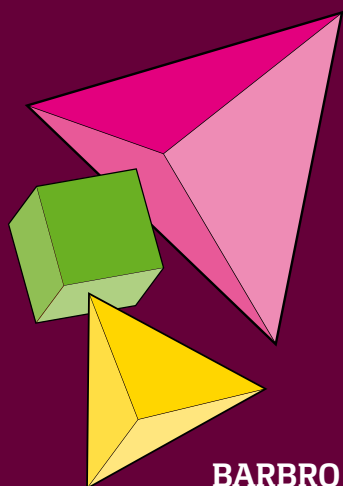report

Changing course?

*Report on digital competence in
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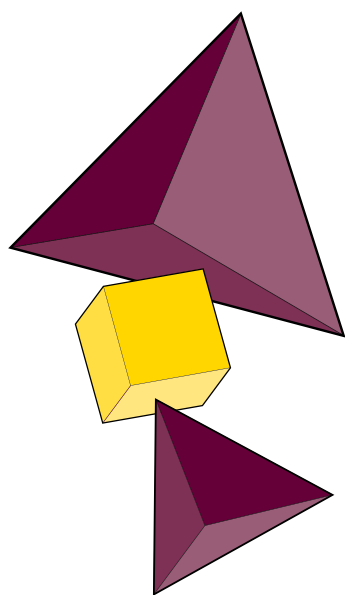
**BARBRO HARDERSEN
MONICA JENSSEN**

Changing course?

Report on digital competence in new early childhood education and care centre teacher training

BARBRO HARDERSEN
MONICA JENSSEN

Om Senter for IKT i utdanningen.

The purpose of the Norwegian Centre for ICT in Education is to contribute to the realization and the development of ICT policy. It shall further cooperate with relevant public and private institutions. The centre will also participate in international cooperation. Our main goals are to improve the quality of education and to improve learning outcomes and learning for children, pupils and students thourgh use of ICT in education.

Rettigheter.

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1. Introduction

The new early childhood education and care centre teacher training has announced a new course for training, students and early childhood education and care centres. Competent employees are a prerequisite if an early childhood education and care centre is to fulfil its social mandate in line with its objectives[1]. A new education provides the springboard for a new course, also when it comes to implementing digital content. The Norwegian Centre for ICT in Education sees an opportunity for a comprehensive rise in competence as regards the use of information and communications technology (ICT).

To equip early childhood education and care centre children to one day become intelligent seekers of digital information, socially competent and democratic citizens have all become part of the duties of education. On paper. There is also a glaring demand for a rise in digital competence in all parts of the sector. But how will this be achieved in practice? How do we change course?

The Norwegian Ministry of Education and Research has given the Norwegian Centre for ICT in Education the mandate to improve the quality of digital skills development in the early childhood education and care centre sector. With the 3-year early childhood education and care centre study, we have laid the foundation for promoting the use of ICT in all parts of the early childhood education and care centre sector, which teacher training now also will benefit from. Through outreach work and close cooperation in the field itself, we have painstakingly mapped digital life in early childhood education and care centres, how the sector can itself contribute to improving the quality of early childhood education and care centres, and where there are bottlenecks that slow implementation of digital practice. A new education can take advantage of all of these experiences.

The development of digital competence in the early childhood education and care centre sector is best achieved by a holistic approach in which everyone works together. Early childhood education and care centre teacher training is a key element if we are to succeed with a nuanced and appropriate implementation of digital competence. At the same time we also see the value of talking in the 'language' of early childhood education and care centre staff. The use of ICT in early childhood education and care centres should not come at the expense of our traditional and proud early childhood education and care centre culture, but rather they should proceed together into the future. The new framework plan for early childhood education and care centres, which should be operational by 2015, can help to strengthen the overall focus of the sector. The Framework Plan Group has been assigned the task of evaluating and proposing revisions, including with respect to "relevant social changes (including use of ICT)"[2].

It is with considerable pride and joy that through this report I am able to submit the latest findings and the results of the Centre's 3-year early childhood education and care centre initiative, and not least to present a first proposal on what the content of a professional digital competence for early childhood education and care centre staff should be. By making specific proposals concerning what and how training shall ensure that students carry digital skills with them into the teaching profession, we add to the strategy of where we want education and early childhood education and care centres to be in the future.

We hope that this will create inspiration and further the development of what professional digital competence is in theory and practice, at a time when both teachers and early childhood education and care centres want to make sure that

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1   Cf. Framework plan for early childhood education and care centre content and duties (2013) and Sections 1, 2 and 3 of the Norwegian Day Care Institutions Act.
2   http://www.udir.no/Barnehage/Rammeplan/Ny-rammeplan-i-2015/.

technology strengthens professional practice. The final goal of this work will never be reached, as technology and learning are in state of constant change - this is what makes the field so exciting!

With this, I extend a special thank you to the study group with Cecilie Stranger-Thorsen (STRANGER) and consultant Monica Jenssen (Norwegian Centre for ICT in Education) for a brilliant and informative piece of work. Also many thanks to all the contributors in training, early childhood education and care centres and others who have provided their help and support! The opportunity exists now that the training programme is in motion. Good luck!

Oslo 22/11/2013
Barbro Hardersen,
Senior consultant, Norwegian Centre for ICT in Education, project leader for the early childhood education and care centre initiative and the feasibility study

2. About the feasibility study and the report

What problem are we trying to solve?

The new framework plan for early childhood education and care centre teacher training[3] represents a major step forward for digital competence within education. When the framework plan first comes into effect in the autumn of 2013, all of the country's 18 education institutions providing early childhood education and care centre teacher training[4] will ensure that students have a broad knowledge of a child's "nascent digital skills"[5]. In addition, digital competence in professional contexts will be mentioned for the first time in the accompanying guidelines[6], and as a part of the learning objectives.

The guidelines make it clear that teacher training must make a systematic effort to develop students' digital competence. But what exactly does this requirement mean in practice? In this feasibility study the Norwegian Centre for ICT in Education (hereinafter the ICT Centre) has highlighted the following issues:

- What is digital competence in early childhood education and care centre teacher training?
- How do we ensure that teachers at early childhood education and care centres arrive at work with a broad understanding of digital competence?
- How can we ensure that all educational institutions are part of this development?
- What role can early childhood education and care centres play in the development of digital competence in the higher education sector?

IN ORDER TO ADDRESS THESE ISSUES, THE FEASIBILITY STUDY HAS:

- Collected information about the framework and perspectives on ICT throughout the education sector
- Mapped the status of implementation work
- Investigated the level of understanding of digital competence that forms the basis for this work
- Investigated what are the greatest challenges for this work
- Investigated whether a basis for further efforts in this area exists

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3 Regulation regarding a framework plan for teacher training for early childhood education and care centres, Norwegian Ministry of Education and Research 2012. See: http://lovdata.no/dokument/SF/forskrift/2012-06-04-475.

4 List of teacher training for early childhood education and care centres: utdanning.no/studiebeskrivelse/barnehagelaererutdanning.

5 Regulation regarding a framework plan for teacher training for early childhood education and care centres: Section 2. Teacher output, Proficiency.

6 National guidelines for early childhood education and care centre teacher training, Norwegian Ministry of Education and Research 2012. See: www.regjeringen.no/upload/KD/Vedlegg/UH/Rammeplaner/Barnehagelaerer/Nasjonale_retningslinjer_barnehagelaererutdanningen04juni.pdf.

Feasibility study deliverables

OVER A PERIOD OF 10 WEEKS THE FEASIBILITY STUDY HAS:

- Organised the workshop Changing course? in Oslo on 26/09/2013, with approximately 40 participants from 17 of the 18 early childhood education and care centre teacher training colleges (BLU), early childhood education and care centres and other stakeholders.

- Set-up the knowledge sharing forum/blog Digital assembly[7], and a closed Facebook group[8] for information sharing and dialogue between workshop participants.

- Taken the plunge into work on digital competence in BLU through dialogue with training and relevant theory, as well as with six in-depth interviews[9] with key participants. The "digital train" can utilise all its strengths and achieve maximum speed.

- Following the study period, the experiences were assembled in the report Changing course?

