

Newly qualified teachers



PROFESSIONAL DIGITAL
COMPETENCE AND
EXPERIENCES WITH ICT
IN TEACHER EDUCATION

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The Norwegian Centre for ICT in Education was founded in 2010 and is an administrative body directly under the Ministry of Education and Research. The Centre's purpose is to promote the use of ICT to improve the quality of education and bring about better learning outcomes and learning strategies for children, learners, and students.

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1. SUMMARY

This report describes how newly qualified teachers view their professional digital competence and teacher education programmes regarding the use of information and communication technology (ICT). This is important in order to promote greater awareness of how newly qualified teachers view whether they are ready to use ICT in their teaching profession and what can be done to improve teacher education programmes, if appropriate. The report is based on quantitative data collected by the Norwegian Centre for ICT in Education with the assistance of TNS Gallup during the winter of 2013/2014.

We want to promote a holistic approach to the use of ICT in teacher education in order to ensure that the teachers of the future have a common starting point regarding the use of ICT in their work. It is also important that our student teachers have the relevant skills for equipping future learners for a school education and working life that is set to become increasingly digitalised.

Based on the findings of the study, the report concludes with a discussion of how teacher education programmes can better integrate digital competence and pedagogical use in both teaching and practice. We believe that this is important because it will help schools to provide adequate training in digital competence as one of the basic skills.¹

The following findings are highlighted as being of particular relevance to the discussion:

- Teachers have a positive attitude towards, and see many benefits from, the use of ICT in teaching, yet they also see a number of challenges linked to issues such as clear rules and class management.
- Despite these challenges, teachers are saying that they are able to meet the demands imposed on them in their everyday working lives concerning the use of ICT in teaching. One possible reason for this is that teacher education programmes have been relatively effective at providing training concerning general class management. Teachers agree that class management is particularly important in technology-rich environments.
- Another reason that teachers are able to meet the everyday demands of school life in the area of digital competence could be that they consider themselves to have above-average competence in the use of ICT.
- Despite these findings, many teachers who responded to the survey want to develop or refresh their digital competence. They primarily justify this for their

¹ <http://www.udir.no/Lareplaner/Forsok-og-pagaende-arbeid/Lareplangrupper/Rammeverk-for-grunnleggende-ferdigheter/>

own personal and professional interests, rather than in response to external demands imposed by their school's management team, colleagues, learners, parents, or guardians.

- Teachers do not believe that the ICT training provided in their teacher education programmes in a teaching context was particularly effective. The fact that teachers still consider themselves to be competent users of ICT may indicate that they have acquired some basic digital skills on their own initiative, rather than as part of their formal education.
- More specifically, teachers believe there to be little correspondence between their own teacher education and the demands that are imposed on them in the use of ICT in teaching. However, teachers responding to the survey say that, even though their teacher education course did not provide them with particularly good training in the use of ICT, they are still not finding it difficult to meet the demands imposed on them in their everyday working lives. This might indicate that the demands teachers impose on themselves, by being intrinsically motivated to learn more, do not correspond with the external requirements imposed on them in their training or their work as a teacher. One possible explanation could also lie in the fact that the schools at which they work impose ambiguous requirements concerning the pedagogic use of ICT.

2. INTRODUCTION

The way in which we interact with ICT has changed considerably over the past several decades. For many of us, our everyday lives involve the extensive use of information and communication technology (ICT), both at work and at home. The rapid emergence of the Internet and mobile technology is important for our participation in society: how we search for, produce, and communicate information. Our society makes extensive use of technology, and the demands imposed on us in our working lives clearly indicate the importance of possessing digital competence.

Similarly, access to digital tools and media has increased amongst learners and teachers, both at home and at school. This is, for example, reflected in the fact that interactive whiteboards can now be found in many Norwegian classrooms (Dalaaker et al., 2012), and the possession of good digital judgement is becoming more and more important due to increasing access to information and the Internet. Digital technology and networks have become a natural part of everyday life and are changing how we engage with learning and how we communicate and express ourselves (Vasbø & Gudmundsdottir, 2014).

One of the consequences of this trend is a change in how digital competence is understood. It was initially defined as the possession of basic technical skills, but today it increasingly involves broader competence in the context of how the technology is being used (Egeberg et al., 2012). The integration of digital competence into the context of education has also generated interest in the relationship between school/learning and working life, and how this relationship is linked to essential skills in life-long learning.

Norwegian schools have plenty of digital equipment, as well as good access to the Internet, compared with other countries; however they are mediocre in the pedagogical use of ICT in schools (European Commission, 2013). Parents and learners expect schools to help learners achieve the competence targets laid down in the curriculum, which are closely linked to various aspects of ICT use. In the same way, we presuppose that teacher education supports the professional digital competence of student teachers, i.e., it prepares them to use ICT in their profession as a teacher. This means they are able to develop the basic digital competence of their learners and assess which digital tools and media are most appropriate to use in their own teaching. It also means they can use ICT for administrative tasks, for evaluation, for developing their own competence, and to collaborate and communicate with and convey information to their learners and colleagues (Tømte, Kårstein, & Olsen, 2013).

Against the background set out above, the Centre for ICT in Education wishes to review the views of newly qualified teachers about their own professional digital competence after completing their teacher education and their experiences of ICT during their

education. This is linked to a need to assess how professional digital competence is treated in teacher education programmes and to identify any areas for improvement.

How do newly qualified teachers view their professional digital competence (PDC) and how has teacher education prepared them to use ICT in their work as a teacher?			
Self-evaluation and self-defined competence	Needs and wishes concerning competence development	Attitudes towards the use of ICT in teaching	Experiences from own teacher education regarding the use of ICT in their work as a teacher
How do teachers assess their own PDC? (Fig. 1.7)	Do teachers need to refresh their PDC? (Fig. 1.4) In what way do teachers wish to refresh their PDC? (Fig. 1.5) Why do they wish to refresh or develop their PDC? (Fig. 1.6)	To what extent do teachers have a positive/negative attitude towards the use of ICT in teaching? (Fig. 1.1) What do teachers consider to be the challenges associated with the use of ICT in teaching? (Fig. 1.2)	What do teachers think about the learning outcome of training in ICT from their own teacher education programme? (Figs. 1.8, 1.9, and 1.10) Are teachers able to meet the everyday demands placed on them regarding the use of ICT in teaching? (Fig. 1.3)

Table 1. Focus and research questions of the study.

The survey is intended to enhance the pedagogical use of ICT, draw attention to the theme of digital competence in teacher education, and provide newly qualified teachers with a broad basis on which to develop their professional digital competence. Other studies (Egeberg et al., 2012; Hattie, 2009; Krumsvik, Egeland, Sarastuen, Jones & Eikeland, 2013) consider the link between the digital competence of teachers and

learning outcomes amongst learners. Based on the findings of these studies, we believe that contributing to the development of professional digital competence amongst newly qualified teachers will be an important aspect of improving learning outcomes, promoting better learning strategies, and giving learners appropriate teaching.

The pivotal issue in the report is how newly qualified teachers view their professional digital competence (PfDC) and how they have been prepared in their teacher education to nurture digital competence as one of five basic skills with respect to future learners. We have also looked at the way in which teacher education programmes prepare student teachers to use ICT in their own didactic work. Table 1 shows the focus and research questions that guided the work.

The report is structured as follows: we first take a brief backward look at the research field, key perspectives, and frameworks of relevance to the understanding of professional digital competence and ICT use in schools. In the next chapter, we describe the method that was used for data collection and the execution of the survey. In the following chapter, we present the results and review and discuss each individual research question. Based on our findings, we conclude by presenting a number of suggestions for use of existing resources that can be used in teacher education in order to improve the professional digital competence of student teachers and teachers' educators.

3. THEORETICAL PERSPECTIVES

Miscellaneous frameworks

Being prepared to use digital tools and knowing how they can support student learning is a fundamental aspect of any teacher's professional repertoire. Similarly, professional digital competence is a term that is used in different ways in different contexts. Ferrari is one of the international researchers who has prepared a comprehensive overview of various frameworks concerning digital competence (Ferrari, 2013). She attempts to identify common characteristics and to contribute to an agreement concerning a holistic framework for digital competence. The aim is a better understanding of what digital competence is and how it has developed in different European countries. The approach is based on summarising a number of European frameworks, analysing governing documents, and interviewing a number of experts and stakeholders. Ferrari concludes by presenting a framework consisting of five categories. In addition to information, communication, production, and digital judgement, which are recognisable aspects of the Norwegian framework for basic skills (Utdanningsdirektoratet, 2012), she adds problem-solving as a fifth category (Ferrari, 2013). This framework represents an important starting point in defining the term 'professional digital competence' and examining how digital competence can be used in teacher education.

UNESCO's framework for the ICT competence of teachers describes the teacher's digital competence and how it is developed. With the aid of a matrix, the framework illustrates a number of aspects that influence teachers' professional digital competence or use of ICT in their own work. These are: a) policy formulation and framework, b) curriculum and evaluation, c) pedagogy, d) competence and skills, e) learning environments and administration, and f) self-development and professional understanding. The matrix also shows a three-stage progression within all these areas. It can therefore be said that the use of ICT for learning and teaching will involve an altered teacher role and a pedagogic approach to teacher education. UNESCO's framework also states that:

"...The successful integration of ICT into the classroom will depend on the ability of teachers to structure the learning environment in new ways, to merge new technology with a new pedagogy, to develop socially active classrooms, encouraging co-operative interaction, collaborative learning and group work. This requires a different set of classroom management skills. The teaching skills of the future will include the ability to develop innovative ways of using technology to enhance the learning environment, and to encourage technology literacy, knowledge deepening and knowledge creation" (UNESCO, 2011, p. 8).

The International Society for Technology in Education (ISTE) has identified a number of preconditions for teacher education programmes and schools that will help to enable newly qualified teachers to use ICT appropriately in their work. These preconditions

are: a shared ICT vision, access to digital tools, competent teachers, professional development, technical support, content standards and digital subject resources, student-centred teaching, support from a professional environment, and clear policy guidelines and supporting documents (Clausen, 2007, s. 247). It is apparent from this that a number of aspects are considered to be important in supporting newly qualified teachers in their development as professionals with ICT as a central starting point.

In Norway, digital competence in schools has long been on the agenda, but it was not until the Knowledge Promotion in 2006 (K06) (Kunnskapsdepartementet, 2006) that digital competence became one of the basic skills. This means that digital competence must be an integrated part of every subject at every stage. In White Paper no. 31, *Quality in Schools*, it is stated that, with the introduction of basic skills, "further education in subjects must include elements concerning how ICT can be integrated in subjects" (Kunnskapsdepartementet, 2007–2008, s. 67). As a result, digital competence must form a significant part of the actual teacher education process.

As an extension of K06, a framework for basic skills was developed. This framework was originally prepared as a support tool in the revision of national curricula, but it has since been used by teachers and school managers who want a clearer understanding of how digital competence is adapted to different aspects in schools (Gudmundsdottir & Egeberg, 2014). The framework for basic skills shows a progression in skills and is operationalised on the basis of four skill areas: *acquire and process*, *produce and process*, *communicate*, and *digital judgement* (Utdanningsdirektoratet, 2012). According to the framework, these are the basic skills that teachers should take into consideration when using ICT in teaching.

