

## Digital competence in Norwegian teacher education and schools

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The purpose of this article is to examine how policy documents in Norway the last ten years have interpreted ICT and digital competence in teacher education and in school. Norway implemented in 2006 a new national curriculum which increased the status of digital competence to be the fifth basic skill in the Norwegian elementary school (stage 1-13). This was a historic event and never before has digital competence achieved such status in curricula, neither nationally nor internationally. The same has newly happened with the new General Plan for Teacher Education where digital competence has become the fifth basic skill in all subjects. However, both teacher educators and teachers lack sufficient digital competence to fulfil these ambiguous policy goals and therefore the article suggest how a model of digital competence can bridge some of the gap between the intentions in the policy documents and the teachers/ teacher educators' practise. At the same time the article attempts to elaborate our perception of the concept digital competence in an educational discourse and how one can define digital competence in light of a Scandinavian educational perspective. The research question in this article is: how can digital competence be defined and what are the foundations of digital competence in teacher education and schools in light of the policy documents in Norway?

*Keywords:* Competence, digital competence, policy documents, educational alteration

### INTRODUCTION

After my keynote speech at the Swedish conference NU2010 (<http://www.nu2010.se>), *Dialog för Lärande*, I received several emails from conference participants concerning how Norway has defined and implemented digital competence in schools and in teacher education. Therefore, this article will focus on this theme. In Norway, the concept of competence has occupied a strong position in educational policy documents since the late 1980s. Both in higher education and in schools, we can see that this concept has become more central than the concept of knowledge in policy documents. For example, the latest White Paper No. 30 (2003-2004) entitled *Culture for learning* (Ministry of Education and Research [MER], 2004), which has been written for schools, mentions competence 224 times, while knowledge is mentioned only 67 times. In many ways, one can interpret this as a sign that now is a time of upheaval in the traditional epistemology in our educational system in Norway, where the concept of knowledge has dominated White Papers and educational curricula at all levels in previous decades. This article aims to carry out an analysis of the use of the term 'competence' in central documents in general and in relation to digital competence in teacher education and schools in particular. This is based on the fact that Norway implemented the White Paper (No. 30, mentioned above) as the basis for an educational reform and a new national curriculum for schools in 2006 (MER, 2006a), which increased the status of digital competence so that it

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became the fifth basic skill in Norwegian elementary schools (stages 1-13). This was an historic event, and never before has digital competence achieved such a high status in curricula, either nationally or internationally. The same has recently happened with the new General Plan for Teacher Education (for elementary schools, Ministry of Knowledge [MOK], 2010b), in which digital competence has become the fifth basic skill in all subjects. This is often an under-researched area, and in many ways this article focuses on the conceptual questions that the educational system has faced, and is facing, in recent decades. These new educational streams have contributed to the debates surrounding our perceptions of the concept of competence versus knowledge in today teacher education and schools. And these debates have focussed on the question of whether the underlying epistemology within education is steered by policy makers or by academics. Thus, the aim of this paper is to elaborate upon our perceptions of competence and digital competence in an educational discourse, and the question of how one can define digital competence in light of the policy documents in teacher education and schools. The research question in this paper is: how can digital competence be defined and what are the foundations of digital competence in teacher education and schools in light of the policy documents in Norway?

