

Conceiving digital literacies in schools - Norwegian experiences

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Abstract

As a frame of reference I will discuss the present situation in Norway where new national curriculum states that digital literacy is as important as reading, writing and numeracy. This raises many issues on knowledge creation and the way we think about schooling. The paper presents a conceptual discussion about digital literacy and its historical developments. In addition some data will be presented which outlines contextual factors for the use of ICT in schools as a framework for implementing digital literacy in school curricula. The objective of this paper is to raise some awareness about what 'digital literacy' is, and start some discussion on its implications for the epistemological foundation of schooling and different subject domains.

Introduction

In many countries around the world (New Zealand, Hong Kong, Scotland, Finland, Norway) digital literacy is now defined as a key area of competence in curricula for schools. For policy makers the terms 'information society' and 'knowledge society' has been used to argue for implementing new technologies in education, and for improving learning. These views have been highly problematic, partly because they do not take into consideration how new technologies are used by young people, or how schools work as social practices (Bereiter 2002).

Considering the impact of information- and communication technologies on young peoples lives, it is clear that we need to look closer at the social and educational implications this has on literacy and learning (Bransford, Brown & Cocking 2000; Wells & Claxton 2002; Livingstone 2002), and how they represent 'equipments for living' (Cole & Keyssar 1985). How this comes together in school-based settings is more unclear, and there is a need to analyze different aspects of digital literacy. Current perspectives range from broad cultural analysis linked to 'multiliteracies' (Cope & Kalantzis 2000) to developments of specific standards for learning and ICT-literacy (see <http://cnets.iste.org/>).

Until now there has been a lack of framing new media and technologies within curricula strategies, maybe except for media education. However, in a Norwegian setting we are now in a new situation where digital literacy has been defined as a core element in the new national curriculum. This raises several questions about school development, digital content developments, teacher competencies, access to technologies and conceptions of learning. In this paper I will present the conceptual and contextual discussions we have had in Norway concerning digital literacy.

Introducing digital literacy in Norway

The year 2006 indicate ten years of strategic development on ICT in the Norwegian education system. These ten years can be divided into three main phases. The phases

indicate the overall national agenda for scaling up activities using digital media in Norwegian schools. The three phases are also expressed in specific 'action plans' from the Ministry of Education.

The first phase, from 1996 until the end of 1999, was mainly concerned with the implementation of computers into Norwegian schools. There was less interest in the educational context. In the next phase, from 2000 until the end of 2003, the focus was more on whole school development with ICT and changing learning environments. The phase we are in now, from 2004 until the end of 2008, puts more emphasis on digital literacy as an objective for school learning by itself. In the new curriculum there is also an increased focus on knowledge building using digital tools within specific subject domains. The interest among educators and researchers is now more on what learners do with technology, which opens future perspectives on technology and education. The data I will present here is stating the transition from the second to the third phase.

One immediate challenge in these developments has been the balance between 'top-down' and 'bottom-up' strategies. One element has been to commit the Ministry of Education in developing ICT in Norwegian schools, another has been to get schools to use ICT more actively. The latter has been more difficult, with too much pressure from 'the top' (governmental agencies) initiating projects, without too much happening at 'the bottom' (in the classroom). In the last 3-4 years this has changed in the sense that more schools start activities themselves.

As a consequence of such processes a discussion on knowledge creation on a national level has come to the surface in Norway. Some argue, based on PISA results, that knowledge in the basic skills of reading, writing and numeracy has a priority, while others argue that our conception of knowledge is under transition (Østerud 2004).

An interesting compromise has been that digital literacy and the ability to use digital tools has been written into the new national curriculum, and defined as important as reading, writing and numeracy. The implication is that all students on all levels and in all subjects should use and relate to digital media in their learning processes in Norwegian schools. The emphasis is mainly on skills in using the technology, but imply also broader issues of competence such as evaluating sources critically when using the Internet and using ICT to collaborate.

In addition the Ministry of Education has initiated a specific 'Program for digital competence 2004-2008', with different research and development work on different levels in the education system.

What is digital literacy?

