all worked as teachers for more than three years, eight teachers (32 %) had worked between three and ten years, while 17 teachers (68 %) had worked for more than 10 years. A total of 17 teachers (68 %) have skills in line with the level recommended by the National Agency of Education (i. e., PIM level 3), while one teacher (4%) had reached the level of 4, seven teachers (28 %) had reached levels 1 and 2. The teachers' use of digital technologies in the classroom was as illustrated in Table 1

Table 1

Teachers' Previous ICT-Use in the Classrooms

ICT-Use in the Classroom	Number of Teachers	Percent
Every day	0	*0 %*
Once a week	9	*36 %*
Once a month	5	*20 %*
Once per term	6	*24 %*
Seldom/never	5	*20 %*
	25	*100 %*

In regard to the use of digital technologies in the classroom, there were no teachers in this study who reported using digital technologies in the classroom on a daily basis. Nine teachers (36 %) used digital technologies once a week, five teachers (20 %) once a month and the remaining using digital technologies once per term or seldom/never (11 teachers, 44%). To which degree the teachers experienced that they had received professional training in pedagogy, respectively, technology in order to use digital technologies in the classroom was as follows:

Table 2

Level of Professional Training as Experienced by Teachers in Pedagogy and Technology

Level of Professional Training as Experienced by teachers	Pedagogy (Number of Teachers)	Percent	Technology (Number of Teachers)	Percent
None at all	3	*12 %*	3	*12 %*
Low level	10	*48 %*	12	*40 %*
Indifferent	7	*36 %*	9	*28 %*
High level	5	*4 %*	1	*20 %*
Very high level	0	*0 %*	0	*0 %*
	25	*100 %*	25	*100 %*

As seen in Table 2, more teachers experienced their professional training to be at a lower level in technology than in pedagogy. While teachers' experienced level of professional training was more or less the same in pedagogy and technology at neither a high nor low level, more teachers found training to be a high level in pedagogy than in technology. When teachers were asked to express their own level of preparedness as well as how they felt their colleagues were prepared for the use of digital technologies in the classroom. The results are found in Table 3.

Table 3

Teachers' Preparedness for the Use of Digital Technologies in the Classroom

Level of preparedness	I Feel Prepared (Number of Teachers)	Percent	I Feel that my Colleagues are Prepared (Number of Teachers)	Percent
Not at all	1	*4 %*	0	*0 %*
Low level	4	*16 %*	5	*20 %*
Indifferent	15	*60 %*	15	*60 %*
High level	3	*12 %*	3	*12 %*
Very high level	2	*8 %*	2	*8 %*
		100 %	25	*100 %*

While 15 teachers (60%) found themselves indifferent to the question of feeling prepared, five teachers (20 %) were prepared to a low extent or not prepared. The remaining five teachers (20 %) were either prepared to a high extent or to a very high extent. In reference to their colleagues' preparedness for using computers in the classroom, all were prepared to some extent: five (20 %) to a low level, 15 (60 %) were indifferent, while five were prepared to a high or very high extent. When teachers were asked how they used digital technologies in the classroom, the answers were widespread: digital technologies were used to present information with the help of interactive whiteboards, provide information in class, supply students with information regarding tasks, and give response to summited tasks with information as well as planning: "posting homework and using a planning calendar." They used the Internet to help students search for information, writing, showing films, as well as subject-specific programs for mathematics, art and music: "We write and post pictures and search for information on the Internet." Digital technologies are also used as a source of inspiration: "inspiration, finding information and facts."

Expectations Regarding the 1:1 Initiative
When the teachers were asked about their expectations regarding integrating computers in their teaching in the classroom, one teacher (4 %) was negative, six teachers (24 %) were indifferent, while 20 (56 %) were optimistic or very optimistic, four (16 %). They expected to use computers in the classroom by using interactive whiteboards, searching for information on the Internet, film and using computers to draw, listen to texts as well as collective writing in wikis and blogs. While some teachers expected no changes ("I have no special planning"), some found it difficult to foresee the changes ("I don't know; it feels as though we are only in the beginning and that the ideas and educational tools are not fully developed"). The teachers were also asked about what effects the use of digital technologies in the classroom they expected on

students' learning, work methods, collaboration, learning benefits and classroom environment. These results, in percent, are provided in Table 4.