#### CENTRAL POLICY DOCUMENTS REGARDING INFORMATION- AND COMMUNICATION TECHNOLOGY [ICT]

While the concept of knowledge has occupied a strong position in our educational history in Norway, we can see that since the beginning of the 1980s, this has gradually been changing, and the concept of competence has become increasingly dominant in both the media and in policy documents. There are several reasons for this. Competence means the ability to act and used in education this is often related to the thoughts which Nobel Prize Winner in Economics Gary Becker put forward in his book *Human capital. A Theoretical and Empirical analysis, with Special References to Education* (Becker, 1964). This theory of human capital has influenced our educational system, and functions as an argument to give school and our educational institutions more attention and resources, because there will be long-term benefits. The concept of competence has also increasingly been used as a concept for cognitive learning and knowledge (Bernstein, 1996) and we can find evidence of this in several policy documents concerning schools and education in the 1990s. This is especially visible in the latest schools reform in Norway, the 'Knowledge promotion', in which competence functions as a cognitive learning concept, and in which there are competence-based aims (kompetansemål) in all subjects at all levels (MOK, 2010b). These competence-based aims are, in many ways, based on theories such as Bloom's taxonomy (Bloom, 1956; Anderson & Kraftwohl, 2001) and the work of Glaser (1963). We can also find this view in the definitions of competence given in Organisation for Economic Co-operation and Development [OECD] policy documents (Rychen & Salganik, 2001). This has ensured that the concept of competence has had a significant impact in Norwegian schools and in the Educational Act (MOK, 2010a) for schools in Norway. Nowadays, the teachers are required to assess the pupils' competence (both in formative and summative assessments), and not only their knowledge. This means that knowledge has been integrated into the concept of competence, but has to be seen in relation to other components such as the pupils' digital competence.

With regard to teachers' competence, in this reform it is clearly stated in the new curriculum that teachers are expected to be professional in their work, and that:

The total competence of teachers and instructors consists of a number of components where professional competence, the ability to teach the subject, the ability to structure the learning activities and knowledge of assessment and guidance are central elements. Teachers and instructors must also have multicultural competence and knowledge on the different points of departure and learning strategies their pupils have.

(LKO6) (MER, 2006b: p. 5)

The professional competences of teachers also include digital competence, and in the next section I will examine how information technology (IT) and educational technology have gradually been implemented in policy documents throughout the last decade. This provides the backdrop for understanding why, today, digital competence has become the fifth basic competence in schools and teacher education.

#### ICT AND DIGITAL COMPETENCE IN POLICY DOCUMENTS

A great deal of the rhetoric and discourse surrounding technology in policy documents and curricula in Norway during the 1980-90s was typically connected to technological determinism and the instrumental view of technology. We can find traces of this rhetoric in, for example, the subject curriculum for the primary and secondary schools (L97, Ministry of Education, Research and Church Affairs [MERCAs], 1996), where the aim of preparing students for entering an information society (Castells, 1996) is being used to legitimise the use of IT in schools.

Towards the end of the 1990s (when these trial periods of using IT in schools ended, and from the 2002/2003 school year onwards), the use of IT became a mandatory requirement in schools. At the turn of the millennium, the *IKT i Norsk Utdanning* (Action Plan for ICT in Norwegian Education: Plan for 2000-2003, MERCA, 1999) arrived, which outlined the escalation and the focus on ICT in schools and education. Teacher education was also characterised by this focus on ICT, and there direct requirements were clearly set regarding the active use of ICT in teacher education. We can also sense a slightly different and more nuanced view of how ICT should be used. The fact that the plan explicitly mentions that ICT must be used in education, that the correct designation of IT has become ICT, and that this usage will take place in open learning environments, indicates that a broader view of technology had appeared. A great deal of the rhetoric surrounding ICT in schools during this period moved away from the excellence of technology in the educational system in general in an attempt to create pedagogical content for the use of ICT in subjects in schools. This created fertile ground for both innovation and change in both teacher education (Ludvigsen & Flo, 2002) and schools (Krumsvik, 2006).

On the basis of the recommendations of Kvalitetsvalget, *I første rekke* (The Committee for Quality in Primary and Secondary Education in Norway, First Row, (Official Norwegian Reports [ONR], 2003) and Utdanning og Forskningsdepartementet (MER), a new programme for using ICT in schools and education was launched in 2003). The new plan had the title *Program for Digital Kompetanse* (Programme for Digital Competence, [PfDC], 2004-2008) (MER 2003). This plan must be seen in light of the new schools reform, entitled *Kunnskapsløftet* ('Knowledge promotion', with the abbreviation LKO6), and the White Paper *Kultur for Læring* (Culture for learning, White Paper No. 30, MER 2004). This schools reform involves, amongst other things,

