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"I just Google it" - Developing professional digital competence and preparing student teachers to exercise responsible ICT use

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Abstract
The rapid emergence of information and communication technology (ICT) has had implications for the education system and initial teacher education (ITE) in particular. This study investigated the extent to which teacher education assists student teachers in developing their professional digital competence (PDC) in general and, more specifically, their competence in using ICT responsibly. *Responsible use of ICT* is here taken to include privacy and copyright issues, ethical issues and the ability to evaluate digital information. To explore Norwegian student teachers' perspectives, awareness and experience of the responsible use of ICT, in-depth interviews were conducted with 10 student teachers before their practice placements at local schools and with six students after their practice placements. Overall, the findings indicate that the student teachers mostly knew how to search for and evaluate digital information, but that they tended to choose the most convenient approach for search and evaluation. Further, it seems that the student teachers were aware to some extent of how to avoid advertisements, marketing or inappropriate content when using online resources in the classroom. However, they had limited competence in dealing with privacy and copyright issues in a teaching setting. One of the challenges identified through this study is that, during practice placements, the attention seems to be on the technical aspects of ICT rather than on pedagogical or responsible ways of using ICT. The study concludes that teacher education programmes need to include responsible use of ICT as an integral part of their programme, as well as during student teachers' practice placements in schools, rather than providing stand-alone activities or courses of limited duration.

Keywords: digital responsibility, professional digital competence, initial teacher education, student teachers

1. Introduction and perspectives

The rapid penetration of ICT into society has compelled student teachers to adopt and adapt ICT into their teaching practice (Instefjord, 2014; Lund et al., 2014; Røkenes & Krumsvik, 2014, 2016). Technology has changed the way students and teachers interact with one another and use teaching and learning resources. Professional digital competence (PDC) has become an

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essential part of teachers' professional practice and student teachers' initial teacher education (ITE) on campus (Brevik et al., 2019). The preparedness of student teachers to deal with technology-rich classrooms is also essential to enable them to cope and succeed in their practice placements.

Krumsvik (2014) claims that all types of teacher education should place emphasis on basic competence in the use of digital tools and the pedagogical use of ICT. This is particularly important to meet the expectations of professional practice and the needs of schools. Different strategies have been identified to support student teachers' PDC (McGarr & Gallchóir, 2020; Instefjord & Munthe, 2017); these involve preparing teacher educators to be role models, reflecting on the role of technology in educational practices, using technology by design, collaboration with peers, scaffolding authentic experiences and continuous feedback (Tondeur 2012; Tondeur et al., 2018).

Hsu (2011) has expressed concern about the extent to which teachers are utilising ICT to enhance the learning of their students, and Gudmundsdottir and Hatlevik (2018) and Gudmundsdottir et al. (2014) claim that there is a gap between what newly qualified teachers need in practice and how teacher education prepares them in this regard.

Recently, the concept of 'responsible use' has been receiving attention, partly owing to the creation of new privacy rules in Europe, the General Data Protection Regulation (GDPR), which is designed to protect the privacy of citizens in the EU and the European Economic Area (EEA), as well as regulate the transfer of personal data outside these areas. For research in particular but also for teaching, these rules have had implications on how teacher educators prepare student teachers, for example with respect to issues about sharing images or showing information about their pupils' achievements or other personal information (Mac Mahon et al., 2019; Marković et al., 2019).

Another reason to highlight the responsible use of technology is the online risks to which children and young people can be exposed (Barn & Medier 2020; Livingstone et al., 2008), which may be identified by three keywords: content, contact and conduct. The types of risks depend on and vary according to the roles people have, i.e. a recipient, a participant or an actor (Livingstone et al., 2008, 2011). As recipients, young people can be exposed to spam, sponsorship offers or offensive content. As participants, they may receive unwanted contact from other people and be tracked, bullied or invited to meet strangers. However, young people are also actors and may indulge in illegal copying, illegal reuse and creation of inappropriate material. ITE needs to equip student teachers to discuss digital responsibility with their pupils, alert them to the types of online risks they may encounter and explain and advise how to avoid such risks (Gudmundsdottir et al., 2020).

