


From a student perspective, what constitutes a good (or less good) use of ICT in teaching?

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Abstract This paper investigates what upper secondary school students regard as good or less good teaching using ICT. 367 Swedish upper secondary students in 2 schools responded to a web-based questionnaire. The students were asked to describe one of their teachers who used ‘ICT in a way that made them learn very well, and one who used ICT in a way that made them learn less well’ and to describe what these teachers did and why their teaching was understood as good or less good. 18 themes were identified, of which 17 were combined into eight overall counterpart themes and one non-counterpart theme. ‘Clarity’ was the most prominent theme, followed by ‘teachers’ ‘ICT skills’, ‘uses ICT in a good way’, ‘fun factor’, ‘puts information on the LMS’, ‘varies the teaching methods’, ‘demonstrates how to use ICT’ and ‘general pedagogical skills’. The results show that although the specific focus is on students’ views of their teachers’ use of ICT, general pedagogical skills are a major focus in the themes. Effectiveness is an explicit theme in terms of ICT adding value to teaching and learning, while ineffectiveness is an implicit underlying dimension in the themes relating to less good teaching. It is also evident that the students value the same teacher’s use of ICT in teaching differently.

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1 Introduction

In research, efforts have been made to understand the use and role of information and communication technologies (ICT) in teaching and learning in K-12 schools. For instance, research on teachers has focused on their use of or opinions about ICT (Olofsson et al. 2017; Ryan et al. 2010) and their competencies and strategies to enact ICT in teaching (Keane and Keane 2017). Among other things, research on students has focused on their use and views of ICT in general (Olofsson et al. 2018; Bulfin et al. 2016) and of specific digital hardware, software or applications in particular (Duran and Aytac 2016; Ott et al. 2018; Towndrow and Fareed 2015; Rähkä et al. 2014). An increased research focus can also be seen on students' views of the 1–1 concept (Keane and Keane 2017; Spanos and Sofos 2015), mobile use (Gromik 2017), coding (An 2016; Falloon 2016) and the idea of a 'flipped classroom' (Hatakka et al. 2013; Limniou et al. 2018). However, as the interest in this paper is students' views of what constitutes good or less good teaching with ICT to support their learning, earlier studies only contribute limited knowledge, especially in a K-12 context. This paper therefore investigates this particular issue and attempts to shed more light on it.

The study's starting point is that by listening to students and acknowledging their views, a lot can be learned and subsequently transformed into a teaching practice that is supported by ICT. There are at least 4 reasons for this.

First, it has been claimed that students' views of what constitutes 'good' or 'less good' teaching are rarely examined, and that this calls for additional research (Raufelder et al. 2016). As shown below, this is especially the case regarding students' views of how the use of ICT contributes to 'good' or 'less good' teaching. Secondly, valuing and taking students' views into account may strengthen their commitment to their teachers and their school (Öqvist and Malmström 2016). If this makes them feel more like 'subjects' *in* teaching, rather than 'objects' *for* teaching, they will hopefully enjoy a more positive learning environment (Manca et al. 2016). Third, it has been found that students who regard their learning environment as positive perform better academically (Back et al. 2016; Dorman and Adams 2004) and experience positive student-teacher relations (Raufelder et al. 2016; Wubbels et al. 2015). Frelin (2010) argues that teachers' efforts to build relations and acknowledge students' views are central components of teacher professionalism in making situations 'educational'. A fourth and final reason is that teachers' interests in students' views of teaching and learning can be a powerful factor in teachers' professional development (Manca et al. 2016; Messiou and Ainscow 2015; Messiou et al. 2016; Witte and Jansen 2016). For instance, Messiou and Ainscow (2015) claim that teachers who are more responsive to student diversity and engage with students' views stimulate students' alternative thinking, encourage experimentation and positively contribute to their own professional development and improvements at school.

Considering the 4 above reasons, there seems to be a need for research that connects these issues with the complex activity of teaching and learning. Teaching takes place in a multi-layered context, where teachers manoeuvre amongst a diversity of tasks, interests, relations, expectations, oughts and so on, many of which compete or conflict

(Fransson and Grannäs 2013; Ryan et al. 2010). This paper acknowledges that students cannot be expected to understand all teachers' intentions and the entire range of circumstances that teachers have to take into account. Nevertheless, research reports that students are able to accurately judge instruction quality and teachers' teaching skills (Irving 2004; Wagner et al. 2013). For instance, Irving (2004) shows that high school students in the USA and New Zealand are able to identify highly accomplished mathematics teachers amongst others mathematics teachers. However, the validity of students evaluating teaching has been contested (Spooren et al. 2013), although students' abilities to evaluate teachers, instructional quality and teaching have been recognised (Wagner et al. 2013; Witte and Jansen 2016). In this paper students' views of teaching are interpreted as valid in terms of *their* views. Students are capable of providing important information about how they understand the circumstances pertaining to teaching and their own learning, especially when it comes to teachers' use of ICT in teaching and learning (Olofsson et al. 2018) which is the focus of this paper.

2 Students' views of what constitutes good teaching with ICT

Some of the aspects relating to students' views of good or less good teaching using ICT to support their learning have been identified in other studies, albeit indirectly. For instance, Deaney et al. (2003) analyse whether teachers in English secondary schools teach differently using ICT in the classroom and find that with ICT, students' former collective classroom interactions then become more individually oriented.