Changes to teacher education

When the general teacher education programme was replaced by a new primary and lower secondary school teacher education programme (GLU) in 2010, a number of changes were made to optional subjects and the in-depth study opportunities available in teacher education programmes. The current primary and lower secondary teacher education has two differentiated paths: one aimed at teaching years 1-7 and one for years 5-10. Increasingly stringent requirements are being imposed concerning academic specialisation in teaching subjects, and practical training has also been strengthened. The regulation covering a framework plan defines the national requirements for GLU 1-7 and GLU 5-10. It states that the graduate [the student teacher] must have a knowledge of work relating to the basic skills of learners across subjects and be able to facilitate progression in the teaching of the basic skills appropriate to learners at various stages (Kunnskapsdepartementet, 2010a). The national guidelines of teacher education for primary and lower secondary school teaching also state that digital competence forms part of the basic skills and that "*each individual subject is responsible for ensuring that student teachers acquire a knowledge of how they can work on learners' development in the basic skills in the subject. Pedagogy and learner's*

knowledge shall form the basis for ensuring that students teachers acquire a theoretical superstructure concerning basic skills, as a precondition for the work with these skills in different subjects" (Kunnskapsdepartementet, 2007–2008, 2010b; 2010c, s. 9).

In 2011, a systematic review of Norwegian general teacher education in 2000–2010 was presented (Haugan, 2011). Many of the studies of teacher education and student teachers explored the use of ICT as a facilitator in the professional development of student teachers. This review shows that there is an awareness of ICT in the professional development of teachers and that it is important. Despite this, a NIFU report dating from 2013 concludes that the initiative relating to ICT in teacher education is fragmented and poorly anchored amongst the management. The development of professional digital competence is often driven by pioneers, and there is a general lack of competence development amongst those working within the teacher education sector (Tømte, Kårstein & Olsen, 2013). Haugan (2011) refers to the national guidelines for primary and lower secondary school teacher education programme 1-7 and 5-10 (Kunnskapsdepartementet, 2010b, 2010c; Ministry of Education and Research, 2011) and concludes that ICT or digital competence has not been integrated as a separate competence area that is important for the work of teachers.

In addition, there would appear to be a contradiction in that the latest reform and regulations concerning teacher training emphasise digital competence as one of the basic skills, yet student teachers have little choice as regards specialisation in interdisciplinary subjects such as ICT or digital competence. Digital competence is linked to traditional subjects such as Norwegian, English, or mathematics, and it is up to the subject teachers whether or not they prioritise the pedagogic use of ICT in their subjects. In this context, Engen, Giæver, and Mifsud (2014) have asked whether the structure of the new teacher education programme has in reality limited the opportunities to develop professional digital competence when compared with the expectations that schools have towards newly qualified teachers.

Expectations concerning the role of teachers

The NIFU report referred to above defines professional digital competence by linking the use of ICT by teachers to preparing teaching schemes, using ICT in a pedagogic way in their own teaching, and using ICT for administrative tasks, evaluation, and research purposes (Tømte et al., 2013). After considering the other frameworks linked to teacher education, we found a number of aspects that can be used as a basis when defining the term 'professional digital competence'. The aspects that Tømte and others refer to are aimed at the teachers themselves, but do not include external factors that could form starting points in the development of professional digital competence. Such external factors could include teaching environments, teaching plans, and policy formulations, or attitude-related aspects such as self-awareness and interpersonal skills (Nordenbo, Larsen, Tiftikçi, Wendt & Østergaard, 2008).

Against the background of this discussion, we want to investigate the extent to which teacher education in Norway prepares teachers to use ICT in their profession. We want to emphasise the term *professional digital competence*, which is intended to describe the digital competence that is pivotal to the practice of the teaching profession. Professional digital competence is a composite competence dependent on both external and internal factors. It combines digital competence linked to the profession of teaching and didactic practice within different subjects, but it is also strongly linked to the frameworks that teachers are given in order to practise their profession. Awareness of the importance of professional digital competence in pedagogical development in subjects, within teacher education, and teachers' professional development, is essential. It is on the basis of this discussion we want to highlight the professional digital competence of teachers and how teacher education programmes prepare teachers to use ICT for various purposes linked to their work.

Teacher education is pivotal in helping the teachers of the future to develop a realistic understanding of their profession and preparing them for their future careers (Brouwer & Korthagen, 2005; Sinclair, 2008). In an OECD report based on the experiences of 25 countries, it is, for example, claimed that virtually all countries face challenges linked to the development of relevant knowledge and skills for student teachers. A lack of skills to meet the needs of schools is a matter of some concern (Organisation for Economic Co-operation and Development, 2005). In connection with this, changes in and expectations concerning the role of teachers as a result of the use of ICT in teaching and for administration purposes play an important role. When newly-qualified and relatively inexperienced teachers encounter a discrepancy between the expectations of their profession and the reality they face in the classroom, they experience what is often referred to as a 'reality check' (Kunnskapsdepartementet, 2013; Rots, Aelterman, Devos & Vlerick, 2010). Given the situation in Norway, with good access to ICT in schools and an emphasis on digital competence in the national guidelines for teacher education, we believe that the likelihood of experiencing such a reality check will rise severely if the demands imposed in teacher education do not coincide with the everyday practices of teachers in technology-rich environments.

We can also see that young, newly qualified teachers are expected to be able to use ICT to a greater extent than older teachers (Ulrik & Langørgen, 2012). A study conducted by Skaalvik and Skaalvik in 2013 indicates a distinct trend for newly qualified teachers to be assigned to teach in subjects in which they have no formal competence. Many newly qualified teachers are also uncomfortable about transferring practical digital competence to their teaching (Engen, Giæver & Bjarnø, 2008). Researchers believe that in the worst case, teachers could lose their motivation to continue in the profession.

The Centre for ICT in Education wishes to investigate the experiences newly qualified teachers themselves have from their teacher education in the use of ICT, how newly qualified teachers view their basic education, and how this has contributed to their



professional digital competence. We want to investigate how well newly qualified teachers are prepared for using ICT in their teaching, and how well teacher education has prepared them to use ICT for different tasks relevant to their pedagogical practice and professional development as teachers in a school.

4. ABOUT THE STUDY

Target group

A number of reviews have been carried out concerning teachers' access to, use of, and attitudes towards ICT. In this study, we wanted to use newly qualified teachers as a starting point. In this regard, we define 'newly qualified teachers' as teachers who have been in the profession for up to two years, and have graduated less than two years previously. They should therefore be able to reflect on how their teacher education has influenced and contributed to their professional digital competence and the use of ICT in the practising of their profession.

There are no exact figures or records for newly qualified teachers with regard to which institutions they graduated from and whether/where they are now employed. According to the database for statistics concerning higher education (DSB NBH), a total of 2,077 students graduated with a general and primary and lower secondary school teacher education during the period 2011–2012.² Figures from Statistics Norway (SSB) also show a shortage of teachers through to 2035 (Roksvaag & Texmon, 2012). This is partly because not enough people are applying to teacher education programmes, but also partly because some qualified teachers are not applying for teaching posts in schools after completing their teacher education (Kunnskapsdepartementet, 2013).

According to the primary and lower secondary schools' information system³ as of June 2013, there are 3,116 primary and lower secondary schools in Norway in the study's target group. Figures for the distribution of newly qualified primary and lower secondary school teachers across schools tentatively indicate an average of 0.6 newly-appointed teachers per school if all schools make such appointments, or 1.2 teachers per school if only half of the schools have newly qualified teachers. It is assumed that taking teachers from a random nationwide sample of schools will give a good spread of graduate teachers from the country's various teacher education institutions.

Procedure

Notice of the study was given to Norwegian Social Science Data Services, which approved it. A draft questionnaire was formulated by the Centre for ICT in Education and finalised for interview purposes in collaboration with TNS Gallup. The interview lasts about ten minutes and the form is primarily written. However, the telephone interviews in the concluding data acquisition phase required a verbal version to be created. The use of written and verbal interviews could lead to different answers being given to the same questions, partly because the answer scales are visible/invisible to

²<http://bit.ly/1fDFyug>

³<https://gsi.udir.no/>

the respondents during the interview and partly because a telephone interview can have an 'interviewer effect'.

The desired net sample consists of approximately 1,000 newly qualified teachers, representative of the educational institutions. It was assumed in advance that a gross sample of 2,000 randomly-selected schools would give about 1,000 schools net and 1,500 teachers' e-mail addresses gross (with a school response rate of 50%). Assuming that two-thirds of teachers would answer the questionnaire, this would give a net sample of approximately 1,000 newly qualified teachers. The recruitment was carried out amongst schools and teachers in two phases.

Phase 1

The principals of primary and lower and upper secondary schools were contacted and asked to identify newly qualified teachers and send the teachers' e-mail addresses to TNS Gallup.

The school recruitment phase took place over a 12-week period in October to December 2013. In the first instance, an electronic form was distributed to 782 randomly selected primary and lower secondary schools and 218 upper secondary schools, where the head was able to state whether or not the school had newly qualified teachers and enter the newly appointed teachers' e-mail addresses.

During the first three weeks of the recruitment period, just 52 answers were received, along with 69 teachers' addresses, and electronic reminders were sent out to the schools. The response rate to the electronic form was relatively low. Telephone calls were therefore made to the schools. However, the follow-up was limited to the primary and lower secondary schools only, as feedback from the upper secondary schools indicated that their teachers primarily had their background in specialized vocational training programmes or one-year practical teacher training following the taking of an academic degree, and were therefore not covered in the target group of teachers with general teacher education.

Following further telephone calls, contact was made with most primary and lower secondary schools (84%). The lack of an answer (8.5%) or the fact that the telephone number was no longer in use (4.9%) were the main reasons for failure to make contact with schools. Very few schools declined to participate during the calls (1%). It also became apparent that the first e-mail enquiry had not always reached the heads of the schools. One reason might have been because some e-mail addresses were specific to an individual and the head of the school had left the school. Links were sent out again on an ongoing basis to schools who requested them. At the end of the recruitment phase, it was apparent that 38.4% of the schools did not have any newly qualified teachers, while 29.1% of the schools did have such teachers. Some schools had not opened the link (4.5%) and 1.3% of the schools were not available for interview. Three schools with

newly qualified teachers did not want to disclose the e-mail addresses of their teachers. See Table 2 for an overview.

School characteristics	Population	Gross sample	No contact	No newly qualified teachers	Drop-out				Schools with teachers
					Upper Secondary	Closed/ no tel.	De-clined	Un-known	
Number of students									
0-50	13.7	13.3	15.8	17.5	0.5	33.3	31.6	17.3	6.2
51-150	23.9	23.3	20.8	30.6	11.3	29.4	10.5	36.5	16.9
151-300	28.5	29.4	31.7	29.5	15.4	22.5	36.8	23.1	34.4
301+	33.9	34.1	31.7	22.4	72.8	14.7	21.1	23.1	42.5
Total	100	100.1	100	100	100	99.9	100	100	100
Type									
Primary school	53	52	55.3	64.1	0	62.7	73.7	55.8	48.9
Lower secondary school	15.7	17.8	20.4	16.4	0	14.7	21.1	13.5	25.3
Combined	20.3	19.4	23.9	19	0	22.5	5.3	23.1	22.9
Upper secondary	11	10.9	0.4	0.4	100	0	0	7.7	2.9
Total	100	100.1	100	99.9	100	99.9	100.1	100.1	100
Region									
Oslo/Akershus	14.2	14	15.5	10.2	19.5	5.9	21.1	3.8	18.4
Rest of Eastern Norway	25.4	26.3	24.3	27.6	25.6	32.4	10.5	17.3	26
Southern and Western Norway	36.8	36.4	35.2	38.3	37.9	31.4	47.4	53.8	32.7
Trøndelag and Northern Norway	23.6	23.4	25	23.9	16.9	30.4	21.1	25	22.9
Total	100	100.1	100	100	99.9	100.1	100.1	99.9	100
N/n	3116	2000	284	767	195	102	19	52	581

Table 2. Gross and net samples of schools (%).

