GÖTEBORGS UNIVERSITET

The relationship between teachers´ attitudes, self-perceived competencies and usage of ICT

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Degree project- second cycle L3XA1A

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Abstract

Title: The relationship between teachers´ attitudes, self-perceived competencies and usage of ICT

Swedish title: Relationen mellan lärares attityder, självuppfattade kompetens och användande av IKT

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Key words: ICT, classroom, attitudes, self- perceived- competencies, usage

The aim of the study is to investigate how teachers´ self-perceived competencies and their attitudes toward ICT in the classroom are related to the use of ICT. The methodology that is used for answering the research question is of a quantitative character in form of questionnaires. The research question for this study is: How are teachers´ self-perceived competencies and attitudes toward ICT in the classroom related to the use of ICT? The results show that the investigated teachers feel capable of using ICT in different aspects, the teachers have positive attitudes toward ICT and use ICT often in their classroom. Teachers who perceived themselves as being more competent in using ICT had more positive attitudes toward benefits of ICT, and positive attitudes were found to be related to more frequent usage of ICT in the classroom. There are new demands on what students in Swedish schools should learn and what abilities students should be given the opportunities to develop. Because of this there are also new demands on the teachers in school. We live in a complex society were the information flow is huge and it is therefore of importance that teachers feel like they are in control and that they see benefits of using ICT in the classroom, both for themselves, their students and for the development of our society.

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Introduction

Society today becomes more and more dependent on information- and communication technology (ICT). There are new things to learn every day about it and all members of society are expected to keep up. Without adapting to the new technologies it could become hard for an individual to participate in work, social and daily life. The progression of information- and communication technology also puts new demands on schools and educational systems in general. As a result, there are also new demands on the people who work in schools and in education. In other words, there are new demands on teachers who work in schools (Jämterud, 2010).

Teachers have to keep up with new information- and communication technology because their task is to communicate this knowledge and this competence to their students. Skolverket (2017) suggests that students in school should be given the opportunity to develop digital competence. Students should also be given the opportunities to develop their ability to use digital technology and learn to have a critical and responsible approach to technology. This is because the students should be able to see both possibilities and risks with ICT.

Digital elements are also central in the syllabi for many subjects in the curriculum (Skolverket, 2017). For school to succeed in the mission to strengthen students' digital competence, teachers themselves have to have a well-developed digital competence (Jämterud, 2010).

The Swedish government has an aim regarding IT- policy, that Sweden should become the best in the world in practicing digitisation´s possibilities (Regeringskansliet, 2017).

At the same time, one of the European Union's key competencies for lifelong learning, is digital competence. Members of the European Union should be able to use and learn how to use digital technology in a safe and critical way for work, leisure and communication (European Parliament & Council of the European Union, 2006).

In modern schools today teachers do not have a choice whether to use ICT in their classroom or not. They are now in a position where the usage of ICT in the classroom is obligatory (Tallvid, 2016). Even though ICT should be closely integrated into the education in Swedish schools (Skolverket, 2017) the use of ICT varies among teachers and schools (Estling-Vannestål, 2012). It is of importance for Swedish education to investigate possible reasons for this variation in ICT usage.

This study investigates teachers between 22 and 67 years old. The teachers have different experience of teaching, ranging from 1 to 46 years. They are teaching in pre-school class up to ninth grade. The teachers work in schools in the outskirts of a major city in the west of Sweden. The schools belong to the same municipality. The municipality invests in ICT-equipment equally to all schools. The municipality is working systematically and effectively with developing digital competence to students and teachers. A central ICT-group is working in the municipality to support teachers with instruments and competence. All 11 schools have the same access to ICT-hardware.

Aim of the study and research question

The aim of this study is to investigate how teacher´s self-perceived competencies and attitudes toward ICT in the classroom are related to the use of ICT.

The research question is: How are teachers´ self-perceived competencies and attitudes toward ICT in the classroom related to the use of ICT?

Background

The process of digitizing the school has been in progress during many years. At first, it went very slowly but Internet made an entrance into Swedish schools in the middle of the nineties and that is when digitizing rapidly developed. Nowadays, digital technology is a very

important factor in schools. It is useful for administration and information and communication to and between teachers and parents, colleagues and students. Digital technology is also an important tool for the organization of the education itself. The last years, it has been a discussion about what the students should learn and develop regarding the new technology (Hylén, 2010).

In the curriculum for 1994 it is written that students should be able to use information technology (IT) as a tool for learning. They should also develop knowledge about living in a complex, inconstant reality with huge information flow (Utbildningsdepartementet, 1994).

In the curriculum from 2011 it is written that students should be able to face a complex, inconstant reality with a huge information flow. Students should also develop their ability to be critical regarding received information. Students in school should also be able to use modern technology for information, communication, creative work and learning (Skolverket, 2011).

The curriculum from 2011 was revised in 2017 and there are a lot of more information regarding what the students should develop in digital technology and competence in this revised edition. Students should be given the opportunity to learn about how the digitization affect individuals and society. School should also give the students opportunities to learn how to use digital technology. Students should also be given to opportunity to develop a critical and responsible approach to digital technology. Students should develop a critical and responsible approach because they should be able to see possibilities and risks and value information when using digital technology. Digital competence is also something students should be given the opportunity to develop. Further, students should be able to use digital technology when processing and searching for information, for problem solving, for creative work, for communication and learning (Skolverket, 2017).

The section addressing digital technology in the syllabus was substantially revised over the years and teachers working in school during all these years have witnessed and participated in this development.

Theoretical framework

The theoretical framework for this study is the *theory of planned behaviour*. This social science theory proposes that human actions are conducted with regard to three types of considerations. The first consideration are behavioural beliefs which refer to a person´s belief about the consequences of his or hers behaviour. These beliefs produce positive or negative attitudes toward the behaviour. The second consideration are normative beliefs, beliefs about expectations from other people. This consideration can create social pressure. The last consideration are beliefs about the presence of factors that can encourage or hinder act of the behaviour. This is called the control belief (Ajzen & Fishbein, 2011).

If a person has positive attitude toward something, believes that other people will appreciate the behaviour and that the person has the control of doing something the person most likely has the intentions to perform the behaviour. If a person has a negative attitude toward the behaviour, believes that other people will decrease the behaviour and if the person does not believe that he or she has control the person will most likely not perform the behaviour.
This study will focus on the behavioural beliefs and the control belief. Self-perceived competence refers to the control belief. If a person feels like he or she is competent, the person feels like he or she has control. This person will most likely perform the behaviour (use ICT in the classroom).

Fazio and Williams (1986) made an investigation of how attitude and behaviour are related to each other. Results in this investigation show that attitudes, to a certain extent, -form behaviour. This refers to the first consideration of the theory of planned behaviour, behavioural beliefs.

People form attitudes that most predict behaviour when they are motivated to think about an object, when they have direct experience to the object, when they form their attitudes on

relevant information regarding the object and when they believe that their attitudes are the correct attitudes (Glasman & Albarracín, 2006).

When it comes to the usage of ICT in the classroom research has shown that teachers´ attitudes toward ICT actually influences their use of ICT in the classroom. Teachers who are motivated and value the usage of ICT in the classroom tend to use ICT more in their teaching (Cox, Preston & Cox, 1999).

Central terms

IT is a shortening of Information technology and is a term that stands for the technical possibilities that have been developed within the technology and telecommunications. *ICT* is another term that is broader than the term IT. ICT is a shortening of Information and Communication Technology and was developed from IT because of the important role of telecommunication (NE, 2017).

Attitude is an important term in social psychology and is commonly used to describe a person´s feeling about something. The attitude or the feeling is often based on a person´s experiences and is often expressed when the person agrees or disagrees regarding something. (NE, 2017).

Self-perceived competence is a central term in psychology that stands for a person´s own beliefs regarding their capabilities and abilities to control a specific situation (American Psychological Association, 2017).