Table 4

Teachers' Expectations Regarding the Effects of the Use of Digital Technologies in the Classroom on Students' Learning/Learning Environment

Effect on Students' Learning/Learning Environment	No Effect	Low Extent	Indifferent	Some Extent	High Extent	
Improved ICT-competence	4 %	4 %	16 %	32 %	44 %	*100 %*
Improved subject competence	0 %	12 %	44 %	40 %	4 %	*100 %*
More efficient work methods	0 %	8 %	44 %	28 %	20 %	*100 %*
Increase in collaboration	8 %	28 %	36 %	20 %	8 %	*100 %*
Enhanced learning	0 %	8 %	36 %	52 %	4 %	*100 %*
Improved collaboration between teachers and students	0 %	16 %	24 %	52 %	8 %	*100 %*
Calmer classroom	8 %	12 %	24 %	44 %	12 %	*100 %*

The use of digital technologies was not expected to have any effect on students' ICT-competence by one teacher, while two teachers expected no effect in regard to increased collaboration and a calmer classroom environment. Effects to a low extent, indifferent extent or higher was seen in the categories improved subject competence, more efficient work methods, enhanced learning and improved collaboration between teachers and students. The largest number of teachers, 13 or 52 %, effects to some extent regarding enhanced learning and improved collaboration between teachers and students. All of 11 teachers expected students' ICT-competence to be affected to a high extent, while 11 teachers were indifferent regarding improved subject competence and more efficient work methods for students. Other effects that teachers expected to come about with computers in the classroom were concerns in regard to focus:

> In my experience students more easily disappear into the computers than listening and working with what they should be working with or calmer since they are sitting at their computers, but all students are not doing what they should be during the lesson, the computers entice them way from the teaching.

One teacher saw the possibility of ICT-competence as an "introduction to social media, both positive and negative, possibility of talking about

ergonomics and netiquette," as well as the helping students with special needs, "easier for students who have language problems and learning disabilities." While the teachers' expectations showed many possibilities, they also expected challenges, ranging from: "The realist in me sees that time and emerge (initially) will be spent on controlling/directing students' work towards the right things, that the computer is used for the right things" to finding ways for combining digital technologies and learning, "searching, gaming and integrating social media in their learning process."

Expectations Regarding Teachers' Own Learning and Use of Digital Technologies

When the teachers in this study were asked if they expected the 1:1 initiative to imply improved ICT-competence for themselves as teachers, seven teachers (28 %) were indifferent. While nine (36 %) expected their ICT-competence to improve somewhat, the remaining nine teachers (36 %) expected improved competence at a high level. The motivations for these expectations ranged from no new learning (e.g., "I don't feel that I have learnt anything new. I am using knowledge that I already have ") to the need for time in the learning process: "It matures along the way. I am quick in learning some things, while other things mature slowly." There is also the need for new learning and ICT as a continual and stimulating learning process (" I think it feels fun to develop teaching with new work methods and will be forced to learn more in or to keep up with students' knowledge"), as well as not knowing exactly what new competences will be needed: "Yes, hopefully, but currently I don't know what the project will imply." To what extent the uptake and use of digital technologies can be seen to develop their own teaching as well as to provide opportunities for professional development is shown in Table 5.