The conceptual development of literacy and technology goes back to the 'New Literacy Studies' in the 1970s and 1980s. Several researchers at that time (see for example Street 1984; Graff 1979) were critical to the conception of literacy as a neutral set of skills, what Brian Street (1984) describe as 'the autonomous model of literacy', where literacy, seen as a set of neutral skills, can be used in different contexts and for different purposes to complete a set of tasks. The 'New Literacy Studies' expanded this limited notion of literacy to take account of sociocultural influences. (See for example Scribner and Cole 1981.) The term literacies emerged to

signal the different ways people use language and different systems of representation in social practices. As stated by Pahl and Rowsell; “Literacy as decoding and encoding without consideration of context belies the complex nature of reading and writing. When we read and write, we are always doing it in a certain place for a certain purpose.” (2005:3). The consequences was that the concept of literacy was opened up to include interaction with different text forms and studying them in different social practices (Barton 1994). In addition there has been an influence from studies of how children and youth use different media, and on media education in schools, where the term media literacy has been used, indicating a need to teach children about the social and cultural influences of different media in our society (Tyner 1998; Buckingham 2003). The term digital literacy builds on these conceptions and is then linked to the development of digital technologies and media forms.

In the new curriculum in Norway it is unclear what is meant by digital literacy, and they often use the term ‘using digital tools’ as curriculum goal. In the White Paper, making the framework for the curriculum, it is described as;

Digital literacy is the sum of simple ICT skills, like being able to read, write and calculate, and more advanced skills that makes creative and critical use of digital tools and media possible. ICT skills consist of being able to use software, to search, locate, transform and control information from different digital sources, while the critical and creative ability also needs an ability to evaluate, critical use of sources, interpretation and analysis of digital genres and media forms. In total digital literacy can be seen as a very complex competence. (2004:48, my translation)

In a recent book (Erstad 2005) I have used this description of digital literacy to present a definition of digital literacy as “skills, knowledge and attitudes in using digital media to be able to master challenges in the learning society”. This is a broad definition linked to the challenges of what some call the ‘learning society’ (Qvortrup 2001) indicating a more active process-oriented perspective on society than terms like the knowledge-, information- or network-society.

Digital literacy relates to both an ability to operate technological applications and to use technology to accomplish personal and collective needs. In this sense, it raises important questions about new digital divides in the population, between the ones who knows how to operate the technology and the ones who do not, and between the ones who use the technology to gain relevant knowledge for education and the ones who use it for other purposes.

Important perspectives on this broader cultural issue can be found in the literature about the changing features of literacy in our culture (Lankshear 1997; Kubey 1997; Warschauer 1999). In her book ‘Literacy in a digital world’ (1998) Kathleen Tyner studies some of the elements of a modern interpretation of literacy both related to what she term ‘tool literacies’, which imply having the necessary skills to be able to use the technology, and ‘literacies of representations’, which relate to the knowledge on how to take advantage of the possibilities that different forms of representation give the users, especially the new information and communication technologies.

We can then conclude from the above that digital literacy is high on the political agenda, but it is not clear what is meant by this term, especially when we try to link in-school and out-of-school activities.

Developing frameworks

The different definitions and conceptions of technology literacy and fluency have been related to certain frameworks and the development of standards for educational practices. In January 2001, the Educational Testing Service (ETS), in the U.S., assembled a panel to develop a workable framework for ICT Literacy. The outcome was the report *Digital Transformation. A Framework for ICT Literacy* (ETS, 2002). Building on this document one might, as the Australian authorities have done (Ainley, Fraillon, Freeman & Mendelovits 2006), define ICT-literacy as

“the ability of individuals to use ICT appropriately to access, manage, integrate and evaluate information, develop new understandings (create), and communicate with others in order to participate effectively in society”.

The concepts mentioned can be described as;

<i>Item</i>	<i>Description</i>
Access	knowing about and knowing how to collect and/or retrieve information
Manage	applying an existing organizational or classification scheme
Integrate	interpreting and representing information. It involves summarizing, comparing and contrasting
Evaluate	making judgments about the quality, relevance, usefulness, or efficiency of information
Create	generating information by adapting, applying, designing, inventing, or authoring information
Communicate	processing information in a way that highlights main points and process it to others

(Figure 1: Key items of ICT-literacy as defined by the Educational Testing Service (ETS) in the U.S..)

All of these terms are oriented towards information handling. They also relate to the issues of problem solving and self-regulation. This consists of more general competencies that are not connected to specific subjects in school or specific contents in subjects. They can be taught and are not only related to what is learned in school settings, but also to situations outside the school.

