School subject paradigms and teaching practice in lower secondary Swedish schools influenced by ICT and media

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A B S T R A C T
This article deals with how school subjects’ paradigms, i.e. the established content of the teaching and the way in which the teaching is traditionally organised, are influenced when digital media are becoming increasingly common in educational contexts. The study is based on interviews in so-called focus groups with teachers of different school subjects in a Swedish lower secondary school about issues concerning how much they use media and ICT in their teaching and how they think this affects the content of their subject, relations in the classroom, working methods and the role of the teacher. The theoretical point of departure is Basil Bernstein’s concepts of ‘recontextualisation’, ‘framing’, ‘classification’, and ‘the sacred and the profane’. The study shows that the teachers in the lower secondary school where the investigation was conducted use so-called new media to a relatively limited extent but that they are ready to develop their use if resources are made available. They also think that the content, working methods, relations and the role of the teacher are changing, usually for the better. Drawing on Durkheim’s concepts of ‘the sacred’ and ‘the profane’ it appears in this study that the sacred in schools is often associated with the physical and practical.

1. Introduction

The issue of the approach of schools and teaching to developments in the ICT area is the subject of great scientific interest. A large proportion of the research is and has been focused on more general learning processes (Baggott La Velle, McFarlane, John, & Brawn, 2004) and more connected to general mental abilities than to traditional subject-based objectives in the curriculum (Olson, 2000). Similarly, Watson (2001, p. 255) thinks that the new technology represents a “vocational rationale” that governs the development and that implies that the borderline between learning about something or by means of something is being erased.

Specific studies of school subjects focusing on how different subjects interact with ICT are less numerous. We know that teachers reluctantly accept a technology that is incompatible in relation to what they think is the traditional content and way of teaching and that they associate with the traditional content and way of teaching and with the subculture of the subject (Goodson, Knobel, Lankshear, & Mangan, 2002). The aspiration of this article is to study, on the basis of some Swedish teachers’ experiences, what happens to the subject content and teaching practice, i.e. a subject’s paradigm, when new technology in the form of for example computers, digital photography, video cameras, keyboards, etc. finds its way into schools and teaching.

2. Research orientation

School subjects include not only an established field of knowledge but also a social practice containing special assumptions of what are valuable knowledge, effective learning, what a diligent pupil is and what different types of tests and examinations are suitable when the knowledge of the subject is to be checked and marked. The tradition that has given rise to these cultures is however complex and based on organisational practice, individual biographies and collective experiences (Goodson & Mangan, 1995). According to Baggott La Velle et al. (2004), a school subject can be regarded both as a paradigm attributable to teachers’ conceptions of the subject they teach, which includes their views of themselves as specialists in this field, and also as pedagogy, i.e. the ideas and procedures surrounding the organisation of teaching and learning in the classroom, i.e. the teaching practice.
According to Hennessy, Ruthven, and Brindley, 2005, research provides only limited support for the notion that the new technology has revolutionised teaching and learning. Correspondingly, Cuban, Kirkpatrick, and Peck, 2001 thinks that access to hardware and software seldom leads to more extensive use of ICT among teachers and pupils. Most teachers are occasional users or non-users. When teachers used computers in the classroom, the teaching practice did not change either. Kerr (1991) claims, however, that the media technology can serve both as a lever by means of which the teachers attempts to establish a more efficient practice and as a fulcrum including a reorientation of the educational practice.

In a survey of the use of ICT and media in Swedish schools, Jedeskog (2005) finds that teachers of certain subjects such as mathematics, science subjects and Swedish accept ICT more easily and indicates “authority losses” for schools as an institution. In a comparative study among lower secondary classes in the USA, England and Wales, McEachron, Baker, and Bracken (2003) show how different school subjects’ so-called ‘universal and characteristic’ structures influence both the classroom environment and the educational interaction between pupils and teachers.

A large and extensive English project, Inter Active Education: teaching and learning in the information age (John & Sutherland, 2005) focused on various different “communities of practice” connected to different subject areas: English, mathematics, natural sciences, modern languages, music, history and geography. Sutherland and et al. (2004) started out from the question of how “embedded” ICT is in these different school subjects. The result shows that many of the teachers of natural science subjects work in a cultural context counteracting the use of ICT in their teaching. Most mathematics teachers were willing to incorporate ICT in their teaching. Many teachers of English and foreign languages have also developed productive ways of integrating ICT in their teaching, whereas the work with ICT in history and geography was more varied.