Table 5

Teachers' Expectations Regarding Development of Teacher and Opportunities for Professional Development as the Result of Digital Technologies

Level of Teachers' Expectations	Development in My Teaching (Number of teachers)	Percent	Opportunities for Professional Development (Number of Teachers)	Percent
No effect	0	*0 %*	0	*0 %*
Effect to a low extent	1	*4 %*	0	*0 %*
Indifferent	8	*32 %*	5	*20 %*
Effect to some extent	10	*40 %*	14	*56 %*
Effect to a high extent	6	*24 %*	6	*24 %*
	25	*100 %*	25	*100 %*

All of the teachers in this study expected the uptake and use of digital technologies to have a certain effect on the development of their teaching and

on their opportunities to professional development. While eight teachers (32 %) were indifferent and one teacher (4 %) expected development to a low extent, 16 (64%) of the teachers expected that the 1:1 initiative would imply a development in their teaching to some extent or to a high extent. While 20 teachers (80 %) saw the 1:1 initiative as a way towards professional development, the remaining five teachers (20 %) were indifferent in their expectations regarding this issue. This was expressed by the teachers as regarding use, "I still think that teachers of the future will use computers substantially more than today," to, "The computer will be a part of the overall teaching and possibilities of teaching with digital technologies: "It is one the possibilities to achieve effective learning environment for students and through 1:1 I can make my teaching more inspiring for students."

Teachers' Expectations for the Future Uptake and Use of Digital Technologies
What expectations do teachers have regarding the effects of digital technologies on the school as an organization? Here, the teachers listed a number of issues regarding their workload, documentation, improved results for student with learning difficulties, information to students and parents, as well as a restructuring of the work in the classroom and lesson planning. While a number of teachers were not sure of the effects of digital technologies, other saw possibilities: "Perhaps beaurocracy will decrease and one will be able to deal with pedagogical issues or an experience that the progression in the organization and learning goes much more quickly and is more stimulating. How work as a teacher will be affected by the 1:1 initiative in regard to the organization of classroom teaching, more planning, more administration, more work at home and more work at school was the next set of questions, as illustrated in Table 6.

Table 6

Teachers' Expectations Regarding the Effects of the Use of Digital Technologies on Their Work

Effects on Teachers' Work	No Effect	Effect to a Low Extent	Indifferent	Effect to Some Extent	Effect to a High Extent	
Alternative organization of teaching	4 %	4 %	32 %	40 %	20 %	*100 %*
More planning	0 %	4 %	44 %	40 %	12 %	*100 %*
More administration	4 %	6 %	28 %	44 %	8 %	*100 %*
More collaboration with other teachers	12 %	16 %	52 %	12 %	8 %	*100 %*
More efficient work methods	0 %	8 %	28 %	52 %	12 %	*100 %*
New forms of teaching	0 %	0 %	4 %	64 %	32 %	*100 %*

All of the teachers expected change to a certain extent in regard to more planning, more efficient work methods and new forms of teaching. While many of the teachers were indifferent to the effects regarding an alternative organization of teaching, more planning, more administration, more collaboration and more efficient work methods, many saw an effect to some extent within the same areas, with the exception of more collaboration with other teachers. The highest level of impact was expected to be seen in new forms of teaching with 16 teachers (64 %) expected new forms of teaching as the effect of the 1:1 initiative to some extent and 8 teachers (32 %) to a high extent, and one (4 %) teacher being indifferent. Some of the expectations were voiced as more adapted work methods and "yet another work method that is attractive to many." The possibility of the classroom being calmer was seen from two different perspectives:

> Calmer classroom environment, easier to create tasks for each respective student and It will be calmer, yet more difficult to reach the students who have difficulties in concentrating, the computer offers other things that are more interesting than the lesson.

There was also the possibility of opening the classroom in both space and time: "The world will come into the classroom in a new way and teaching will hopefully take place in real time. " Technical support was also necessary professional training: professional "training for teachers in technology and pedagogy and rules for use the consequences thereof."

The largest challenges for the 1:1 initiative, according to the teachers in this study, is student focus: "that students think that it is ok to do other things during class than what they are supposed to and not using the computer as a tool for learning." Time is also important. Time is necessary for professional training, which in turn is difficult to find and create if the workload is too high, "that we have so much work that we do not have time to develop our work methods." Other challenges are technical problems with equipment, as well as "aversion to computers." Yet another challenge is "traditional thinking, that everything should follow a school book," as well as the human factor, " that students are people and so are teachers."