Similar points are made in the report by the National Research Council (NRC) in the U.S. with the title *Being Fluent with Information Technology* (1999). Fluency in Information Technology (“FITness”) covers three types of knowledge:

- i. *contemporary skills*: “the ability to use particular (and contemporary) hardware or software resources to accomplish information processing tasks.” (ibid.: 18) Naturally these skills will change over time as hardware and software evolve.
- ii. *foundational concepts*: “the basic principles and ideas of computers, networks, and information.” (ibid.: 2-3) These include computer structure, information systems, networks, modelling, algorithmic thinking and programming, the limitations of IT and its social impact.
- iii. *intellectual capabilities*, which “integrate knowledge specific to information technology with problem domains of personal interest to individuals.” (ibid.: 20)

These are general thinking skills which might be recognisable in many disciplines, and include sustained reasoning, managing complexity, testing solutions, evaluating information, collaboration, anticipating change and expecting the unexpected.

The concept of fluency used in this report (1999:9) connotes the ability to reformulate knowledge, to express oneself creatively and appropriately, and to produce and generate information (rather than simply to comprehend it).

Other frameworks have used ‘digital competence’ as an overall term. One example is the working group on “key competences” of the European Commission ‘Education and Training 2010’. This programme identifies *digital competence* as one of the eight domains of key competences, defining it as “the confident and critical use of Information Society Technologies for work, leisure and communication.” (European Commission 2004: 14). Information society technologies (IST) are defined as “offering services based on the use of Information and Communication technologies (ICT), the Internet, digital content, electronic media, etc., via for example a personal computer, a mobile telephone, an electronic banking machine, an eBook, digital television, etc.” (European Commission 2004: 14). Digital competence is regarded as consisting of knowledge, skills and attitudes, as shown in Figure 2 below.

FRAMEWORK FOR KEY COMPETENCES IN A KNOWLEDGE-BASED SOCIETY				
Domain	Definition of the competence	The competence consists of the following elements of knowledge, skills and attitudes as appropriate to the context:		
		Knowledge	Skills	Attitudes
4. Digital competence	<p>Digital competence involves the confident and critical use of Information Society Technologies (IST)¹⁸ for work, leisure and communication. These competences are related to logical and critical thinking, to high-level information management skills, and to well developed communication skills.</p> <p>At the most basic level, ICT skills comprise the use of multi-media technology to retrieve, assess, store, produce, present and exchange information, and to communicate and participate in networks via the Internet</p>	<p>Sound understanding of the nature, role and opportunities of IST in everyday contexts comprises¹⁹:</p> <ul style="list-style-type: none"> • Understanding the main computer applications, including word processing, spreadsheets, databases, information storage and management; • Awareness of the opportunities given by the use of Internet and communication via electronic media (e-mail, videoconferencing, other network tools); and the differences between the real and virtual world • Understanding the potential of IST to support creativity and innovation for personal fulfilment, social inclusion and employability; • Basic understanding of the reliability and validity of the information available (accessibility/acceptability) and awareness of the need to respect ethical principles in the interactive use of IST. 	<p>As IST have many and growing applications in everyday life, such as learning and leisure activities, the required skills comprise:</p> <ul style="list-style-type: none"> • Ability to search, collect and process (create, organise, distinguish relevant from irrelevant, subjective from objective, real from virtual) electronic information, data and concepts and to use them in a systematic way; • Ability to use appropriate aids (presentations, graphs, charts, maps) to produce, present or understand complex information; • Ability to access and search a website and to use internet-based services such as discussion fora and e-mail; • Ability to use IST to support critical thinking, creativity and innovation in different contexts at home, leisure and work. 	<ul style="list-style-type: none"> • <u>Pronensity</u> to use IST to work autonomously and in teams; critical and reflective attitude in the assessment of available information. • Positive attitude and sensitivity to safe and <u>responsible use</u> of the Internet, including privacy issues and cultural differences. • Interest in using IST to <u>broaden horizons</u> by taking part in communities and networks for cultural, social and professional purposes.

(Figure 2: Framework for key competences in a knowledge-based society, area 4 on digital competence, as defined by the European Commission.)

Competence’ here refers to a combination of skills, knowledge, aptitudes and attitudes, and the disposition to learn in addition to know-how. (ibid.: 3)

Several initiatives for such standards are now being developed around the world. They are defined as important tools for teachers in the way they use technologies in their educational practices. It is, however, important that such standards do not become static tests, but can relate to technological and cultural change processes.

Linked to the Norwegian experiences mentioned above, research show that there is a gap between the conceptual definitions and elaborations on the importance of digital literacy in our society as expressed in different policy documents and curricula, and what is actually happening in educational practice among teachers and students (Erstad 2005). Such standards are often interpreted narrowly as the skills in operating hardware and software, and to a lesser degree manage to grasp how digital technologies create new conditions for learning and knowledge building (Bereiter 2002).