Phase 2

Distribution of questionnaires to the teachers

Upon conclusion of the recruitment phase, 581 schools had returned a total of 1,016 teachers' addresses, equivalent to an average of 1.7 teachers per school with new teachers and 0.8 teachers among the 1,340 schools about which we have information (Table 3).

The teachers' questionnaire was distributed in November for whom e-mail addresses had been obtained. These were followed up while the follow-up of the schools was still ongoing. Following the dispatch of the questionnaire to a total of 925 valid addresses in early November, only 157 answers were received. A third reminder was therefore sent out, which increased the responses to 221 teachers.

In order to increase the response rate further, telephone calls were made to 703 teachers who could be identified by name via their e-mail address and linked to the school's telephone number. It is difficult to contact teachers during their working hours; however, the teacher interview could be conducted during the day or the evening in order to improve the availability of teachers.

Number of teachers per school	Number of schools	Percent	Total teachers
0	767	57.2	0
1	324	24.2	324
2	144	10.7	288
3	58	4.3	174
4	25	1.9	100
5	13	1	65
6	4	0.3	24
7	1	0.1	7
8	2	0.1	16
9	1	0.1	9
10	1	0.1	0
Total	1,340	100	1,016

Table 3. Teachers per school.

Upon conclusion of the data acquisition phase, responses had been received from a total of 375 teachers (see Table 4). In this report, we have chosen to ignore the responses from 19 newly qualified teachers working at an upper secondary school, as they represent such a small group. As a result, the underlying data presented in the next chapter is based on 356 responses.

School characteristics	Percentage of responding schools	Schools with newly qualified teachers	Average number of newly qualified teachers per school	Teachers	
				Gross	Net
Number of students					
0-50	13.7	6.2	0.3	4	5.1
51-150	23.9	16.9	0.4	13.6	11.2
151-300	28.5	34.4	0.8	31.5	33.9
301+	33.9	42.5	1.2	50.9	49.9
Total	100	100	0.8	100	100
Type					
Primary school	53	48.9	0.6	46.5	43.2
Lower secondary school	15.7	25.3	1.1	30.1	30.7
Combined	20.3	22.9	0.7	19.6	21.6
Upper secondary	11	2.9	2.1	3.8	4.5
Total	100	100	0.8	100	100
Region					
Oslo/Akershus	14.2	18.4	1.4	25.6	25.9
Rest of Eastern Norway	25.4	26	0.7	22.9	25.6
Southern and Western Norway	36.8	32.7	0.6	29.4	28.8
Trøndelag and Northern Norway	23.6	22.9	0.7	22	19.7
Total	100	100	0.8	100	100
N/n	3,116	581	1,340	1,016	375

Table 4. Percentage of responding schools, school with newly qualified teachers, and average number of newly qualified teacher per school.

There is no exact overview of the number and composition of newly qualified general teachers in Norwegian schools. It is desirable that the sample is nationally representative of graduated teachers as well. The representativeness of the sample according to study background can tentatively be summarised through the distribution of graduates from general teacher education programmes at accredited state and private institutions during the period 2011-2012:

- Oslo and Bergen universities are not included in the register statistics.
- The teachers in the sample are distributed according to educational institution in much the same way as amongst the registered graduates. The largest institutions (Oslo and Akershus University College and Bergen University College) are somewhat under-reported.

- The proportion of teachers in the sample with an education from (the registered) universities is slightly lower (15%) than amongst all the graduates (18%). This is partly because the upper secondary schools in the sample were not systematically followed up.
- In the sample, 94% of the teachers work at primary and lower secondary schools: six out of ten at the primary level and four out of ten at the lower secondary level.
- 74% of the teachers in the sample are women.
- The sample is not weighted.

5. RESULTS

The teachers have a positive attitude towards the use of ICT in teaching

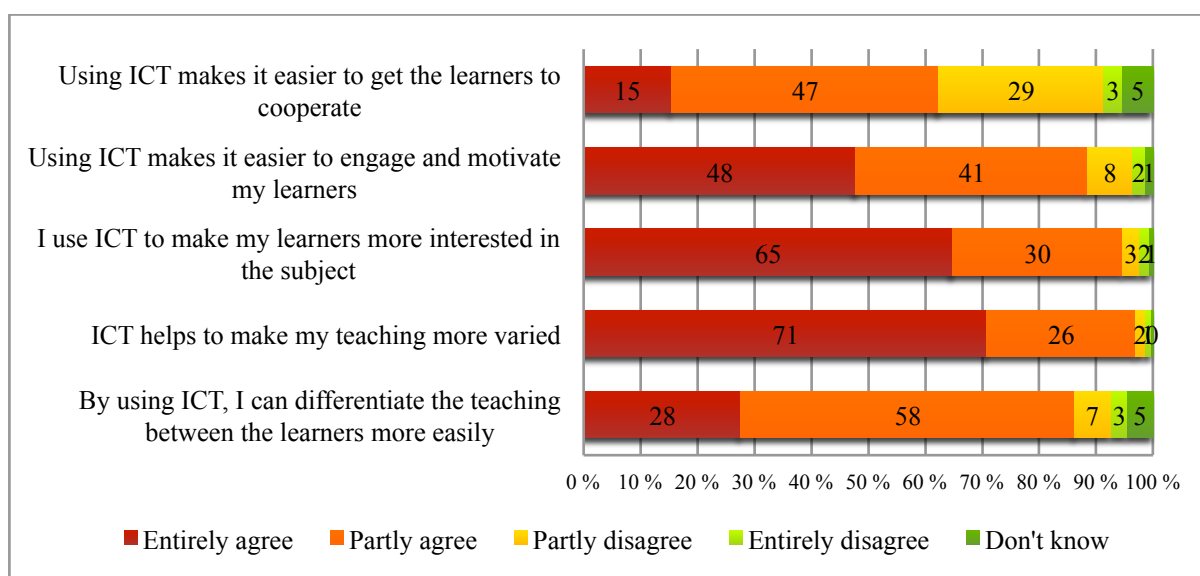


Figure 1.1 To what extent do you agree or disagree with the following statements concerning the opportunities presented by the use of ICT in teaching? (N=355–356)

The teachers who took part in the survey were asked to assess the use of ICT in teaching compared with other, more traditional, teaching methods without ICT. The distribution of the responses in the figure above indicates that the teachers in the sample are very positive towards the use of ICT in their teaching (Figure 1.1). 97% either entirely or partly agree that ICT helps to vary the teaching. The fact that they use ICT to make learners more interested in a subject is also cited as an important reason for the use of ICT in the teaching process. Of the teachers in the survey, 95% either entirely or partly agree with this. 89% also believe that ICT makes it easier to motivate the learner. The ability to use ICT in order to differentiate teaching between learners also seems to be a common perception of advantage amongst the teachers; 86% replied that they either entirely or partly agree. Somewhat fewer believe that ICT makes it easier to get the learners to cooperate; nevertheless, 62% either entirely or partly agree.

The teachers believe that ICT in teaching requires clear rules and clear class management

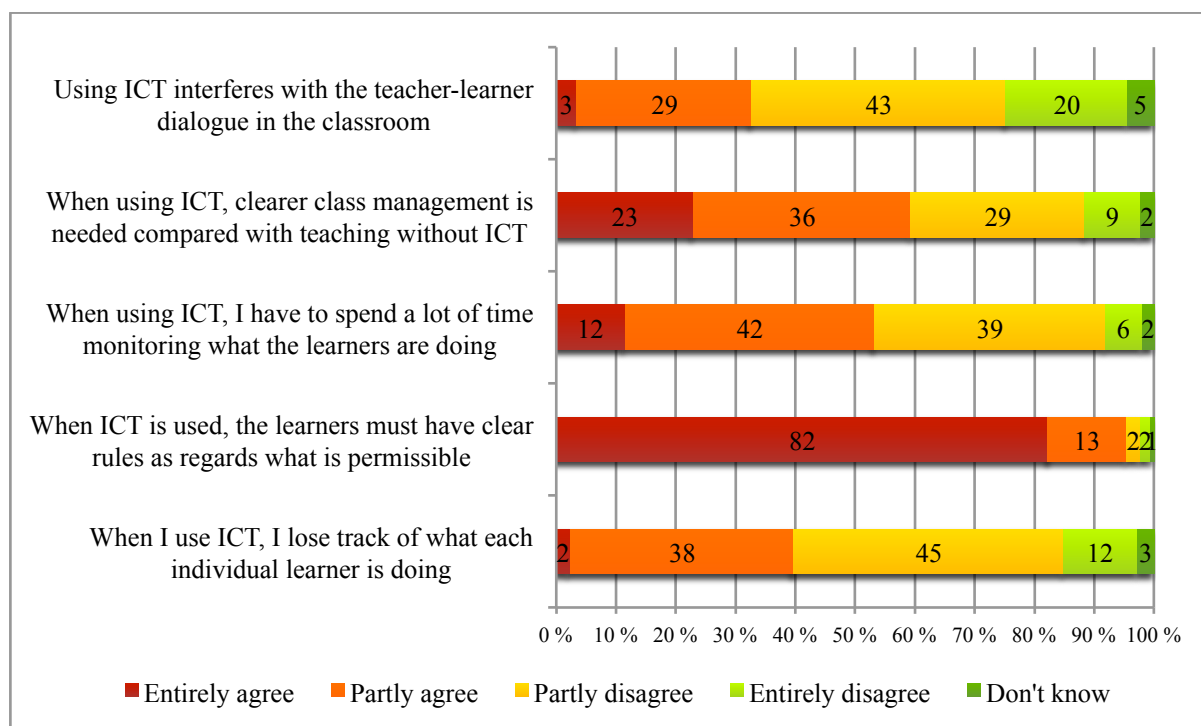


Figure 1.2 To what extent do you agree or disagree with the following statements concerning the challenges that you may encounter in connection with the use of ICT in teaching? (N=354-355)

The teachers were also asked to what extent using ICT in the classroom can challenge their class management skills in different ways. The responses indicate that the introduction of ICT in the classroom leads to a number of challenges in teaching. Over half of the teachers say that they either entirely or partly agree that ICT in the classroom makes it more challenging to monitor what the learners are doing (54%). Furthermore, 59% of the teachers believe that the introduction of ICT in the classroom requires clearer class leadership than would otherwise be the case. No fewer than 95% either entirely or partly agree that the use of ICT in teaching requires clear rules about what is permissible in the classroom. Despite some teachers pointing out that these challenges are real, fewer are as aware that they also lose an overview of what the learners are doing. 40% of the teachers either entirely or partly agree that they lose an overview of what the learners are doing, while 32% either entirely or partly agree that it disrupts the dialogue between teacher and learner.