At the same time as ICT is regarded with great suspicion in some school subjects, that is, as a kind of “Trojan horse” (Olson, 2000) conflicting with a traditionally deeply embedded “subject grammar”, young people are bringing popular and media cultural knowledge and experiences from outside into the classroom and the specific school subjects. Their qualifications are in this respect well developed as regards making web pages, handling files, downloading pictures, using e-mail and word processors and making various kinds of multimedia productions (Elmfeldt & Erixon, 2007; Erixon, 2007).

3. Theoretical points of departure

In order to understand what happens in the educational practice in schools, i.e. the place or context in which the cultural reproduction and production take place when new technology is introduced into the educational context; I draw on the work of the leading European curriculum theoretician, Basil Bernstein (1996/2000). Bernstein emphasises the relation between knowledge and power, and also the connection between form and content, or in terms of his own concepts, between ‘framing’ and ‘classification’. Since new technology entails new forms of teaching, this also means that influences the content of what is communicated. Bernstein's theories are important for pointing out the power relations that always exist in the teaching context; he draws attention to the influence of the power relations between e.g. teachers and pupils on the content and form of the teaching, i.e. its classification and framing.

According to Bernstein (1996/2000) the educational discourse comprises two interspersed discourses: one discourse concerns various kinds of abilities and knowledge and their relations to one another and one discourse concerns social order. By means of recontextualisation the educational discourse creates a selection of imaginary subjects, i.e. school subjects. Authors of textbooks, for example, work in the recontextualisation field, the rules of which are governed by regulative discourse.

Bernstein’s concept of ‘classification’ is, among other things, about the relationships of different school subjects or disciplines to one another, i.e. what separates them and what they have in common. A distinction can be made between strong and weak classification. Where there is a strong classification, things must be kept apart, i.e. the difference must be emphasised. Where there is a weak classification, things must be brought together and the differences must no longer be stressed. Framing represents the educational practice, i.e. the form of the control of the communication between teacher and pupils, pupils and pupils. It is a matter of who controls the communication and hence also the sequencing of the teaching, i.e. in what order and in what way things should be presented. When the framing is strong, the person making the transfer has explicit control over the selection, sequencing, etc. When it is weak, the recipients have more implicit control. Where there is weak framing as regards the instructional discourse, there is also weak framing of the regulative discourse. The weakening of the framing will also challenge the classification. Changes may thus occur at the level of framing. This means that the forms of teaching challenge the content of the subject.

Bernstein’s (1990) phrase ‘the sacred and the profane’, which he borrowed from Durkheim, can be used to analyse the ways in which school subjects relate to ICT (John, 2005). The ‘sacred’ concerns what constitutes the specific substance of a topic and distinguishes it from all other subjects as well as the socially discursive demands that this places on the subject. The profane is related to the contextual demands and compulsion that economic contexts inflict on the sacred. This study concerns whether, and in what way, media and ICT play a role as a lever by means of which the teachers attempts to establish a more efficient practice and as a fulcrum including a reorientation of the educational practice.

Education is influenced from both above/outside and from below (Dale, Robertson, & Shortis, 2004). Influences from above are normative by nature and include anything from school cultures, subject cultures and national curricula to various different global factors. Influences from below are on the other hand more informal and comprise young people’s cultures outside school and the experiences they have concerning learning in various informal contexts. We know that it is precisely today’s young people that are developing competences in the ICT area, which they bring into the classroom in different ways (Elmfeldt & Erixon, 2007; Facer et al., 2003).