To protect pupils as recipients of online information, teachers need to be able to assess the accuracy, authority, objectivity, currency and coverage of this information (Metzger, 2007). Further, student teachers should be trained in how to participate safely online, to protect personal information and to avoid hostile or unwanted contact from others. Finally, student teachers need to teach their pupils how to produce, share and spread information safely and legally (Choi, 2018). Botturi (2019) identifies five core competencies as a part of teachers' citizenship in the digital age, namely the ability to: 1) make responsible choices when accessing information, 2) evaluate the quality and credibility of content, 3) create one's own content, 4)

reflect on one's own conduct and communication behaviour, and 5) participate, engage in social action and share knowledge online.

The present study explored Norwegian student teachers' perspectives on and awareness of the responsible use of ICT, as well as their own experience during their practice placements in schools. Aspects of this topic are privacy, copyright and ethical issues and the ability to search for and evaluate digital information. We examined student teachers' ICT experience before their practice placement in a primary or secondary school, framed as the first research question (RQ1): *How do student teachers perceive their preparation for exercising responsible use of ICT before their practice placement in schools?*

We further examined student teachers' experience during their teaching practice, leading to the second research question (RQ2): *What experiences do student teachers have in the responsible use of ICT during their practice placement in schools?*

2. Conceptual framework

2.1 Professional digital competence in teacher education

The concept of professional digital competence (PDC) is a central element in European discourse about teachers' proficiency in using ICT (Ferrari, 2012, 2013; Gudmundsdottir & Hatlevik, 2018). Since 2006, digital competence has been identified as a key competence in the Norwegian school curriculum. In a European context, Ferrari (2012, 2013) developed the European digital competence framework (DigComp). This was later revised as a more general framework for children, students and employees (Carretero et al., 2016), but also as a framework for educators (Caena, 2014; Caena & Redecker, 2019; Redecker, 2017). The concept of PDC is accorded much importance in Norway and within the Nordic countries (Brevik et al., 2019; Instefjord, 2014; Lund & Erikson, 2016). In terms of content, there are similarities between concepts such as digital competence for educators and PDC (McGarr & Gallchóir, 2020).

This study took into account the following components of PDC: 1) generic digital competence, 2) subject-related digital competence and 3) profession-related digital competence (Gudmundsdottir & Hatlevik, 2018). Generic digital competence is about the basic ICT skills, knowledge and attitudes that teachers need in order to make use of ICT in their practice, including the use of software and knowledge on responsible use, such as privacy and copyright issues. Subject-related digital competence deals with the particulars of every subject and how each can be taught with and through ICT. This may include the use of modelling and simulations in science subjects or language labs in foreign language teaching. Profession-related digital competence refers to aspects of teachers' work related to the teaching profession that extend beyond subject knowledge and are not necessarily only classroom teaching, for example home–school communication, online assessment and feedback, classroom management in technology-rich classrooms, relational skills such as dealing with digital bullying and harassment and how a teacher approaches his or her own continuous professional development with regard to the use of ICT.

In addition to these three components, a fourth component dealing with a *transformative agency* may be considered (Brevik et al., 2019). This entails teachers dealing with new

conditions due to technology use and the challenges and opportunities for students and teachers that arise, for example working with online knowledge representations and resources and responding to unforeseen classroom situations. As Engen (2019, p. 17) claims this "requires an awareness and knowledge of how to use technology in the classroom". Simultaneously, student teachers need to abide by recognised appropriate practice in schools, which means conforming to expected norms and possessing the necessary PDC. In this respect, responsible use can be seen as an element in all four components of PDC.

Nevertheless, a survey of newly qualified teachers indicated that teachers did not find that the ITE contributed to their development of PDC (Gudmundsdottir & Hatlevik, 2018). This is in line with a study that reported that teacher educators seem to demonstrate "little awareness of how to use digital tools in their own teaching practice, and even of how to teach on digital competence-related issues themselves" (Tømte, 2013, p. 85). Krumsvik's study (2014) indicated that teacher educators need to develop digital competence by themselves. However, a sharp focus has been on PDC in recent years.[2] National strategies and guidelines specifically incorporate PDC as a priority in teacher education in Norway, reflecting a greater awareness of its importance on the policy level. It remains however to be seen how widely the concept of PDC will be adopted in future within ITE, in teaching practice in schools and research.