Self-efficacy is a person´s belief in their own ability (NE, 2017).

PIM means practical IT- and media competence and was an education for teachers that started 2005. It was supposed to develop competence regarding practical IT and media (Jämterud, 2010).

ITiS stands for Information Technology in School and was a project during 1999-2002. The purpose of the project was to educate teachers in IT. (Jämterud, 2010).

Unikum is a learning portal where teachers, units and schools can document information about students during the students´ entire schooling, from pre-school to high school. Unikum is a tool for making it easier to adjust each student´s learning (Unikum, 2017).

Previous research

Attitudes toward ICT

Previous research has shown that teachers´ attitudes toward ICT varies. There are teachers who have positive attitudes toward ICT and teachers who have negative attitudes toward ICT (Tallvid, 2016). Previous research has shown that there are different aspects forming these attitudes.

Tallvid (2016) has conducted an ethnographic case study in Sweden about teachers´ reluctance to the pedagogical use of ICT in the 1:1 classroom. He found out that there are five main arguments about why teachers are reluctant for using ICT in the classroom. Lack of technical competence is one argument. It was shown that teachers do not feel that they are competent enough in managing digital teaching material, mainly on the Internet. The teachers felt stressed over being updated all the time. They felt that it was impossible to follow the constantly changing resources on the Internet. The lack of technical competence also revealed that teachers felt insecure about the occurrence of technical problems. Teachers pointed out that the students in their classroom were more confident in handling technical problems than the teachers themselves and the teachers did not feel comfortable with this situation (Tallvid, 2016). Zyad (2016), who has conducted a mixed-method study in Morocco about teachers´ attitudes toward ICT and integrating computers in the classroom, also claims that teachers fear that their students know more about ICT than the teachers do themselves.

Another argument Tallvid (2016) found in his study was “not worth the effort” which means that teachers believed that the benefits of using ICT in the classroom did not measure up to the perceived costs. The teachers thought that there was a risk about students using the ICT for something other than learning activities. Teachers also claimed that it takes a lot of time and effort to look for pedagogical material and preparing for the use of ICT in the classroom.

Insufficient teaching material was another argument in the study. Teachers considered that the teaching material they could find from the Internet was not sufficient. When searching for material on the Internet the teachers also declared that they could find a lot of inappropriate information. They preferred using material from textbooks instead because then they knew that the material held the standard and followed the curriculum.

The fourth argument found in this study is “diminishing control” which meant that the teachers thought that they lost the control in the classroom when ICT was used. Students seemed to drop their assignments and started doing something else when using laptops during a class. Diminishing control also meant that the teachers felt that they could not control everything on the Internet. They felt that the students easily could access other things than their assignment.

The last argument was lack of time which meant that teachers felt that they had no time to prepare a class including ICT.

Estling-Vannestål (2012) has conducted a study about integrating ICT in language teaching. She found out that language teachers do not use the ICT to its full potential and the reasons are insufficient access to computers, lack of time, negative experience of students doing something else on the computer than their assignments, computers working badly, lack of general knowledge regarding computers and lack of knowledge regarding the school subjects. On the other hand, teachers in this study also saw some benefits of using ICT. The teachers were positive about being able to individualize the education for the students with ICT. The teachers claimed that they could easily create more advanced assignments to students who needed that and simpler assignments to the students who needed that. Further, teachers were positive to ICT because they could adjust the assignments after the students´ interests which resulted in motivated students. In that way, students felt confident. The teachers also thought that ICT made it possible to work in a variated way. They saw possibilities such as the ability of instructing and illustrating with different programs such as PowerPoint, pictures and videos. They also saw the possibilities with accessing different sources on the Internet and digital dictionaries. The teachers claimed that digital dictionaries were positive for students with reading difficulties because with digital dictionaries students could hear how words were pronounced which is not possible with a dictionary in book-form.

It is also shown that teachers think that ICT makes it possible to access current, relevant and stimulating material on the Internet. They claim that it feels like Internet has brought the world closer and into the classroom. The teachers suggest that this makes their students more motivated and stimulated (Estling-Vannestål, 2012 & Player-Koro & Beach, 2012).

Prieto-Rodriguez (2015) made a study of teachers´ usage of ICT to convey relevance of mathematical content. As methodology she used both an online survey, focus groups and interviews with teachers. It is shown in her study that teachers´ attitudes toward ICT varies. Teachers in the study felt that time was an argument for not using ICT so much in their teaching. They expressed that if they got more time, then they would use ICT more in their classroom. They also claimed that they need appropriate resources aligned with the curriculum. Professional development in ICT designed for mathematics is another aspect that teachers report to miss. Teachers also think that ICT only is a tool among other tools for reaching goals and to create engagement among the students. The most important and the goal itself is good pedagogy. A majority of the teachers thought that their students became more engaged and more attentive when using ICT in the classroom. Teachers also felt that the Internet was a good source of information but that it took a lot of time and effort to find appropriate information.

Teachers also thought that ICT was not as necessary in mathematics as in other subjects (Prieto-Rodriguez, 2015).

Self-perceived competencies

Although teachers´ self-perceived competencies in ICT is investigated in this study, other researchers have investigated in teachers´ self-efficacy and their use of ICT in the classroom. Self-efficacy and self-perceived competencies are closely related terms.

A survey conducted in Sweden shows that teachers´ self- efficacy influences teachers in their use of ICT in education. Teachers who see themselves as competent in the use of ICT in education also use ICT in their classroom. These teachers also consider and are aware of that ICT will benefit their work in school and that it is positive for their students´ learning (Player-Koro, 2012). Hatlevik (2017) examined the relationship between teachers´ self-efficacy, digital competence, strategies to assess information and usage of ICT. He investigated 332 teachers who participated in a survey. He also claims that teacher´s self-efficacy is important for teacher´s use of ICT in school. He found out that teachers´ self-efficacy in basic ICT and in online collaboration is related to their use of ICT in the classroom. Teachers who trust that they are capable of carrying out online collaboration activities for their students also use ICT in the education. Hatlevik (2017) explains another factor related to teacher´s use of ICT in the classroom which is digital competence. The higher accomplishment in digital competence, the more the teachers use ICT. The higher level of digital competence a teacher have the more the teacher can use the digital technology in a sensible and examining way.

Hutchison and Reinking (2011) also report that teachers´ beliefs of the importance of integrating ICT into literacy teaching and teacher´s own perceptions of their abilities to ICT usage are related to their actual practice of using ICT. Hutchison and Reinking (2011) found this in their survey in the United States where 1441 teachers participated.

The use of ICT in the classroom

Estling-Vannestål (2012) conducted a research in 2007 on how often English teachers use ICT in their teaching. Results show that 43% of the 96 participating teachers use ICT every day or every week. 50% used ICT every month or a few times in semester and 7% never used ICT in their teaching.

The teachers were asked in what ways they used ICT and results showed that ICT was mostly used for information search and creating texts. This is also something that is found in Hutchison and Reinking´s study from 2011, creating texts and locating information online are the activities that teachers mostly use ICT for. Estling-Vannestål (2012) reports further that ICT was used for digital dictionaries, language practising programs, media on the Internet and webpages from organisations or authorities. 16% or less used ICT for texts from CDs, PowerPoints and communication on Internet.

Player-Koro and Beach (2015) conducted a study about ICT-enabled innovation in technology rich schools. An online survey was applied for collecting data and the teachers were presented questions in how often they used ICT in their teaching. 84% of the teachers used ICT more than one time per week and 40% used ICT every day. 4% of the teachers never used it. Results from this study also show that the most common ways of using ICT was for seeking and retrieving information and producing texts.

Prieto-Rodriguez (2015) found out in her study that the most common way of using ICT was for presentations. While presenting information, computers together with projections devices or electronical whiteboards were often used.