4. Method

This study is based on interviews with all 23 subject teachers in a lower secondary school. The teachers represent the subjects of physical education and health, social studies, science subjects, English, German, French, Swedish, woodwork and metalwork (Sloyd), textile handicraft (Sloyd), home economics, music and art, i.e. a total of 12 school subjects. 15 of the teachers were women and eight were men.
The research approach is ethnographic. The data collection took place in natural contexts and the research process was as open as possible. Interviews were made in so-called focus groups, which are a well-tested qualitative method of investigation for studying notions of, attitudes to and judgements of different aspects of teaching, among other things (Wibeck, 2000; Wibeck, 2002). It is a method that in a short period of time can yield a great deal of information in a particular area (Morgan, 1997). In the focus groups the teachers are influenced by the social interaction (Bloor, Frankland, Thomas, & Robson, 2001). In an individual interview the researcher has greater control over the interview situation. In focus interviews this control decreases. At the same time the informants are forced, as Morgan (1998) points out, “to explain themselves to the interviewer so that the elaboration of initial statements often occurs with relatively little input from the interviewer” (p. 11). Wibeck underlines a risk that might be involved in focus interviews, namely a kind of group thinking, i.e. that there are norms for what is permissible to say or not in a certain group. In this study it is precisely the group thinking in a subject that is the object of my interest. The selected method thus focuses on what the teachers say and believe that they do, i.e. the rhetoric, not on how they really act in the concrete teaching context in the classroom, i.e. the practice. Nor is the pupils’ perspective ever expressed.

The focus interviews focused on a number of themes, namely: (1) what position ICT and media had in the teachers’ subjects, (2) how they thought that the use of media and ICT influenced the working method in the classroom, (3) the relations to the pupils, (4) the subject content itself and finally (5) the role of the teacher. The interviews were grouped in the following way: (1) Swedish, (2) English, (3) social studies, (4) crafts, art, music and home economics, (5) science subjects, (6) physical education and health, and (7) modern languages, i.e. German and French. Some of the focus groups came to consist of teachers from different subjects with, in my opinion, some kinship.

The empirical material consists of recorded focus interviews. Each talk lasted for 40–60 min and consists of statements from all the teachers included in the group. The empirical material has undergone three “transformations” (Wolcott, 1994). The first transformation took place when the recorded group interviews were transferred from speech to writing. The second transformation was based on the analytical themes that the first transformation had resulted in and that concerned the different areas that the interviews were about. This second transformation resulted in a number of quotations from different interviews grouped under the respective theme. In the third transformation specified analytical categories were created.

5. The study

As regards access to and use of computers and the Internet, national quantitative studies indicate the enormous success of computers in everyday life in Sweden. Computers will soon be as common in the homes as TV sets. According to Nordicom-Sveriges Internethbarometer, 2007 (published 02/09/2008), 83% of Sweden’s population had access to the Internet in their homes in 2007. Together with the other Nordic countries Sweden has for a long time been regarded as world leading with regard to IT in education. Sweden is considered to be in third place out of 27 countries concerning IT use during lessons in European schools. The total number of computers with an Internet connection in Sweden is 16.6 computers per 100 pupils. In a European perspective this implies that Sweden is in sixth place (Myndigheten för skoltveckling [The Authority for school improvement’], 2007).

This study was conducted in a Swedish lower secondary school (forms 7–9, ages 14–16). The primary and lower secondary school system in Sweden consists of nine compulsory years (i.e. forms 1–9) and is not subject to any final test. The Swedish municipalities are responsible for the compulsory education. The basic provisions for the primary and lower secondary school system are found in the Education Act and the Compulsory School Ordinance. Curricula, the latest of which is called Lpo 94 (Skolverket [Swedish National Agency for Education, 2006]), are decided by the Swedish Parliament. In addition to municipal schools, there are also so-called independent schools managed by religious communities, companies, etc.

The lower secondary school where the study was conducted has about 350 pupils and is managed by a municipality in Northern Sweden, which has for nearly 20 years consciously and consistently invested large amounts of resources in developing the use of media and ICT particularly at lower secondary levels (7–9). As regards access to ICT and media equipment, there is in the school, a mobile unit, a so-called nomad, which the teachers can book. This must be done well in advance, since it is often occupied. Besides this nomad there are four ‘digital’ classrooms, i.e. especially equipped with the latest technological devices, computers, projectors for use in the classroom and other equipment. In addition this school has had since 1999, ahead of all other schools in this municipality, a special so-called media workshop with equipment for creative work with media.

For a long time past the teachers in the school and municipality staff has undergone various forms of in-service training in ICT and media, e.g. practical ICT and media competence training PIM (Practical IT and Media). Thus the teachers have in different ways acquired various qualifications in the field of ICT and media.