2.2 Responsible use of ICT

This paper explores student teachers' knowledge and reflections on privacy issues, how (and if) they evaluate the authenticity and quality of digital content, copyright and ethical issues related to online well-being and safety for pupils, whether in the role of the recipient, participant or actor. Responsible use of ICT means protecting oneself and one's information and at the same time protecting information from or about other people to prevent misuse, lies, bullying or the violation of privacy.

The most important common features of concepts such as online privacy (Livingstone et al., 2008, 2011), internet safety (Calvani et al., 2012), digital protection (Ferrari, 2013), responsible use of ICT (Jia et al., 2016; Gudmundsdottir et al., 2020), and cyber citizenship (Choi, 2016) are that they deal with identifying, preventing and decreasing the impact of online risk for young people.

Dealing with online risk is part of the national and international frameworks for digital competence/literacy (International Society for Technology in Education, 1998). The framework of basic skills (Norwegian Directorate of Teaching and Education, 2012) is a tool that can be used when developing the curriculum in schools. The framework consists of four sub-categories: *Search and process*, *Produce*, *Communicate* and *Digital responsibility*. Source criticism is part of the sub-category *Search and process*, copyright is part of the sub-category *Produce* and the sub-category *Digital responsibility* covers how to deal with unwanted content and contact and avoid sharing inappropriate material. Similarly, the PDC framework for teachers (Kelentrić et al., 2017) is meant to strengthen teachers' professional development and support them in their practice. The framework has seven competence areas, one of which is an *Ethics dimension*, which deals with issues such as privacy and copyright (Kelentrić et al., 2017).

[2] For example, from the Norwegian agency for international cooperation and quality enhancement in higher education (DIKU).

Further, responsible use of ICT and protection from online risk fall within several international frameworks, e.g. 21st Century Skills (Binkley et al., 2012), DigComp (Ferrari, 2013), Digital Citizenship (UNESCO, 2014; Choi, 2016) and ICILS (Fraillon et al., 2013). Safety is part of the European DigComp framework (Ferrari, 2013; Vuorikari et al., 2016; Carretero et al., 2017) and online safety and security issues are encompassed within the UNESCO framework of Digital Citizenship (UNESCO, 2014). Choi emphasises the importance of teaching "students to become responsible, well-informed, and actively engaged digital citizens" (Choi, 2016, pp. 589–590).

2.3 Evaluating online content

Recent research has yielded data about pupils evaluating online content and receiving unwanted online content (Staksrud, 2013, Livingstone et al., 2011). In her dissertation, Frønes (2017) observes how 15-year-old Norwegian secondary school pupils struggle with evaluating online content. Online information is easily manipulated; thus, being critical of the authenticity of such content is important for pupils, students and teachers. In a Stanford study, Wineburg et al. (2016) found that 82% of schoolchildren could not recognise the difference between advertisements and original content. Researchers have expressed concern about what students do when they read and evaluate digital information (Puustinen & Rouet, 2009; Johannessen, 2016). It seems to be difficult for students to know if digital information has been reviewed (Kubiszeqski et al., 2011) and by whom and how they can check the quality of the information (Metzger & Flanagin, 2013; Walraven et al., 2009). Recent studies also show that student teachers and teachers need help in developing online reasoning and the ability to judge the credibility of online information (Kubiszeqski et al., 2011; Metzger & Flanagin, 2013; Shin, 2015). One way could be to develop explicit criteria that student teachers could follow (Metzger, 2007; Metzger & Flanagin, 2013) and apply during their own studies, in-service practice and when they start working as teachers. When evaluating online information, Metzger (2007) advised pupils to scrutinise and assess the 1) accuracy, 2) authority, 3) objectivity, 4) currency and 5) coverage of online information. Teachers and student teachers can build on these five criteria in their own search and evaluation of digital information. They can also use these five criteria as a starting point when teaching pupils in primary and secondary school to do the same. This is particularly important when pupils are the recipients of unwanted information such as racist, hateful, obscene or violent content. Young people are particularly exposed to commercial content that is not age-appropriate.