Methodology

According to Bell (2000) it is of importance to design and formulate an aim and research questions before choosing a methodology for a study. It is of importance that the methodology is adequate to the aim of the study.

To obtain a broad picture of the use of ICT in the classroom a quantitative methodology in form of questionnaires has been applied. Researchers in quantitative studies are often interested in measuring and to include as many participants as possible to be able to generalize their results (Bryman, 2011). This study is measuring teachers´ self-perceived competencies, their attitudes toward ICT and their usage of ICT in their classroom.

To address research question proposed here, collecting data from larger number of teachers would be beneficial. Therefore, survey methodology was opted for this study. When using questionnaire as methodology one can obtain a large amount of information from a large amount of people (Bell, 2000).

It was an efficient way to distribute the questionnaires, although, it was not as easy to get them back. Bryman (2011) suggests that this is a limitation when using questionnaire as methodology. It can take weeks to get a questionnaire back, and in some cases, researchers might encounter the problem of low response rate.

In quantitative studies it is often of interest finding out why something is in a certain way. This is called causality. Causality is an alignment of finding causation between variables (Bryman, 2011). This study does not allow for causal conclusions. Instead, this study looks for correlations. Correlations are also commonly used in quantitative research. Correlations show the relationship between two variables. Relationship between variables can be strong, weak or missing. The relationship can be between -1 and 1. If it is a positive relationship the measure is close to 1 and if it is a negative relationship the measure is close to -1. If a relationship does not exist between the variables it is close to 0 (Djurfeldt, Larsson & Stjärnhagen, 2003).

Targeted sample

Participants in this study have been selected through the procedure of convenience sampling. According to Bryman (2011) convenience sampling means that participants have been selected to participate in a survey by availability. They are the first available primary data source for a researcher. Teachers from 11 schools participated in the survey. The schools are located close to each other in the outskirts of a major city in the west of Sweden.

Questionnaire

The questionnaires were in a paper- and pencil form. This form was chosen because if an online-survey was used instead, teachers using ICT more could be overrepresented.

The questionnaire consisted of seven sections. Both multiple-choice questions and open-ended questions were applied.

The first section contained standard demographic questions such as gender, age, education and experience as a teacher.

The second section contained questions regarding teachers' self-perceived competencies in using ICT. The survey asked teachers to rate statements regarding how capable they felt in different aspects of using ICT (for example *"How capable do you feel about using ICT together with your students?*"). Teachers could answer: not at all, to a little extent, to a high extent or to a very high extent.

The third section contained questions regarding the usage of ICT-hardware. Teachers were asked about what type/s of hardware the students used in their classroom. They were given the alternatives: computer, tablet, Chromebook, other hardware or none hardware at all. Teachers were also asked how satisfied they were with the hardware. They could answer with: not satisfied at all, less satisfied, satisfied or very satisfied.

In the fourth section, questions about attitudes toward the benefits of using ICT were formulated (example: "*The ICT I use in my classroom makes it possible to individualize the education*"). These questions about attitudes were formed with a 5-point Likert-type scale (1=strongly disagree and 5=strongly agree). A Likert-type scale is useful for allowing respondents to express their agreement to a statement (Bryman, 2011).

The fifth section of the questionnaire measured perceived obstacles and facilitators to using ICT (example: "*I have good access to ICT-hardware on my workplace*"). Teachers were asked to rate these statements with a 5-point Likert-scale (1=strongly disagree, 5=strongly agree).

The sixth part of the questionnaire was about the use of ICT in the classroom. Teachers were presented questions about how often they used ICT for different purposes (for example: "*ICT is used for language practising programs*"). Teachers answered how often they used ICT for different purposes with: daily, every week, every month, a few times in semester or never.

The last section contained questions about interest in further education in ICT. Teachers were presented a question about if they were interested in further education in ICT. If they responded that they were interested in further education they could openly fill in what kind of education. The teachers were also presented a question about how prioritized such an education would be. Teachers could respond with: not prioritized at all, prioritized to a little extent, prioritized to a pretty high extent or highly prioritized.

Parts of the second, fourth, fifth and sixth section of the questionnaire come from Hutchison and Reinking´s study from 2011.

Procedure

Before handing out the questionnaires in schools, headmasters or administrators of the school approved the survey to be conducted among the teachers working in the schools. In each school a contact person was chosen to help with the administration and the collection of the questionnaires. The contact person also helped with reminding the teachers about the survey. Questionnaires were collected during a ten days period, in November 2017. In total, 140 questionnaires were distributed and 51 were returned (36%). Yet, this return rate was more or less expected. Contact persons at the schools reported that the teachers had a lot do at work and that it was many papers to fill in. Questionnaires were received from every school.

The returned questionnaires were analysed with SPSS (Statistical Package for the Social Science). SPSS is a statistical data-analysis software package used for educational research (Mujis, 2011).

Ethical considerations

Science and research are significant for both development of society and individuals. Society and individuals need to make sure that science actually is driven and that it is essential and contains high quality. This demand is called the research ethic. The protection of participants is another demand and it can be explained in four ethical principles. (Vetenskapsrådet, 2002). This study was made in complete accordance to these four ethical principles. By informing the participants about the aim of the study, that the participation was voluntary and that the collected data is used only for the study, the principle of information has been reached. The participants also had the right to refuse their participation according to the approval principle. The personal data that was collected is completely confidential. Teachers´ and schools´ name are not collected or mentioned in the study. This refers to the principle of confidentiality. The last ethical consideration that was taken is that the collected data is only used for the aim of the research which is according to the last principle, the access right (Vetenskapsrådet, 2002).

Reliability and validity

Reliability refers to the repeatability and the reliability in a measurement. In a quantitative study like this it is significant that if the research would be done again with the same respondents

and it gives the same results it is reliable. If this research would be done again, time is a significant factor. If it is short of time between the measuring occasions the respondents can remember what they answered the first time and if we leave too long between the measuring occasions, attitudes and beliefs regarding ICT may have changed (Muijs, 2011).

Validity refers to the question of measuring the concept that we are supposed to measure. It is of importance that we construct the measurement correctly (Mujis, 2011). When constructing the questionnaire for this study, parts of questionnaires applied and validated in previous research with the same content were used. Original authors were contacted and asked if these parts of their questionnaires could be used.

Sample description

A total of 51 teachers participated in the survey. Teachers participating in the survey were mostly female (84.3%), between 22 and 67 years old (M=41.3, SD=12.287).

21.6% of the participants were between 22 and 32 years old. 47% of the participants were between the ages 33 to 43. 13.8% of the people participating in the study were between the ages 44 and 54 and participants from 55 to 67 were 17.6%.

The teachers have different experience in teaching, ranging from 1 and 46 years (M=14.3 and SD=12.622). The wide range of age and experience in teaching was chosen in order to include teachers of various experience in the study.

Graduation year also varies among the teachers, they graduated between 1971 and 2017.

The teachers received degrees in various teaching programs and are educated to teach in pre-school to municipal adult education.

Finally, the teachers are teaching in pre-school class up to ninth grade. These teachers are divided into two groups: 25 teaching in pre-school class up to second grade and 26 teaching in third grade up to ninth grade. This categorization was chosen because it was of interest to see if there was any difference between teachers who work in classes with younger students and teachers who work with older students when it comes to ICT. Skolverket (2015) writes that it is more common that older students get their own computer or borrow a computer from school than younger students. Therefore it was of interest to see if the usage of ICT varies among lower and higher grades.

Results

Teachers´ education

Of the investigated teachers, 36% had another type of education other than their teacher education. 50% of the teachers who had received additional training had received education regarding school and teaching.

More than a half (58.8%) of the teachers never received education regarding ICT. Of 21 teachers that did receive ICT-related education 15 reported when the education were held. It is seen from results that the earliest education in ICT dates back in 1998 and the latest in 2017.