The teachers believe that there is little correspondence between the ICT training given in teacher education programmes and the expectations imposed on them in their profession

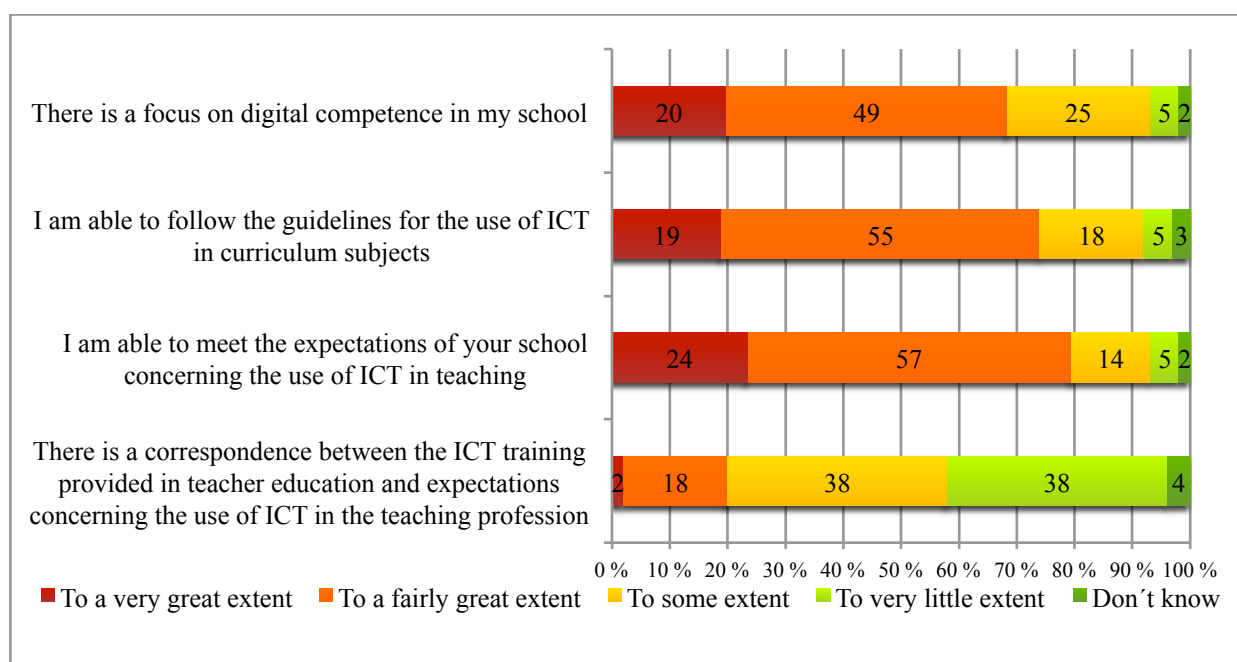


Figure 1.3 To what extent do you find that...? (N=355–356)

The teachers were asked to assess the link between the ICT training given in their own teacher education programmes and the expectations imposed on them to use ICT in the teaching profession. A high proportion of teachers (76%) replied that there is little correspondence between the ICT given in teacher education programmes and the expectations imposed on them regarding the use of ICT in the teaching profession. Based on the questions we asked, we are unable to say anything about the way in which they believe that there is no correspondence. This could partly be the result of differing priorities in teacher education programmes and in practice. Teachers also encounter widely varying expectations at their schools. We can therefore see digital divides between individual schools and individual municipalities. There may also be variations in the emphasis placed on digital competence by the educational institutions that student teachers have attended. This requires further research.

The teachers say they are able to meet the expectations that are imposed on them by their school concerning the use of ICT in teaching

Although the teachers who responded to the survey find that teacher education and practice do not correspond concerning expectations about the use of ICT in the teaching profession, the figures in Table 1.3 indicate that they are still able to meet the demands imposed on them on an everyday basis in the area of digital competence. 81% of the teachers say that they either entirely or partly agree that they are able to meet the expectations of their school with the use of ICT in teaching. Most teachers also believe that they are able to meet the demands imposed by the curriculum (74%). Table 1.3 can indicate that what teachers have learned about the use of ICT in teaching does not depend on their teacher education and that the digital competence teachers possess is thus more the result of chance than of formal education or competence development.

Although many teachers say they are not experiencing any particular difficulties meeting the expectations imposed on them by their school or curricula concerning the use of ICT in teaching, a high proportion still claim that they need to develop or refresh their own digital competence (see Figure 1.4).

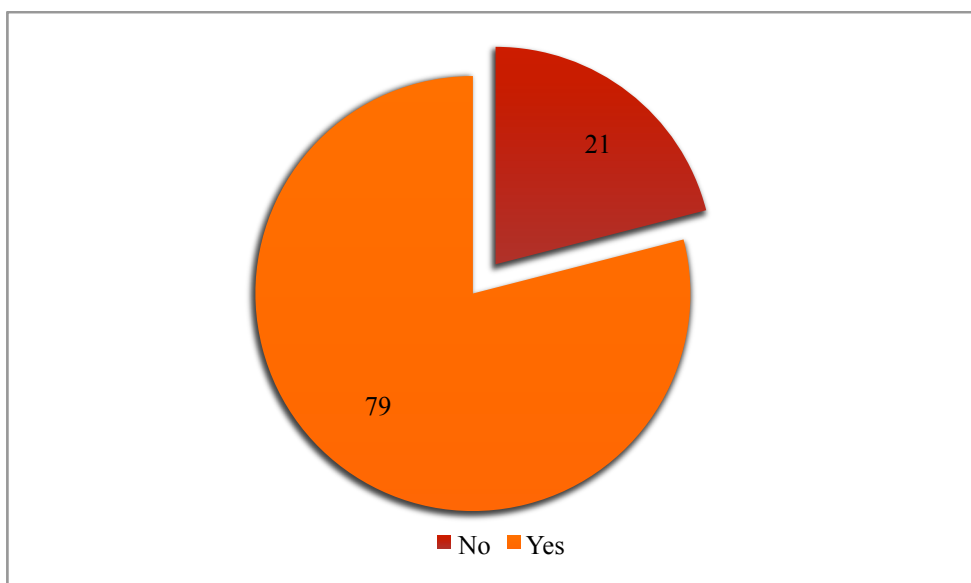


Figure 1.4 Do you need to develop or refresh your ICT knowledge and digital competence in relation to your job as a teacher?

The teachers express a desire to develop or refresh their ICT knowledge and digital competence

Although most teachers are able to cope on an everyday basis in the use of ICT, 79% believe that they need to develop or refresh their digital competence in connection with their work as a teacher (Figure 1.4). This indicates not only that the teachers want to undergo training, but also that the need for training does not adversely affect their ability to cope on an everyday basis. We can also see that the teachers possess a basic competence which enables them to see the added pedagogic value of using ICT, but thus far it is not expected that this will be exploited (Figures 1.3 and 1.4).

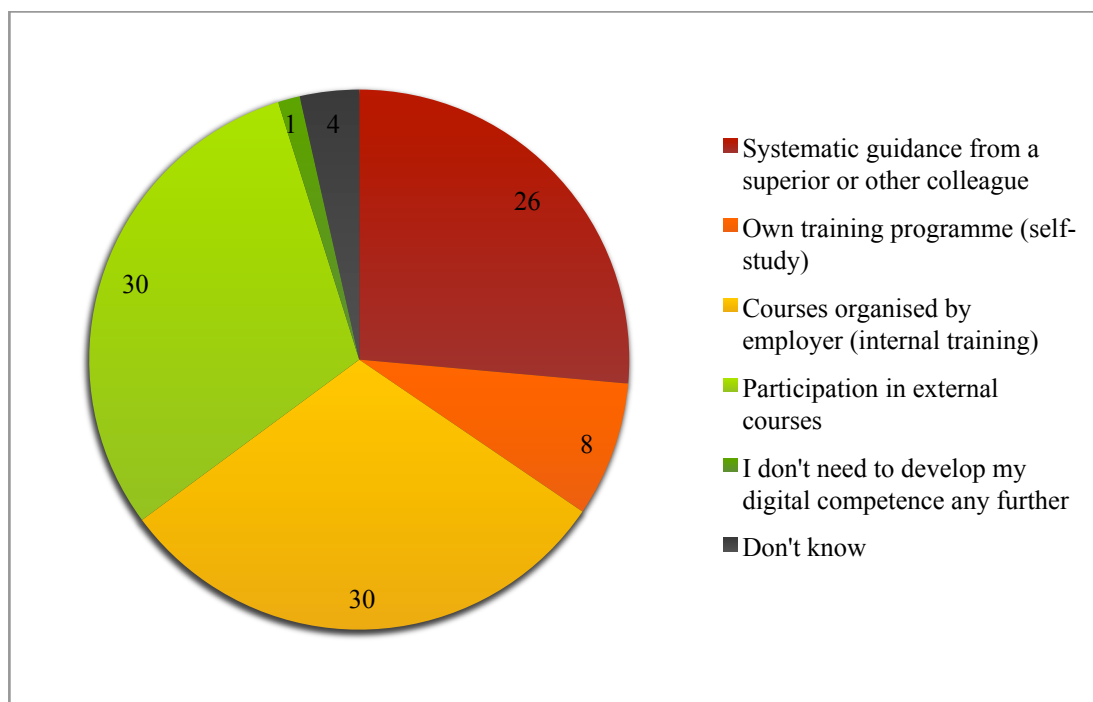


Figure 1.5 What form of teaching do you believe to be best in relation to the further development of your digital competence? (N=356)

All teachers in the survey were asked what form of teaching they would prefer to improve their competence, and 60% said they would like to attend external or internal courses (see Figure 1.5). A quarter would also prefer systematic mentoring by a colleague. Only one percent responded that they did not need to develop their digital competence further.