In addition, it is important to stress that technology literacy and fluency is related to *situational embedding*, that is, the use of technology within life situations. To understand such processes we have to look at different contexts where literacy is practiced and given meaning. This is especially important when relating it to how children and young persons use digital technologies.

Voices of multi-literacies

In order to communicate and make sense of the world we use different kinds of mediational means. Many researchers from different perspectives have been interested in this phenomenon. Related to learning and development, the perspective of most immediate relevance is the socio-cultural perspective first developed by Russian psychologists during the 1920s -30s. I will briefly highlight four elements of relevance to my discussion about digital literacy and how we conceptualize this term.

The first is the importance of studying the tools and resources used for human development in social practices. Any culture incorporates a number of different tools, or what many call artefacts. In order to study the culture you need to grasp the knowledge and ideas build into the developments of certain tools or artefacts. Development of material resources goes hand in hand with the development of ideas and intellectual knowledge (Säljö 2000:29).

The second point, based on this socio-cultural perspective, is that learning is studied as an interdependence between collective and individual processes in specific situations. Learning is first evolving as a social process through communication, and later on, at an individual level (Vygotsky 1978). In contrast to Piaget's theory of learning and development, it becomes much more important to study how we construct meanings together and in relation to each other. Another implication is that knowledge is negotiated and not something that is available for the person out there in the world, as we find in the theories of Piaget. Knowledge is a result of struggle and engagement and is deeply related to argumentation and mediated action in social context (Säljö 2000:26).

The third point of relevance indicates that the way we organize and understand learning changes over time according to broader cultural change. Again this is in contrast to most other theories of learning. These changes could be both the result of developments in tool structures, and related to broader social and cultural developments, for example the changing roles of youth in society over time. It has been common to describe youth as innovators of new technologies. Youth is the first group in society to take up new technologies and use them in social practice. By doing so they also get an important role for diffusion of innovations in society.

The fourth element is the concept of ‘mediated action’ elaborated on by James Wertsch (1998). One of his questions on mediated action is ‘how the introduction of novel cultural tools transforms the action’ (1998: 42), and he mentions many different examples, ranging from sports to classroom activities. Transformations of mediated action can be seen in the introduction of the calculator and the computer, and the controversies these developments raise among educationalists.

One could focus on the emergence and influence of a new mediational means in sociocultural history where forces of industrialization and technological development come into play. An important instance of the latter sort is what has happened to social and psychological processes with the appearance of modern computers. Regardless of the particular case or the genetic domain involved, the general point is that the introduction of a new mediational means creates a kind of imbalance in the systemic organization of mediated action, an imbalance that sets off changes in other elements such as the agent and changes in mediated action in general. (ibid. p. 43)

The point to infer is that modern technologies are important cultural tools to take into consideration, and that they have broad cultural and social implications. In this sense new technologies cannot only be seen as a continuation of old technologies like the typewriter or a calculating machine, like most teachers do (Erstad 2005), but also as something transforming the way we create knowledge and meaning, communicate and interact.

The points made above indicate the importance of studying how new technologies represent new cultural tools that create new meaning structures. These tools create new possibilities for how people relate to each other, how knowledge is defined in negotiation between actors and also how it changes our conception of learning environments in which actors negotiate meaning. Empowerment is related to the active use of different tools, with persons that have the competence and power to use them. All this comes together in the term multi-literacies (Cope & Kalantzis 2000), where the changes in our conceptions of new literacy practices is highlighted (see Lankshear 1997; Snyder 2002).

Contextual challenges

According to the national monitor in Norway (Erstad, Kløvstad, Kristiansen & Soby 2005) on the educational use of ICT, done every second year, in average there are 2 students per computer at upper secondary level and 6 students per computer at both lower secondary and primary level. Broadband access to schools has also been steadily improving, even though 65% of teachers think access to the Internet is too slow.

One problem in Norway has been that teachers do not use available computers much in their own teaching. The tendency has been that teachers mainly use computers and the Internet for preparing their teaching and not actually in the classroom. When we ask the students how much they use computers in school activities during an average week 54% say that it is about 1 hour or less, and 17% say never at all (Erstad, Kløvstad, Kristiansen & Soby 2005).