As part of the municipality media effort there have been a number of specially authorized cutting-edge projects (Hansson, 2004). These have priority over other projects, in terms of additional equipment and computers via the IT department. Several of the school social studies teachers were fortunate to be able to participate in one such project. As a result, they were granted access to the four digital classrooms and were able to acquire considerable competence in teaching and learning using new technology. They also both studied relevant literature and participated in staff discussions in order to share their experiences with other teachers. The school has a good development culture in the sense that it is not confronted by deep-seated resistance strategies. The school also displays higher levels of understanding of how to use and develop teaching with new technology. In addition to this high level of competence with new technology, my choice of school for the investigation was influenced by the strong commitment to media educational work displayed by municipality evident also in the school.

5.1. Media, ICT and subject content

The result of this investigation shows an inconsistency as regards the different teachers’ relation to and use of media and ICT in their teaching. On the one hand there is often a personally motivated positive attitude to using media and ICT in the teaching. On the other hand they also express resistance. This inconsistency is likely to be partially related to the fact that the lower secondary school in question only has one mobile unit with about 10 computers and other equipment that every teacher must book well in advance to be able to use it in her/his teaching. This unit is heavily used and that for this simple reason the teachers cannot use it to the extent they would like. This condition
also includes a kind of resistance to using the mobile unit, as it both requires good advance planning and leads to loss of time when moving it to and from the classroom.

The resistance to using the mobile units is perhaps connected not only to resistance to the new technology as such. To a teacher that has a teaching style based on current topics, flexibility, etc., the demand for long-term planning may seem inappropriate. Also he/she may feel that something sacred that is connected to either content and form of teaching might get lost when ICT and media are incorporated. However, if teachers have no access to computers, they also lose the possibility to develop their competence in handling technology or discovering where it might be used in their teaching.

Insufficient access to computers is emphasised in several studies as one of the most important reasons for teachers not using ICT in their teaching to any considerable extent (Chaib, Cahib, & Ludvigsson, 2004; Myndigheten för skolutveckling, 2007).

The media and ICT are therefore used in the daily teaching to a relatively limited extent in the various school subjects, approximately in 10–15% of the total teaching time, which is in line with the report from Myndigheten för skolutveckling (2007, p. 6). In the subject of mathematics the teachers state that they do not use media and ICT at all in the teaching, for which reason this subject will not be discussed in this article. The exception is the teachers involved in an authorized project. In the teachers’ unanimous opinion, the use would be much more extensive if there were computers, editing equipment and projectors to a greater extent than is the case. Resistance based more on principle is expressed among certain subject groups at the same time as they might nevertheless be willing to develop the use of media and ICT in their teaching. Another result of the investigation is that some subjects are regarded as more practical than others and that, according to the teachers of these subjects, precisely for this reason they cannot integrate media and ICT in their teaching without any great difficulties.

The two male teachers of woodwork and metalwork (Sloyd), for example, thought that “that product” is not used. They also thought that when attending handicraft lessons, the pupils’ attitude is that they want to “start working”, i.e. start working physically with a job leading to “sweat in the armpits”. They think that the whole effort at using the technology can be questioned. They have noted that one thing that is negatively affected in this connection is the account for purchasing wood, “the wood account”, which constitutes a kind of guarantee for the practical handicraft activities. Without it there will be no handicraft, in their opinion. One of the handicraft teachers equates theory and passivity. But there is also another reason:

I think there are enough subjects where the pupils merely sit listening and receiving passively, so sometimes they must be sweaty in their armpits and feel they have done something.

To the woodwork and metal work teacher, work is here associated with the practical manual work that is done in handicrafts. Accordingly, what is done is the more theoretical school subjects is not ‘work’. When the woodwork and metal work teacher expresses a negative attitude towards new technology, however, it might not be primarily an indication of opposition to the new technology per se but about to what the new technology is connected and where it might lead. It is evident that this teacher sees his subject as practical unlike most other school subjects. He thus shows the importance of keeping the sacred aspect of the subject. He emphasises the strong classification of the subject, i.e. what distinguishes it from other subjects, and seems to think that if new technology gains too much influence over handicraft, the subject will become increasingly theoretical and its classification will weaken. The meaning of the subject of handicraft will then disappear, which in the long term will jeopardise further its position in the hierarchy of school curricula. The subject of handicraft anyway has a somewhat marginalised position in schools because of its practical nature and also due to handicraft rooms often being located in separate accommodation because of the need to house different kinds of machinery.