A total of 60% of the teachers had received ICT-related education at their current workplace. The type of education varied vastly, for example: education regarding smartboard, iPad, ICT in general, programming, Google classroom and Google drive. Others have had some single courses and web-seminars. There are also teachers who have taken courses in and about *Pim*, *ITiS* and *Unikum*.

Self-perceived competencies

To find out how capable (competent) teachers feel about ICT in different aspects, four questions were asked.

The first question “How capable do you feel about using ICT in general?” is showing that 17.6% of the participants feel that they are capable about using ICT to a little extent. 82.3% feel that they are capable of using ICT to a high or a very high extent.

The question “How capable do you feel about using ICT in your teaching?” is showing that only 2% are not feeling capable at all about using ICT in the teaching. 13.7% feel that they are capable of using ICT in their teaching to a little extent and 84.3% feel that they are capable of using ICT in their teaching to a high or a very high extent.

The third question about competencies regarding ICT is a question about how capable teachers feel about using ICT together with their students is showing that 18% feel that they are capable of using ICT together with their students to a little extent. Meanwhile, 82% feel that they are capable of using ICT together with their students to a high or a very high extent.

The last question about competencies regarding ICT is “How capable do you feel about instruct your students about ICT?” It is shown here that 28% of the participants feel that they are capable to instruct their students about ICT to a little extent. 72% answered to a high or a very high extent.

To summarize teachers´ self-perceived competencies, it is shown that teachers feel competent regarding using ICT in general, in their teaching and together with their students. The aspect where the teachers felt a little less competent is to instruct their students about ICT.

Table 1. and Figure 1. show teachers´ self-perceived competencies regarding ICT. It ranges from 0-3.

Table. 1 Average self-perceived competencies

Self-perceived competencies	Mean	S.D
How capable do you feel about using ICT in general?	2,16	,703
How capable do you feel about using ICT in your teaching?	2,14	,722
How capable do you feel about using ICT together with your students?	2,12	,689
How capable do you feel about instruct your student about ICT?	1,96	,727

Figure 1. shows the level of teachers´ self-perceived competence in ICT in different aspects. The numbers above the staples are showing the percentage of the responding teachers.

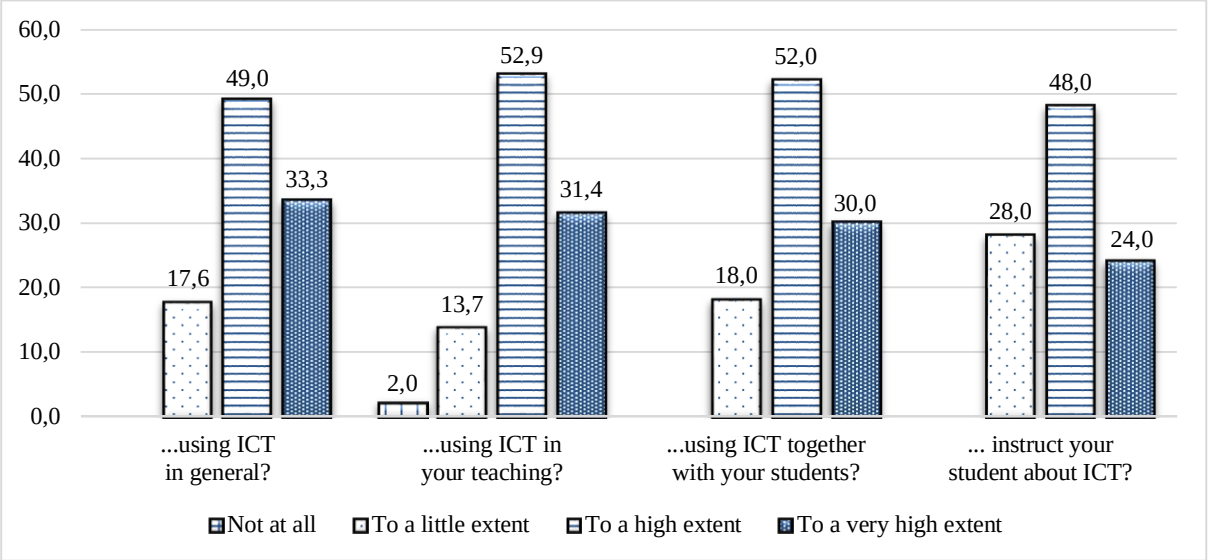

Figure 1. The percentage of answers to the questions *How capable do you feel about…?*

Hardware

When teachers were asked about what hardware the students are using in their classroom they were offered 5 options: -computer, tablet, Chromebook, other hardware or none hardware at all. First, how many different types of hardware are used by different teachers was investigated.

Table 2. Number of hardware types used by students in the classroom

Number of hardware types used	Number of teachers	%
1	37	72.5
2	12	23.5
3	1	2
4	1	2
Total	51	100

It can be seen from Table 2. that most commonly only one hardware is used in the classroom (72.5%). Following, it is seen that 23.5% are using 2 types of hardware in the classroom and only 4% are using 3 or 4 types of hardware in the classroom.

The one hardware that is most commonly used is Chromebook (52.9%). The second most common hardware to use is the tablet (43.1%) and the third most common hardware to use is the computer (35.3%). 2% are using another hardware in their classroom.

In the section about hardware in the questionnaire there is a question about how satisfied the teachers are with the hardware.

2.1% of the teachers are not satisfied at all with the hardware. 20.8% are less satisfied and 77.1% are satisfied or very satisfied with the hardware the students are using in their classroom.

Attitudes toward benefits of using ICT

In order to investigate teachers´ attitudes toward the usefulness of ICT in the classroom, teachers were asked to express to which degree they agree with several statements about the usefulness of ICT in different aspects of teacher´s work. The teachers could answer in a scale from 1-5 where 1 means *strongly disagree* and where 5 means *strongly agree*.

As Table 3. shows, teachers see substantial benefits of the ICT they are using in their classroom. On average the teachers highly agree with the statements regarding various benefits of the use of ICT.

What the teachers agree with the most (M=4.31, SD=0.787) is that the ICT they use in their classroom makes it possible to create more variation in the education. The teachers also strongly agree with the statement about that the ICT makes it possible to access compensatory resources (M=4.14, SD=0.939) and authentic material (M=4.06, SD=0.890).

Average agreement with the statement that the ICT *makes it possible to individualize the education* was M=4.04 and SD=0.999. Average under 4 was found for the statements about the *possibility to work in a student-centred way* (M=3.88, SD=0.840) and *in a creative way* (M=3.86, SD=0.980). The statements were the teachers did agree but not to such large extent was the *possibility to meet the students on their home turf* (M=3.63, SD=0.871) and the *possibility to make the students interact with each other* (M=3.59, SD=1.117), all of which still indicates that the teachers find ICT useful high or average at least.

Table 3. shows teachers´ attitudes toward the usefulness of ICT. It ranges from 1-5.

Table 3. Attitudes toward the benefits of using ICT

Attitudes toward the benefits of using ICT	Mean	S.D
The ICT I use in my classroom makes it possible to create more variation in the education	4,31	,787
The ICT I use in my classroom makes it possible to access compensatory resources	4,14	,939
The ICT I use in my classroom makes it possible to access authentic material	4,06	,890
The ICT I use in my classroom makes it possible to individualize the education	4,04	,999
The ICT I use in my classroom makes it possible to work in a student-centred way	3,88	,840
The ICT I use in my classroom makes it possible to work in a creative way	3,86	,980
The ICT I use in my classroom makes it possible to meet the students on their "home turf"	3,63	,871
The ICT I use in my classroom makes it possible for the students to interact with each other	3,59	1,117

Perceived obstacles and facilitators to using ICT

When factors that facilitate and undermine usage of ICT in the classroom were measured the teachers were presented with eight statements and marked their agreement on the scale 1-5 (1= "*strongly disagree*" and 5= "*strongly agree*"). What is found here is that teachers think that they have good access to ICT- hardware on their workplace (M=4.08 of maximum 5, SD=0.986). It is also found that the teachers think that they have good, general knowledge about ICT (M= 3.82, SD=1.024). At the same time teachers think that they have more knowledge

regarding ICT than their students (M=3.75, SD=1.120). Teachers think that their students mostly are doing what they should do when ICT is used in the classroom (M=3.61, SD=0.874). Further it is found that the teachers think that the ICT that is used in the classroom works quite well (M=3.56, SD=0.861). The statement "I have enough time preparing a class containing ICT" was M=3.06 and SD=0.978. The statement "if technical problems would occur, there is always support to get close by" was M=2.65 and SD=1.230.