a 13 years of basic education, new curricula in all subjects and the identification of digital competence as the fourth (eventually fifth) basic skill. In this document, a description of what the MER's perceives as the concept of digital competence is outlined, but not fully operationalised. Despite the frequent use of the term 'digital competence' in the PfDC, only parts of the content of the five-year programme build upon the National Network for IT-Research and Competence in Education's (ITU) problem booklet: *Digital Danning* (Digital competence: from four basic skills to digital competence, ITU, University of Oslo, 2003), in which the foundations of digital competence are elaborated. In this way, the PfDC has dissociated itself from a more thorough operationalisation of the term 'digital competence'. According to the ITU's booklet, digital competence refers to the fourth basic skill and the fourth cultural technique (Andresen, 1999), which aims to capture the digital revolution's impact on schools and education. Another key document in the PfDC is the *Skole for digital kompetanse* (School for Digital Competence) (The Research Council of Norway, 2003), which, in many ways, views the concept digital competence in relation to new technologies, broadband and the Internet.

The main criticism directed towards the PfDC was not (in the beginning) with regard to its ambitions and strategies, but its unwillingness to operationalise and define its terms properly. Consequently, as the PfDC provided the premise for the upcoming reform *Kunnskapsløftet*, the sceptics feared that the rather scant description of its key-terms would leave its mark on several upcoming documents. In the White Paper No. 30 (2003-2004) *Culture for learning* (MER, 2004), digital competence is mentioned 17 times, but is only described in part:

The Quality committee define 'basic competence' as a part of a holistic competence. This basic competence is defined by the committee as reading – and writing abilities, arithmetic, skills in English, digital competence, learning strategies and motivation and social competence (MER, 2004: p. 31).

It is also worth noting that, as a consequence of this, the White Paper defined a new fifth basic skill: the ability to use digital tools (which in many ways is a concrete version of the concept of digital competence as set out in White Paper No. 30). The Ministry of Education and Research believes that the most central basic skills, therefore, are:

- the ability to express oneself orally;
- the ability to read;
- the ability to express oneself in writing;
- the ability to do arithmetic;
- the ability to use digital tools.

(MER, 2004: p.32)

However, in retrospect, the PfDC went further in elaborating the concepts associated with the use of technology than previous departmental plans. The PfDC is clearer with regard to expectations for the use of ICT in schools and, in a way, raised the status of ICT by referring to it as a fifth basic skill. However, both the PfDC and the subsequent White Paper, *Culture for learning*, have been criticised, in that the practical implications for digital competence mentioned in this document have meant that 'the ability to use digital tools' has become the fifth basic skill in the new educational reforms. Several academics and teachers have argued

that this implies that there will be too much emphasis on technology, at the expense of a broader understanding of digital competence. In a way, this is a legitimate criticism, because in the new educational reforms, *Kunnskapsløftet*, with the new national curriculum (LKO6, MER, 2006a) for elementary schools (stages 1-13), the broader term of ‘digital competence’, as set out in the PfDC, the ITU memo and White Paper No. 30, has (in many ways) been reduced and narrowed down to ‘the ability to use digital tools’. It is also interesting to note that the financial investments in ICT in the same period were halved in relation to the previous period of the programme (2000-2003), and that new national ‘steering-instruments’ with a strong focus on the concept of competence (instead of knowledge, as in previous curricula) and competence-based aims were introduced which many felt could be “parking” the efforts in the field of ICT. Several sceptics asked whether a ‘right wing’ technology and competence-based discourse had had an impact on schools. However, when there was a shift in government in 2006 and the new left-wing government took over, they only dismantled the national tests (for a while) and the curriculum remained unchanged with regard to digital competence. Regardless of this shift in government, the new final version of the national curriculum (MER, 2006a) was an historic event in Norway with regard to ICT and educational technology in schools, because it increased the status of ICT and ‘the ability to use digital tools’ as the fifth basic skill in all subjects at all levels. This milestone meant that teachers were required to use educational technologies in their subjects, because the competence-based aims in all subjects of the curriculum specifically referred to the use of ICT in these subjects. In retrospect, one can see that, despite the criticism concerning the narrow descriptions of digital competence in the *Kunnskapsløftet* (LKO6, MER, 2006a), because ‘the ability to use digital tools’ is so clearly linked to competence-based aims in all subjects, the pedagogical and didactic use of ICT in teaching has gradually increased in importance in recent years among teachers. For this reason, one can consider digital competence as a concept with holistic content and a relatively strong position according to the majority of teachers’ perceptions of this new curriculum. In addition, because of the increased status of ICT and the improved level of access to technology in schools (Krumsvik, 2008; Krumsvik & Almås, 2009), this can be said to be a time of upheaval in the curricula as well as the result of the ‘winds of change’ within the discourses of technology and competence in schools.