Teachers' limited ICT skills are also highlighted, as is students' frustration at having to wait for help. Here, the teacher's role in regulating and structuring the work and the importance of giving support are emphasised. Similar conclusions are drawn by Montreux et al. (2017) in their study of the implementation of tablet devices to promote student-centred learning in science education in secondary schools in Flanders. They show that students who make use of the structures offered by teachers score better on tests and that teachers are acknowledged for their interventions and support. Liu et al. (2012) find that senior high school students in Taiwan who are used to a teacher-centred teaching style of instruction in a technology rich classroom prefer peer-to-peer interaction and autonomous learning. In a similar study, Chipangura and Aldridge (2017) show that senior high school students (aged 11–17) in Australia who are often exposed to multimedia (such as interactive whiteboards, iPads, computers etc.) during their mathematics education are more positive about their learning environment than students who do not have the same degree of exposure. In a Greek study Vekiri (2010) shows that if students in years 8 and 9 perceive that teachers expect a lot from them in ICT, it is positively associated with their beliefs in their own computing abilities. Also, if the students experience learning activities as creative and personally meaningful, it can be seen as a predictor of their interest in computing. In their study of upper secondary school students' views of ICT in education in Sweden, Lindberg et al. (2017) find that a teacher's preferred style of teaching influences his or her use of ICT and, consequently, the students' own use of ICT. In other words, the teaching style of a teacher relates to what kind of ICT is used, how it is used, for what purpose it is used and to what extent it is used to support teaching and learning.

In the USA, Borup and Stevens (2017) report on an attempt to identify the best instructional practices of a cyber charter high school by researching the students' perceptions of the most effective teaching practices. The researchers acknowledge that if the students are to stay on task, teachers have to nurture caring relationships, sustain dialogue using several modes of communication, vary the online teaching and learning methods, set relevant tasks and provide clarifying information and support. Even though the focus of their study is on efficient teaching, a few examples of less good practices are also given, such as tasks that lack relevance or are repetitive.

The above mentioned research gives some insight into students' views of what constitutes good or less good teaching involving ICT. However, and as already indicated, research with this specific focus appears to be scarce. The study reported in this paper therefore aims to make a knowledge contribution to the field.

3 Aim

The aim of this paper is to investigate what upper secondary school students in Years 10–12 consider to be good or less good teaching with ICT. The following research questions are posed:

RQ1: Which specific practices and uses of ICT on the part of teachers do the students regard as supporting their learning?

RQ2: Which specific practices and use of ICT on the part of teachers do the students regard as less supportive of their learning?

RQ3: Are there any common dimensions of teachers' uses of ICT that students regard as affecting their learning, and if so, what are they and what do they contribute?

4 Method

A web-based questionnaire (survey report) was sent to 2 upper secondary schools (which in the UK is equivalent to sixth-form college) in Sweden to students following the Technology Programme (Te), the Natural Science Programme (Na) and the Electricity and Energy Programme (Ee). These programmes were chosen for strategical reasons, because they were expected to display variations in the use of ICT tools for teaching and learning and were also part of a larger longitudinal research project. Notably, the majority of the teachers in these 3 programmes also taught in other programmes in the schools. The programmes have been running for more than 10 years, although a revision of the national curricula and syllabi was carried out in 2011 in order to improve the content and provide clearer instructions about the focus. The reform did not intend to change the way in which the teaching was conducted, nor did it emphasise the enactment of ICT. Both schools were early adopters of a one-to-one school system, which means that every student and teacher has their own portable computer. Our conclusion is that no novelty-effect is related to the implementation of the one-to-one-system. A total of 690 students were asked to answer the web-based questionnaire and 367 students responded, yielding a total response rate of 53.2% (see Table 1). The

Table 1 Overview of invited respondents, responses and response rate for each school and programme and in total

	Technology Programme (Te)		Natural Science Programme (Na)		Electricity and Energy Programme (Ee)		Total Response rate			
	Total Responses	Response rate	Total Responses	Response rate	Total Responses	Response rate				
School A	172	82	47.7%	194	108	55.7%	119	73	63.3%	54.2%
School B	69	42	60.9%	89	42	47.2%	47	20	42.6%	50.7%
Total	241	124	51.5%	283	150	53.0%	166	93	56%	53.2%

response rate differed among the programmes at the 2 schools and the total response rate was slightly higher at what we call school A. The questionnaire was distributed in November 2016 and remained open for 4 weeks.

At what we call school A the principals did not permit the use of the students' individual email addresses for reasons of privacy, but instead preferred an open web-link to the survey. This procedure made personalised email reminders impossible. Instead, the authors of this article asked the teachers to inform the students in class, to distribute the link to the web-questionnaire and after 2 weeks to remind the students to fill it in. Some teachers allowed the students to complete the questionnaire during lesson time, especially in the Electricity and Energy (Ee) Programme at school A, which may help to explain the higher response rate in that programme. At school B, the students' individual email addresses were made available and were stored in the programme used (survey and report) for the web-based questionnaire, thus facilitating a personalised email for the questionnaire and for reminders. Three reminders were sent to non-respondents after a week's interval, and after 2 weeks the teachers were asked to remind the students orally.