The last statement about if teachers find it hard to control what information students access when ICT is used in the classroom was M=2.62 and SD=1.141. The last two statements mean that teachers do not strongly agree with the statements but they do not strongly disagree either. Table 4. shows teachers attitudes toward ICT that limit or enable ICT-usage. Their answers could range from 1-5.

Table 4. Perceived obstacles and facilitators to using ICT

	Perceived obstacles and facilitators to using ICT	Mean	S.D
Facilitators	I have good access to ICT-hardware on my work place	4,08	,986
	I have good, general knowledge about ICT	3,82	1,024
	I consider that I have more knowledge about ICT than my students have	3,75	1,120
	The students are doing what they should do when we use ICT in the education	3,61	,874
	The ICT I use in my classroom always works well	3,56	,861
	I have enough of time to prepare a class that contains ICT	3,06	,978
Obstacles	If technical problems would occur, there is always support to get close by	2,65	1,230
	I find it hard to control what information the students access when ICT is used in the education	2,62	1,141

Usage of ICT

Teachers were asked about how often ICT is used for different purposes in the classroom. It is found that ICT is, in general, used for different purposes quite often.

To start with, it is shown that 94.1% of the teachers use ICT in general on a daily basis or every week (M=4.55 of maximum 5, SD=0.673). 5.9% only use ICT every month or a few times a week. It is also shown that teachers teaching in both lower and higher grades use ICT in general to an equal extent (M_{F-2}=4.36, SD=0.810 and M_{3-9}=4.73, SD=0.452).

Teachers were asked how often ICT is used for reading books or stories online and it is shown that they in general use it for this purpose around a few times in semester or every month (M=2.8, SD=1.262). It is shown that it is more common that teachers teaching in lower grades use ICT for this purpose more often (M=3.20, SD=1.155) than teachers in higher grades (M=2.40, SD=1.258).

Every month or week ICT is used for playing pedagogical games (M=3.8, SD=1.010). It is used a slight more in higher grades for this purpose (M_{3-9}=3.85, SD=1.047 M_{F-2}=3.75, SD=0.989).

ICT is used for information search every month or every week (M=3.76, SD=1.080). Teachers teaching higher grades use it a bit more often than teachers teaching lower grades (M_{3-9}=3.96, SD=0.774 M_{F-2}=3.54, SD=1.318).

For creating text it is used on a daily basis or every week (M=3.52, SD=1.255). It is also shown that teachers in higher grades are using ICT for this purpose more often than teachers in lower grades (M_{3-9}=3.80, SD=1.080 M_{F-2}=3.22, SD=1.380).

For language practicing programs, ICT is used more or less every month (M=3.18, SD=1.304). Higher-grades teachers are using it a little bit more than teachers in lower grades (M_{3-9}=3.31, SD=1.225 M_{F-2}=3.04, SD=1.398).

For multimedia presentations, ICT is used on average every month (M=2.92, SD=1.027). Results show that teachers in lower grades use it more than teachers teaching third grade or higher with a little percentage (M_{F-2}=3.04, SD=0.955 M_{3-9}=2.81, SD=1.096).

In homework, ICT is used in average a few times in a semester or every month (M=2.69, SD=1.339). It is also shown that teachers in higher grades use it a lot more than teachers in lower grades (M_{3-9}=3.42, SD=1.172 M_{F-2}=1.82, SD=0.958).

For digital dictionaries, ICT is used a few times in semester or every month (M=2.53, SD=1.309). Teachers in higher grades use ICT for digital dictionaries more often than teachers in lower grades (M_{3-9}=2.80, SD=1.258 M_{F-2}=2.25, SD=1.327).

The last question was about how often ICT is used for communicating with others (for example, chats). Teachers do not use ICT very much for this purpose. It is found that they in average use it a few times in a semester (M=2.04, SD=1.087). It is also found that teachers in lower grades use ICT for communication less than teachers in higher grades (M_{3-9}=2.38, SD=0.852 M_{F-2}=1.67, SD=1.204).

Results show that ICT is used more in higher grades than in lower grades. It is only when it comes to reading books or stories online and multimedia presentations where ICT is used more in lower grades.

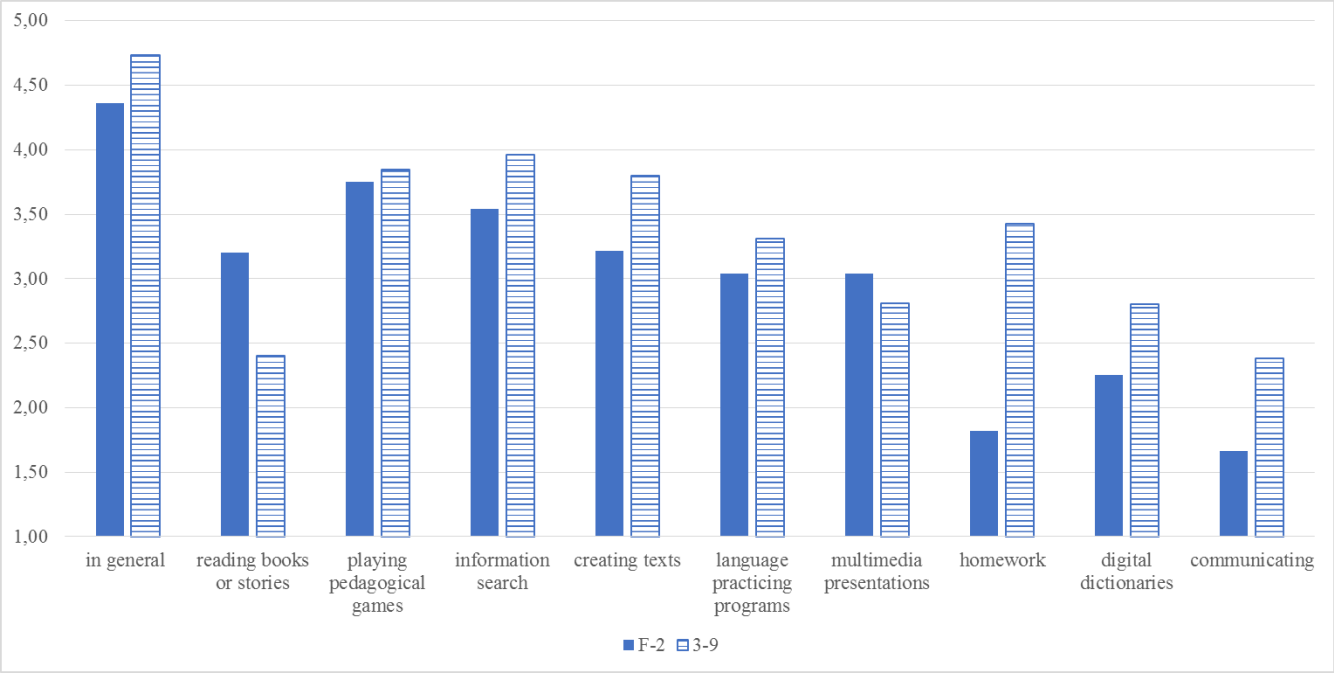

Figure 2. *How often is ICT used…?*

Figure 2. shows how often ICT is used for different purposes. The filled staples show higher grades teachers and the striped staples show the lower grades teachers.