As a consequence of the clear position of ICT in schools established in the *Kunnskapsløftet*, the new White Paper No. 11; *About teacher education* (MOK, 2008) and the General Plan for Teacher Education (MOK, 2010b), ICT has been highlighted much more clearly than in former plans. This teacher education is required for compulsory school (stages 1-10), and the students are awarded a master’s degree. As in the national curriculum for schools (LKO6) (MER, 2006a), the ability to use digital tools has become the fifth basic skill (with reading, writing, arithmetic and oral skills as the four others), both in this White Paper and in the General Plan for Teacher Education, which is anchored in every subject for the students. This makes the pedagogical use of ICT obligatory in every subject in the new version of teacher education in an attempt to prepare student teachers for digital schools and to increase their digital competence during their teacher training. As an example of the learning outcomes (knowledge-based) for the subject of pedagogy and pupil-knowledge, the student teachers should have a knowledge of digital tools and understand the core competencies which form the basis of learning and how these can be developed. With regard to skills, the students should be able to assess different learning resources and reflect on didactical possibilities through the use of ICT. In the subject of English, the learning outcome (knowledge-based) for

the students is to understand the learning potential which different learning arenas e.g. digital media, can offer at an elementary stage. Students should demonstrate the ability to use digital tools as part of the process of learning a language and imparting subject matter (MOK, 2010b). We can see ICT has been implemented more strongly than ever in the new version of teacher education in an attempt to bridge the gap between teacher education and practice. Against this backdrop, it is interesting to see what constitutes digital competence in both teacher education and schools, more specifically in light of the policy documents mentioned above. I will examine this in the next section, and as this article focuses on these policy documents' perceptions of, and impact on, digital competence, I will not focus on their theoretical foundations in this article (see Krumsvik, 2008, for further descriptions concerning the theoretical foundations of the model).

#### DIGITAL COMPETENCE

There have been a number of important contributions made internationally towards the definition of digital literacy in recent years. In particular, Lankshear and Knobel (2006) and Buckingham (2006) have contributed towards the formation of the concept of digital literacy. In spite of the importance of these international contributions in terms of consolidating a conceptual understanding of these terms, it is clear that not all of them can be easily transferred to the context of Norwegian schools and digital competence among Norwegian teachers and teacher educators (TE) under the new national curriculum for schools (LKO6, MER 2006a) and the General Plan for Teacher Education (MOK, 2010b). While digital literacy seems to be the concept which is most commonly used internationally, digital competence is the most commonly used concept in the Scandinavian countries in educational contexts. The main reason for this is that competence as a concept has a broader, more holistic meaning in Scandinavian English than in traditional English. In addition, our policy documents for education highlight the concept of competence to a higher degree compared to other countries. In this sense, teachers' digital competence is seen to incorporate a more complex and holistic level of proficiency in the use of ICT with pedagogical judgement in educational contexts. This means that the focus is directed towards pedagogy and subject matter, while technical skills form only a basic part of this complex concept of digital competence. Therefore, in order to avoid confusion about the content of such concepts, one has to bear in mind the distinction between the general international perceptions of digital literacy and the more specific perceptions in Scandinavian countries of teachers' and TEs' digital competence and the policy documents they are demanded to follow. It is thus important for the reader to be aware of this distinction when I discuss this further later on in the article.