2.4 Participating in online activity

Recent research has yielded information about pupils in the role of participants and how to prevent them from taking part in an undesirable online activity (Staksrud, 2013; Livingstone et al., 2011). Student teachers need, therefore, to act appropriately in response to challenges, such as cyberbullying, that their pupils may face or participate in within or outside the classroom. What makes this difficult is that cyberbullying often happens outside of school hours and within closed online groups to which teachers, parents and other adults do not have access. Teachers and student teachers should nevertheless make every effort to prevent cyberbullying and harassment, for example by emphasising the cruelty of online threats through narratives and

first-person accounts describing the experience of such cruelty and the psychosocial consequences (Lwin et al., 2012). They need to identify unwanted behaviour and take action to prevent it (Heath, 2018; Choi, 2015; Pusey & Sadera, 2011). In 2017, Zych, Baldry and Farrington found that present research on anti-cyberbullying programmes is unfortunately not capable of identifying which programmes are preventing or reducing cyberbullying, because of a lack of methodologically sound evaluations. They conclude that "Even though some programs are effective in increasing knowledge about risks related to the Internet, behaviors do not always change significantly" (Zych et al., 2017, p. 128). Nevertheless, peer support for teachers, coping strategies and a systemic whole-school approach to improve the school environment appear to have the greatest potential for reducing cyberbullying (Zych et al., 2017).

There are other risks associated with pupils as participants, for example, participation in forums promoting various forms of eating disorders, drug use, self-harm or even suicide.

Pupils also participate in activities that, unknown to them, are adult-initiated, as well as in peer-to-peer activities. These can, for example, involve sexting or grooming, which have been defined as sexualised risks (Machimbarrena et al., 2018). In a systematic review of school-based education programmes for the prevention of sexual abuse, Walsh, Zwi, Woolfenden and Shlonsky (2018) found that such programmes increased children's self-protective skills and knowledge. It is, however, unclear whether this knowledge also decreases the likelihood of sexual abuse of the child (Walsh et al., 2018).

2.5 Active producers

Recent research has been conducted into pupils as actors and what they should consider when it comes to sharing and publishing digital content or being active producers and/or distributors of digital content (Staksrud, 2013; Livingstone et al., 2011). Choi argues that privacy issues, i.e. "protecting privacy, […] and respecting self, others, and community" (2018, p. 577), are important aspects of digital responsibility. However, Coetzee (2013) claims that less has been written on children as the manufacturers or distributors of cyber pornography and the role of the school in this regard than on children as victims.

Cross and colleagues (2015) identified several individual characteristics of mediators of cyberbullying, such as a lack of empathic responsiveness, moral disengagement and tolerance or even advocacy of bullying. They, therefore, called (2015, p. 114) for schools and teacher education to promote critical thinking and issues relating to digital reputation, as well as awareness of rights and responsibilities online, decision-making in online environments and empathic responses.

Finally, research on the role of the pupil as an actor also highlights excessive use of social media and gaming, in which settings the pupil is primarily self-harming. In a Finnish study (Salmela-Aro et al., 2017), the researchers found gender differences in adolescents' risky use of digital technology: girls were more likely to experience depressive symptoms and anxiety, whereas boys were more prone to excessive internet use. Raising pupils' awareness of the dangers and the concept of responsible use is important for preventing harmful use of the Internet; several studies also confirm that excessive use can be related to loneliness, depression, anxiety and low self-esteem (Baltaci, 2019; Darcin et al., 2016; Gámez-Guadix, 2014; Lam & Peng, 2010).

3. Methodology

This study was based on qualitative data from focus groups as well as individual interviews. A qualitative approach was chosen to obtain detailed information from the student teachers about their awareness of the concept of responsible use of ICT, their perception of their preparedness to exercise such use of ICT and their individual experiences both during their teacher training and in practice placements in local schools (Kvale & Brinkmann, 2015). In addition, we wanted the participants to explain whether and how they would incorporate ICT into their own professional practice. Accordingly, we interviewed student teachers before and after their practice placements at local schools.

3.1 Participants and data

The ten participants in this study were student teachers in a large urban university with teacher education programmes that qualify the students for teaching at primary and lower secondary school levels. Three faculty staff members assisted us in recruiting students by providing information about the study in their lectures and encouraging students to participate in focus groups that were arranged immediately after lectures on campus during three days in the following week. The main reason for using focus groups to collect data was to foster good dialogue with the student teachers (Bloor et al., 2002). The students had attended the same courses but were not familiar with the researchers. It was therefore important that they would feel at ease and willing to share their experiences (Morgan, 1997). The student teachers were not placed in the same schools for their practical training. We, therefore, decided to invite them to reflect on their experiences individually. Michell (1999) advised researchers who intend to combine focus groups and individual interviews to start with the focus groups to ensure that everyone understands the context and learns the terms and concepts used.