This report summarises the conclusions of the work, and is also meant to form a starting point for a broader discussion and further work in the field, in which participants from both teacher training and early childhood education and care centres are involved.

Scope

The feasibility study has focused on digital competence at the level of early childhood education and care centre teacher training. The starting point was to identify what digital competence the training must give the students in order for them to be able to practice their profession. The indicators for digital competence must therefore also apply to the teachers themselves. The objective of the study has not been to develop content for a child's digital competence or to discuss the framework conditions for digital competence in the early childhood education and care centre.

This is at times a difficult boundary to draw, since the students' opportunities to use their digital competence in the workplace is affected by the situations they encounter: access to equipment and the competence of owners, boards and teachers. Therefore, the first step was to look at the sector as a whole in order to identify the key participants and to be able to discuss what educational measures are essential in Chapter 6 of the report. Similarly, we also needed to have a child's digital competence when discussing digital competence in teacher training for early childhood education and care centres.

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7 http://digitalsamlingsstund.wordpress.com.
8 http://www.facebook.com/groups/digisam.
9 In depth interviews were conducted with:
   - Helge Habbestad, Director of Studies, University of Tromsø - the Arctic University of Norway, Tromsø campus, Norway
   - Henriette Jæger, university college lecturer, Oslo and Akershus University College, Norway
   - Magnus Nohr, responsible for ICT teaching in primary and lower secondary schoolsteacher training, Østfold University College, Norway.
   - Aud Marie Stundal, Director of Studies, and Hege Gjerde, university college lecturer, Sogn og Fjordane University College, Norway
   - Margrethe Jernes, senior teaching assistant, University of Stavanger, Norway
   - Mimi Bjerkestrand, head of the study group for teacher training for early childhood education and care centres.

To create lasting changes and consensus, educational measurements must be combined with measures on the early childhood education and care centre level. This report will serve as a knowledge base for how digital competence in training contributes to - and is a prerequisite for - digital competence in early childhood education and care centres for ongoing work on the new framework plan for early childhood education and care centres.

The restrictions on the conclusions of this report concerning possible measures should not be regarded as an obstacle to seeing training and fields of practice in context. As the further analysis will demonstrate, digital competence and motivation are just as great in the country's early childhood education and care centres as they are in its training centres, and there is a large demand for closer cooperation.

Feasibility study work methods

The feasibility study is a test project in new terrain. Training centres have just started to gain experience in implementing the framework plan[10]. It has not been possible to conduct a broad survey of the status of implementation work - because the primary need has been to first identify indicators of digital competence and to conduct a basic investigation into key challenges and possible courses of action.

Our priority was therefore to engage in a dialogue with the participants in the field, map the status, create support for the work and to share the findings and conclusions along the way through social media. This dialogue has been central to the results of the feasibility study. At the workshop Changing course?, four different participants from early childhood education and care centres and training colleges gave introductions about 'digital competence' in practice, as a starting point for discussions among participants about how this should be defined.

Through its work on the development of competence in early childhood education and care centre staff, the ICT Centre has already experienced the importance of early childhood education and care centre teachers being given their own experiences and 'adventures' with digital tools and methods. In the group work discussing challenges and initiatives, the participants tested the following digital tools themselves: Blog, Facebook, Padlet. Such activities create experiences and insight among teachers about how important it is to feel confident with such tools in order to be able to teach them, and these methods create the motivation for both personal development and further work within the teacher's own institution.

In this way, the feasibility study has set in motion a change in work practice and opened a channel of dialogue with participants and stakeholders in the early childhood education and care centre teaching field. Hopefully the methods of the feasibility study will increase the relevance of the conclusions in this report, as participants have received and commented on them along the way. Such working methods also heighten a sense of co-responsibility in the participants[11]. The participants can continue the dialogue among themselves through further activity on the blog and in the Facebook group[12].

To create lasting changes and develop new measures it was necessary to have a large number of participants, and to carry out a more systematic review of the status for mapping purposes, which included quantitative measurements. With the knowledge produced here we are hopeful that everything is in place to ensure that this can be done.

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10 With the exception of Sogn og Fjordane University College, who held pilot training during 2012-2013, training colleges had their first experience of the new framework plan at the start of the school year in autumn 2013.

11 The idea for a network directory, with contact information for all training programmes and links to programme plans, has been posted on the blog. This measure was also spontaneously requested during the workshop, but it proved difficult to obtain a response from the network when asked to enter this information. Such tests of interest are perhaps good indicators of what is important and realistic in everyday life, and in relation to such signals it could be more important to prioritise rather than implement a pre-defined plan - and the same applies in future work.

12 The Facebook group was transferred to workshop participants on 31/10/2013; they were all made administrators in order that further work can be managed by the network. During the three weeks following this transfer, the size of the group has increased by 50%, from 48 to 72 members, a good indication that the workshop participants themselves see a need to build up the network and include their colleagues in further discussions.

3. New framework plan for BLU

Framework plan

When the new early childhood education and care centre teacher training programme came into force in autumn 2013, the training programme changed its name from 'pre-school teacher training'. The new framework plan for early childhood education and care centre teacher training stated for the first time that the early childhood education and care centre teacher training programme should ensure that students have:

...a broad knowledge of a child's language development, multilingualism, social, physical and creative development and nascent digital, reading, writing and maths skills[13].

Digital competence is essential in order to have a broad knowledge of a child's nascent digital skills. The framework plan explicitly mentions such digital competence during learning outcome descriptions for knowledge, but not during learning outcome descriptions for skills or general competence. The reader must thus have the knowledge and motivation to 'read between the lines' that digital competence is an integral part of the other educational objectives.

Guidelines

In addition, the framework plan mentions the guidelines called National guidelines for early childhood education and care centre teacher training[14], digital competence in several contexts, both in the general part and in two of the six knowledge areas:

FROM PART 1, GENERAL PART - ORGANISATION, STRUCTURE AND CONTENT:

- Ultimately, students shall be trained in oral, written (bokmål and new Norwegian) and practical presentation, and will gain experience in the use of digital tools in a professional context (4. Training Structure and Content, Section 4.2, point E: Work and assessment methods).
- One of the prerequisites for professional practice is to be able to use the Norwegian language orally, in writing and with digital tools in a qualified manner in different contexts. These competencies are developed as part of the skills in all knowledge areas (5. Quality characteristics with new early childhood education and care centre teacher training, 5.2. Professional direction).
- The programme plan will ensure systematic work on the development of oral, written and digital competence for students (6. Indicators for new early childhood education and care centre teacher training, 2. Professional direction, Point IV).

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13 Regulation regarding a framework plan for early childhood education and care centre teacher training: Section 2. Teacher output, Proficiency.

14 National guidelines for early childhood education and care centre teacher training, Norwegian Ministry of Education and Research 2012.

FROM PART 2, NATIONAL GUIDELINES FOR KNOWLEDGE AREAS:

- The student gains knowledge of various educational and digital tools which influence a child's play and learning, and also how these can be used creatively and critically (Learning outcomes for the knowledge area: Child development, play and learning).
- Central to this knowledge area is qualifying the student to work with a child as it engages with a variety of artistic and cultural expressions. An important aspect of this competence is to use digital media in creative and thoughtful ways (Learning outcomes for the knowledge area: Art, culture and creativity).
- [The student] gains knowledge of a child's musicality and musical development, a child's development in creative work within digital and two- and three-dimensional forms and expressions, and about the aesthetic dimensions and formal elements in a child's dramatic play and development (Learning outcomes for knowledge area: Art, culture and creativity).
- The guidelines make it clear that digital tools should be used in a professional context and that they should be used in a qualified manner in different contexts. This is new, and it is left to the teacher training programmes to determine what these wordings mean, what content teacher training must include and how to use digital tools in the early childhood education and care centre profession (as opposed to other professions).
- The guidelines prepared by the Framework Planning Committee are a supplement and guide for teacher training. Therefore the wordings we find here regarding digital competence do not carry as much weight as the wordings in the guidelines. Nevertheless, there is no doubt that teacher training must now ensure that graduate students have digital competence.