Discussion and Conclusions

That work with digital technologies provides many opportunities that may lead to an increased interest in learning, motivation and involvement (Bebell & O'Dweyer, 2010), is expressed by the teachers in this study, many of who see new possibilities in the learning environment. When the walls of the classroom are opened through digital technologies, the outside world enters the classroom. Information becomes immediately accessible and available for students who are given the responsibility of searching for information and creating their own knowledge. Expectations regarding making work more structured and easier are voiced by the teachers, as well as being able to individualize their teaching to suit individual students to greater extent. Challenges are expected to be found in the technology itself. The idea that access to technical support, teacher collaboration, making instruction more

individualized and appears to make the classroom more constructivistic (Donovan, Hartley, & Studler, 2007) appears to be present among the teachers in this study. Expectations regarding how methods will develop to meet these challenges in order to support and motivate student learning is expressed as well as perhaps the most intensive challenge: to help students focus on classroom work and to use digital technologies as tool for learning. This will be a challenge for teachers, as they are forced to meet these demands while at the same time keeping up with students' knowledge which excels even faster. When computers are introduced in the classroom in a 1:1 initiative, there are widespread changes in the competence of teachers (Kroksmark, 2010, 17).

The teachers in this study see the need for preparedness in the form of professional training in ICT and pedagogy, as well as the insight that the uptake and use of computers takes time. Although 18 teachers (72 %) have reached the level of ICT-competence recommended by the National Agency for Education, there still appears to be a need for more teacher professional training in both ICT and subject-related didactics that involve technology. That so many of the teachers are indifferent regarding if they are prepared in regard to their professional training in technology and pedagogy can be interpreted in at least two ways. Firstly, it may express that the professional training provided is sufficient, at least at this point in time when the 1:1 project has recently been initiated. However, it may also express a need for professional training, which involves the difficulty in expressing what type of professional training is necessary. Teachers need time to discuss content, students' work, pedagogics and technology (Drayton et al., 2010). Furthermore, the uptake and use of digital technologies in the classroom requires a form of professional development which is a complex combination intertwining technical, pedagogical and subject-related didactic competences (Mishra & Koehler, 2006). At this point in time it may be difficult to foresee and verbalize what specific professional training is necessary. However, it also notes expectations by the teachers in this study regarding an awareness of the change in the role of the teacher which is involved. The roles of teachers are important in this process, as well as ICT-strategies comprising more than just technology (National Agency for Education, 2012).

For the teachers who are involved in the 1:1 initiative in this school, finding themselves in the initial stages of the uptake and use of digital technologies, there are many possibilities and challenges. For many teachers, it is difficult to know what to expect. New methods of teaching will be involved in order to integrate and support the uptake of computers in day to day work, such as continual access to information and the ability to distribute information inside the classroom with the help of digital technologies. New forms of teaching are expected by 23 (96 %) of the teachers in this study, while one teacher (4 %) remains indifferent. It is most likely that the use of computers in the classroom will increase. However, in which way the computers will be used and what forms of new teaching will develop is difficult to anticipate at initial stage of the 1:1 project. Teaching and motivating the students to use the computers for the right things in class will be important as well as recognizing possibilities for own learning and professional development. With these possibilities and challenges as the framework for this 1:1 initiative, teachers' expectations

appear to be optimistic, although somewhat reserved, realizing the importance as well as the necessity of the uptake and use of digital technologies in the classroom.

Future Research

In the future, it will be interesting to explore how teachers' expectations of teaching with digital technologies will affect their work with students in the classroom. While many of the preliminary finding in this study are in line with previous research the possibilities and challenges in the uptake and use of digital technologies for teaching methods and strategies warrant more in depth studies. How teachers adapt their work methods and take on challenges in order to achieve individualization, motivation and maintain student focus, create possibilities for their own learning and profession development as well as the effects of this process on the school as an organization are important questions for future research.

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