The ten participants (seven females, three males, all aged in their early 20s) participated in three focus groups, which comprised the first phase of the data collection. We divided the participants into three groups, each consisting of student teachers who were training in different subject areas, to make the groups varied and avoid discussions in which all were unanimous. We used a semi-structured guide to pose questions to the groups and continued the discussion until no new insights were emerging. The interviews varied in length from 58 minutes to 87 minutes. Themes and questions were developed prior to the focus group sessions, but, as they were semi-structured, follow-up questions were asked when appropriate.

Phase two consisted of individual interviews conducted after the students had been in practice placements for three weeks, all in different schools. The added value of these interviews was that they elicited in-depth descriptions of the student teachers' experience in the practice situation. All the participants were invited to participate in these individual interviews and six accepted (four females and two males). The participants needed to actively accept our invitation by e-mailing us stating when they would be available for interview. The interview guide considered some of the issues that had been talked about in the focus groups, but primarily it dealt with their individual experiences of ICT use in practice placements and their reflections on the responsible use of ICT in their professional practice. The interviews lasted from 30 to 50 minutes.

During both data collection phases, we encouraged participants to express themselves openly and encouraged them to describe both the challenges and the opportunities in their learning from lectures and seminars, as well as their own use of ICT during their practice placements in schools. All focus group sessions and individual interviews were audio-recorded and transcribed in full, by a research assistant, before being subjected to analysis. Direct quotations in this paper have been translated from Norwegian into English by the authors. The research project complies with national ethical standards and was approved by the Norwegian data protection services.

3.2 Analysis

We considered each of the three participating focus groups as a separate case and conducted cross-case analyses to identify common issues among the groups. Although our focus group samples were rather small, we consider the empirical data to be rich and valuable. Thematic analysis (Braun & Clarke 2006) proceeded from the focus group transcripts and concentrated on the following questions from the interviews:

- How do you understand the concept of 'responsible use of ICT'?
- What can be the challenges when locating and showing an appropriate video or film from the Internet in teaching?
- What is your experience of learning about and using ICT in courses during your ITE?
- Imagine that you intend to use a YouTube video as an introduction to the theme for pupils' project work. Reflect on the opportunities and challenges with regard to copyright and privacy issues.

In the individual interviews, we posed the following questions:

- How did you access and use ICT during your placement?
- With hindsight, what is your experience of learning about and using ICT in courses during your ITE?

Both authors analysed the data, first separately and then together, to ensure a common understanding. First, we individually identified and tagged the various PDC categories in the text, as well as when the student teachers discussed digital responsibility. Second, we met and discussed our initial coding. Finally, we conducted a thematic analysis based on the initial analysis and based on the research questions.

4. Findings and discussion

Six main themes emerging from the focus groups proved relevant for answering our first research question (RQ1) about student teachers' perception of their preparedness to exercise responsible use of ICT in their forthcoming teaching practice. These six themes are explored in section 4.1. Also, three main themes emerging from the individual interviews were relevant for answering the second research question (RQ2) about the student teachers' experiences with exercising responsible use of ICT during their practice placements. These three themes are explored in section 4.2.

4.1 Perception of preparedness to exercise responsible use of ICT in practice placements

From the focus groups, conducted before the student teachers went into their practice placements in schools (RQ1), several themes emerged, namely 1. *trusting Google*, 2. *advanced search procedures*, 3. *evaluating digital information*, 4. *copyright and privacy issues*, 5. *digital footprints and 6. teacher educators as role models*.

The first theme to emerge from the focus groups was *trusting Google* as a source of information. When the student teachers were asked how they could learn about the responsible use of ICT, one answered, "I just Google it" (student #1). None of the others in the group contradicted or questioned this answer, rather they expressed a sound of agreement. Moreover, recent research on students' use of and access to online information corroborated this approach. For example, Colón-Aguirre and Fleming-May (2012) found that many students believe they can find whatever information they need by using Wikipedia and Google. This is also in line with a previous Norwegian study showing that secondary school students rely on obtaining information from Wikipedia (Blikstad-Balas, 2016), which can lead to a narrow and incorrect understanding of the outside world.