It is therefore important that attempts have been made to create a Norwegian understanding of complex digital competence in the light of the policy-related circumstances in Norway. Erstad (2005), the ITU (2005) and Krumsvik (2007, 2008, 2009) have been the important contributors to the development of the term 'digital competence' in the Norwegian setting. The ITU defines digital competence as 'skills, knowledge, creativity and attitudes required to use digital media for learning and comprehension in a knowledge society' (ITU, 2005: p. 7). This is a broad definition on a macro level which focuses on the general role of the e-citizen in today's society. Erstad defines digital competence as: 'skills, knowledge and attitudes with the use of digital media for mastering in the learning society' (Erstad, 2005: p. 133). Once again, this is a broad definition on a macro level which is suited to forming an understanding of digital competence in societal contexts. In an attempt to incorporate its implications for the individual teacher/TE, I have developed a definition aimed at describing digital competence for these: 'Digital competence is the teacher/TEs' proficiency in using

ICT in a professional context with good pedagogic-didactic judgement and his or her awareness of its implications for learning strategies and the digital Bildung of pupils and students' (Krumsvik, 2007; Krumsvik (in press)). This definition implies that teachers/TEs distinguish themselves from other technology users by their focus on education and teaching, rather than everyday use and entertainment. Therefore, the double dimension is a part of teachers' digital competence. This means that teachers/TEs will, in some way or another, be role models for their pupils/students' subject use of ICT. 'Teach as they preach' will be an important guide for the formation of digitised learning environments for pupils and students, and assumes that there will be a digitally confident teacher/TE. At the same time, teachers must continually make pedagogic-didactic judgements based on how ICT can expand the learning possibilities for pupils/students in certain subjects. The double dimension constitutes digital competence for teachers/TEs with a greater complexity than average citizens' everyday digital literacy skills, which often only entail using ICT for personal purposes (Internet banking, e-mail, instant messaging, etc.). Therefore, it is necessary to establish a pedagogical framework and didactic content related to teachers/TEs' practices in schools and teacher education institutions, if one wishes to incorporate this requirement for complex digital competence into digitised schools and teacher education. The problem with such frameworks, definitions and descriptions is that they lack functionality in practice unless they are operationalised in a teaching context where the policy documents which the teacher/TEs are required to follow are also considered. I would therefore like to present an in-depth framework and model for teachers' digital competence, and to discuss how to prompt teachers/TEs to reflect on their own digital competence based on this model (Figure 1), which takes account of the various key elements contained in this concept.

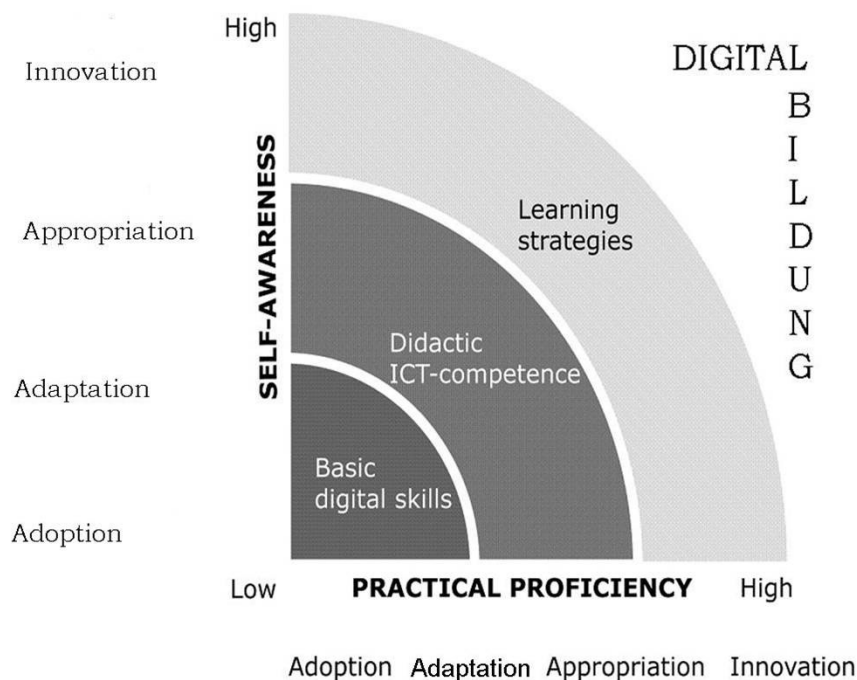


Figure 1. Model of digital competence for teachers and TEs (Krumsvik, in press)

As this model was originally developed for teachers in schools in 2007, I would first like to highlight that what has happened in schools since this model was developed has provided the premise for the General Plan for Teacher Education in Norway (MOK, 2010b) within the area of digital competence.