Interest in further education

The majority of the teachers would like more education regarding ICT (87.8%). Of the 43 teachers that applied that they wanted more education about ICT, 35 reported in what they would like further education. For example, they want further education in programming, technical education, ideas on how to use ICT in teaching and in different subjects. They are also interested in getting more education regarding different applications, reading-and writing programs, creative programs and pedagogical games. Many teachers are also interested in getting more education regarding ICT in general and to get new ideas on how to work with ICT in the classroom.

Teachers were asked how prioritized such an education would be from 0 (*not prioritized at all*) to 3 (*highly prioritized*). Teachers prioritized such an education to an extent of M=1.67, SD=0.591.

Correlations between teachers´ self- perceived competencies, attitudes toward the benefits of using ICT and usage of ICT

As expected, results show that teachers´ self- perceived competencies correlate with their attitudes toward the benefits of using ICT. As a rule, it is found that the higher self-perceived competencies are related to more positive attitudes toward ICT benefits. Teachers self-perceived competencies are related to teachers´ attitudes toward: ICT makes it possible to work in a student- centred way (r=.336, p=0.016), ICT makes it possible to individualize the education (r=.332, p=0.017), ICT makes it possible to work in a creative way (r=.322, p=0.021) and ICT makes it possible to access compensatory resources (r=.300, p=0.032). It means that, to a certain extent, the more competent teachers feel, the more positive they are about different aspects of ICT usage and benefits of it in teaching.

The results also show that teachers´ attitudes toward the usefulness of ICT correlate with the usage of ICT in the classroom. This tendency was analysed on an item level, in order to investigate which aspects of attitudes are related to which behaviours. The statement about ICT is used in general in the classroom correlates with the attitude that ICT makes it possible to access authentic material (r=.283, p=0.047) and ICT makes it possible to individualize the education (r=.443, p=0.001). ICT is used for homework correlates with the attitudes that ICT makes it possible to access compensatory resources (r=.318, p=0.028) and to individualize the education (r=.324, p=0.024). ICT is used for information search correlates to attitudes about access to authentic material (r=.289, p=0.044), individualize the education (r=.354, p=0.012) and work in a creative way (r=.350, p=0.013). ICT is used for creating texts correlates with attitudes about compensatory resources (r=.365, p=0.011), individualize the education (r=.619, p=0.000), work in a creative way (r=.409, p=0.004) and meet the students on their "home turf" (r=.359, p=0.012), interaction between students (r=.405, p=0.004) and work in a student-centred way (r=.305, p=0.035). ICT is used for digital dictionaries correlates with attitudes about compensatory resources (r=.350, p=0.014) and individualize the education (r=.365, p=0.010). ICT is used for language practising programs relates with compensatory resources (r=.356, p=0.011), individualize the education (r=.368, p=0.009), create more variation in the education (r=.482, p=0.000) and work in a student-centred way (r=.362, p=0.010). ICT is used for multimedia presentations is correlating with attitudes about access to compensatory resources (r=.393, p=0.005) and individualize the education (r=.283, p=0.046). ICT is used for playing pedagogical games correlates with individualizing the education (r=.437, p=0.002), meeting students on their "home turf" (r=.442, p=0.001), students interacting with each other (r=.320, p=0.023) and working in a student-centred way (r=.378, p=0.007).

Table 5. Correlations between self-perceived competence and attitudes toward ICT

	How capable do you feel about using ICT in general?
The ICT I use in my classroom makes it possible to access authentic material	,248
The ICT I use in my classroom makes it possible to access compensatory resources	,300*
The ICT I use in my classroom makes it possible to individualize the education	,332*
The ICT I use in my classroom makes it possible to work in a creative way	,322*
The ICT I use in my classroom makes it possible to meet the students on their "home turf"	,261
The ICT I use in my classroom makes it possible for the students to interact with each other	-,018
The ICT I use in my classroom makes it possible to create more variation in the education	,271
The ICT I use in my classroom makes it possible to work in a student-centred way	,336*

*p < 0.05

Table 6. Correlations between attitudes toward benefits of using ICT and usage of ICT

How often is ICT used…?	The ICT I use in my classroom makes it possible to access authentic material	The ICT I use in my classroom makes it possible to access compensatory resources	The ICT I use in my classroom makes it possible to individualize the education	The ICT I use in my classroom makes it possible to work in a creative way	The ICT I use in my classroom makes it possible to meet the students on their "home turf"	The ICT I use in my classroom makes it possible for the students to interact with each other	The ICT I use in my classroom makes it possible to create more variation in the education	The ICT I use in my classroom makes it possible to work in a student-centred way
…in general in your classroom?	,283*	,195	,443**	,238	,015	-,146	,008	-,131
…in homework?	,230	,318*	,324*	,104	,215	,030	,187	,257
…for information search?	,289*	,277	,354*	,350*	,074	,183	,206	,189
…for creating texts?	,225	,365*	,619**	,409**	,359*	,405**	,155	,305*
…for digital dictionaries?	,188	,350*	,365**	,246	,145	,052	,132	,159
...for language practising programs?	,060	,356*	,368**	,162	,186	,225	,482**	,362**
…for multimedia presentations?	,252	,393**	,283*	,230	,260	,112	,131	,201
…for playing pedagogical games online?	,025	,266	,437**	,237	,442**	,320*	,256	,378**

*p < 0.05
**p < 0.01

Discussion

The aim of the study was to investigate how teachers´ self-perceived competencies and their attitudes toward ICT in the classroom are related to the use of ICT. According to the previous research, it was expected that teachers´ self- perceived competencies and their attitudes will be related to the use of ICT. These relations can be explained with the *theory of planned behaviour*. According to this theory, attitudes and perceived control predict behaviour (Ajzen & Fishbein, 2011). In this study, it was found that the teachers on average have positive attitudes toward ICT and they feel that they are in control, that is, that they feel capable of using ICT in different aspects and they also use ICT a lot for different purposes.

The positive attitudes toward ICT that teachers have can depend on a lot of factors. Previous research shows that it can depend on that teachers see many benefits with ICT when it comes to students´ learning (Estling-Vannestål, 2012; Player-Koro & Beach, 2015 & Prieto-Rodriguez, 2015). It can also come from teachers own experience and education regarding ICT (Hatlevik, 2017 & Zyad, 2016).

Previous research has, like this study, shown that teachers´ beliefs about their own capabilities toward using ICT in the education are related to the actual usage of ICT (Hatlevik, 2017; Hutchison & Reinking, 2011 & Player-Koro, 2012). Player-Koro (2012) supports the argument that behaviour comes from attitudes and teachers´ beliefs about their own capability. When a person´s attitudes are specific toward a behaviour and when the person also has the experience it is more likely that it guides the behaviour.

Results show that there are positive relationships between teachers´ self-perceived competencies, the attitudes toward ICT and the usage of ICT. If one of these variables increases, the other variables do too. Correlational design does not allow us to make causal inferences. It is possible that the attitudes toward ICT influence teachers´ use of ICT but it can also be the other way around. Teachers´ usage of ICT can influence their attitudes toward ICT. It is also possible that some third underlining factor is causing both. But, the results show positive connection between self-perceived competencies, attitudes and behaviour, and it is theoretically expected that self-perceived competencies and attitudes precede behaviours. Further research is needed to establish causal relationships. For example, intervention study that would aim at increasing teachers competencies, or time-dependent research design where future behaviours would be investigated in relation to initial competencies and/or attitudes.