The second topic to emerge from the focus groups was *advanced search procedures*. The participants were asked to reflect on how they select images for use in teaching during their teaching practice. In one of the focus groups, four student teachers agreed that they had learned about search procedures in their ITE programme. They also explicitly mentioned knowing about the creative commons licensing of images. Nevertheless, the same student teachers, asked to elaborate further, could not explain how they would conduct an online search that included *only* images (and not text) with creative commons licensing. One responded by saying that such a search could be "an option in the search engine, but I am not sure how" (student #2). These answers demonstrate that the students had not mastered advanced search strategies, which supports our first theme. Previous research by Selwyn (2016) describes procedures failures and a lack of competencies as downsides of the use of digital technologies. This means that, without the necessary PDC, the student teachers experience challenges in using ICT, for example when performing specific online searches with advanced settings for explicit purposes. List, Grossnickle and Alexander (2017) investigated what sources and what approaches students use when conducting academic research. It seems that the majority of the students are more willing to use Internet search engines than library catalogues. Additionally, it can be difficult for student teachers to evaluate the trustworthiness of the information they find online (Clark et al., 2020; Sawyer & Myers, 2018). Student teachers, therefore, need support to develop strategies for online search and navigation (Clark et al., 2020).

The third theme that emerged from the focus groups was how to *evaluate digital information*. The student teachers were not able to demonstrate how they evaluated the reliability of sources or other digital information. This is a particularly important part of digital responsibility, given the amount of fake news and misleading information that currently abounds. For student teachers, it is particularly important to be able to pass this on to their pupils in the classroom. Research by Puustinen and Rouet (2009) found that it can be difficult for students to know how to go about evaluating digital information. However, when the student teachers in the present study were asked how they could find appropriate sequences from videos to use for subject-related purposes in their teaching, most of them explained how they viewed videos before deciding which ones to use in their teaching.

Our findings reveal that participants in the study had limited awareness of *privacy issues*, which was the fourth theme that emerged from the focus groups. It was not an issue to which they had given much thought or attention. They lacked the words to explain what being concerned with privacy issues meant in their profession and how they related it to the use of ICT in classroom teaching. For example, a YouTube video, a film sequence on Instagram or other social media sites may include people who have not given their consent to participate. In most cases, lack of consent will be a violation of privacy rules and regulations, unless there is a large "crowd of people in an event of general interest, e.g. a demonstration or a football match" (Kolås, 2016, p. 61).

The use of ICT in teaching and learning, i.e. by using social network sites (Manca & Ranieri, 2017) or by using learning analytics (Rubel & Jones, 2016), can have great implications for the privacy of students. Previous research (Engen et al. 2014) also confirms that student teachers report uncertainty about privacy issues, despite their frequent use of ICT.

We also asked the student teachers to reflect on using sequences in the classroom from videos that require a private licence. One explicitly stated that *copyright issues* were of minor importance in teaching because to ignore copyright rules "has no consequences" (student #1). Despite being aware that *copyright rules* are applying to the use of music, images and films, the participants could not explain what steps they should take to ensure they were not breaching these rules. Overall, such attitudes are consistent with findings from other research that secondary school pupils find it difficult to follow copyright rules (Blikstad-Balas, 2016). Further, recent research also shows that students who frequently stream music seem to be willing to do so without obtaining consent (Borja et al., 2015).

The student teachers were asked what they should be concerned about when showing film sequences in the classroom. One of the student teachers mentioned personalised advertisements at the end of a sequence (student #1), and another mentioned how "sequences overlap" (student #3), that is, how previous viewings suggest what one's next choice will be. Advertisements and suggested new film sequences are traces of our *digital footprints*, which can, for example, be used for marketing purposes by online companies that attempt to direct viewers' attention and choices. This means that, when introducing and using digital technologies in teaching, it is possible to track the digital footprints of the user, be that the pupil or the teacher.

Finally, one of the student teachers mentioned how a teacher educator served as a role model in teaching practice on campus. The teacher educator was showing how teaching with ICT in a particular subject, and also mentioning explicitly how ICT could be used to strengthen general teaching practice. Another student teacher explained how a teacher educator helped a group of students during their previous practice period by showing them how to use an interactive whiteboard in their teaching at the practice school. Role models are important to develop self-confidence in the use of ICT in teaching (Bandura, 2015) as it is important to experience your own success, but it can also be very inspiring to experience that others succeed (Wallace, 2017).