ICT between the lines

In the framework plan as well as the guidelines, there are several places where 'digital competence' is not mentioned specifically, but where a person coming with a digital perspective can see that digital competence among teachers and students is assumed. Some selected examples of this from Parts 1 and 2 of the framework plan:

PART 1, GENERAL PART - ORGANISATION, STRUCTURE AND CONTENT:

- The assessment methods should help students to see the connection between theory and practice and the links between the various knowledge areas, and contribute to learning and personal development (4.2 Work and assessment methods).

The assessment methods should also include a digital perspective. For example, many students must submit handwritten exams. This also implies that students should gain experience delivering work in digital files, a form of assessment that is directly transferable to working with the files of children in an early childhood education and care centre.

- Varied practice means that students gain experience with various aspects of the early childhood education and care centre teaching profession in an early childhood education and care centre field which is characterised by change, diversity and complexity.

From this it might be understood that students should be required to take reflection notes, carry out tasks and/or implementations with an ICT perspective.

- Teacher training prepares students for the demands and expectations that society places on early childhood education and care centres by actively adhering to society and social changes that affect children, families, upbringing and early childhood education and care centres (5.2 Professional direction).

Society places demands on us as knowledgeable users of ICT with regard to everyday online tasks, or to keep abreast of new technology or media content that children are familiar with or engaged in.

PART 2, NATIONAL GUIDELINES FOR KNOWLEDGE AREAS:

- The knowledge area covers child development, play and learning in a society characterised by diversity, change and complexity. The knowledge area should provide the understanding and insight which the early childhood education and care centre teacher needs in order to direct and lead play, learning and education processes.

It is obvious that a child's every day life includes digital games, digital learning and digital education processes.

Leadership, cooperation and development work

The knowledge area examines educational leadership in early childhood education and care centres, personnel management and management of change and development processes in a diverse early childhood education and care centre environment as well as cooperation with parents/guardians and external authorities. This knowledge area emphasises an understanding of how management actions can help to strengthen learning and development in early childhood education and care centres and ensure an equitable and inclusive community for children, parents/guardians and staff. Supervision and management of the learning processes of children and employees is central, as is the use of different methods and tools suitable for designing strategies and initiating and leading development work.

In this section on leadership, development and cooperation, a digital perspective could be introduced into every sentence. Being a leader in an early childhood education and care centre has many facets, and involves many different tasks that have or should have an ICT perspective. This requires digital competence coupled to challenges regarding safety and privacy. The early childhood education and care centre teacher must also be able to supervise and act as a 'warning beacon' for digital activities in the early childhood education and care centre: in terms of administration, education and in all collaborative processes. It would be interesting to see a study of how teacher training examines and equips students to become digital leaders in the change and development processes described here.

The framework plan describes an education with a "comprehensive profile [which] means that learning arenas complement each other and that, when combined, knowledge areas constitute an integrated whole." A trained eye and awareness is needed in order to introduce a digital perspective where it is not evident in the framework plan, and to see digital tools in the context of the framework plan's overall objectives.

As the new early childhood education and care centre teacher training programme is moving from 10 subjects to 6 knowledge areas, this emphasises even more than before the need for interdisciplinarity. In addition to being a reflection of practice within early childhood education and care centres, this interdisciplinary

perspective means that digital competence must be integrated into all knowledge areas, and in this way also implicitly forces teacher training programmes to give students digital competence.

Introducing an ICT perspective into these texts/key knowledge areas makes an assumption about a reader's digital maturity, as it assumes that he or she has come a long way towards connecting ICT to his or her own work processes around the early childhood education and care centre profession. This is difficult to ensure without digital competence being specified in all learning outcome descriptions, both as skills, knowledge and general know-how.

The inclusion of digital competence in early childhood education and care centre teacher training is thus not only about skills and tools. It is also deals with developing a digital perspective in both teachers and students, such that the implied importance of ICT is not overlooked. The establishment of a digital learning arena early in education means that such a perspective becomes a natural part of the overall education process.

4. Digital competence – considerations and content

Background to the concept of 'digital competence'

As the concept of 'digital competence' accommodates several earlier definitions and traditions, it may be interesting to mention these before we further examine what the concept means in the context of the early childhood education and care centre profession.

As this review will show, we are still in the startup phase in terms of the awareness and definition of digital competence, and there are several concepts that are tangential to each other . At the same time it is important to remember that both technology and the skills of children are constantly evolving. We will therefore never seem to reach the 'objective' - a definition we can hold onto for a long period of time. It is therefore important that we create a basis for further discussions, a working definition that we can use when implementing and further refining the framework plan.

The concept of Competence used here is the Norwegian translation of the English concept of Literacy – which from the 1970's onwards has meant the ideal that media competent adolescents and adults command the language (referred to as Film / Media / Information Literacy as each new medium and media expression enters the fold) of media, which means the ability to read, analyse and produce media products. This has also been referred to as the extended text concept in both a school and early childhood education and care centre context.

Where Media Literacy has from the start (1970s) been linked to ideological criticism, in which popular culture in particular is seen as an expression of a social order and commercial influences which pupils must learn to see through, the IT initiatives from the 1990s onwards have been considerably more positive about technology. Self-production is now essential, both as a starting point for one's own creative expression and as the gateway to critical reflection in both traditions.

UNESCO currently uses the term Media and Information Literacy ('Medie- og informasjonskunnskap' in Norwegian)[15] as an accompaniment to ICT (Information and Communications Technology), which is also a term that accommodates both technology and message, knowledge and skills.

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15 Ulla Carlsson (ed.) Media and information proficiency in the network society. School and democracy, Nordicom 2013

UNESCO operationalises the concept with the following skills:

Media Literacy

Understand the role and functions of media in democratic societies.	Understand the conditions under which media can fulfil their functions.	Critically evaluate media content in the light of media functions.	Engage with media for self-expression and democratic participation.	Review skills (Including Information and Communication Technology, ICT) needed to produce user-generated content.

Information Literacy

Define and articulate infor-mation needs.	Locate and access infor-mation.	Assess infor-mation.	Make ethical use of infor-mation.	Communicate information	Use ICT skills for informa-tion proces-sing

Digital competence must in this context be seen as a reflection of Media and Information Literacy. In the Knowledge Promotion Reform, digital skills were established as one of five key core skills in primary and lower secondary schools, along with reading, writing, arithmetic and oral presentation:

Digital skills means being able to use digital tools, media and resources in an appropriate and sensible way in order to solve practical problems, collect and process information, create digital products and communicate. Digital skills also means developing digital judgment by acquiring knowledge and useful strategies for using the internet.[16]

Here we can see that the concept of skill is not just about the technical handling of tools, but also about how to use and decode content and self production.

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16 Framework for basic skills, p. 6. Norwegian Directorate for Education and Training www.udir.no.

The same framework also operationalises digital skills in various skill areas and levels[17].

Digital skills as basic skills					
Skill Area	Level 1	Level 2	Level 3	Level 4	level 5
Learn and handle	Reads hypertext and simple interactive information using image- and icon-based navigation.	Performs simple digital searches, and reads and interprets information from digital sources. Uses simple digital resources and tools for information handling and teaching.	Selects and evaluates information and search strategies from digital sources. Uses different digital tools and resources for information handling and teaching.	Filters, adapts and compiles information from digital sources. Uses relevant search engines and has mastery of search strategies in subject work.	Collects and organises continually updated digital information. Uses advanced search strategies and sources in subject work.
Produce and adapt	Writes simple texts on the keyboard and creates simple digital composite texts. Aware of the basic use of digital sources and copyright.	Creates digital composite texts with different elements and simple digital format requirements. Also uses simple digital sources and copyright during reuse and further development.	Creates digital composite texts with linked content. Understands and uses digital format requirements in own texts. Refers to digital sources and follows rules for copyright.	Produces and edits digital composite texts. Refers to and evaluates digital sources in current subject content situations.	Selects and uses digital tools on the basis of need, digital format requirement, work form and recipient. Administers copyright on own digital products. Has mastery of digital source referencing.
Communication	Uses simple digital tools and media in presentations and communication	Uses a range of digital tools and media in presentations and communication	Uses different digital tools and media to convey a message in one-to-one and group communication.	Uses digital media and tools to precisely convey a message for communication and documentation.	Selects, evaluates and uses digital communication tools and media on the basis of different occupational requirements.
Digital judgement	Follows simple rules for digital interactions. Aware of the basic rules for personal privacy on the internet.	Uses basic networks and has knowledge of rules for personal privacy on the internet.	Uses networks and follows rules for personal privacy on the internet and in social media.	Uses the Internet and social media in a sensible manner.	Has the capability for ethical reflection and evaluation of the Internet and social media as communication and information channels.