It is reasonable to claim that teachers' complex digital competence includes (at a fundamental level) the intersection between cognition, metacognition, motor skills, learning strategies, self-efficacy and pedagogic-didactic aspects. The holistic foundations of such a perception of digital competence is much more than merely technical skills, and this underlines the need for teachers to acquire such competence. How can this be done in light of the relevant policy documents? The model above shows the many ways in which teachers have to deal with this complex competence journey. In the section below, I will describe the most important parts of this model.

The model puts the spotlight on four core components: basic ICT skills; didactic ICT competence; learning strategies; and digital Bildung. The first component, basic ICT skills (located in the lower left hand corner), indicates that ICT (like any other cultural tool) must be 'transparent' in order to enable teachers to understand how to use it. Compared to the situation under the former curriculum (L-97, MERCA, 1996), implemented in 1997, it is obvious that in 2010, modern user-friendly technologies and teachers' use of technology outside school (e.g. Internet banking, e-mail, personal computers at home, etc.) are making it easier for teachers to obtain basic technical skills now than it was 10 years ago. Teachers are therefore becoming more and more 'hands on' with technology and often have their own laptops at school, which increases the frequency with which they use technology considerably. Digitally self-confident pupils (acting as 'guides') can also be beneficial to the teacher in terms of demonstrating basic ICT skills. However, the main anchor of this component can be found in the national curriculum (LKO6, MER, 2006a) and the ability to use digital tools as the fifth basic skill (part III of the national curriculum). This focuses on both the pupils' and the teachers' abilities to handle basic ICT skills and how to use digital tools. In this way, basic digital skills are formally anchored in a policy document; part III of the national curriculum, which it is mandatory for teachers to follow.

The second core component, didactic ICT competence (located in the middle of the diagram), underlines the dialectic relationship between 'hands on' and 'heads on' when using ICT in education. What makes this dialectic relationship particularly relevant in relation to the Knowledge Promotion Reform (MER, 2006a, 2006b) is the clear emphasis on the ability to use digital tools in subjects in order to achieve competence-based aims, which requires an extended competence on the part of the teacher in terms of seamlessly incorporating the subject matter, pedagogy and digital competence. Therefore, didactic ICT competence is formally anchored in the curriculum (part III of the national curriculum), where the competence-based aims for all subjects are described and where the didactic use of ICT in the education is mandatory for all teachers to fulfil the requirements of the curriculums and the Education Act relating to primary and secondary education (Education Act, 2010). This is a significant challenge for teachers, especially as they have never been taught (in their teacher education) how to achieve such didactic ICT competence. Teachers therefore need support and guidance from their colleagues as well as further training in order to raise their awareness of what is required of them in order to become digitally competent enough to develop their didactic ICT competence.

The third core component, learning strategies (on the top right of the model), assumes a meta-perspective regarding the first two components (within the model), but places more emphasis on the pedagogical implications that an extended view of knowledge will have on learning strategies



in a new pedagogical landscape. The multimodal format, digital teaching materials and Web 2.0 do indeed invite more flexible learning strategies than the L-97 curriculum (MERCA, 1996) did when it was introduced 14 years ago. This could provide teachers with new approaches to knowledge and learning, but presumes that systematic planning, tutoring pupils, differentiation models and school-home cooperation will all contribute towards capturing the pupils' aptitudes and needs within the framework of a community of practice. For the first time in history, it is possible to value, utilise and challenge pupils' digital competence as an entry point to new learning strategies and subject matter in Norwegian schools. This implies a significant pedagogical potential, but this potential cannot be fulfilled without a digitally competent teacher who knows how to utilise ICT in educational settings. Once again, a need is identified for digitally competent teachers who can maintain a clear focus on their subject in these kinds of learning environments and who can realise that these competence objectives can be reached by means of very different learning strategies among pupils because of the affordances that ICT and their digital confidence can offer. The symbiosis between the elevated status of ICT in the curriculum, teachers' digital competence, a swarm of digital learning resources and pupils' digital confidence have provided new 'digital' affordances for taking into account different aptitudes, needs and learning strategies within LK06 (MER, 2006a, 2006b). This component is clearly linked to the part II of the LK06 curriculum, *Principle of the education*, according to which the teacher shall 'Stimulate the pupils to develop their own learning strategies and ability to develop critical skills' (MER 2006b, p. 2-3).