The questionnaire could be answered via computers, tablets or smartphones. Research has shown that responding via smartphones can lead to a higher break-off rate, a lower response rate and a longer response time than via computers (Wells et al. 2014). However, some studies report no differences in the response rates when using different digital tools to respond to a questionnaire (Schlosser and Mays 2017). In an attempt to increase the response rate, the email invitation and reminders were personalised. Depending on the students' preferences and situations, the specified estimated time for answering the questionnaire (approximately 10 min) may have affected the response rate in both a positive and negative direction.

The questionnaire consisted of 18 questions. There was a mixture of questions, for example requiring Likert-scale answers, options for comments and questions requiring text comments. In addition to some background questions, the Likert-scale questions focused on how often different ICT tools or applications were used, or how they were seen to have impacted the teaching and learning practices. The analysis of some of these quantitative oriented questions shows that the use of ICT in these 2 upper secondary schools does not seem to differ from other similar schools in Sweden, which aligns with other Swedish studies of the use of ICT in schools (Perselli 2014; Tallvid 2015; Willermark 2018). The most popular computer programs are Microsoft Word and PowerPoint, digital teaching materials (e-books) and web-based tests, whereas the use of tools to produce videos, audios or pods, or to log data or make simulations, is not common. 65–96% of the students said that stationary computer were never used, 70–85% claimed that portable computers were used on a daily basis and 37–45% said that they used their own mobile phones in school every day. A comparison of the use of nine different tools showed that in 22 out of 27 cases (9 tools surveyed in the 3 programmes) the reported mean-value was higher at school B than at school A. This could indicate a slightly higher use of digital tools at school B. A One-Way ANOVA post-hoc test (0.05 level) (henceforth referred to as 'ANOVA test') showed significant

differences in the use of the following 4 tools between school B and school A: Microsoft Word - mean differences 0.62 on a scale with six alternatives, tools logging data (such as temperature, speed, etc.) - 0.44, e-books - 0.37 and PowerPoint - 0.32. For instance, ANOVA test shows that Word was used much more frequently in the Na and Ee programmes at school B than at school A (significant mean difference 0.71 and 0.76). Almost 29% of the students in the Ee-programme (21 of 72 students) at school A reported that they ‘never’ or ‘almost never’ used Microsoft Word, and 2.5% (5 out of 108 students) of the students in the Na programme reported the same. However, the major difference between the schools concerned the use of SmartBoards. ANOVA test showed significant mean differences (1.92 on a five point Likert-scale) in the use of SmartBoards between school A ($M=3.11$) and school B ($M=1.19$) and that these were significant in all 3 programmes.

The 2 questions in focus for in-depth analysis in this article required text comments and asked the students to recall ‘One teacher who uses ICT in a way that makes you learn very well, one who uses ICT in a way that makes you learn less well, and why these ways are good or less good’. This was then operationalised as 2 questions: (Q1): ‘What does the teacher who uses ICT in a way that makes you learn very well do, and why is this way good?’ (Q2): ‘What does the teacher who uses ICT in a way that makes you learn less well do, and why is this way less good?’

The intention with these 2 questions was to encourage the students to reflect on the teachers’ actions and use of ICT in the teaching practice and to identify specific learning qualities in order to draw attention to the quality of the teaching practices, rather than to popular or unpopular teachers. We regarded it as unethical to ask direct questions about, for instance, ‘bad teaching’, as this may have projected the notion of ‘bad’ onto some teachers. Thus, we agreed that questions formulated around teaching in which the student ‘learned less well’ were more appropriate and less stigmatising than those about ‘bad teaching’. Furthermore, in this way we tried to avoid a binary positioning of teaching as ‘good’ versus ‘bad’, and instead acknowledged the ‘quality of teaching’ as being on a sliding scale.

The responses to the 2 questions were organised and analysed using NVivo® software. A content analysis (Miles et al. 2014) was performed on the 367 students’ responses in order to identify patterns and themes. During the coding, the responses were divided into ‘comments’, which included comments on one or more themes that needed to be coded differently. The coding was carried out in an iterative process, in which the data was first coded and temporarily thematised. These temporary themes and the NVivo coding were then critically scrutinised and revised. The ‘counterpart themes’ (see Table 3) emerged from the data and the analysis and, in a third step, the themes were combined and in some cases renamed to better reflect the actual content. As a whole, the coding yielded 775 comments in 3 main categories relating to comments about (a) teachers and (b) technology and (c) no comments, do not know or nonsense answers.

Table 2 gives an overview of the categories and the 2 research questions. For instance, for question 1 (Q1): ‘What does the teacher who uses ICT in a way that makes you learn very well do, and why is this way good?’ 396 comments were coded, of which 204 related to teachers, 104 to technology and 88 to the category ‘do not know, no answer, or nonsense answer’.

Table 2 Overview of the categories and codes for the 2 main questions

	No. of student responses	Comments coded ¹	Comments related to teacher	Comments related to technology	Category 'do not know, no answer or nonsense answer'
Q1. 'What does the teacher who uses ICT in a way that makes you learn very well do, and why is this way good?'	367	396	204 9 themes	104 8 themes	88
Q2. 'What does the teacher who uses ICT in a way that makes you learn less well do, and why is this way less good?'	367	379	183 9 themes	74 10 themes	122

¹ Of the 367 student responses some have been coded to include comments relating to more than one theme

5 Results

The study's findings are presented in this section. The analysis and coding of the category 'comments related to teachers' yielded a total of 18 themes. These are presented in Table 3, which includes the frequency of comments for each theme.