In this report we will use the term ICT to denote digital tools and media content. We will use the general concept of digital competence in a wide sense, to denote proficiency in the use of digital tools and the ability to read and analyse media content, as linked to the general concept of education.

But a general definition of digital competence is insufficient if we want to specifically discuss the early childhood education and care centre profession. As shown in the table above, indicators of digital competence in schools are linked both to a school-specific teaching situation and to the skills (as adapted for age group) needed in everyday school life, but not for early childhood education and care centres.

As we have already seen in Chapter 3, the framework plan makes reference to an infant's nascent digital skills. These nascent skills will form a natural starting point and transition to skill areas in primary and lower secondary schools and on to further levels in the structure of the education system. However, the task of preparing an equally detailed operationalisation of digital competence for children in early childhood education and care centres remains to be done.

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17 Ibid., p. 7.

ICT in the early childhood education and care centre

As we have seen, in the Knowledge Promotion Reform digital skills were integrated into work on the framework plan for primary and lower secondary schools. But where digital competence is considered to be a core skill in school education, it has so far been regarded as an exclusive - and voluntary - ingredient in the context of early childhood education and care centres. The wording in regard to digital competence in the framework plan for early childhood education and care centres, i.e. "Children should discover that digital tools can be a source of fun, communication and knowledge"[18] is presented as an suggestion rather than a requirement.

The early childhood education and care centre sector was not included in the Knowledge Promotion Reform's juxtaposition of digital skills with the other basic skills. This is also reflected by the actual situation in the field: IT upgrades of schools from the 1990s and onwards did not reach the early childhood education and care centre sector as a whole. Even today, access to equipment and the internet varies across the country's early childhood education and care centres.

The traditions and working practices of early childhood education and care centres invite them to embrace social changes: The early childhood education and care centre is a learning organisation that should reflect society, which is an objective for both the framework and practice. The early childhood education and care centre's interdisciplinary lay-out as well as the focus that early childhood education and care centre teachers have on groups of children and the individual child's circumstances and interests, make it easier to 'change direction' as and when the outside world requires.

This ought to indicate that an ICT perspective will become a part of the development of early childhood education and care centres naturally. Nevertheless, the early childhood education and care centre profession has been characterised by an absence of knowledge or resistance towards ICT. A regular feature in the argument is the idea that the use of ICT poses a threat to traditional early childhood education and care centre activities such as, for example, physical activity and free play. This argument is in the process of giving way to curiosity and testing.

Many early childhood education and care centres view ICT from an educational perspective, in the belief that then the centre 'is digital'. A wide selection of digital play-and-teach programmes ensure that early childhood education and care centres can work with the subject areas of the framework plan and be digital. At the same time the genre of educational software can also create an artificial distinction between tools that aim to be educational and tools that are used educationally. All ICT has educational potential - it is up to the teacher in the early childhood education and care centre to have the competence to utilize it to the greatest benefit.

A basic understanding of how digital technology and digital content is part of contemporary children's culture must be the foundation from which the abilities of judgment and critical use develop. A broad digital competence therefore recognises contemporary children's culture as the starting point for early childhood education and care centre programmes. As the report An infant's digital universe[19] has shown, there is considerable variation in the experiences children have with ICT - many children have experience of several digital universes, while others have no personal experience at all.

The early childhood education and care centre teacher's ability to meet children as they are - and to work with the experiences and reference points that the children themselves have - will therefore play a more central role in the implementation of

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18 Regulation regarding a framework plan for early childhood education and care centre content and duties, Norwegian Ministry of Education and Research 2012, p. 27. See: http://www.regjeringen.no/nb/dep/kd/dok/lover_regler/forskrifter/2011/forskrift-om-rammeplan-for-barnehagens-i.html?id=631906.
19 Norwegian Centre for ICT in Education 2011.

digital competence than the actual tools which are used. For example, an early childhood education and care centre teacher may recognise that a child's play is inspired by children's TV and seize the opportunity for further exploration in other media. In this way, it is possible for an early childhood education and care centre teacher to practice and create digital competence without using a single display board or camera.

As we see here, there is a sense of a separate professional direction in digital practice within early childhood education and care centres. What condition does this provide for digital competence in education and what are the indicators for such know-how?

Professional digital competence in teacher training programmes

When working with digital competence in early childhood education and care centre teacher training it can be helpful to take a close look at the work in primary and lower secondary school teacher training (GLU) in order to get a better understanding of the content of the concept.

The report from the Nordic Institute for Studies in Innovation, Research and Education (NIFU) entitled ICT in teacher training: Towards professional digital competence?[20] emphasises some interesting aspects of ICT initiatives within GLU:

As long as some academic staff involved in teacher training have an insufficient "level of digital expertise", the ability of students to acquire a holistic educational approach to ICT will be compromised. While student teachers remain largely at the mercy of "enthusiasts" when learning about ICT and the use of digital tools in teaching, education will at best be somewhat random in terms of the extent to which students are prepared to use ICT in their own teaching work. Teacher training programmes that have their own expert environment linked to ICT and learning are key drivers in the efforts to get academic staff to work with ICT in their teaching practice, but there is no mandate for such an environment to involve all teachers, and it is often the teachers who already have some knowledge who make use of the opportunities for competence development offered by such an environment. (p. 8)

The introduction of work requirements, i.e. compulsory exercises in order to take the exam, is however an example of how digital competence can be addressed during teacher training. This does however present a risk that in the worst case digital competence will only be used as a tool rather than being included in a more comprehensive approach to education. In such cases, the work demands associated with ICT risk becoming a fallback or an ICT alibi for teacher training. Conversely, we have also seen that it is possible for the work requirements of ICT to be integrated into more comprehensive learning processes. (p. 8)

The report therefore concludes that digital competence must cover all aspects of primary and lower secondary school teacher training and that we also have to make use of other means than formal (working) requirements if we are to create a broad digital competence among students.

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20 Authors: Cathrine Tømte, Asbjørn Kårstein, Dorothy S. Olsen. Published by the Nordic Institute for Studies in Innovation, Research and Education, 2013.

The NIFU report established the concept of 'professional digital competence', i.e. an expertise one should have in order to practice the profession, which is not necessarily the same as general digital competence. Professional digital competence for an early childhood education and care centre teacher is not about being able to master Facebook or tablets, but is rather about being able to use these tools and platforms in his or her own administrative and educational practice, for example when keeping in touch with parents or engaging in play and documentation together with children.

To be able to implement a similar systematic investigation of digital initiatives in early childhood education and care centre teacher training as for the NIFU report, would be very interesting. In this feasibility study, we have mirrored work in the NIFU report by primarily identifying enthusiasts and seeking to strengthen competency networks by letting them discuss precise definitions of professional digital competence, work requirements and learning outcome descriptions, both digitally and at a workshop. As we shall see, there are several conclusions which seem to be the same in the early childhood education and care centre sector.

But the definition of a professional digital competence cannot be taken directly from schools, and early childhood education and care centre teacher training must find its own content and meaning for the term rooted in its own framework plan. The feasibility study has taken the first steps towards such a definition through dialogue with the participants in the study.

Professional digital competence in early childhood education and care centre teacher training

At the time of this feasibility study the teacher training programmes have only just started to define digital competence in the new early childhood education and care centre teacher training, in their work with preparing programme syllabi for the start of the first school year.

The choice to make digital competence a general competency in the framework plan and to thus implicitly assume that this is 'spread across' knowledge areas, is possibly to emphasise that it should be as natural to select - or deselect - digital tools as other tools. In line with this, training programmes have also started to formulate general requirements for digital competence in their programme syllabi[21], in addition to individual training programmes which still offer in-depth digital study modules.

However if the intention is to juxtapose digital competence with the other learning objectives for teacher training, it is not enough just to have digital literacy 'between the lines'. In order to create awareness that digital competence is a natural part of early childhood education and care centre teacher training, one must proceed through a phase where the need is made clear, skills are operationalised and work requirements are formulated. This may seem paradoxical if one is striving towards a juxtaposition of different competencies.