The female teacher of textile handicraft (Sloyd) maintains that she is only “moderately interested” in using media and ICT in her teaching, but nevertheless she expressed some enthusiasm. She like her colleague above expresses concern that handicraft might become too theoretical. “Handicraft should be to feel, what is practical”, she says.

The teacher of home economics thinks that the subject has not lost anything through the incorporation of media and ICT in her teaching. Accordingly, what she calls “the handicraft part” of the subject has not disappeared, neither will it do so in the future. In home economics she mostly uses media and ICT for documentation of what the pupils have made. What is made in home economics naturally disappears when it is consumed. At the same time the question is, according to the teacher, on what to spend the money if one has to choose: on a projector in the ceiling or on food ingredients: “But we stand up for practical matters!” The two male teachers of physical education and health also emphasise that they teach “a physical subject” and that they prioritise “this activity”. They have occasionally thought of creating a power point presentation, but have so far not quite carried the idea into effect.

In this way a number of school subject practitioners consider that they have a special relationship not only to new technology but also to other school subjects. The teachers argue that, unlike other (theoretical) subjects, handicraft, home economics and physical education are primarily practical subjects. What these have in common is that distinctive skills have to be developed and inculcated in their students, i.e. practical and sometimes manual knowledge. They further argue that competence in these subjects cannot be acquired merely through reading. Rather, the body has to be taught to perform the skills on which the subjects are based.

These school subjects have in common that pupils often experience them as positive and offering a space in an education programme that is otherwise mostly theoretical. The subjects are perceived as oases, of which the teachers are aware and which they associate with the practical aspects. For this reason, they are also anxious to retain (and even emphasise) the practical nature of their subjects. Where the subjects become too much like one another, e.g. through the use of media and ICT, it is argued that subjects such as handicraft, home economics and physical education might lose their power of attraction to the pupils and in the long term, to the curriculum. The woodworking and metal work teachers say explicitly that the more media and ICT are used in other school subjects, the more important it is that the subject of handicraft remains practical:

In this way we’ll be more exotic.

But there are also some theoretical subjects where practitioners consider themselves to be practice-based, although perhaps in a different way. In the science subjects the teachers fear that the pupils will lose their sense of holding something or doing it themselves. The physics teacher quotes a lecturer in physics in Uppsala from his student days who thought that “physics is working with your hands”. And in that connection technology is a “complement”. Similarly, the chemistry teacher says that “the laboratory aspect is very large” in particular in chemistry and that something would be lost by handing it over to “the world of computers”.


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The subject of science consists of a combination of four different subjects: chemistry, physics, biology and natural science. Its classification is thus weak in terms of subject boundary maintenance. However, the subject contents of all these science subjects are well defined and thus may be said to be strongly classified. In the science subjects practical work is apparently associated with a form of manual work; pupils are for example supposed to be able to conduct practical laboratory work, i.e. measure correctly, pour correctly, etc. But this is a skill that is also intimately connected with theoretical knowledge. As the teacher puts it, ICT and media are hence more of a complement to other elements in their teaching. Thus, what is sacred is not practical skills (such as claimed for handicraft, home economics and physical education), but theoretical skills. But in order to develop their theoretical domains pupils need first to learn and hone practical skills.

There are areas in the science subjects where use can be made of various media and ICT. It may for example have to do with information about and pictures of how a brain is structured. They think that being able to show it in 3D and turn it round would be an advantage. It may also be a matter of finding information quickly on the Internet about illnesses, which takes a long time when looking for it in books. Books quickly become dated in the area of natural sciences, they think, and the Internet is then a good source. They give examples of how “smoothly” the pupils can learn birds’ sounds by means of the new technology at the same time as they can see what the birds look like. They point out that afterwards the pupils can “go out and listen and watch in reality”. This might be used as a good example:

The teachers of art and music are those who express themselves most positively and unconditionally in favour of using media and ICT in the teaching. The male art teacher often uses media and ICT in the teaching of art, although access to computers is limited.

It feels natural and the pupils are very interested; this is our world [...] The creation of pictures has accelerated lately, and the craftsmanship, the manual creation, lives side by side with the digital creation.