The teachers are intrinsically motivated to improve their own digital competence

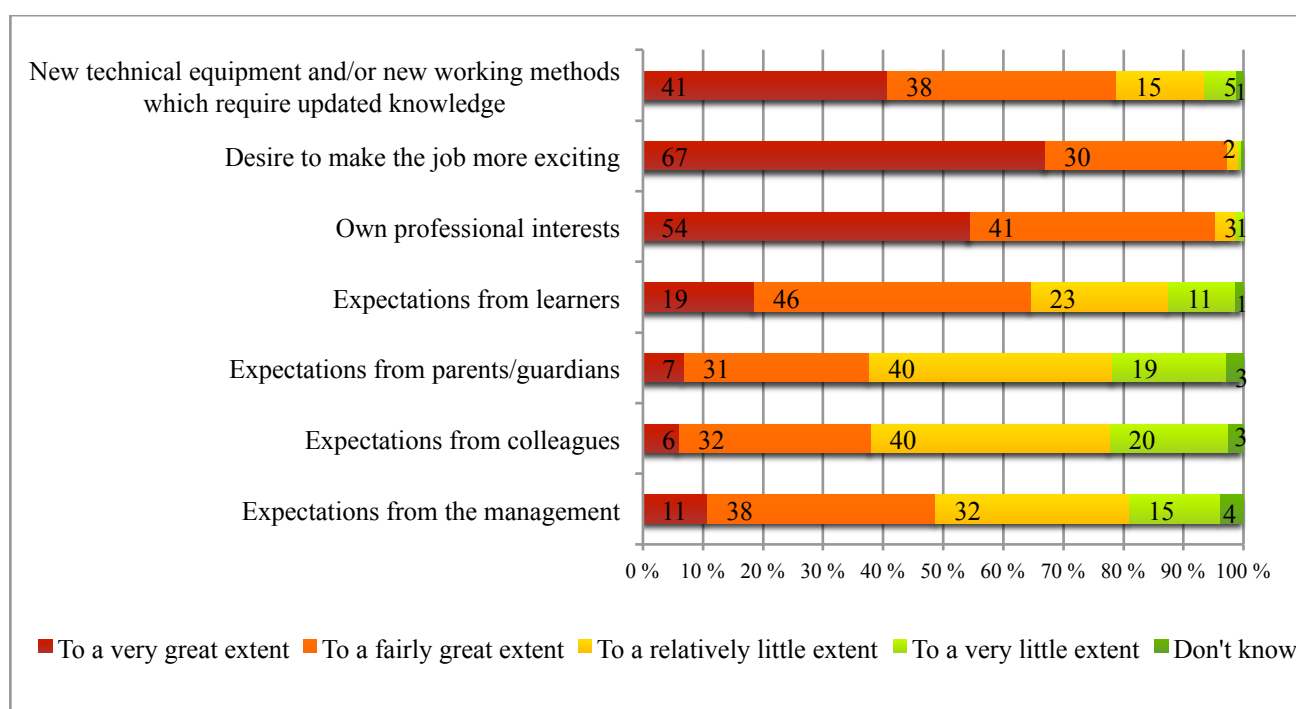


Figure 1.6 To what extent is the need to develop or refresh your ICT skills determined by the following factors? (N=275–280)

Of the 79% who expressed a need to improve their competence, personal interests were given as the most important reason. It can therefore be assumed that teachers are intrinsically motivated to learn more about the use of ICT in their everyday working lives. These teachers were asked to assess the extent to which certain factors determine their need to develop or refresh their ICT skills. The responses indicate that the most important reasons cited as motivation to improve their ICT skills were the desire to make the job more exciting and to develop their own professional interests.

A number of external factors were also cited as important reasons for improving their own digital competence. For example, 79% say that they have a strong or fairly strong need to improve their digital competence because new technical equipment or new working methods are being introduced. Another important reason was expectations from learners, although this factor appears to be less pressing. Sixty-five percent say that this either strongly or fairly strongly applies to them. Other external factors, such as expectations from parents or guardians, colleagues, or the management, appear to play

a minor role in determining why the teachers need to improve their own digital competence.

The teachers consider themselves to be competent ICT users

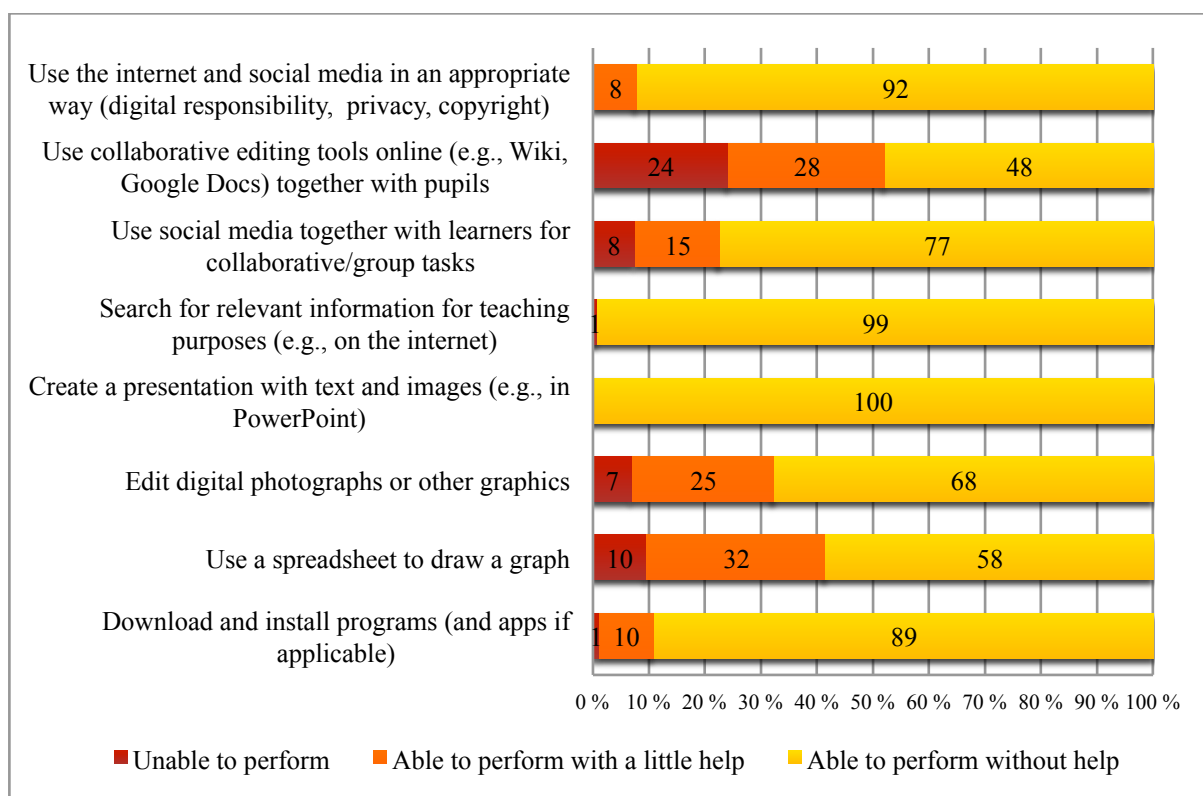


Figure 1.7 To what extent can you perform these tasks when you use ICT? (N=356)

The teachers were also asked to assess their own digital competence on a scale using "cannot do", via "can do with a little help", and "can do without help". Most teachers responded that they can carry out the various procedures without help (Figure 1.7). All the teachers said that they can create a presentation with text and images in PowerPoint, and 99% say that they can search for relevant information for teaching purposes, e.g., on the Internet, without help. Using the Internet appropriately and downloading and installing programs are also tasks that 90% and 89% of teachers believe they can do without help. They are somewhat more uncertain about the use of social media together with learners in joint/group tasks, although 77% believe that they can use social media unaided. They are even more uncertain about the editing of digital photographs (68% say they can perform this task unaided) and using spreadsheets to draw graphs (58% say they can do this without help). Using collaborative editing tools online, such as Wiki or Google Docs, is the task about which teachers say they are most

uncertain. Although 48% say they can do this without help, 25% say that they cannot, while 28% would need a little help in order to do this.

Once again, it is important to remember that the teaching subject, the level taught, and the academic specialisation of the respondents may have an influence on the responses. For example, there is reason to believe that a mathematics teacher would be more competent drawing a graph in a spreadsheet than a music or a language teacher. It is also possible that an arts and crafts teacher would have more interest in and use for editing photographs or other graphics than teachers of other subjects. The composition of the group may therefore have an impact on the results. However, the questions in Figure 1.7 are examples of tasks and competencies from the curricula in various subjects. Therefore, one may assume that the teachers should be able to perform them as well, in order to assist their learners to achieve the competencies in the subjects.

The teachers believe that their teacher education programmes are below average as far as training in the use of ICT in teaching.

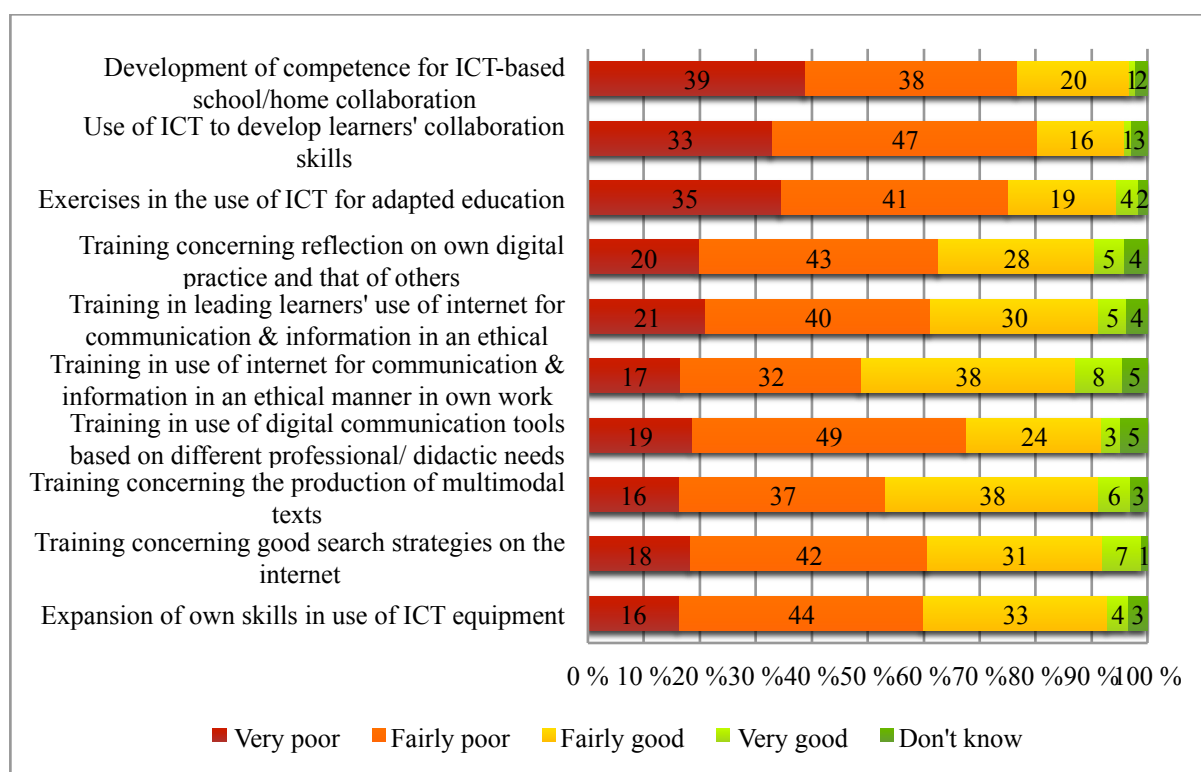


Figure 1.8 What are your views of the following aspects of your teacher education as far as the use of ICT in teaching and learner evaluation? (N=355-356)

We asked about several different aspects regarding the teachers' assessment of the teacher education concerning the use of ICT in teaching and in student evaluation. The teachers are critical of their teacher education. The aspect they are most satisfied with is training in use of the Internet as a communication and information channel. With regard to this, 46% of the teachers responded that their education was either fairly good or very good, while 49% responded that it was poor or very poor in the same area. Forty-four percent of the teachers are satisfied with the training they received concerning the production of multimodal texts, i.e., texts which may contain text, images, and audio/video (Figure 1.8).

The aspects which were assessed as poorest by the respondents were training concerning how teachers can use ICT to communicate between their school and their learners' homes, the use of ICT to develop the collaborative skills of learners, and exercises in the use of ICT for adapted teaching. Within these respective areas, 21%, 17%, and 23% considered their teacher education to be fairly good or very good (Figure 1.8).