However, in the transition phase we find ourselves in need of digital competence which is operationalised and thoroughly mapped, as the NIFU report has already done for primary and lower secondary school teacher training. This is the only way to keep up with developments in the field and to discuss new efforts for competence in training.

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21 There has not been space for a thorough analysis and comparison of the programme syllabi at the 18 educational institutions in this feasibility study, but this would be a good topic for future work, namely to systematically investigate how the wording in programme syllabi is designed and how this affects implementation efforts.

This feasibility study wants to take the first step in this direction by providing content for 'professional digital competence' in early childhood education and care centre teacher training.

Content for the concept of Professional digital competence

This report introduces the concept of professional digital competence in a context of early childhood education and care centres:

Professional digital competence for early childhood education and care centres begins with the child in an early childhood education and care centre. By professional digital competence we mean the early childhood education and care centre teacher's ability to use digital tools both when teaching and in his or her own work. A digitally competent early childhood education and care centre teacher can use ICT broadly and in an appropriate manner to achieve the objectives of the framework plan for the content and duties of early childhood education and care centres.

This definition is based on the following considerations about the diverse content of professional digital competence:

- ICT is an integral part of the educational practice in early childhood education and care centres.
- Within the educational programme, early childhood education and care centre teachers shall see and recognise each child's digital life as a starting point for the child's development processes and education.
- In practice this means that early childhood education and care centre teachers use ICT in administration, in contact with parents, in their own development processes and in a variety of educational programmes.
- Professional digital competence is about having access to a broad educational palette: to be able to use a large arsenal of digital tools and digital content in an appropriate manner.
- In order to realise the framework plan's content and duties, the early childhood education and care centre teacher must:
  - Include ICT in practice in the early childhood education and care centre where going digital gives educational value
  - Have knowledge and awareness of digital divides and ethical challenges
  - Stimulate the ability of children to select, use and evaluate[22] ICT
  - Stimulating a child's digital judgment[23] and netiquette through thought and participation

  Strengthening this digital perspective in early childhood education and care centre's content and duties and will give children their own experiences - and thus build their nascent digital skills. This emphasises that it is also the responsibility of early childhood education and care centre teachers to ensure that the digital skills children acquire prepare them for starting school and for the demands they face further on in their education.

22 Corresponding skill areas Learn and handle, Produce and adapt and Communicate from Framework for basic skills, p. 6, cited above.
23 See operationalisation from Framework for basic skills, p. 6, cited above.

As we have seen from the NIFU report, teachers must also possess professional digital competence if these goals are to be realised. With regard to teachers of early childhood education and care centre teacher training, we can rely on the NIFU report's definition of professional digital competence in teacher training:

... to use ICT to prepare teaching programmes, educational use of ICT in their own teaching, in their own administrative work and in evaluation and research (p. 12).

Thus, employees in early childhood education and care centre teacher training institutions must be able to master digital skills in their own work and to use them in educational contexts within higher education to ensure that future students possess the same competence.

5. From plan to practice: Implementation of the framework plan

With the exception of Sogn og Fjordane University College, Norway's early childhood education and care centre teacher training had only been rolling out the reform for a few weeks when this feasibility study was completed. It is therefore too early to evaluate the implementation of the framework plan for the new teacher training.

However, up to now participants in the feasibility study have stressed a number of challenges in the work which will need to be addressed in the future. The challenges are so numerous that in order to obtain a good overview it may be helpful to map out the landscape of early childhood education and care centre teacher training, its participants, their challenges and the interests they represent.

Description of participants

Norwegian Ministry of Education and Research (KD)

KD is responsible for all educational programmes, in this case both the early childhood education and care centre teacher training institutions and early childhood education and care centres. The Ministry's primary management tool for education are its framework plans, the framework plan for early childhood education and care centre teacher training (2012) and the anticipated revision of the framework plan for early childhood education and care centres (2015), respectively.

As we have seen above, both the framework plan and the guidelines mention digital competence and digital tools. In addition, there are a number of areas where a digital perspective is central, but where it cannot be taken for granted that all teachers interpret the wording in this way.

The Norwegian Ministry of Education and Research promotes a number of measures for the whole sector in Expertise for the future early childhood education and care centre 2014-2020, Strategy for skills and recruitment. This document describes an employee's competence as the single most important factor in order for children to thrive and develop in early childhood education and care centres. The rise in competence is viewed in the context of the new early childhood education and care centre teacher training, where close collaboration with practicing teachers is highlighted. The training should make the students better prepared to meet the duties today's early childhood education and care centres face.

Norwegian Centre for ICT in Education (ICT Centre).

The ICT Centre reports to the Ministry and is tasked with increasing the quality of education through the use of information and communication technology by 'end users' in educational institutions, which in the context of this report means children in early childhood education and care centres and students in early childhood education and care centre teacher training institutions. In order to reach these target groups, those persons that provide relevant educational programmes must also be addressed, which in this context means teachers (and early childhood education and care centre teachers). The ICT Centre is pivotal in driving forward ICT issues, as well as acting as a provider of inspiration and national coordination of digital sharing resources, network spread etc. The ICT Centre is reliant on local and regional partners to anchor national measures.

Part of the mission and central role of the ICT Centre is to thematise terms such as 'digital competence' and to discuss their content.

Teacher training

In Norway, there are 18 teacher training institutions, higher education institutions, which offer early childhood education and care centre teacher training. This training will be replacing the former pre-school teacher training programme from the autumn of 2013.

The teacher training programmes control the overall framework for the teaching, locally at the institution. Senior management must be aware of the importance of professional digital competence in order for ICT to be prioritised, and so that there is sufficient equipment and space available for testing, educational and technical ICT support, as well as resources for competence building and continuing education.

The educational management's prioritisation of R&D resources will also reflect the priority of digital issues.

Director of studies

Directors of studies, together with other faculty heads and the remaining management team, are responsible for the early childhood education and care centre teacher training as a whole. Directors of studies are responsible for the preparation of programme, disciplinary and semester plans in line with framework plans and national guidelines. They also have management responsibility for the unit and for digital issues, together with other major and minor issues in day-to-day education, as well as overlapping focus areas such as diversity and the very youngest children.

Directors of studies shall ensure that a digital perspective and activities are embodied in assessment formats, work requirements and learning outcome descriptions for the courses. Directors of studies are also responsible for structural decisions about digital tools in teaching methods, such as the use of digital teaching and examination methods.

Directors of studies must ensure that the enthusiasts who carry the heaviest load when it comes to teaching digital competence do not burn out, and that their driving force is supported in order to create lasting changes through a culture of sharing and structural measures. The directors of studies must be knowledgeable about professional digital competence and the educational opportunities that ICT provides, and should join forces with enthusiasts to create strong frameworks for the development of competence and mentoring, in order to secure digital tools and deal with old prejudices.

It is also the directors of studies' responsibility to ensure that the interdisciplinary elements of the study include digital competence - and that this is defined and practiced broadly, both as part of all disciplines, and as a part of specific priority areas, for example relating to netiquette and law and ethics. The same applies for the importance of being familiar with the culture of modern children and how this culture can be used as the starting point for work with digital competence in the early childhood education and care centre.

Subject teachers

The staff at early childhood education and care centre teacher training institutions often have a background in and responsibility for a particular subject area (education, Norwegian, natural science, music, etc.). A few subject teachers have expressed concern about limited time resources, and whether the digital perspective is being pushed at the expense of subject content - and how will it be possible to keep up with developments regarding new tools.

If subject teachers lack digital competence it cannot be created by the students, and several quarters have highlighted the need for both an improvement in the competence of subject teachers as well as a variety of good professional reasons why we

need to use ICT to ensure that all subject teachers experience the benefits of working digitally.

To get all subject teachers onside requires new working methods to ensure interdisciplinarity, an objective which many believe the new teacher training supports by merging ten previous subjects into six knowledge areas. This interdisciplinarity is essential for creating a broad educational competence in students, in which ICT is an integral component. A culture of sharing in line with the early childhood education and care centres is desirable, with mentoring and sharing of best practice.