In the teaching of art they use both still cameras and film cameras as well as the cameras in the pupils' mobile phones. In his capacity as teacher he wants to develop the best of the “old art teaching” at the same time as the digital picture world “must get in”.

The female teacher of music expresses herself most positively, stating that she “loves this technology” and therefore uses it “to an enormous extent” in her own teaching. Everything is so much quicker, she says. The pupils look for lyrics and find a lot of very interesting music on Youtube, for example. In the subject of music, they are “halfway into media”. They have recording devices which produce high-quality recordings and the discs can easily be connected to a computer and ‘burned’: “As quick as lightning” they will have a result and proof of what the pupil has done, she says.

Like e.g. handicraft and physical education, music and art are principally practical subjects. To be able to play, paint or draw, pupils have to train up their skills, which again cannot be attained merely by reading. What is special about music and art is however that they have close affiliations to youth culture and modern communication technology. In these subjects, the pressure comes from below, i.e. from the pupils themselves (Dale et al., 2004), and is perhaps stronger than in other subjects. One example of this is that playing and composing music in Swedish schools have gained an increasingly strong position in the curriculum from the middle of the 1990s onwards. The subject contains, in fact, a pedagogy based on cultural revaluations and the spread of the media (Scheid, 2009). Thus young people develop competences in the ICT area, which they bring into the classroom in different ways (Elmfeldt & Erixon, 2007; Facer et al., 2003).

Likewise, the social subjects teachers express much interest in using ICT and media in their teaching though here, the interest seems partially to emanate from a kind of deficit perspective. The teachers suggest that pupils’ ability to assimilate a single text in a reader or in another book is becoming increasingly difficult. The pupils have, it seems, difficulty in sustaining their concentration over time. They give up, it is asserted, after half a page reading and start flipping through the text. They do not do “factual reading” but “data reading”, i.e. they “scroll” or “read by searching” through the text. Therefore, the teachers think that pictorial aspects tend to be the important thing in teaching by means of the new technology. They state that there is not a lot of “text work” now in the social studies. Films and short film sequences from various areas are used instead in order to “support the pupils pictorially” and “supplement the reading”.

It becomes much more vivid then. You bring the world into the classroom at once when you can click on the Internet when something special has happened.

The social subjects in Swedish schools consist of a combination of geography, history, religion and social studies. Like science, this means that the subject has weak boundary maintenance. The ambition for all these subjects is to link subject content to contemporary political and economic conditions for the benefit of the pupils. However, this has probably contributed to a weakened classification in recent years. This might be one of several reasons why the subject is positive to media and ICT. The sacred element in the social subjects is therefore not the forms of mediation but rather the content. It is relatively unimportant whether a pupil acquires knowledge and insight via a traditional textbook, computer programme, the Internet or a film. The social studies teachers emphasise the different kinds of reflection not least on learning that the Internet, for example, requires. It is for this reason that they complain of never having enough time to deal with the necessary themes. It does not take more time, but places the focus on other things. The technology creates interest in something deeply embedded in the pupils’ minds. They acquire a deeper understanding of the area.

The mother tongue or language 1 (Swedish language), has a special relation to the book and written culture. Andrews (2000, p. 26) writes about how the mother tongue language (English in this case) is based on a “book-dominated culture”. Historically, the written text and printed book the paper and pen, have occupied a prominent place in mother tongue teaching with the individual reading experience viewed as an important part of this culture. As Jewitt (2002) has shown, however, this individual reading is currently being challenged by a more favoured collective form of reading and interpretation, such as assimilation of content (of a novel) by means of CD-ROM. Thus narrating, independently of mediation and as a kind of concession, has become the important, or sacred, aspect here: this is at a time when the written culture is being challenged by the new media and pupils are developing alternative media competences. In the subject of Swedish, therefore, narration is emphasised and in this connection, the Internet offers considerable advantages. One teacher says:

There are older Swedish writers who have made sound recordings of things that can now be found on the Internet, so that you can listen to what they sound like. You can listen to songs, but that requires that you’ve got the proper technology [...] [the pupils] like borrowing a CD book, some who are not so fond of reading.
At the same time as books and written narratives still seem to be the norm, the teachers realise the new forms of distribution of narratives, e.g. in the form of a narrating voice in a sound book or pictures intended to illustrate a story in the form of a film or in some other way, also imply that something qualitatively new is being added. The pupils who do not manage to commit a story to paper often succeed, also, in making a story with the aid of film. The pupils with a writing disability then often begin with a storyboard, as they do not have to write anything but only to draw:

When they make a film, that’s another way of telling a story, and those who do not manage to commit it to paper often manage actually to get it, to make a coherent story, maybe even with a little twist. In the seventh form they can already manage, those who think it is a little boring to write, for example, and then that we compare the film with the narrative, that’s something I think we all do.