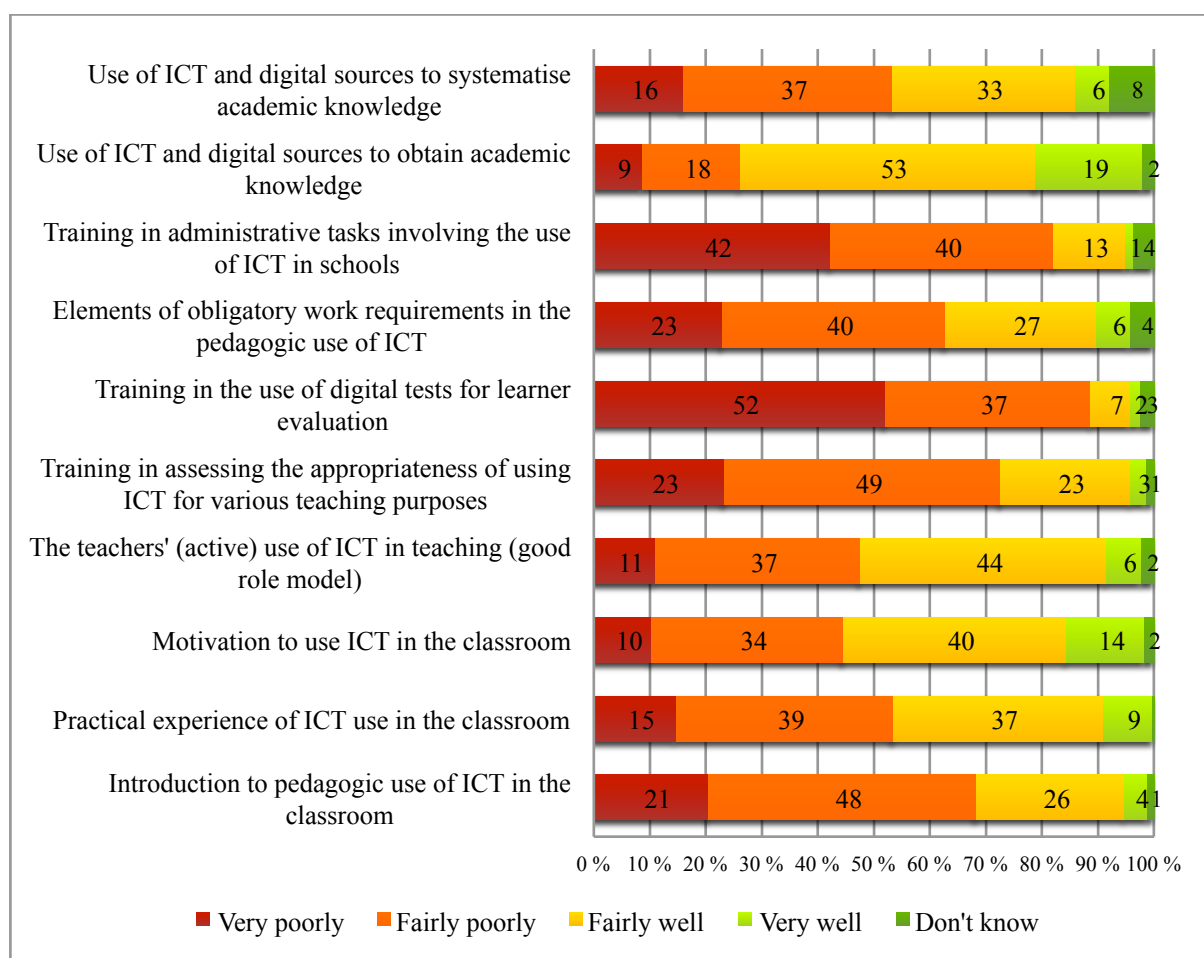


Figure 1.9 How do you assess the following aspects of your teacher education in relation to expanding your digital competence? (N=350–356)

In order to investigate how the teachers assessed their teacher education in relation to expanding the students' digital competence, we asked about the process concerning the personal development of digital competence. In retrospect, we can see that the differences between the questions in Figures 1.8 and 1.9 are perhaps not sufficiently clear. The intention was to distinguish between the teacher education programme itself (Figure 1.8) and the process to develop the professional digital competence of the student (Figure 1.9). Nevertheless, we have decided to present the responses to both questions. The questions in Figure 1.8 concern specific aspects of the pedagogic use of ICT by teachers, while the questions in Figure 1.9 are aimed at more various aspects of

the teachers' digital competence in the practising of their profession. Together, these questions provide a good overview of relevant aspects of the teachers' professional digital competence.

From the distribution in Figure 1.9, we can see that there are differing opinions as to the ability of teacher education programmes to boost the professional digital competence of the students. The prioritisation by teacher education programmes of training concerning the use of digital tests for learner evaluation was considered poor. Of the teachers who responded to the survey, 9% believe that their teacher education course was either good or fairly good in this respect, while 89% believe that their course was very or fairly poor. The training provided in the programme concerning the use of ICT to obtain academic knowledge was awarded the best score. Of the teachers in the survey, 72% believe that their course was either very good or fairly good, while 27% believe that their course was either fairly poor or very poor in this regard. The ability of teacher education programmes to motivate teachers when they were students also appears to have been above average. When asked whether their teacher education programmes motivated them to use ICT in the classroom, 40% of the teachers responded that it did to a reasonable degree, while 14% said that it did to a considerable degree. The responses are distributed in much the same way as the question concerning whether teacher education programmes acted as good role models by using ICT for teaching purposes on the teacher education programmes themselves.

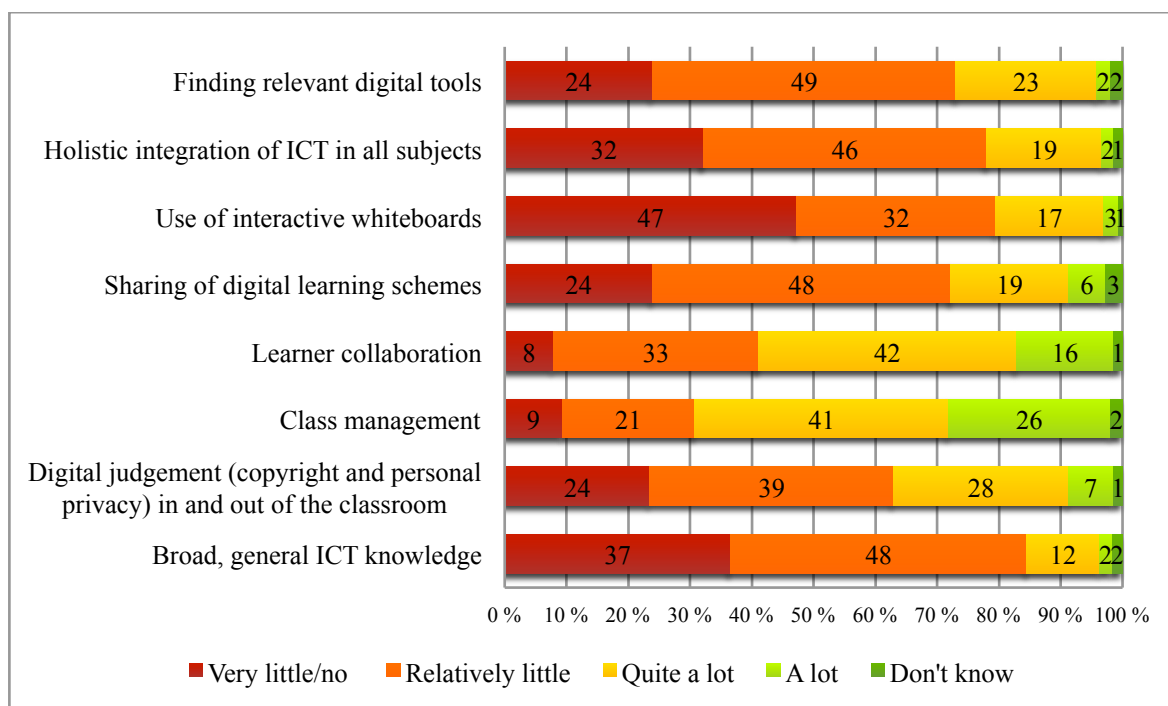


Figure 1.10 What benefit have you derived from your teacher education course in the following areas? (N=353–356)

The teachers were also asked to assess the extent to which they have benefited from their own teacher education in certain areas. Of all the teachers, 67% responded that they have derived considerable or very considerable benefit from their teacher education in the area of training in class management, while 58% say that they have derived fairly considerably or very considerable benefit from their course's focus on learner collaboration. These are the only aspects which are not directly linked to ICT in the survey. We decided to specifically ask about them in order to obtain a basis for comparison with ICT-related aspects. This may also have led to some misunderstandings amongst the respondents.

According to the respondents, they have derived little benefit from their teacher education in the use of interactive whiteboards. No less than 79% of the teachers say they derived very little or relatively little benefit from the training they received concerning the use of such boards. Seventy-eight percent replied they derived very little or relatively little learning outcome from instruction in holistic integration of ICT into all subjects. No fewer than 85% believe that the learning outcome they derived from their teacher education with regard to general ICT skills was very/fairly modest. However, such a statement is difficult to interpret as it is not very specific and opens up the possibility of differing interpretations of the statement by the respondents.

Of other areas which the teachers were asked to consider, we can, for example, see that 73% of them say that they derived very little/no or relatively little benefit from the focus of their teacher education programme on identifying relevant digital tools for various purposes. We can also see that 63% of the teachers say they derived very little/no or relatively little benefit from their teacher education programme's training in, and emphasis on, digital responsibility in and out of the classroom.

6. CONCLUSION

This chapter presents a brief summary of the key findings of the study. The summary is followed by an introduction to certain resources that teacher education programmes can use to improve the professional digital competence of their employees and teaching students.

In this report, we have gained some insight into the benefits that newly qualified teachers, a sample group of whom was surveyed for this study, believe they have derived from their teacher education regarding the development of professional digital competence and the use of ICT for their own teaching purposes. A total of 356 newly qualified teachers responded to questions concerning various aspects of their teacher education linked to ICT. They were also asked what they believe ICT can contribute in teaching, whether they want or need to improve their digital competence and, if appropriate, how they believe this improvement in competence should be brought about. By considering our findings in context, we have a basis for discussing the extent to which there is correspondence between teacher education programmes and the everyday working lives of teachers in the prioritisation and use of ICT.

Summary of key findings

Positive attitude towards ICT amongst teachers and teacher educators

The responses show that most teachers in the survey have a very positive attitude towards the use of ICT in teaching (Figure 1.1). In addition, almost 80% responded that they would like to receive more education in the use of ICT and that they are generally intrinsically motivated to improve their own competence in this regard (Figure 1.6).

Based on the figures in the report, we also believe that teacher educators have a relatively positive attitude towards the use of ICT in schools, as over 50% of the teachers in the survey say that the teacher education programme motivated them into using ICT and teacher educators acted as a good role model in the use of ICT (Figure 1.9). This could indicate that the attitudes found in teacher education towards the use of ICT in schools are positive and not a hindrance as far as training in this use is concerned.

The teachers believe that their own education was not adequate regarding ICT

Although the teacher education programmes appear to be above average (54%) in motivating their students to use ICT and being good role models (50%) (Figure 1.9), the teacher education programmes are nevertheless considered to be less good in the teaching of various aspects that are important in developing the professional digital competence of student teachers.