In addition to an ample supply of equipment, it is essential that teachers have sufficient time available for in-depth studies with, and testing of, digital tools. Subject teachers have also requested a network and new models of mentoring - a strong culture of sharing both within teacher training and on a regional and national basis.

Practice supervisors

The practice supervisor coordinates and structures the students' practice periods in collaboration with subject teachers, and is the link between teacher training and practical work in early childhood education and care centres. As for subject teachers, it is important that practice supervisors have both the knowledge and motivation to guide the students in digital methods.

The desire for a closer connection between the field in practice and teacher training recurred throughout discussions of challenges during the feasibility study. Close links of this type could be a source of information about what is happening with ICT in educational practice, and using people from the field as teachers in teacher training.

Early childhood education and care centre teacher training students

The students are a diverse group, consisting of both full-time students and a large group of students in part-time/continuing education studies. There are a large number of students who have experience in early childhood education and care centres and are seeking formal education or who are entering teacher training as mature students - along with students coming straight out of college.

For the most part, students (especially the younger ones) have a personal digital competence. Despite this, many students fail to make the link between this competence and a professional digital competence, and do not see their own experience of social media or digital tools as relevant in the context of the early childhood education and care centre profession.

Student practice periods are also mentioned as an untapped opportunity for closer cooperation with the field of practice. Practice periods could be an opportunity for students to conduct their own ICT work (safeguarded by work requirements during one or more practice periods), or for example, could give students the task of collecting and categorising good educational software to ensure that teacher training is updated to the best possible extent.

Early childhood education and care centre practice periods

The guidelines for early childhood education and care centre teacher training state that students shall have 3 practice periods over 3 years, of which 95 of the minimum requirement of 100 shall take place in an early childhood education and care centre. The requirement for a practice period is integrated into all knowledge areas and in-depth studies. A practice supervisor is appointed for each student during his or her practice period in the early childhood education and care centre.

Unlike practice periods in primary and lower secondary school teacher training, there is no requirement for digital equipment or competence when practicing in early childhood education and care centres.

Early childhood education and care centre principals and teachers

When students enter working life, their digital practice is not only determined by their training, but is also controlled by the early childhood education and care centre's equipment and internet access, as well as by the motivation and competence of other personnel in the early childhood education and care centre. It was emphasised that many of the nation's early childhood education and care centres lack both equipment and ICT support, even though ICT already lies at the forefront of focus for early childhood education and care centres. The opportunity for early childhood education and care centres to work actively with the ICT is governed by resource issues such as time with the children and the number of teachers in employment.

A soon to be released study entitled Early Childhood Education and Care Centre Monitoring[24] performed a survey of equipment, use and attitudes related to digital tools in early childhood education and care centres. 74% of respondents in the study said that they would like courses and continuing education in the educational use of digital tools (even more wanted courses and continuing education in administrative tools), which the study concludes is evidence of high motivation among early childhood education and care centre teachers but of some confusion about what and how tools can be used.

It should be emphasised that it is important to show, through good examples and training in practical use, how digital tools can be used in an educational context, in order for the early childhood education and care centre teacher to see the link between new tools and his or her own work and to utilise available tools and in the children's own stories and spontaneous play.

Parents

Parents constitute a secondary 'end user' of the early childhood education and care centre programme. They are of course affected by the early childhood education and care centre's educational use of ICT on behalf of their children, but they are also more directly involved in the digital practices of the early childhood education and care centre by way of communication, management and documentation tools and routines.

Parents are also 'gatekeepers' and supervisors of their own children's use of ICT in their spare time. The report An infant's digital universe[25], which was based on interviews with parents about children's digital habits in their spare time, concluded that even though there is considerable variation in the 0 - 6 age group, many children, even the youngest, use digital tools for structured and spontaneous play. The parents in the study were mostly positive about their children's use of digital devices, and participated in and set boundaries for their children's digital activities.

Nevertheless there was not always an equivalent understanding of precisely why early childhood education and care centres should give children digital competence, or what this might mean in the context of the early childhood education and care centre profession.

Children

Children in early childhood education and care centres are the primary end users for the work with ICT - it is the children's digital competence that provides the ultimate goal for the work, both in teacher training and in the early childhood education and care centre.

In addition to stimulating the early childhood education and care centre teachers' interest in ICT, teacher training stresses that children should take part and that the early childhood education and care centre teacher must meet the children on their level. This is because of the 'free' access the teacher obtains to children's culture by being observant of what devices children bring in to the early childhood education

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24 Norwegian Centre for ICT in Education, December 2013.
25 Norwegian Centre for ICT in Education 2011

and care centre (this allows the teacher to work with ICT without a single 'tool' being present in the early childhood education and care centre). To fulfil the objectives of the framework plan of giving children "nascent digital skills" it is important that the children get to work with the tools themselves and thereby become digitalproducers - and not just consumers.

As the report An infant's digital universe has shown, children aged 0-6 have unequal access to ICT, with some lacking the experience entirely while others have broad experience. One of the report's conclusions is that today's children have several rather than one digital universes. Teaching staff must be familiar with the different needs of the children in the early childhood education and care centres in order to be able to provide a programme adapted to the individual.

It is easy to see an implied causality or the appearance of a "food chain" in this presentation, with arrows pointing downward as if requirements from the Ministry trickle down through the system and ultimately benefit the end users (i.e. children) - in a concentrated form in the best case and in a diluted form in the worst.

However reality looks nothing like this. Several of the participants in the feasibility study emphasised that the early childhood education and care centre is where most happens in the ICT area. Early Childhood Education and Care Centre Monitoring likewise emphasises that the motivation of early childhood education and care centre teachers to work digitally does not come from 'above', i.e. from management or a strategic level in the early childhood education and care centre, but rather from the children themselves. Large numbers of children are already digital consumers and producers.

What we see therefore is an interaction between the requirements of the national framework plan and practice in the early childhood education and care centre, where the needs of early childhood education and care cause early childhood education and care centre teachers to also demand more knowledge.

Therefore, it is perhaps better to use the metaphor of a chain in which there are a number of links that must be connected in order to work together to drive the wheels of the 'digital train'. In the same way, a number of participants and actions must pull in the same direction if the objective of professional digital competence is to be realised.
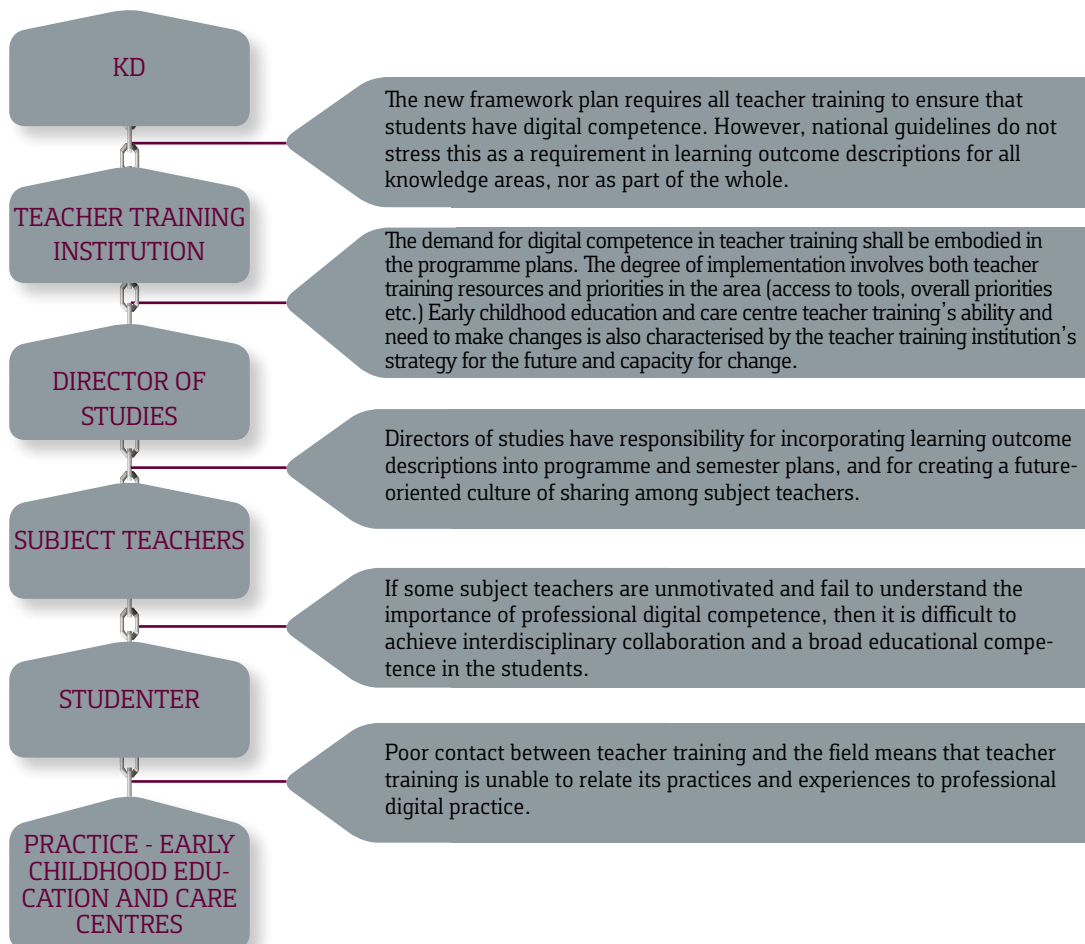
"The digital train"