Another issue is that students and teachers relate to technology in different ways. When we asked students and teachers what they use computers for both at school and outside the school the results show that teachers have a more limited usage of

information- and communication technologies than their students. The students often (daily or 2-5 times a week) use ICT for different purposes, like writing, surfing on the Internet, sending e-mails, chatting, downloading music, playing games and making web-pages. But for the teachers almost 90% use ICT for writing, sending e-mail, seeking after information on the Internet or surfing for entertainment purposes. But they almost never use ICT to download music, chatting and playing games. Teachers use ICT mainly as an extension of technologies they already know, like the typewriter, calculator, writing letters and searching for information. Young people use the new technologies to seek out new possibilities of use. Teachers often have negative opinions of such ICT usage, but they speak less out of personal experience and more out of a general expectation. At the same time we see that many teachers have a positive attitude towards computers and the impact it might have on students learning (Erstad, Kløvstad, Kristiansen & Soby 2005).

When working with teachers it often becomes evident that teachers' attitudes and convictions towards their own practice is hard to break. As one teacher told us in an interview at the beginning of one project (Erstad, 2004);

My students learned much more before these new technologies were introduced. I had long experience with teaching and know what works. New teaching methods create chaos. (Teacher, 2000)

Also linked to developing new literacy practices we see that a few schools report on how using ICT changes literacy practices. One interesting quote comes from a mother I interviewed concerning the project work her daughters were involved in using IMovie to present their results in natural science.

My girls are academically weak because they both have dyslexia and during the years in primary school they have struggled all the time with not being able to prove themselves in any subject oriented way. I think it was incredibly positive for them to come here . . . to be able to work on computers and film and edit and such things. They have done a bit of that at home before, so they had knowledge that the other students could get from them, and through that they got a higher status in the group. So for them it has been like . . . I don't know . . . almost like a new life. It is very important that they gain ownership of their work. I think that is one of the keys to create engagement. For adults it is like this, and I do not think this is different for children. (Mother)

From a few projects we can see some interesting results of how digital literacy is having an impact in school settings, and how the learning environment is defined. However, in the majority of projects in a Norwegian setting it is very unclear what actual changes in learning activities that are going on.

Looking ahead

A lot of focus these days is on changing the role of schools in our society in order to make them better adjusted to the challenges of the knowledge society. In several countries this is both related to strengthening basic skills in core subjects and advocating the need for digital literacy. How this will come out in practical learning activities in schools is still an open question.

The digital divide has been discussed, but only on a very superficial level. Either it has been linked to differences in access to technology, gender issues or the information flow in our world. But what kinds of differences is related to the competence of using new technologies, to know how to navigate on the information

'highway' on the Internet, to create, to communicate and so forth. This is where issues of digital literacy and empowerment come in.

By studying digital literacy it becomes evident that young people gain most of their competence outside the formal institutions of knowledge building. Thus, digital literacy among young people today is of direct relevance to discussions about learning in schools, and it seriously confronts earlier conceptions of literacy and learning. Our societies have also become characterized by cultural complexity and knowledge building processes that challenges our education system.

One basic problem in this is the gap between the school as a learning arena and media use outside of schools. There will always be a gap between these two settings. The issue is though, that the experiences and the competencies that young people make outside of schools become increasingly important related to learning processes. However, the school as an institution with all its standards and norms, and the teachers' habitus has been a barrier for including new media and technologies in school settings. This is still a challenge in order to reach the ambition of digital literacy in schools.

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Ferrari, A. (2012) Digital Competence in Practice: An Analysis of Frameworks. The first conceives young people as media experts through their use of digital media in their everyday lives, as the "innovators"™ of new practices of great importance for society at large. The second term is then directed towards the adult generation, born before the introduction of digital media. Adults are immigrants in the land of the young, said to have problems in coping with the challenges of the digital society. This project took place between two lower secondary schools, one in the Eastern part of Oslo and one in the Western suburbs. Digital literacy in the school]. Oslo: The Norwegian University Press.

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European Commission. Digital literacy is not a significantly less equivocal concept than that of information services. It is one of numerous new literacies that has been introduced and discussed in various disciplinary contexts during the last couple of decades. I study digital literacies as school practices involving the use of digital technologies and media for generating, communicating and negotiating meanings. I call these practices "school digital literacies"™. View chapter Purchase book. Read full chapter. URL: <https://www.sciencedirect.com/science/article/pii/B9781876938796500066>.

Objectives and actions. Proceedings of the 3rd International workshop on Digital Literacy. Conceiving digital literacies in schools - Norwegian experiences. Linked to the Norwegian experiences mentioned above, research show that there is a gap between the conceptual definitions and elaborations on the importance of digital literacy in our society as expressed in different policy documents and curricula, and what is actually happening in educational practice among teachers and students (Erstad 2005).