When the teachers were asked whether their teacher education had contributed to their knowledge concerning the use of ICT in their own teaching, the teachers replied that their teacher education programmes were not particularly good at this (Figures 1.8, 1.9 and 1.10). It is particularly interesting to note that 79% of the teachers believe that they did not derive sufficient benefit from their teacher education in the use of interactive whiteboards, and 63% of the teachers are of the same view regarding the learning outcome derived from their teacher education within the area of digital judgement. This could represent a problem in that interactive whiteboards can be found in a high proportion of Norwegian classrooms (Dalaaker et al., 2012), and that digital judgement is becoming an increasingly important topic both at school and within society due to a steady increase in access to information and the Internet.

Digital competence is, to a limited extent, developed through requirements and working processes in teacher education programmes

Figure 1.7 shows that the teachers consider themselves to be competent users of ICT in selected areas both within and outside teaching. It is interesting to note that the teachers consider themselves to be competent ICT users, even though they are not particularly satisfied with the educational benefits they received in the area of improving their own professional digital competence. For example, all of the teachers believe they would be able to create a presentation containing text and images unaided, even though many of them are not satisfied with the training concerning the production of multimodal texts provided in teacher education programmes (Figure 1.8). The fact that the teachers still say they are able to do a great deal, even though they are relatively dissatisfied with their training in the use of, and education in, ICT for teaching purposes and learner evaluation in different ways, may indicate that they have learned much of what they know outside their course. It is also possible that they possess a good general digital competence, but lack the professional aspect from their teacher education.

The teachers do not experience a 'practice shock' linked to the use of ICT

The teachers in our survey were asked to what extent they are able to meet the everyday demands and expectations of the teaching profession that are imposed on them regarding the use of ICT in their teaching. Based on Figure 1.3, it would not appear that the teachers are experiencing major problems meeting the demands concerning digital competence imposed on them in their work, despite the fact that they believe the prioritisation of ICT on their course did not reflect the demands of everyday teaching.

74% and 81% of the teachers respectively say they entirely or partly agree that they are able to meet the expectations that the curricula and their schools have towards them as to their use of ICT in their teaching. We are therefore unable to say that the 'practice

shock', or reality check, that some newly qualified teachers experience at their schools particularly applies to their ability to use ICT for teaching purposes.

This also ties in with what we presented previously in this report, i.e., that teachers who express a desire and a need to improve their competence justify this through personal intrinsic motivation, rather than through external expectations such as requirements imposed by the school or by learners' parents or guardians. It is also possible that newly qualified teachers are improving their digital competence through self-study and trial and error, as indicated by the findings of the Monitor study (Egeberg et al., 2012). In this way, they are able to acquire the skills they need in accordance with the requirements of the curriculum and their school. By way of conclusion, it is also possible that the requirements imposed by schools on newly qualified teachers are not sufficiently clear about the use of ICT in their pedagogical practice.

The way forward - what now?

Drawing on the findings above, we outline some directions we can take in order to assist teachers and schools that want to exploit the potential of ICT and overcome the challenges presented by technology.

Clearer requirements regarding the use of ICT in basic training

On the one hand, teachers do not appear to be experiencing a 'practice shock' as a result of being unable to meet the requirements imposed by schools, homes, and governing documents. On the other hand, we can see that the teachers do not believe there to be clear correspondence between the education they received and the work itself. Given that teacher education programmes are also considered to be inadequate in ICT training, we must ask in what way there is a lack of correspondence between the teacher education programmes and the everyday requirements imposed on teachers regarding the use of ICT for teaching purposes.

Based on our findings, it would appear that the requirements being imposed on teachers on an everyday basis are more demanding than the learning pressure in the teacher education programmes, yet newly qualified teachers are still not experiencing problems in satisfying these requirements. There is also evidence suggesting that, although they have not received particularly good training concerning ICT in their teacher education programme, they have still mastered the digital competence explored in this report. We have also seen that teachers are intrinsically motivated to learn more and can see the benefits of using ICT for teaching purposes. This may indicate that the requirements imposed concerning the use of ICT in basic training should be made clearer and a greater part of the training, even though lack of such requirements does not appear to lead to a 'practice shock' or other challenges.

The Centre for ICT in Education has the following proposals as to how we can bring about clearer requirements concerning the use of ICT in primary and lower secondary schools:

- ***Clearer emphasis on ICT in the curriculum***
- ***Facilitate good digital learning aids in schools linked to subjects and interdisciplinary use***

Clearer requirements concerning the use of ICT in basic training will of course present additional challenges, e.g., a need to provide digital teaching resources for teachers. If this need is not met, it could in the long term lead to considerable variation between schools and contribute to a digital divide between learners. This challenge will concern educational institutions, schools, and municipal authorities. Teachers are already supporting each other with regard to improving their own competence (Figure 1.5 results for colleague guidance). Good digital learning aids which can readily be brought into use in subjects and which can stimulate interdisciplinary work can help to facilitate the use of ICT by teachers in an otherwise hectic working day.

Consistent priority of and systematic training in the use of ICT

As an extension of the proposal that basic training should increase the requirements for the use of ICT for teaching purposes, it is appropriate that teacher education programmes also prioritise ICT more consistently than currently appears to be the case (cf. Tømte et al., 2013). It is important that teacher education programmes ensure that all qualified teachers are able to teach what the curriculum requires. In that way the competence becomes independent of the students' personal interests or where they studied. We cannot leave it to chance whether the teachers are able to use ICT appropriately in their teaching, as digital competence is a basic skill which should be integrated in all grade levels regardless of the subject concerned.

Although we are unable to say at this stage that the teachers have a real need in relation to the expectations they encounter in practice as newly qualified teachers, it is clear that they want to learn more and believe that the use of ICT benefits teaching. This is a starting point which indicates that newly qualified teachers see a benefit in the use of ICT for teaching purposes. However, it might seem that the conditions and expectations imposed by both government and local school authorities are not sufficient to ensure that newly qualified teachers can see opportunities for and the value of trying out a new practice which requires professional digital competence. When the teachers express a strong need and a desire for more training, particularly more systematic training, we should take this seriously.

In this report, the teacher education programmes are considered to be inadequate in training for certain tasks linked to the use of ICT for teaching purposes. The Centre for ICT in Education has put forward suggestions regarding what teacher education

programmes can do in order to place greater emphasis on, and provide better training regarding, the use of ICT in the ways implicated by the curriculum. There are a number of tasks in particular that seem to need better clarity:

- ***Emphasis on digital judgement in and out of the classroom***

Copyright, proper use of resources, and privacy issues are becoming increasingly relevant with greater access to the Internet and the use of mobile technology. We know that most schools take advantage of the opportunities presented by the Internet, e.g., as a communication and information source between teachers, learners, and parents or guardians. Social media are also being used in and out of school. As a result of the use of mobile technology (e.g., smartphones and tablets), the Internet is now more accessible than ever before. It is therefore important that schools help to raise awareness concerning topics linked to digital judgement, such as the sharing and use of images, music, and information.

- ***Emphasis on existing technology (for example interactive whiteboards)***

Today, we know that most classrooms in Norway have interactive whiteboards (Gudmundsdottir, Dalaaker, Egeberg, Hatlevik & Tømte, 2014). These whiteboards are often not being used to their full potential. They can even have the opposite effect to what intended, i.e., to facilitate and provide variety in the everyday working lives of teachers. It would therefore be beneficial if teachers were to receive appropriate training in the use of interactive whiteboards during their teacher education programmes.

- ***Emphasis on training in ICT linked to subjects and subject didactics***

The teachers consider themselves to be competent ICT users. The teachers in the report also say their teacher education programme provided them with relatively poor training regarding the introduction of the pedagogic use of ICT in education and exercises in finding relevant and appropriate digital resources for teaching purposes. This indicates that training in ICT and subject didactics takes place separately to some extent. It may be beneficial if ICT were to be included as a more integral part of subject didactics, and be linked to individual subjects more directly. At the same time interdisciplinary projects represent a good alternative, e.g., for collaboration and collaborative editing using digital tools.

- ***Emphasis on strengthening teaching practice positions (work experience placement), practice schools and mentors***

Teacher education programmes can provide better training in ICT by using practical training in schools, which have varied use of ICT, and mentors who are confident in the use of ICT in their subject. Placements where student teachers, supported by an experienced teacher, can try out various types of technology and pedagogical practice play an important role in developing the professional digital competence of the teachers of the future.

- *Emphasis on class management in technology-rich environments*

The Centre for ICT in Education has previously pointed out that teachers face new challenges as a result of greater access to ICT in the classroom. It is important not to ignore these challenges. In that way, digital technology will not stand in the way of teaching and learning, increase commotion, or lead to a lack of concentration amongst learners. Good class management is the key to keeping learners motivated despite the many temptations that can be found online. Teachers believe that class management is becoming more challenging as a result of the introduction of ICT in the classroom. Over half of the teachers answer that ICT necessitates clearer class management and clear rules about what is permissible (Figure 1.2). Our findings also indicate that teacher education programmes appear to place emphasis on general class management (Figure 1.10). This could possibly be one of the reasons why teachers believe they are meeting the expectations imposed on them in their everyday working lives in the area of digital competence.

Professional digital competence in a digital school day

The Centre for ICT in Education works to ensure that schools exploit the opportunities presented by ICT in order to enhance the learning outcome amongst our learners. This requires professional digital competence amongst teachers.

It is difficult to say how much knowledge and digital competence will be necessary in order to master pedagogical practice involving ICT. A further important aspect is that teachers need to be able to decide not to use ICT when other methods or approaches are more appropriate in any given teaching situation. Using ICT often requires time in the form of preparation, but it also opens up many opportunities which analogue methods cannot offer. The learning objectives in the subject could perhaps be achieved regardless of the methods or aids that are chosen, but the basic digital competence in the curriculum and the competence goals concerning ICT will be suppressed.

Our aim is to bring about teacher education in Norway that addresses ICT in a holistic way. The foundation for achieving this is in place. We have teachers who are interested in using ICT, and who also want to learn more about the use of ICT in their professional practice. We also have good individual initiatives within teacher education programmes across the country; yet strengthening professional digital competence requires time and resources, interest and motivation amongst everyone involved.

Resources

By way of conclusion, we wish to highlight some of our resources for teachers and teacher educators. These are resources that student teachers can subsequently use in their profession as teachers in order to raise the level of digital competence in their schools.

Continuous professional development resource package - (CPDLab)

CPDLab is a European collaborative project which has developed continuing education and training material for teachers and teacher education programmes. The resource packs consist of teacher guidance and support material. They concern the pedagogical use of interactive whiteboards, digital judgement in and out of school, and the classroom of the future. The resources have been developed in collaboration with practising teachers and other experts in Norway, Finland, Italy, and Portugal.

<http://iktsenteret.no/content/ressurspakke-profesjonsfaglig-digital-kompetanse#.U2pHl8c3qx4>

Nettbrettstafett (Tablet relay)

The "Tablet relay" lends out 30 tablets for teacher educators who, together with student teachers, explore the pedagogical opportunities presented by tablets.

<http://iktsenteret.no/prosjekter/nettbrettstafett#.U1y0Y8c3qx4>

IKTplan (ICTplan)

IKTplan.no is a website which guides teachers in developing the digital competence of their learners. The service follows the competence goals for years one to ten and includes various tools and assessment criteria which are explained through videos.