The results are presented in terms of themes related to each of the 2 questions (see Table 3). In principle, 17 of the 18 themes can be presented as 'counterparts' to one or 2 other themes, e.g. as a binary construct of 'good' – 'less good' teaching. For instance, the themes 'clarity' and 'lack of clarity' can be regarded as opposites but are still related in the theme 'clarity'. Thus, 14 themes are presented in pairs with comments about teachers who use ICT in a 'good way' and about teachers who use ICT in a 'less good way'. The theme 'in good ways – less good ways' includes 2 sub-themes for teachers who use ICT in a less good way: 'advances too fast' and 'too much/little text'. The theme – uses ICT to make teaching and learning more effective' – is not possible to present in pairs with any obvious counterpart. This theme is marked in bold in Table 3. The presented quotes relate to the 2 studied schools and the 3 specific programmes.

5.1 Clarity – Or lack of it

The most frequent theme for teachers regarded as using ICT in 'a good way' or a 'less good way' is 'clarity', with comments about 'structure' and 'clarity' (see Table 3). Regarding teachers who use ICT in a 'good way', 66 of the 204 statements address 'clarity', of which 27 statements are of a general character or implicitly address the use of ICT, while 39 statements explicitly focus on ICT (Table 3). Examples of the latter are:

Use visual aids to clarify what is said orally. (School A, Te)

Writes on the SmartBoard and takes things step by step. (School A, Na)

The teacher who uses ICT in a good way does this with clear, interactive and practical examples. (School B, Te)

The above comments reflect teachers who students regard as systematic, can explain things well, use ICT to visualise and highlight the content and deepen their learning.

When it comes to teachers using ICT in a 'less good way', 46 of the 183 comments point to a lack of ability to address 'clarity', of which 26 comments are of a general character and 20 have an explicit focus on ICT. 'Lack of clarity' refers to unclear instructions or PowerPoints, being poor at explaining or using ICT in an unstructured way. Here, examples of comments are:

A teacher who only uses PowerPoints that are unclear and difficult to understand and who hardly explains what s/he means. (School B, Na)

Uses ICT in an unstructured way. (School A, Na)

Table 3 Overview of themes emerging in the coding and the frequency of comments for each theme

Theme	Teachers who use ICT in a good way to facilitate learning	204	Teachers who use ICT in a less good way to facilitate learning	183
Clarity (Clarity, explicitly addressing ICT– 39) (Clarity in general– 27)		freq. 66	Theme Lack of clarity (Unclearness, explicitly addressing ICT– 20) (Unclearness in general – 26)	freq. 46
ICT skilled		13	Insufficient ICT skills	42
Use ICT to make teaching and learning more effective		33		
In ‘good ways’		27	In less good ways: advances too fast	22
Makes it fun		22	In less good ways: too much/little text	18
Puts information on LMS		22	Boring lessons	12
Variety of teaching methods		17	Does not put information on the LMS	5
Demonstrates how to use ICT		12	Too little variation of teaching methods	15
General pedagogical skills		12	Does not demonstrate how ICT works	8
			Lack of general pedagogical skills	15

A lack of clarity seems to lead to uncertainty, irritation and extra work for the students, thereby affecting their motivation and learning and how they value teachers.

In this theme, the focus is on what the teachers *do* or *do not do*, rather than the merits or shortcomings of the ICT tools or applications. The ways in which the teachers provide and structure information in a PowerPoint, on a SmartBoard or a regular whiteboard are in focus in the students' answers, as is their ability to explain things in a clear way. However, teachers are praised for using ICT that for instance facilitates a visualisation of graphs and correlations in mathematics that are clear and support learning or for preparing information in advance in a structured way, instead of successively writing information on the whiteboard.

5.2 Teachers ICT skills – Or lack of them

Teachers' ICT skills is the second most common theme when it comes to the use of ICT in a 'less good way' (see Table 3). As the question itself focuses on ICT – what do the teachers who use ICT in a 'less good way' do – it is hardly surprising that a teacher's lack of ICT skills is emphasised. Examples of comments in this theme are:

Doesn't know much about ICT and asks for our help to solve problems. (School B, Ee)

The teacher wastes a lot of lesson time due to a lack of ICT skills and we therefore learn less. When the teachers uses ICT s/he does not explain things very well and we understand very little. (School A, Te)

Despite all teachers being knowledgeable, some do not have a very good grasp of the ICT they are working with. This means that you have to try to find the answers to your questions yourself, which can take time and be devastating for some people. (School B, Te)

Teachers' insufficient ICT skills seem to affect the students in several ways. The most salient impact appears to be the loss of time during lessons. When technical challenges occur, a teacher's ability to deal with them effectively is important for the students. According to the students, teachers with limited ICT skills do not deal with these challenges very effectively, which reduces the teaching time, irritates the students and results in less learning. Students also comment that teachers' technical insecurities can slow a lecture down and limit the kind of support the students need. Teachers' limited ICT skills also seem reduce students' confidence in the teachers.