To provide power and drive in the same direction the participants and educational measures may be linked like connected carriages, together forming "a digital train".

The question is the following: Where is the chain broken? If the requirements of the framework plan formalise the objective to meet the digital reality that already characterises day-to-day life in early childhood education and care centres, then how far has teacher training come?

If we focus exclusively on the educational progression (not on the student's working life and day-to-day activities in the early childhood education and care centre), and look at management tools and factors we can control, then (as we have seen) several points of weakness appear. We can assume that implementation will take longer the more weak points there are in the chain.

The figure below illustrates the education institution in the form of a rectangle. Points of weakness internally within teacher training and in relation to the outside world are marked with red lines in order to emphasise how important connections can fail.

POINTS OF WEAKNESS THAT CAN UNDERMINE A HOLISTIC FOCUS:

KD

The new framework plan requires all teacher training to ensure that students have digital competence. However, national guidelines do not stress this as a requirement in learning outcome descriptions for all knowledge areas, nor as part of the whole.

TEACHER TRAINING INSTITUTION

The demand for digital competence in teacher training shall be embodied in the programme plans. The degree of implementation involves both teacher training resources and priorities in the area (access to tools, overall priorities etc.) Early childhood education and care centre teacher training's ability and need to make changes is also characterised by the teacher training institution's strategy for the future and capacity for change.

DIRECTOR OF STUDIES

Directors of studies have responsibility for incorporating learning outcome descriptions into programme and semester plans, and for creating a future-oriented culture of sharing among subject teachers.

SUBJECT TEACHERS

If some subject teachers are unmotivated and fail to understand the importance of professional digital competence, then it is difficult to achieve interdisciplinary collaboration and a broad educational competence in the students.

STUDENTER

Poor contact between teacher training and the field means that teacher training is unable to relate its practices and experiences to professional digital practice.

PRACTICE - EARLY CHILDHOOD EDUCATION AND CARE CENTRES

The same picture must form the starting point for a discussion of what can be done to strengthen professional digital competence in teacher training - as well as in the students. By strengthening these steps, we can promote a holistic focus in a new terrain.

The "digital train" can utilise all its strengths and achieve maximum speed.
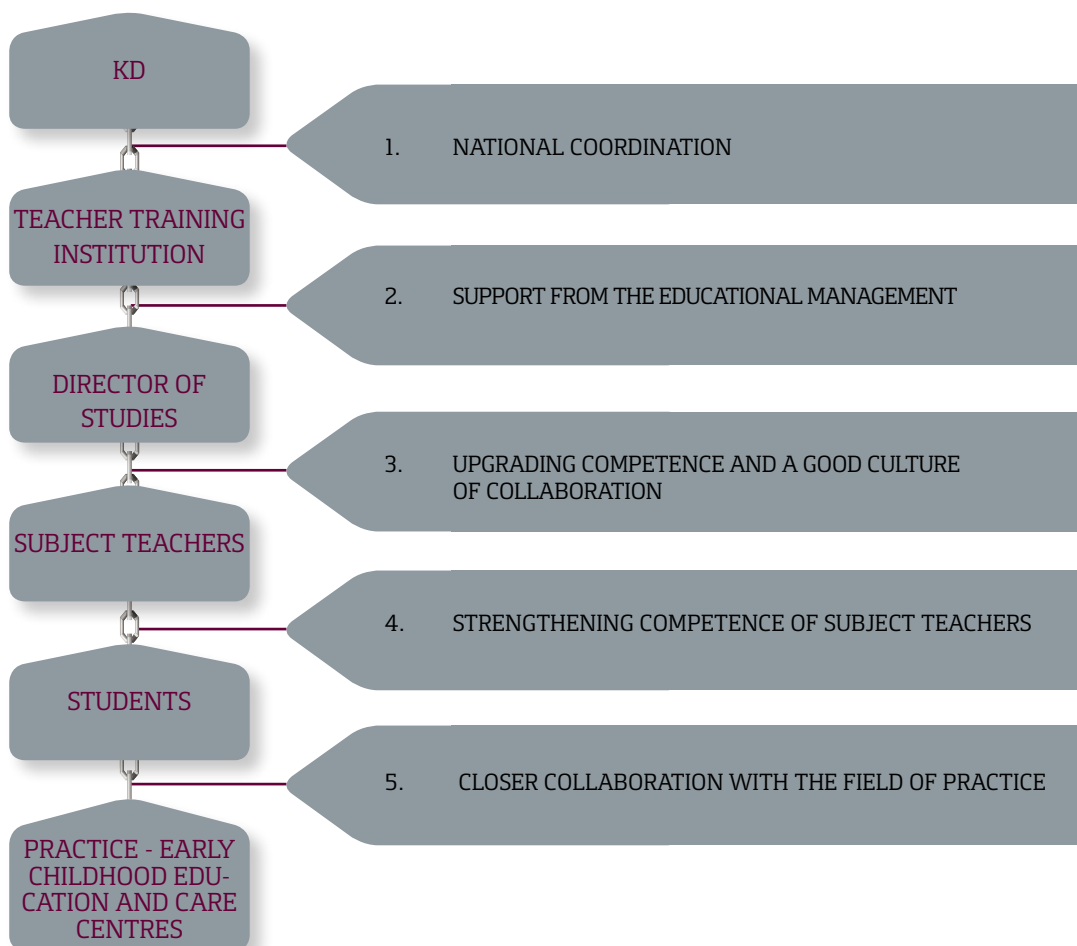
6. Changing course?

"The strength is not in the framework plan - it's in the people," said Henriette Jæger (senior lecturer, Oslo og Akershus University College, Norway) in one of the in-depth interviews for the feasibility study, with reference to the personal factors that impact on the realisation of professional digital competence in teacher training and early childhood education and care centres. And as we have seen, the lack of detail in the formal requirements for teacher training is only a small part of the answer to why early childhood education and care centre teacher training lags behind with regard to professional digital competence.

There are enthusiasts who have created good examples and experiences that the future will build on. But the desired rise in competence in early childhood education and care centre teacher training requested by participants in the feasibility study cannot come from enthusiasts alone. It requires new structures and established practice at all levels of education.

Creating a holistic strategy for professional digital competence in early childhood education and care centre teacher training falls outside the mandate of this feasibility study, and relies on obtaining support for objectives and resource utilisation from all participants.

However, feasibility study work has identified a number of measures that may help to accelerate the work with professional digital competence in early childhood education and care centre education. In order to create a good interaction between legislation, education and field of practice - and thus to strengthen the weak links emphasised above - these measures can be organised as challenges according to the same chain:

Possible priority areas to strengthen overall quality:

KD	
	1. NATIONAL COORDINATION
TEACHER TRAINING INSTITUTION	
	2. SUPPORT FROM THE EDUCATIONAL MANAGEMENT
DIRECTOR OF STUDIES	
	3. UPGRADING COMPETENCE AND A GOOD CULTURE OF COLLABORATION
SUBJECT TEACHERS	
	4. STRENGTHENING COMPETENCE OF SUBJECT TEACHERS
STUDENTS	
	5. CLOSER COLLABORATION WITH THE FIELD OF PRACTICE
PRACTICE - EARLY CHILDHOOD EDUCATION AND CARE CENTRES	

The stronger theses chains are, the easier it will be to implement professional digital competence within early childhood education and care centre teacher training.