4.2 Experience with the exercise of responsible use of ICT during practice placements

A few weeks after the focus group sessions, the student teachers entered their practice placements in six different schools. Having completed this practice period, they were invited to

participate in individual interviews to reflect on their experiences with digital technologies during their placement.

The three main themes that arose were *general infrastructure, administrative/didactic tools* and *practice teachers as role models*. These themes reflect access to and use of ICT in general in the practice schools, rather than responsible use in particular.

With regard to *general infrastructure*, the student teachers reported different experiences and different priorities for ICT in the six practice schools. Two out of the six were in schools where ICT was hardly used. At one of them, the advice from the mentor teacher was, "We avoid using ICT at this school" (student #5).

On the other hand, three of the six student teachers found that the use of ICT had a high priority in their school. One school had a policy of distributing a tablet to each pupil, which could be taken home and used to do homework. Two of the other schools opted for laptop use. One of the schools had a personal computer for each student, while the other had computers in lockers that students could use and log into with their own user account. In the latter case, the student teachers experienced some problems with updating software and unforeseen technological challenges. One of the student teachers was placed in a school equipped with a computer room and experienced it clearly as representing a higher demand to use ICT as part of teaching practice than in situations where students had individual access. Some teachers described challenges in the use of ICT, such as charging computers kept in lockers, installing updates and having sufficient wi-fi capacity.

Four of the six student teachers spoke of access to and use of *administrative/didactic tools* and software. There were problems with accessing the school network, with the software used by the pupils, and with interactive whiteboards, printers and other devices. Two even had to use their own private computers. Some of the student teachers also had to send lesson plans and teaching materials they had prepared to the teacher in advance in order to get them printed out before the lesson. This suggests that the benefits of using ICT within subject teaching or administration were mixed.

The student at the school with individual tablets for the pupils observed that the school had a comprehensive plan for the use of tablets in teaching and learning, whereas in the other schools, planning for and use of ICT varied greatly. These findings are in line with previous studies from primary and secondary schools in Europe (Almerich et al., 2016; Egeberg et al., 2011; Wastiau et al., 2013).

The third theme, which was frequently brought up in the individual interviews, related to student teachers' views on their mentors as *role models* and how they organised practice and followed the student teachers' progress. One student teacher said that the mentor was absent and hence did not provide much mentoring in any aspect of teaching. For this student, the placement was like having to shoulder the responsibilities of teaching on his own. In such cases, the student teacher neither gets the guidance from the mentor to which s/he is entitled nor the opportunity to participate in the so-called "third space" where collaboration between student teachers, mentors in schools and supervisors from teacher education on campus takes place (Lillejord & Børte, 2016; Daza Ramoz, 2019). Nevertheless, three of the student teachers mentioned that their practice schools were well prepared and that they experienced good follow-up during their placement. In that respect, the mentors were considered as good role models, who, among other things guided them in the use of ICT. This form of supervision enables

student teachers to receive comments on their practice and to take part in discussions with the mentor and other student teachers (Lillejord & Børte, 2016; Munthe, 2019). This, in turn, can develop students' self-confidence, not least because seeing others succeed can give them the confidence that they can succeed themselves (Wallace, 2017; Bandura, 2015). It follows that it can be important for student teachers to see that mentors and other teachers have mastered the rules and recommendations for the responsible use of ICT.

The answers from our respondents illustrated their varied experiences in placement schools and the wide range of ICT practices they discovered. This indicates that preparing student teachers for practice and the pedagogical use of ICT in a responsible way is challenging and does not follow a single path. The great majority of the student teachers' experiences from practice were related to general ICT use that is the generic and subject-related dimensions of PDC rather than specifically on responsible use. This should not be interpreted as meaning that digital responsibility did not exist in schools. One of the student teachers said:

> they [at school] were actually going to start a campaign the last week we were in practice on digital responsibility, but they didn't manage to start it, which was a bit typical. But they planned to have it; in fact, that was one of the first things she [the mentor] mentioned when we arrived, how important it was in a way, in relation to the Internet and things like that when they [the pupils] were using iPads and so on. About what they were going to work with, so they were aware of it (student #1).