In this study it is found that teachers feel competent about using ICT in different aspects to a high extent but it is also shown that a majority of the teachers are interested in further education regarding ICT. Teachers did feel competent using ICT in general, in their teaching and together with their students. What the teachers did feel less competent about was to instruct their students about ICT. Previous research has also shown that lack of competence is one argument for not using ICT to a high extent (Estling-Vannestål, 2012 & Tallvid, 2016). When teachers in this research were asked about what further education they were interested in, programming and technical education were two requests that came up. For instructing students about ICT, teachers may feel that programming and technical education may be important to be familiar with.

As mentioned previously, results show that the teachers are interested in learning more and to develop more knowledge about ICT. It is also shown in previous research that teachers need and want more education about ICT (Zyad, 2016). This is an argument for giving teachers more education in ICT. Although, the municipality already is working effectively with developing digital competence to teachers, teachers in the municipality still want to learn and know more in and about ICT. If we want to reach the goal of being the best country in the world in practising digitization's possibilities we need teachers who feel completely competent about using ICT. It is of importance that teachers feel competent when they are teaching their students. The students are our future so if we want to reach the goal about being the best in the world and if we want

our citizens to have the key competence “lifelong learning”, teachers need more education regarding ICT so that they can teach their students in the best, possible way.

Teachers need to get education about ICT already in the teacher education. There are places in Sweden where the teacher education has come far with the education about ICT but there are still a lot left to approve (Estling-Vannestål, 2012 & Jämterud, 2010). Jämterud (2010) suggests that IT should permeate all teacher education. The teacher students should be given the opportunity to learn and to get their own experience of using digital technologies so that they can bring this knowledge and experience to their future work with their students.

If teachers today should be able to teach their students more about ICT, they also need more education themselves. We cannot expect that teachers already know how to manage ICT and how to teach their students in and about ICT.

It is also shown in the results that teachers do not agree completely with the statement about that they have enough of time preparing a class containing ICT. This can depend on how competent the teachers feel. It may take too long for the teachers to prepare for a class containing ICT because they do not know how to manage it. It can also depend on their schedule, it is truly that they do not get the time they need for preparing a class containing ICT. Previous research also showed that teachers feel that they do not have the time for preparing a class containing ICT but if they got more time to learn about ICT and for preparing a class containing ICT they would use ICT more (Prieto-Rodriguez, 2015). Another thing teachers seem to need is technical support if technical problems would occur. The teachers did not agree with the statement that technical support always is possible to get close by if it is needed. Hutchison and Reinking (2011) also suggests that teachers in their study find the minimum level of technical support as an obstacle for using ICT.

Time and technical support are two factors that teachers seem to need to be able to use and see ICT in its fully potential.

Teachers mostly have positive attitudes toward the usefulness of ICT in the classroom. They agree to the most of the statements to a high or a very high extent. For example the teachers agree that the ICT that is used in their classroom makes it possible to individualize the education, work in a student-centred way and create more variation in the teaching. Although, there are a couple of statements that the teachers agree less with. The statement about ICT making it possible for the student to interact with each other was one of them. In the making of the questionnaire this was one of the expected answers. Jonsson (2011) suggests that online community is another way of socializing than the traditional way. Online communities are for example Facebook or Twitter, where individuals communicate with each other. It was expected that teachers would see interaction between students in the “traditional way”, in the “real world”. When teachers were asked about how much ICT was used for communicating with others they answered that ICT is used for communicating a few times in semester. It is shown that ICT is used for communicating the least in the classroom. Although these two variables do not correlate with each other in this research it is possible that these two variables are related in a broader research. If ICT is used less for communicating and teachers attitudes toward ICT and interaction are not very strong. On the other hand, does interaction only exist in the traditional way? *Interaction* defines as a process where groups or individuals interplay and affect each other by their actions (NE, 2017). Is it also possible to interact over the Internet when using ICT? Maybe it is difficult for the teachers to see that interaction can exist over Internet too. It is a quite new phenomena and all teachers are not born as digital natives as their students are and maybe see interaction as something that has to exist in the “real world”. Alexandersson and Hansson (2011) write that socializing and interacting on the internet is an important factor for individuals today. Children and youths construct new identities and create relationships with others in the virtual world. They communicate and interact through social media such as Facebook and Twitter. The virtual world makes it possible for individuals to

develop new abilities and for students in school to cooperate and interact with each other. The virtual world creates new possibilities for learning.

ICT makes it possible to work in a creative way was another statement that the teachers did not fully agree with. This question may have been a bit blurry. A creative way can mean a lot. It can also be very personal. What is working in a creative way? Is it drawing, sewing, drama or singing? Do the teachers know how to work in a creative way with ICT? What is most creative, drawing on papers or drawing on the computer? Creating videos on the computer or play theatre in real life? As said, a creative way can mean a lot. Although, the question may have been a bit blurry, it is possible that the teachers think that working in a creative way with ICT is not optimal. They may think it is difficult because they do not have the competence or the education for this. It is also shown in the results that teachers want more education regarding creative programs and ICT so it is possible that teachers simply do not know how to work in a creative way with ICT.

When it comes to the usage of ICT results show that almost all of the teachers are using ICT in general every day or every week. They are using ICT mostly for reading books or stories online, playing pedagogical games and search for information. There are some differences when it comes to the usage of ICT in different aspects between lower and higher grades. It is shown that ICT is used more in homework in the higher grades. A reason for this finding may be that students in higher grades have more homework than students in lower grades. Another reason can be that it is more common that students in higher grades have got or borrow an ICT-hardware from the school that they can bring home when the school day is over and do their homework then. Skolverket (2015) writes that it is more common that students in higher grades get their own computer from school than students in lower grades.

Another difference that is worth mentioning is that ICT is used more for communication (for example, in chats) in higher grades than in lower grades. This finding was expected. Students in lower grades have less school experience and therefore it is most likely that they have not learned reading, writing and using communication tools as chats to an equal extent as the higher grades students. An interesting aspect tough is that ICT is used for reading books or stories online to a higher extent in lower grades than in higher grades. How can it be possible for the students to read books or stories online if they do not have the capacity to read in a chat? The teachers were asked how often ICT is used for reading books or stories online. Then, one reason could be that the teachers are reading for their students in lower grades and that may be why reading books or stories online in lower grades are more common than in higher grades.

The information flow is huge today. It is very easy to access different webpages, Google and klick on different links that pop up but it is not as easy to choose the right links and webpages (Jämterud, 2010). Teachers in this study were presented the question if they find it hard to control what information their students can access when using ICT. It seems like the teachers did agree with the statement to a moderate extent. This is also shown in previous research. Teachers in previous research find it hard to control what information their students can access when they use ICT in the education (Estling-Vannestål, 2012 & Tallvid, 2016). It can be problematic if teachers feel this way. There are webpages that are inappropriate for young students to watch and these webpages can be as easy to access as any other webpage. It is a problem that needs to be solved. Maybe schools need to block inappropriate webpages including violence, porn, propaganda etc. Young students can get negatively affected and may even copy these behaviours. Then it can be a problem for the whole society. We need to think of what kind of society we want to live in and think of how we want our young citizens to feel and act. It is of importance that we teach our students to be critical against what they hear and what they read. Information competence is an important competence students need to practice (Jämterud, 2010). They also need to learn the risks about using Internet and social media. Skolverket (2017) reports that teachers in school have the responsibility in teaching the students

about risks and possibilities with ICT and to have a critical and responsible approach when using ICT.

Today´s teachers are working in complex circumstances and we need to have and to develop competencies to be able to live in this reality. Digital technology is constantly developing and we need to keep up (Jämterud, 2010). Students in school today also have to keep up to be able to function in a complex reality. We cannot expect that the students already know how to manage ICT and digital technologies because they are "digital natives" and because it is their "home turf" (Estling-Vannestål, 2012). There are a lot to learn about ICT. A lot of possibilities but also a lot of risks. The responsibility lays in hands on different levels, politicians, school administrators, parents and the teachers that meet the students every day.