When it comes to teachers who use ICT in a 'good way', the theme 'ICT skilled' is not particularly prominent, given that it is the seventh out of nine in the ranking. However, as the question addresses teachers who use ICT in a 'good way', teachers' ICT skills may have been taken for granted when answering the questionnaire. Notably, many of the comments in the other themes either explicitly or implicitly address teachers' abilities to use ICT. For instance, teachers putting information on the school's Learning Management System (LMS) implies that they know how to do it. Comments about showing the students how to use ICT implies that the teachers are knowledgeable in this field. Explicit examples of comments in the 'ICT skilled theme' are:

The teacher is very knowledgeable and very good at using the SmartBoard and other programs. The lessons flow well and the teacher does not waste time trying to fix problems. He also makes his own programs, which are fantastic. (School A, Na)

The teacher knows how to emphasise what is important in a PowerPoint presentation. The way he uses PowerPoints makes it very interesting to listen to, that is, the effects of it, how things glide in and out. The teacher is really very good at creating PowerPoints. (School B, Na)

The students describe those teachers regarded as using ICT in a ‘good way’ as having a good flow in their teaching and being able to take advantage of what ICT has to offer. Even though the students’ comments are sometimes limited, they can be interpreted as teachers integrating ICT, pedagogical skills and pedagogical content knowledge. An examples of this is:

The teacher uses summarised PowerPoints, shows slides and short films that make it easier to put the subject into context. (School A, Na)

5.3 Using ICT to make teaching and learning more effective

The second most common theme for teachers regarded as using ICT in a ‘good way’ is ‘using ICT to make teaching and learning more effective’. Here the comments focus on the benefits and added values that the use of ICT brings to teaching and learning. This theme has no (obvious) binary counterpart. The comments often address teachers’ use of ICT and the technical options and effects for teaching and learning. Examples of typical comments are:

The teachers explains things better with rather than without ICT and you understand much better when the teacher clarifies things with ICT than without. (School B, Te)

The teacher uses ICT to interactively demonstrate different situations in a way that you can easily understand and see what the effect is straight away. (School A, Te)

The teacher makes use of programs like GeoGebra and Logger Pro. These are programs that facilitate an understanding of different phenomena in e.g. physics. An experiment is easier to understand when you see it, experience it and can to analyse explicit values in a program like Logger Pro. (School A, Na)

In this theme, the interplay between teachers, ICT and pedagogies is in focus. Students seem to appreciate teachers having a certain level of ICT skills and knowledge about how to use ICT to support learning.

Other comments focus on how teachers use ICT to prepare lessons or simulations in advance, which is more time-effective, interesting and supports learning, as well as how

they organise documents, link webpages effectively and allow pupils to use computers instead of writing by hand:

Quicker run-throughs with for example a SmartBoard than those using an ordinary board. More time for own work. (School A, Te)

This teacher prepares a Word document for the lesson's work with links to listening exercises and other kinds of tests in an easily accessible document. This makes the work smoother. (School B, Na)

5.4 Uses ICT in a 'good way' – Or in a less good, e.g. advances too fast or uses too much or too little text

The third most common theme is teachers regarded as using ICT well is 'in a good way'. The counterpart to this theme, teachers who use ICT in a 'less good way', focuses on teachers who 'advance too fast' or use 'too much or little text' on PowerPoints, SmartBoards etc. (see Table 3). The comments in the 'in a good way' theme are general in character but at the same time highlight what teachers do well or how they use ICT in a 'good way', often involving the term 'good'. These comments generally contain fewer words than those in other themes. Besides the 2 most extensive comments of 124 and 43 words, the remaining comments consist of an average of 14 words. Examples of comments are:

She explains things well. (School A, Na)

Good at using digital tools and using good materials. (School A, Ee)

The comments seldom address specific issues, although it is sometimes possible to catch glimpses of the students' underlying meanings. For instance, comments like the following can be interpreted as ICT being the taught content.

It is involved in the subject and fits in in a good way. (School B, Te)

The third most common theme for teachers regarded as using ICT in a 'less good way' is 'advances too fast'. The theme focuses on students not being able to catch up with their writing or having too little time to reflect before the teacher quickly advances to the next task or set of information. Examples of comments are:

The teacher is in too much of a hurry and is therefore not precise, does not demonstrate clearly etc. (School A, Te)

Goes through far too much on the SmartBoard and we sit and take notes at every damned lesson. (School A, Na)

One strategy described by the students for dealing with the challenge of teachers progressing too quickly is to take photographs of the text on the whiteboard or SmartBoard.

For teachers regarded as using ICT in a ‘less good way’, the comments concern teachers who provide too much information and text on, for instance PowerPoints, which means that students do not have time to write everything down or are unable to concentrate on reading and listening simultaneously. Comments here also relate to too little information, for example a brief presentation using bullet points, which leads to difficulty when revising for an exam or understanding what has been addressed. Examples of comments are:

Has PowerPoints that are far too long, have too much text and goes far too quickly in relation to the amount of information presented. (School A, Na)

13 of the comments are about too much text and five of the comments relate to too little text.