<http://www.iktplan.no/>

eTwinning

eTwinning offers a platform for teachers, enabling them to communicate, work together, develop projects, share, and be part of an extensive learning community across Europe. eTwinning is intended to promote collaboration between schools across Europe through the use of ICT and offers schools support, collaborative tools, and services.

<http://www.etwinning.net/no/pub/index.htm>

Monitor

Monitor is a longitudinal study of access, use, and attitudes. It provides an overview of status of ICT integration in Norwegian schools, and contributes to our underlying knowledge concerning ICT in schools. Every other year, the survey is qualitative (2012, 2014), and the other years quantitative (2011, 2013).

<http://iktsenteret.no/prosjekter/monitor-skole-kartlegging-av-norsk-grunnopplaering#.U1y1Ysc3qx4>

Du bestemmer (You decide)

'Du bestemmer' is a resource concerning privacy and digital judgement for learners aged 9–17. The aim of the service is to promote awareness, reflection, and knowledge amongst children and adolescents concerning privacy and the choices they make in connection with the use of digital media. Digital judgement is an element associated with the basic skill of digital competence and aims to turn learners into responsible and

confident Internet users. Digital judgement is about reflection, ethical awareness, and actual skills, all of which enable learners to safeguard their own privacy and that of others.

www.dubestemmer.no

IKT i praksis (ICT in practice)

ICT in practice is a platform for sharing digital practice. Digital resources and lesson plans created by teachers, teacher educators, and student teachers are published and shared online. Kindergarten teachers, teacher educators, student teachers, and teachers within primary and secondary school can reuse them in their own work.

<http://iktipraksis.iktsenteret.no/>

Class management in technology rich environments

The increasing use of ICT in schools reflects the developments taking place within society and presents schools with both challenges and opportunities in learning. This guide gives tips on how teaching can be improved in classrooms with many digital devices. The guide was prepared in collaboration with experienced teachers who have tested various examples of the use of ICT. The examples show the value of good planning, didactic focus, clear learning objectives, and a plan for learners' evaluation.

http://iktsenteret.no/sites/iktsenteret.no/files/attachments/bm_klasseledelse_web.pdf

iTEC

Through the European project iTEC which stands for Innovative Technologies for Engaging Classrooms, teachers are exploring how technology can be used in an engaging, targeted, and creative way in schools. iTEC is based on today's technological reality, placing emphasis on the development, testing, and dissemination of learning processes and activities which have the potential to influence future practices in the classroom.

<http://iktsenteret.no/prosjekter/fremtidens-klassemom-itec#.U1y3Wsc3qx5>

Digital games in schools

Digital games are on their way into the classroom, and an increasing number of teachers can see the benefits of using games as part of their teaching. Digital games are opening up new opportunities for learning and motivation, as well as many opportunities for their use in and across subjects.

<http://iktsenteret.no/prosjekter/datspill-i-skolen#.U1y5NMc3qx4>

The Nordic Journal of Digital Literacy

The *Nordic Journal of Digital Literacy* is aimed at researchers, school authorities, school leaders, academic employees, and others interested in the field of education and ICT.

The journal contains peer reviewed articles, conference contributions, debates and

comments, and software and book announcements. Through the presentation of national and international research, the journal aims to contribute to the debate concerning education policy relating to digital competence and ICT in schools.

<http://www.idunn.no/ts/dk>

References

- Brouwer, N. & Korthagen, F. (2005). Can teacher education make a difference? *American Educational Research Journal*, 42, 153–224.
- Clausen, J. M. (2007). Beginning teachers' technology use: first-year teacher development and the institutional context's Affect on new teachers' instructional technology use with students. *Journal of Research on Technology in Education*, 39(3), 245–261.
- Dalaaker, D., Egeberg, G., Gudmundsdottir, G. B., Guttormsgaard, V., Hatlevik, O. E., Ottestad, G., . . . Skaug, J. H. (2012). *Monitor 2012. Elever skal synes. Hvordan kan IKT utvikle kompetanse i skolen?* Oslo, Norway: Senter for IKT i utdanningen.
- Egeberg, G., Gudmundsdottir, G. B., Hatlevik, O. E., Ottestad, G., Skaug, J. H. og Tømte, K. (2012). *Monitor 2011. Skolens digitale tilstand.* Oslo, Norway: Senter for IKT i utdanningen.
- Engen, B. K., Giæver, T. H. & Bjarnø, V. (2008). Integrating ICT in teaching: the winding road to bridge the gap between teacher education and teachers' practice. In J. B. Curtis, M. M. Lee, & T. H. Reynolds (Eds.), *E-Learn 2008. World Conference on E-Learning in Corporate, Government, Healthcare, & Higher Education*. Association for the Advancement of Computing in Education, New Orleans, Louisiana, USA
- Engen, B. K., Giæver, T. H. & Mifsud, L. (2014, March). *Mind the gap: ICT in the Norwegian national curriculum and the 2010 teacher education reform*. Conference presentation at the Nordic Educational Research Association, NERA, Lillehammer, Norway.
- European Commission. (2013). *Survey of schools: ICT in education. Benchmarking access, use and attitudes to technology in Europe's schools*. Retrieved 3. June, 2013, from <https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/KK-31-13-401-EN-N.pdf>
- Ferrari, A. (2013). DIGCOMP: a framework for developing and understanding digital competence in Europe. In Y. Punie & B. N. Brecko (Eds.), *JRC Scientific and Policy Reports*. Seville, Spain: European Commission Joint Research Centre. Institute for Prospective Technological Studies.
- Gudmundsdottir, G. B., Dalaaker, D., Egeberg, G., Hatlevik, O. E., & Tømte, K. H. (2014). Interactive technology: traditional practice? *The Nordic Journal of Digital Literacy*, 9(1), 23–43.
- Gudmundsdottir, G. B., & Egeberg, G. (2014). Digitale ferdigheter. In J. H. Stray & L. Wittek (Eds.) *Pedagogikk - en grunnbok*. Oslo, Norway: Cappelen Damm.
- Hattie, A. C. (2009). *Visible learning: a synthesis of over 800 meta-analyses relating to achievement*. London: Routledge.
- Haugan, J. A. (2011). A systematic review of research regarding Norwegian general teacher education 2000-2010. *Nordic Studies in Education*, 31, 229–244.
- Krumsvik, R. J., Egeland, K., Sarastuen, N. K., Jones, L. Ø. & Eikeland, O. J. (2013). *Sammenhengen mellom IKT-bruk og læringsutbytte (SMIL) i videregående opplæring*. Bergen, Norway: Kommunesektorens organisasjon (KS) og Universitetet i Bergen.

- Kunnskapsdepartementet. (2006). Kunnskapsløftet. Retrieved 10 October 2011, from <http://www.regjeringen.no/nb/dep/kd/tema/grunnopplaring/kunnskapsloefte.html?id=1411>
- Kunnskapsdepartementet. (2007–2008). St.meld. nr. 31. Kvalitet i skolen. Retrieved 3 June, 2013, from <http://www.regjeringen.no/pages/2084909/PDFS/STM200720080031000DDD/PDFS.pdf>
- Kunnskapsdepartementet. (2010a). Forskrift om rammeplan for grunnskolelærerutdanningene for 1.–7. trinn og 5.–10. trinn Retrieved 15 November 2013 from http://www.regjeringen.no/upload/KD/Rundskriv/2010/Forskrift_rammeplan_grunnskolelaererutdanningene.pdf
- Kunnskapsdepartementet. (2010b). Nasjonale retningslinjer for grunnskolelærerutdanningen 1.–7. trinn. Retrieved 15 November 2013, from http://www.regjeringen.no/upload/KD/Rundskriv/2010/Retningslinjer_grunnskolelaererutdanningen_1_7_trinn.pdf
- Kunnskapsdepartementet. (2010c). Nasjonale retningslinjer for grunnskolelærerutdanningen 5.–10. trinn. Retrieved 15 November 2013, from http://www.regjeringen.no/upload/KD/Rundskriv/2010/Retningslinjer_grunnskolelaererutdanningen_5_10_trinn.pdf
- Kunnskapsdepartementet. (2013). «Reservestyryken» av lærere. Utdannede lærere som ikke jobber i skolen. Hva kan bringe dem tilbake? Retrieved 1 May 2013, from [http://www.utdanningsforbundet.no/upload/Grunnskole/Rapport_reservestyryken_av_l%c3%a6rere_\(TNS_Gallup_116626\).pdf](http://www.utdanningsforbundet.no/upload/Grunnskole/Rapport_reservestyryken_av_l%c3%a6rere_(TNS_Gallup_116626).pdf)
- Ministry of Education and Research. (2011). National guidelines for differentiated primary and lower secondary teacher education programmes for years 1–7 and years 5–10. General provisions. Retrieved 15 November 2013, from http://www.regjeringen.no/upload/KD/Vedlegg/UH/forskrifter/Guidelines_Differentiated_Teacher_Education.pdf
- Nordenbo, S. E., Larsen, M. S., Tiftikçi, N., Wendt, R. E. & Østergaard, S. (2008). Lærerkompetanser og elevers læring i førskole og skole. Et systematisk review utført for Kunnskapsdepartementet, Oslo. Copenhagen, Denmark: Danmarks Pædagogiske Universitetskole.
- Organisation for Economic Co-operation and Development. (2005). Teachers matter: Attracting, developing and retraining effective teachers. Paris, France: OECD Publishing.
- Roksvaag, K. & Texmon, I. (2012). Arbeidsmarkedet for lærere og førskolelærere fram mot år 2035. Dokumentasjon av beregninger med LÆRERMOD 2012 (Vol. 2014). Oslo – Kongsvinger, Norway: Statistisk sentralbyrå.
- Rots, I., Aelterman, A., Devos, G. & Vlerick, P. (2010). Teacher education and the choice to enter the teaching profession: a prospective study. *Teaching and Teacher Education*, 26(8), 1619–1629.

- Sinclair, C. (2008). Initial and changing student teacher motivation and commitment to teaching. *Asia-Pacific Journal of Teacher Education*, 36, 79–104.
- Tømte, C., Kårstein, A. & Olsen, D. S. (2013). *IKT i lærerutdanningen. På vei mot profesjonsfaglig digital kompetanse?* Oslo, Norway: NIFU.
- Ulrik, M. & Langørgen, P. (2012). What can experienced teachers learn from newcomers? Newly qualified teachers as a resource in schools. *Teachers and Teaching: theory and practice*,
- United Nations Educational, Scientific and Cultural Organization (UNESCO). (2011). ICT competency framework for teachers. Retrieved 29 October 2011, from <http://unesdoc.unesco.org/images/0021/002134/213475E.pdf>
- Utdanningsdirektoratet. (2012). Rammeverk for grunnleggende ferdigheter. Til bruk for læreplangrupper oppnevnt av Utdanningsdirektoratet. Retrieved 3 June 2013, from http://www.udir.no/Upload/larerplaner/lareplangrupper/RAMMEVERK_grf_2012.pdf?epslanguage=no
- Vasbø, K. B. & Gudmundsdottir, G. B. (2014). Methodological challenges when exploring new learning spaces in educational research. In G. B. Gudmundsdottir & K. B. Vasbø (Eds.), *Methodological challenges when exploring digital learning spaces in education*. Rotterdam, The Netherlands: Sense.



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