The "digital train" can utilise all its strengths and achieve maximum speed.

Possible further measures

The following points are ideas taken from the workshop Changing course?, supplemented by ideas from in-depth interviews and informal conversations. Some of the points are combined and reworded, but together they comprise a list of possible measures at various levels:

1. NATIONAL COORDINATION

- Digital competence must enter into learning outcome descriptions in all knowledge areas in the guidelines, and digital competence must permeate the framework plan for early childhood education and care centre teacher training.

- Professional digital competence and terms linked to digital technologists must be operationalised and further discussed.

- A national plan/guidelines for systematic work with professional digital competence in early childhood education and care centre teacher training must be produced, which can be adapted and supported locally.

- "We need a website that contributes to digital competence with good examples."

- Resources for competence development and continuing education are required (for knowledge areas and competence strategies).

- Meetings with courses and inspiration are required, both nationally and regionally.

- A national network with higher education institutions, early childhood education and care centre resources and the ICT Centre should be set-up.

- A starter pack for BLU should be prepared with good examples, software, etc.

- Cooperation with other national initiatives such as the Norwegian Association of Higher Education Institutions (NRLU), the Follow-up group for early childhood education and care centre teacher training etc. should be established.

- Initiatives / joint applications for R&D[26]-funding and SAK[27]-funding should be coordinated nationally.

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26 Research and Development.
27 Cooperation, Division of labour and Concentration (SAK) - the Norwegian Ministry of Education and Research's funds allocated to reduce the fragmentation of higher education in Norway through increased cooperation and division of labour between institutions.

2. Support from management

- Practice periods should be compulsory for higher education management so that their knowledge regarding children's digital reality is supported by their own experiences.

- The ICT Centre should help teacher training by putting ICT on the agenda locally.

- Teacher training must support university colleges so that ICT is used in all projects, regardless of what the project is about.

- Resources for competence development and continuing education are required.

- A national requirement concerning a digital examination format should be established.

- There should be a national requirement that teacher training should organise and secure equipment for both administrative and educational tasks.

3. Upgrading competence and a good culture of collaboration

- Directors of studies should facilitate a culture of sharing with mentoring schemes and systematic interdisciplinary collaboration.

- Clearer requirements for the use of digital tools in the teaching of education should be formulated.

- Students should be able to develop and maintain a directory of educational software.

4. Strengthening subject teachers' competence

- "We need a forum and meeting place for sharing resources and experiences in knowledge areas."

- Regional and national networks of subject teachers with a focus on competence building.

5. Closer cooperation with practice in the field

- Work should be carried out on coordination/collaboration between the practice and training element, with dialogue, meeting points, collaboration projects and knowledge sharing.

- This should be linked to students' requirements for early childhood education and care centre practice periods.

- The categorisation of these measures is somewhat arbitrary, several of them can fit into more than one level, and the measures do not necessarily correspond with the institutions' national, regional or local areas of responsibility.

- In this instance our thought is to bring the ideas together for inspiration, since those who wish to contribute in this area would easily be able to identify their own interests and corresponding freedom of action in such a list. Several of these can be made locally or regionally, starting in teacher training's own work. Others require a national effort through coordination and fresh funding if they are to be realised.

7. Conclusions

In this feasibility study we have focused on bringing together enthusiasts and participants within the area of digital competence in early childhood education and care centre teacher training. We have documented the landscape and participants in order to form a picture of the status of implementation work for the framework plan, and we started what has now been shown to be necessary networking in the form of both physical and digital meetings.

We have applied a broad digital perspective in this report, combining a focus on technical skills with insight into the culture of today's children and reflections concerning didactics. We have seen that digital competence and a holistic digital perspective is required in order to see how digital tools and skills are an integral part of the framework plan's overall goals.

The report has shown the importance of making its own definition of the PDK concept in the context of early childhood education and care centres. There is important inspiration to be gained from work on digital competence in primary and lower secondary schools and their associated teacher training programmes, but the definitions therein cannot simply be transferred to the early childhood education and care centre.

The fact that the report sets out the first proposal for what 'professional digital competence' (PDK) is, is both groundbreaking and one of the most important results to emerge from the feasibility study. The PDK concept is complex and consists of many, rather than just one, competencies. Starting the work by clarifying the content of the concept makes it manageable to participants and enables both the use of the concept as well as a continued discussion regarding its meaning.

The way forward

A number of challenges have been outlined through dialogue with participants in the field. Among the solutions that manifest themselves for these challenges, we have highlighted the participants' own proposals and categorised them in a proposal for further work to ensure that all teacher training programmes are involved.

The time is ripe for a rise in digital competence within early childhood education and care centre education. If the programmes provided by early childhood education and care centres in the future are to reflect society and equip children to be competent participants in that society, then digital competence must form a natural part of educational work in these centres. This is what the framework plan must help to implement, both in education and in the field.

As we have seen, early childhood education and care centre teacher training lags behind that for primary and lower secondary schools in the implementation and evaluation of digital initiatives. It is our hope that this study will prepare the ground for a further study that can provide more information about ongoing work in teacher training and attempt to answer several of the challenges that have been identified.

One of the most important conclusions of the feasibility study, built both on feedback from participants as well as the latest figures from Early Childhood Education and Care Centre Monitoring, is that the greatest pressure on teacher training comes 'from below'. The need to engage with children's digital reality constitutes greatest challenge of teacher training.

And this is one of the biggest opportunities for teacher training: A closer collaboration with actual early childhood education and care centres and the practical element in general. This could involve study visits for management, early childhood education and care centre teachers working as teachers in teacher training and work requirements for students, as well as their participation in cataloguing and evaluating educational software.

The participants in the feasibility study have shown great willingness to act, strengthening the conditions for creating lasting, structural changes. Perhaps this is due precisely to the long tradition within early childhood education and care centres of being learning organisations with a strong focus on practice.

Irrespective of motivation and willingness to change, theses types of change processes will take time - and will depend on resources for digital tools as well as time and funding for competence development. As the catalogue of measures proposed in the previous chapter shows, there are many tasks that must start within teacher training, including establishing a culture of sharing and digital mentoring, as well as closer cooperation with the field in practice.

Nevertheless, it is important to emphasise that the greatest effect will be gained by connecting local and regional initiatives with national coordination, network building and face to face meetings. Some of the initiatives will also require national measures, involving both coordination and resources, that focus on network building and resources for a reliable rise in the professional digital competence of the personnel involved in teacher training.

The feedback from the participants in the feasibility study was that the ICT Centre is an important partner in this work. Local plans for upgrading digital competence should be supported by national coordination, and the ICT Centre will play an important role here as a partner for the Norwegian Ministry of Education and Research in work on the framework plan and the conditions for teacher training.
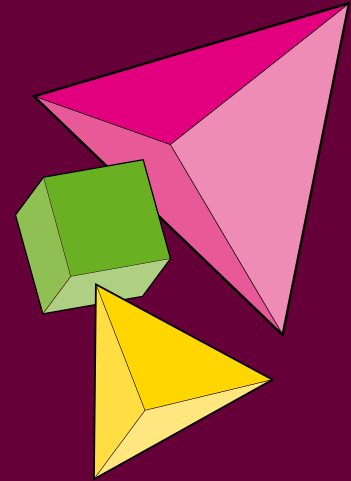
New early childhood education and care centre teacher training clearly requires a change of course as it must provide newly qualified day-care centre teachers with digital competence.

How can we support Norway's early childhood education and care centre teacher training institutions so that a new training course benefits the entire early childhood education and care centre sector?

In dialogue with the institutions and day-care centres we have investigated the state of the digital condition of those who are training Norway's early childhood education and care centre teachers and how cooperation between the training courses and field of practice can improve quality in the field as a whole. In this report we propose content for the concept of professional digital competence, with measures for further work in early childhood education and care centre teacher training in order to contribute to changing course.