5.5 The fun factor – Or the lack of it

This theme emphasises teachers’ abilities to make teaching and learning fun and interesting, or whether this is boring. Here, the students’ comments related to teachers regarded as using ICT in a good way are both general and specific in nature and all but 2 of the 23 comments specifically address ICT. Examples are:

Clear and skilful PowerPoints done in a fun way. (School B, Na)

Because it’s more interactive and fun. You are more motivated and not so tired or bored. (School A, Te)

There are different descriptions of what makes lessons ‘fun’. This can include the teacher as a person: ‘He’s funny and makes learning interesting’, (School A, Te) or the kind of ‘fun’ ICT tools that are used, such as the use of Kahoot, funny pictures, videos, SmartBoard presentations, etc.

Comments related to teachers regarded as using ICT in a ‘less good way’ describe the teaching as ‘boring’ or ‘uninspiring’. A lack of variation in the teaching methods or ICT used, too long texts without pictures, ‘bad PowerPoints’ or teachers being uninspiring are all mentioned as factors that make teaching and learning boring. Examples of comments are:

Mostly used PowerPoints and Word document, which make the learning less fun. (School B, Te)

The person who teaches in a less good way is what I regard as a bit touchy and sharp, which makes learning less fun. (School A, Ee)

Teacher-centred teaching, i.e. when students mostly listen and are not directly involved, is also regarded by some students as boring.

5.6 Information on the LMS

Teachers who put information on the school's Learning Management System (LMS) are highly valued by the students. When lectures, PowerPoints and SmartBoard notes and links to web pages or films are made available for the students on the LMS it is described as making revision possible after the lessons and later on for tests. Assignments and all kind of documents seem welcome, especially if you are ill or lose your papers. The importance of the information being organised in a simple way and being easy to find is also emphasised. Examples of these comments are:

The recorded solutions and shared them with the students, which meant that you learned better. If you can't keep up during a lesson you can check the solutions at home. (School A, Na)

Teachers who are regarded as using ICT in a 'less good way' either do not put information on the LMS at all, or do it in an unsystematic way. Examples are given by the students of teachers who are 'old-fashioned' and just use the whiteboard, overhead projector or paper, thus making it difficult to share information on the LMS. More comments could have been expected about teachers not putting information on the LMS, especially as this is the fourth most acknowledged theme. However, in their comments students address the most obvious issues, which seem to be closely related to teaching and learning in the classroom. Thus, later work such as collecting information from the LMS is often downplayed.

5.7 Vary the use of teaching methods – Or not

Using a variety of teaching methods, such as lectures, summaries, showing films, asking the students to work in groups or on their own, are emphasised by the students as important. Variations in what kind of ICT is used are valued, as is sometimes using ICT and sometimes not. The gamification of teaching is manifested in for instance the acknowledgement of applications such as Kahoot. Example of comments are:

She varies the content in the lessons. Sometimes we watch a film clip, then we answer questions in a document about the film. Sometimes we make short presentations in group about something, we draw pictures or have a presentation on e.g. PowerPoint. We sometimes look at picture and discuss them. We sometimes do quizzes on the computer etc. She uses lots of different ways, which make you learn really well! (School A, Na)

Uses the internet in a varied way. (School B, Na)

This theme can be summarised as varying methods and sources of information making teaching and learning more interesting for the students and making it easier for them to be focused, actively involved and interested in the task in hand.

Comments related to teachers regarded as using ICT in a 'less good way' are aimed at those who do not vary their teaching methods. Long lessons with little variation and that are monotonous and predictable are commented on. Examples of comments are:

Uses the internet in the same way every lesson. (School B, Na)

Long, boring and monotonous lessons. (School A, Ee)

The teacher almost never wants us to use ICT in the lessons. I think that you learn better when you alternate between ICT and paper and pen. (School B, Te)

10 of the 15 comments address ICT tools in some way, for instance predictable internet use, or lessons taught using Word instead of PowerPoint.

5.8 Demonstrates how to use ICT – Or does not

This theme focuses on teachers who help students to use or understand the ICT tools. A few comments refer to teachers' facilitating source criticism on the internet. Most apparent are comments about teachers who use specific digital programs, such as CAD, PowerPoint or GeoGebra. Examples of these comments are:

The teacher teaches us many programs that are good and can make our studies easier. I think that's good, because there are many aids that can help us when we find things difficult to understand. (School A, Na)

[The teachers] show us how our programs work so that we can use them on our own. (School B, Ee)

Given the question's focus on ICT, more comments could have been expected acknowledging teachers for demonstrating the use of ICT. However, it could also be that students regard ICT as an integrated part of teaching and learning, so that when teachers demonstrate how ICT works, it is natural and no big deal for the students.

Teachers regarded as using ICT in a 'less good way' do not demonstrate how technologies or programs work. Here, the students' comments can be interpreted as teachers not having mastered the programs themselves, or not bothering to teach the students how to use them. Another aspect is that the teachers do not always understand that students need support. Examples of such comments are:

The less good teacher can also skip telling us how the ICT we are working with functions so we are forced to find that out for ourselves. (School B, Te)

In principle she tells us to use a program without hardly showing us how it works. She then does not explain at all well how the program works, which makes the process of using it awkward. (School B, Na)

5.9 General pedagogical skills – Or lack of them

For teachers regarded as using ICT in a 'good way', the theme 'general pedagogical skills' amasses a variety of comments on pedagogical issues. For example, how the teacher moves around in the classroom and 'does not just stand on one place', and how

the teacher ‘uses different coloured pens’. Such teachers are also described as encouraging, good at explaining, letting the students work on their own and collaboratively discussing and elaborating on different kind of solutions.