The fourth core component, 'digital Bildung', stresses that the teacher should acquire a meta-perspective with regard to the first three components and focuses on how the Bildung aspect has been influenced by the digital revolution and digitised schools. Digital Bildung [*digital dannning* in Norwegian] focuses on how pupils' participation, their multi-membership of different communities, the social media and identity development in the digital era are influenced by the digitisation of society. This implies ethical and moral reflections on technology's role in human development. In school settings, this implies the need for both teachers and pupils to develop ethical competences in the critical use of sources, as well as an ethical awareness of the social implications of living in a digitised society and school. This component is anchored in LK06, part I, *General part, The general construction of human being*.

As a summary of this model of digital competence, one can see how important it is that pedagogy, subjects and digital competence 'merge together' in order that teachers can exploit new trends in the digitised schools of today in light of new policy documents. At the same time, this shows the complexity of the digital competence that every teacher has to deal with in our digitised schools, and it goes without saying that teachers need time to achieve this digital competence. Teachers increasingly integrate ICT into their lessons over time, and this 'competence journey' consists of a process of adoption, adaptation, appropriation and innovation (located on the horizontal axis of the diagram), and the digital "hand outs" they develop for their pupils often becomes the explicit part of the tacit knowledge, know-how, knowing and awareness acquired throughout this process. In the first part of this process (adoption and adaptation, seen on the horizontal/vertical axes), teachers are mostly occupied with basic ICT skills and obstacles against handling ICT artefacts. At this stage, ICT artefacts are not immediately obvious to the teacher, and the importance of overcoming this stage is apparent. However, when the teacher reaches the dimension of appropriation, ICT is then seamlessly integrated into the teachers teaching and becomes 'invisible'. In the final dimension, innovation, the teachers are

able to develop both pedagogical and didactic innovations by using ICT in teaching in a creative way, which also implies their ability to redesign and develop digital artefacts (e.g. using digital learning resources within a subject).

As a consequence of this (and other policy conditions), Norwegian TEs under the new national curriculum for schools and the new General Plan for Teacher Education are exposed to a stronger educational top-down implementation of ICT in pedagogy than in other countries. This means that ICT-based exams have been permanently implemented in secondary schools, and this structural attachment of ICT to both formative and summative forms of assessment makes it impossible for teachers in schools to avoid the pedagogical use of ICT. Since 2006, this situation has had a strong 'spill-over' effect on teacher education, which has been required to reflect the current situation with regard to ICT in schools for their teachers in training. Therefore, the new General Plan for Teacher Education (MOK, 2010b) has elevated digital competence so that it has become the fifth basic competence in all subjects and a learning outcome for student teachers.

#### SUMMARY AND IMPLICATIONS

In this article, I have examined how the concepts of competence and digital competence have affected education in general in Norway, and schools and teacher education in particular. The aim of this paper has been to expand our perceptions of competence and digital competence in an educational discourse, and to question how one can define digital competence in light of the policy documents which govern teacher education and schools. The research question in the paper is: how can digital competence be defined and what are the foundations of digital competence in teacher education and schools in light of the current policy documents in Norway?