Conclusions

The research question in this study, is considered, answered. Teachers´ self-perceived competencies and their attitudes toward ICT in the classroom are related in such way that teachers who feel more competent regarding ICT and have more positive attitudes toward ICT also use ICT to a higher extent. What is also found in the study is that teachers can still be more positive and feel more competent regarding ICT- the area of improvement is detected. Education, time and technical support are factors that teachers could need to be able to see and use ICT in its fully potential.

Previous research has shown that teachers want to work in the traditional way, they do not want to change and implement "new things" such as digital technology into their teaching (Tallvid, 2016). This study, though, has shown that teachers want to change, they want to learn new things and they are interested in further education regarding ICT. They also see benefits of using ICT in different aspects. That teachers in the study feel and think like this may be positive for the future work with ICT and for the teacher profession.

Teachers are an important factor when it comes to the future of Sweden. If we want to be the best in the world in practising digitization´s possibilities it is a good way to start in school. By letting competent teachers educate the future citizens in digital technology we may reach the IT-policy aim.

Limitations

The limitations of this study need to be mentioned. First of all, the response rate was only 36%. Time was a contributing factor here. If the teachers would have got more than 10 days, to which data collection was limited, the teachers would have got more time to return their questionnaires.

Second of all, in quantitative research potential to generalize the results to other groups or situations than our own specific group or situation is relevant. It is therefore of importance that the selected group is as representative as possible to be able to generalize in greater extent (Bryman, 2011). Although the teachers who participated in the study were a heterogeneous group regarding age, experience and education, results cannot be generalized.

Replication is another aspect which is interesting in quantitative studies. Replication means that researchers in quantitative studies are interested in being able to repeat their research. If the research is possible to repeat it is more validated than if it is impossible to repeat (Bryman, 2011). To be able to generalize or replicate results in this study to, for example, Sweden, it would be necessary to have a larger extent of teachers participating in the study. It would also be necessary to hear teachers from other and more places in Sweden to be able to generalize and replicate. On the other hand, it may be possible to generalize and replicate the results of this study to other parts of Sweden similar to the part where this study took place. Parts in Sweden with the same economic standards and schools with the same access to ICT- hardware.

Further research

To make it possible to generalize it would be interesting to see a broader picture of teachers´ attitudes toward ICT, self-perceived competencies regarding ICT and the usage of ICT in the classroom. It would be interesting in distributing more questionnaires and collect more data from teachers working in schools around Sweden. Results from this study mostly show teachers who feel competent and have positive attitudes toward ICT. It would be interesting to investigate further and maybe see what happens if teachers feel less competent, have negative attitudes toward ICT and use ICT to a lower extent.

The theoretical framework points out normative beliefs (one´s perception of social normative pressures, or relevant others´ beliefs that one should not perform certain behaviour) as one consideration when it comes to predict behaviour. This study did not investigate how normative beliefs are related to the use of ICT in the classroom but it could be interesting following up on. It would be interesting to see how for example, society, colleagues, education and Skolverket (social pressure) are related to the use of ICT in the classroom (behaviour). Estling-Vannestål (2012) writes that there are arguments from "above", a form of outer motivation which is one kind of social pressure on the teachers regarding how and when they use ICT in the classroom. Another outer pressure on teachers is when a school has spent a lot of money on new digital equipment and teachers then feel like they need to use it (Estling-Vannestål, 2012). For further research it is also recommended to investigate other factors contributing to the likelihood of teachers´ usage of ICT in the classroom, such as age, gender, subject they teach, size of class they teach in and area the school is located in.

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Appendix 1

Hi, my name is Jennica Zackrisson. I am a teacher student and right now I am doing my degree project-second cycle at the University of Gothenburg. I am doing a research about ICT (information- and communication technology) and I would appreciate if you could answer this questionnaire. The questionnaire is anonymous.

Circle the alternative that agrees with you

Gender:

1. Female 2.Male 3.Other

Age: _____

Teacher in grade:_____

How many years of experience do you have as a teacher? _____

What grade/grades are you qualified to teach?_____

What year did you examine from the teachers education?_____

Do you have any other education? (Circle the alternative that agrees with you)

0. No

1. Yes. What education/educations?_____

Do you have any education regarding ICT? (*Circle the alternative that agrees with you*)

0. No

1. Yes. What year did you study this?_____

Have you got any education regarding ICT on your current workplace? (*Circle the alternative that agrees with you*)

0. No

1. Yes What kind of ICT-education?_____

Here are some aspects of using ICT. *(Circle the alternative that agrees with you)*

How capable (competent) do you feel about using ICT in general?

0.Not at all 1.To a little extent 2.To a high extent 3.To a very high extent

How capable do you feel about using ICT in your teaching?

0.Not at all 1.To a little extent 2.To a high extent 3.To a very high extent

How capable do you feel about using ICT together with your students?

0.Not at all 1.To a little extent 2.To a high extent 3.To a very high extent

How capable do you feel about instructing your students about ICT?

0.Not at all 1.To a little extent 2.To a high extent 3.To a very high extent

What ICT-hardware do the students use in your classroom? *(Circle the alternative that agrees with you)*

0.Computer 1.Tablet/iPad 2.Chromebook 3.Other 4.None

How satisfied do you feel about this ICT-hardware (*Circle the alternative that agrees with you)*

0.Not satisfied at all 1.Less satisfied 2.Satisfied 3.Very satisfied

How well do you agree with the following statements? *Fill in a box from 1-5 where 1= strongly disagree and 5=strongly agree*

The ICT I use in my classroom makes it possible to:	Strongly disagree				Strongly agree
… access authentic material	1	2	3	4	5
… access compensatory resources	1	2	3	4	5
… individualize the education	1	2	3	4	5
… work in a creative way	1	2	3	4	5
… meet the students on their ”hometurf”	1	2	3	4	5
... for the students to interact with each other	1	2	3	4	5
… create more variation in the education	1	2	3	4	5
… work in a student-centred way	1	2	3	4	5

How well do you agree with the following statements? *Fill in a box from 1-5 where 1= strongly disagree and 5=strongly agree*

	Strongly disagree				Strongly agree
I have good access to ICT-hardware on my work place	1	2	3	4	5
The ICT I use in my classroom always works well	1	2	3	4	5
I have good, general knowledge about ICT	1	2	3	4	5
The students are doing what they should do when we use ICT in the education	1	2	3	4	5
I find it hard to control what information the students access when ICT is used in the classroom	1	2	3	4	5
I consider that I have more knowledge about ICT than my students have	1	2	3	4	5
I have enough of time to prepare a class that contains ICT	1	2	3	4	5
If technical problems would occur, there is always support to get close by	1	2	3	4	5

How often is ICT used? *Fill in the box that best agrees with how much ICT is used in your classroom*

How often is ICT used:	Never	A few times per semester	Every month	Every week	Daily
… in general in your classroom?	1	2	3	4	5
… to read books or stories online?	1	2	3	4	5
… in homework?	1	2	3	4	5
… for information search?	1	2	3	4	5
… for creating texts?	1	2	3	4	5
… for digital dictionaries?	1	2	3	4	5
… for language practicing programs?	1	2	3	4	5
… for multimedia presentations (for example PowerPoint)?	1	2	3	4	5
… for playing pedagogical games online?	1	2	3	4	5
… for communicating with others?	1	2	3	4	5

Would you like more education regarding ICT? *(Circle the alternative that agrees with you)*

0. No
1. Yes. What kind of education regarding ICT?_____

How prioritized would such an education be for you in your current working situation? *(Circle the alternative that agrees with you)*

0. Not prioritized at all
1. Prioritized to a little extent
2. Prioritized to a pretty high extent
3. Highly prioritized