For teachers regarded as using ICT in a ‘less good way’, this theme addresses different more general pedagogical issues, such as teachers not keeping students on task, assuming that students can do more or less than they are able to, or not seeming to be interested in what they are teaching. Other comments focus on teachers who do not prepare lessons properly, do not read the texts on the websites they link to, are careless with feedback, or who show PowerPoints without adding any further information. Some of the comments can be traced to one and the same teacher. For instance, seven comments from one class focus on one specific teacher’s poor handwriting, which makes it difficult for the students to read and understand the content to be learned.

6 Discussion

In this final section, attention is drawn to six outcomes related to the results in the study. The knowledge contribution is highlighted, as are the practical implications. At the end, some of the limitations of the study are highlighted.

First, it must be acknowledged that the students have *different experiences* and to some extent different opinions about the teachers and their teaching. For instance, some students prefer teachers to use PowerPoints with lots of text so that it makes revision easier, whereas others prefer PowerPoints with the most important information presented in bullet points. That said, some students praise teachers for using ICT in a good way to support their learning, while others downplay the very same teacher’s ability to use ICT to support learning. Thus, the students’ comments vary to some extent depending on how their preferences for teaching and learning match those of the teachers’.

Second, researching students’ views of what teachers do and what is a ‘good way’ or a ‘less good way’ of using ICT resulted in 18 themes which, with one exception, ended up as counterparts, such as ‘clarity’ and ‘lack of clarity’, ‘ICT skilled’ and ‘insufficient ICT skills’ etc. This way, overall themes like clarity, ICT skills, varying the teaching methods and so on emerge as common dimensions of what students regard as affecting their learning (cf. the third research question, RQ3).

The theme – ‘uses ICT to make teaching and learning more effective’ – does not have a single counterpart. ‘Effectiveness’ emerged as one clear theme for teachers using ICT in a ‘good way’, although ineffectiveness did not emerge as a distinct theme in relation to the use of ICT in a ‘less good way’. However, ineffectiveness can be interpreted as an implicit underlying dimension of *every* theme related to the use of ICT in a ‘less good way’. For instance, having insufficient ICT skills is not effective, not demonstrating how ICT works is ineffective, as is not putting information on the LMS. Notably, the theme in which the use of ICT contributed to make teaching and learning more effective is an example of how ICT can bring added value.

Third, the most prominent results of the study are the emphasis on overall *general pedagogical skills*, such as clarity or lack of clarity, advancing too fast or not having enough variation in the teaching methods used. These results are in line with claims that structured teaching and clarity are key elements in good teaching (Hattie 2009; Håkansson 2015; Raufelder et al. 2016). But how should this extensive focus on

general pedagogic skills be understood? It may be the case that when reflecting on the questions, students focus more on the ‘teaching and learning dimension’ in general, rather than the ‘ICT dimension’, and therefore end up with statements that emphasise general pedagogical skills without explicitly addressing ICT. Another understanding of the results is that ICT is regarded as an integrated, and taken for granted part, of teaching in a way that the ICT dimension is implicitly recognised and that statements about general pedagogical skills imply an ICT dimension. Nevertheless, *what* the teachers do, *how* they do it and with *what* awareness and skills it is done are very common themes, both for teachers regarded as using ICT in a good way to facilitate the students’ learning and for teachers who are not as successful in their use of ICT. Thus, the students acknowledge teachers for making the ordinary teaching and learning activities work, supported by appropriate ICT use. This could be understood as students wanting the “state-of-the-actual” to function, rather than expecting any “state-of-the-art” when comes to ICT (Selwyn 2008, 2010; Olofsson et al. 2018). Thus, the students expect that programs and technologies such as Word, PowerPoint, Smartboards, LMS etc. will be used smoothly to support the teaching and their learning. Similarly, the students do not seem to make any major requests for the most up-to-date or flashy ‘state-of-the-art technology’ for their everyday work.

In this context, it is relevant to ask whether there is any ‘novelty-effect’ in teachers using ICT in a ‘good way’. Do such teachers introduce new technologies or methods that make the students regard their teaching as good? Based on the analysis of the data, it could be said that a novelty effect *may* occur in relation to the gamification of teaching and learning, for instance in the use of ‘Kahoot’. Some teachers use these kinds of web-based ICT tools to vary their teaching and make it more fun for the students. In this sense, the themes ‘variations’ and ‘makes it fun’ could be closely connected. Here, we do not regard the use of (digital or analogue) technologies to vary the teaching and learning as a novelty effect. However, the ‘fun’ factor’ could be seen as a novelty effect that may fade over time, especially if teachers are early adopters of specific and beneficial ICT tools that are also regarded as ‘fun’ to work with.

Fourth, teachers’ ICT skills are emphasised in a positive way, although stress is also placed on some teachers’ insufficient ICT skills. Teachers who have not mastered ICT are regarded by students as wasting time in the lessons, which leads to irritation and a lack of confidence in them. The results could be illustrated by 2 construed ‘narratives’ of teachers: one reflecting teachers’ use of ICT in a way that students find supportive of their learning, and the other reflecting teachers who use ICT in a way that students do not find supportive of their learning. These narratives summarise the comments related to the first and second research questions, RQ1 and RQ2.