First, I will claim that it is possible to register general epistemological alterations in the new curriculum for schools and the new General Plan for Teacher Education within the Norwegian educational system. The concept of competence has, in many ways, replaced the concept of knowledge, and the White Paper No. 30 (2003-2004), entitled *Culture for learning* (MER, 2004), mentions competence 224 times, while knowledge is mentioned only 67 times. Digital competence is mentioned 17 times in this White Paper, while the former White Paper regarding elementary level education did not mention it at all. In the White Paper No. 11 (2008-2009) regarding teacher education, competence is mentioned 130 times, while knowledge is mentioned 77 times. Digital competence is not mentioned specifically, but ICT is mentioned seven times. However, in the new General Plan for Teacher Education (MOK, 2010b), the use of digital tools is mentioned 52 times. From this, we can assume that the concepts of competence, digital competence and the fifth basic skill in schools and teacher education, the ability to use digital tools, have left their mark on the foundations of education in Norway today: the policy documents. I will argue that the foundations of the model presented in this article and the definitions attached to the model capture the essence of the concept of digital competence in light of these policy documents which TEs and teachers are required to follow in Norway today. However, as a consequence of the 'spill-over' effect from schools to teacher education which means that teacher education must reflect the current situation in schools regarding ICT, one may ask what new challenges TEs and higher education teachers in general will face in this time of upheaval. One main challenge is the lack of sufficient digital competence among TEs; in order to meet this challenge, it is necessary to establish a framework for the professional development of the TEs within teacher education, where, for instance, this model of digital competence may be incorporated systematically with the TEs on an individual basis. In addition, in 2011, there is a

urgent need for this digital competence to become linked with TEs didactic ICT competence (the second core component of the model) and the student teachers' didactic and subject-didactic ICT needs (the second and third core components of the model) during their teacher education, as well as the practise fields needs when they become new teachers (all four core components in the model). At the same time, it is important to consider that student teachers entering teacher education today are used to ICT-based exams which they will have sat in upper secondary school (as ICT-based exams have been implemented on a permanent basis), and thus the summative assessments of teacher education today (which are very often 'paper and pencil' exams) must be altered in order to reflect the real-life situation. All of this requires an awareness of the complexity which teacher educators are exposed to in this kind of professional development, and it goes without saying that this requires resources, support and a collective willingness to enhance TEs digital competence and to alter the traditional way of teaching within teacher education.

Second, we find many of the same challenges addressed above in higher education in general, both for the pedagogy in higher education and for Bildung within higher education, as digital competence and new forms of teaching and assessment must be implemented in order to capture 'how teachers teach and learners learn' in the digital era. However, when it comes to 'digital Bildung' (the fourth core competence in the model), we find that premise providers for higher education in Norway today (policy documents such as *Tuning Educational Structures in Europe* (Tuning, 2009) and the new *Framework for Qualifications in Higher Education* (MOK, 2010c)) do not mention Bildung specifically. When this area is not tightly coupled with learning goals and learning outcomes in the national curricula in higher education today, one can assume that it will not be of the highest priority in universities and university colleges. In order to overcome this situation, there must be a debate within higher education pedagogy as to how one of the pillars of pedagogy – Bildung – can be given a more central position than it occupies today in higher education and how this can be related to learning goals and learning outcomes in this era of accountability and goal steering.

Third, as a result of the last decade, one can see that the digital revolution has left marks on Action Plans, White Papers, and the use of concepts in curricula. At the same time, one can say that the policy documents, to a certain degree, prepare for another discourse around what learning means in the 21st century. In many ways, competence has replaced the concept of knowledge, and this has established a new discourse which is both interesting and challenging. Competence-based aims are the new 'steering instruments' in the new educational reforms, and both formative and summative assessments are tied to pupils' ability to reach these competence-based aims. From this, we can observe that the pendulum has swung from a reform-pedagogical (progressive pedagogy) perspective on teaching and learning in the former curriculum (L97, MERCA 1996), to a more cognitive perspective on teaching and learning (restorative pedagogy) in the new curriculum, with competence as the foundation. It is too early to say what this epistemological alteration will mean for digital competence in teacher education and schools, but the tendencies so far seem to indicate that the focus is – paradoxically enough – stronger and more holistic than many academics believed it would be (despite the goal steering foundations of the curriculum). Therefore, one can observe a time of upheaval where teachers/TEs have had to become increasingly digitally competent in order to cultivate a 'new pedagogical discourse' and value a 'digital epistemology' in their daily practice. At the same time, it is necessary to debate these new public management and goal steering foundations in the curricula, because the autonomy of the teachers and TEs appears to have decreased.

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