Only one other student mentioned something directly related to digital responsibility. Student #5 explained that they had talked in school about online advertisements connected to blogs and how bloggers get paid to promote certain products, but could not recall any other experience or discussion linked to digital responsibility. In conclusion, two of the six student teachers had brief encounters with digital responsibility in their practice, indicating that access to and general use of ICT are still the highest priority and much less attention is paid to digital responsibility.

4.3. Limitations of the study

This study had several limitations. First, the number of student teachers participating was low. Recruitment was a challenge, partly, perhaps, because we did not work at the institution where we collected our data. Further, four of the student teachers participating in the focus groups did not agree to be individually interviewed after their practice placement. Second, the study explored the importance of PDC in teacher education, but all four dimensions could not be covered, mainly because we prioritised an in-depth look at the *responsible use of ICT*. Another reason was that components three (profession-related PDC) and four (transformative agency) are perhaps more relevant to fully qualified teachers who have the authority and responsibilities that go with that role.

A third limitation was that the individual interviewees were asked to reflect on what they had done during practice related to ICT use and digital responsibility in particular, and some found it difficult to express their thoughts adequately. It could have been more fruitful to ask them to demonstrate (Thorvaldsen et al., 2011) and give concrete examples of, for example, how they went about conducting searches, evaluating sources online and protecting the privacy of students.

5. Concluding remarks and further research

In this article, we argue for greater awareness among student teachers and teachers of the importance of PDC and in particular of digital responsibility.

RQ1 was about how the student teachers perceived their preparation for exercising responsible use of ICT before their practice placements. Based on the focus group discussions, we conclude that the student teachers may often choose an easy way out by using materials and sources that are readily accessible, for example by using Google for searches. There were few descriptions of advanced search procedures to find valid and relevant information. Many of the respondents revealed their insecurity and limited understanding of aspects surrounding copyright and privacy issues in relation to online materials and sources. In the focus group conversations, they struggled somewhat to describe their activities in words, although talking with one another helped them to elucidate concepts. In the future, it could be useful to ask student teachers how they will exercise and prioritise responsible use of digital technology in their teaching and to provide concrete examples. This, however, requires that they know in advance which school they are going to in practice. Also, that they are familiar with the school's technological infrastructure as they vary a lot in how digital technologies are used.

Overall, our findings indicate the teachers had some insight into how to evaluate digital content but tended to prioritise convenience and to access the resources that were most readily available. Further, it seems that the student teachers had limited competence with regard to privacy issues and how to handle cyberbullying.

It became evident that it was important for student teachers to have good role models. This can take place through work on campus, but also follow-up during their practical training. Through the focus group interviews, student teachers talked about the times when a teacher served as a role model either by demonstrating successful use in their own subject on campus or by showing how to use ICT in a practice school. RQ2 asked about student teachers' experiences with the responsible use of ICT during their practice placements. The participants encountered different uses of ICT in the classroom and their experience with digital responsibility, varied greatly according to where they had their practice placements and how much (or little) the schools prioritised ICT and PDC for pupils and staff. Thus, our findings show that the student teachers in our study have little exposure to the idea of digital responsibility during placement in schools. This strongly suggests the importance of good preparation for safe and responsible use of ICT before they enter their teaching practice during their studies on campus.

We see in our interviews that the student teachers vaguely recalled preparatory lectures on digital responsibility during their first year. However, they could not recall their content or make particular use of them later on while in school placements. This may indicate that to prepare student teachers better and in accordance with the framework for basic skills (Norwegian Directorate for Education and Training, 2012) it is important to put an effort to integrate aspects of digital responsibility through their whole five-year programme in various components of their studies.

Based on the focus group discussions, we conclude that the student teachers may often choose the easy way out by using readily accessible sources. However, the individual interviews

reveal that perceived support from practice schools can impact the choices student teachers make and how they use ICT.

Finally, one of the challenges identified through this study is that, during practice placements, the attention seems to be on the technical aspects of ICT (infrastructure and tools), rather than on pedagogical or responsible ways of using ICT. Another challenge is that it can be difficult to learn about the responsible use of ICT in a school where it receives little or no priority. This again underlines that the responsible use of ICT should be a prominent part of the ITE syllabus on campus. It is suggested that future research may examine how digital responsibility is, and can be incorporated into different teacher education programmes and within subject didactics.

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