The teachers who use ICT in a ‘good way’ to facilitate learning are digitally skilled. They have mastered the technical aspects, can demonstrate how to use ICT and can motivate why and when to use it or not. They vary their teaching by using different teaching methods and different ICT tools, programs and applications. Their lessons are well planned and structured, as are their PowerPoints or SmartBoard presentations. They provide adequate information; not too much and not too little. Their instructions are clear and they ensure that the students understand what to do and that they remain on-task. They use ICT in a way that makes teaching and learning more effective, which bring added value. ICT is used for visualisation, summaries and to facilitate asynchronous teaching and learning by, for instance, making their own recordings, encouraging

flipped classroom pedagogies or when putting information on the LMS. The teachers are knowledgeable in their subject, involve students and try to deepen discussions. The teachers strive to make teaching and learning fun, effective and interesting, and the gamification of teaching is supported by ICT.

Teachers who use ICT in a '*less good way*' to support learning do not have sufficient digital skills. As a consequence, their use of digital tools is limited and valuable time is lost in dealing with technical 'problems'. Thus, they also have limited abilities to help the students with ICT matters. Their repertoire of teaching methods and digital tools is limited and their teaching is monotonous. Their general pedagogical ability is regarded as poor and unstructured, and they are described as being too hasty in lectures, not explaining things properly, having poor hand writing, using too much or too little information on PowerPoints or SmartBoards and not preparing lessons properly. Students perceive these teachers as giving insufficient instructions and responses to questions and not ensuring that the students remain on-task. They allow the students to use the internet without sufficient instruction and do not help them to find accurate information. Often they use ICT as replacement for teaching, rather than as a tool for teaching and learning. They are careless with feedback and about putting information on the LMS, if they do this at all. The students find the teaching boring, superficial and monotonous. In sum, the teachers' reputations are damaged if they cannot master the technology and not do take advantage of ICT.

Fifth, it is not clear whether it is likely that a teacher who does not display general pedagogical skills will be able to improve them by just starting to use ICT. On the contrary, there seems to be an impending risk that the use of ICT would reinforce the effects of insufficient pedagogical skills. This is in line with the OECD claim that: 'Technology can amplify great teaching but great technology cannot replace poor teaching' (OECD 2015, p. 4). On the other hand, some teachers who are pedagogically skilled yet have insufficient ICT skills could be regarded as 'old-fashioned', which may in turn jeopardise their reputations as teachers simply because they are not ICT competent. Sixth, organising the data in the analytical binary of 'good' and 'less good' teaching should not be interpreted as the only 2 positions in teaching. Teaching is a complex and multifaceted endeavour and at an overall level is seldom a matter of binary positions. As has been shown, students value teachers and their teaching differently. This makes the following questions relevant: 'Good/less good teaching under what circumstances, for whom and in relation to which goals, values, interests or positions?' 'How do structural and contextual preconditions influence teachers' actions and options?' 'How do teacher-student relations influence the teaching and learning and how are they valued?' (Raufelder et al. 2016). Thus, it may be more accurate to value teaching and the use of ICT on a sliding scale of appropriate or inappropriate, depending on the conditions, needs, what the teaching is about and how important the use of ICT is. Our position is that teachers do their best in the prevailing situation and try to manoeuvre amongst a number of tasks, interests, oughts' and so on as well as they can. However, things can always be done differently and, in their everyday teaching, teachers may act in 'good ways' but also in ways that, on reflection, could have been done differently. This is one of the challenges of being a teacher.

Finally, the knowledge contribution of this study is what students regard as good and less good teaching with ICT from a teaching and learning point of view. It also contributes to a field that, as highlighted in the introduction, is under researched. The

results have practical implications for teachers, in that they help them to be better informed about students' views. As research has shown, teachers' knowledge about students' views of teaching and learning can be important for teachers' own teaching, their professional development and how to best support students' learning (Messiou and Ainscow 2015; Witte and Jansen 2016).

6.1 Limitations of the study

The study involves students in 3 specific programmes at 2 schools. The kinds of ICT that are used in these schools and programmes, the teachers' preferred styles of teaching and the students' views of what constitutes 'good teaching' and a 'good use' of ICT – factors that are culturally and contextually bound – set the frame of reference for the students in this study. Being realistic, the results cannot be expected to be valid in other contexts, although the transferability of results is possible in relation to contextual circumstances. Thus, the issue of transferability may not primarily be about transferring and applying the results, but rather how these results could help to understand other contexts better (Merriam 1989).

As this study focuses on students' views on teachers regarded as using ICT in a good or less good way to support learning, the results cannot be acknowledged as having fully captured what constitutes 'good teaching', or 'less good teaching' in a general sense. However, the results do seem to be in line with what is generally regarded as 'good teaching' (Hattie 2009; Håkansson 2015).

Another limitation is connected to the brevity of the answers, in that most of the comments only address one or 2 aspects of the teachers' teaching. If the comments had been more extensive and focused on more aspects, the emphasis may have been different. The comments appear to address what is most obvious to the students at the time. However, the results of this study may benefit from being complemented by a more qualitative approach, such as focus group interviews. The internal 'loss' of answers may also have influenced the outcome. With regard to the first research question, 20% of the students did not leave a comment or a nonsense comment. This was also the case for 30% of the students in the second research question.

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