As regards the way in which the subject content is affected in the foreign languages English, French and German, they think that the pupils are good at cramming words with the aid of computer programmes but worse at combining them into sentences. At the same time the pupils are now more conscious of working with a language spoken in some country. That is a qualitative improvement in comparison with earlier periods. They also learn to understand cultural differences, e.g. through the personal contacts that they have. The exchanges also give them contacts for the rest of their lives. In this way they develop as human beings. They can use the practical language, the language that is spoken, and they also realise that they have to learn foreign languages. In this way the difference decreases between the educational activities at school and the reality outside school.

5.2. Media, ICT and working methods

School subjects include not only an established knowledge area and assumptions about what is valuable knowledge, but also a social practice containing specific assumptions of effective learning, what a clever pupil is, and what different types of tests and examinations are suitable when the knowledge of a subject is to be checked and marked, what Bernstein calls “framing”. One of the questions concerned how the working methods might be influenced by using media and ICT in the teaching. The overall judgement is that the modes of working are positively affected.

The art teacher thinks, for example, that if the pupils take an interest in something including media and ICT, e.g. making a film, they are careful about the different details of the work; the planning, writing the manuscript, the editing, applying the soundtrack, etc. They are responsible in that type of work. At the same time the pupils appreciate that the school, the subject and the teacher take an interest in what they are interested in. In this way a kind of approach takes place between the school and the pupils’ everyday culture.

The language teachers think that they really demand more responsibility on the part of the pupils. The working methods are also more varied, not least when they work with films. The pupils also have daily contacts with pupils in other countries via e-mail. In the subject of French a web camera is used in the contacts with France, and the learning of the language becomes more vivid. The pupils really want to learn languages, since they experience that it makes things more realistic. All this places higher demands on the pupils.

As mentioned above, the social studies teachers think that the pupils are forced to reflect more. Questions arise about a number of different things, not least figures. The science teachers think that the pupils present good reports with pictures and sound of e.g. birds taken from the Internet. The pupils often become very interested and think the work is fun. They are committed; they come to grips with the different things, not least figures. The science teachers think that the pupils present good reports with pictures and sound of e.g. birds taken from the Internet. The pupils often become very interested and think the work is fun. They are committed; they come to grips with the different things, not least figures.

As regards the relations in the classroom, they are obviously changing, according to the teachers. The science teachers stress that there is more cooperation, although they are otherwise relatively critical in this connection. The pupils develop their contacts and train their social roles, according to the language teachers. Using media and ICT in the teaching also implies that the pupils must help each other more
(Swedish). This also implies that the pupils help the teachers to a greater extent. The teachers will therefore have to do away with their prestige.

When there is no prestige in the same way as before, this also leads to an increasing dialogue between pupils and teachers. The pupils and teachers are on the same side, that is, no one is above the other, according to some of the teachers. They all move in the same direction and help one another. “There is something we cannot manage that we have to solve.” One of the social studies teachers says:

.../ so I think it’s good, an ideal teaching situation in that the pupils feel that I’m standing here and that we will sort something out together, that we are on the same side and not this and that. Feeling that we are moving in the same direction, helping one another; there is something we can’t manage, we’ll examine it; then we hope I’ll be the one to sort it out together with them.

They think that, as a consequence of this, the classroom relations are becoming more intimate and hence more positive. The pupils want to learn more. The learning situation becomes more realistic (languages). While the teachers are better informed in general than the pupils, these are better informed about technology than the teachers. This places greater knowledge demands on the teacher, who feels greater pressure to know the language, not merely what is there in the textbooks but also the colloquial language, which is spoken e.g. in Germany. The teacher of German says for example that she upgrades her colloquial German by reading books in German before going to Germany with her pupils.

Earlier on the teacher could be two pages ahead of the pupils, but this is no longer the case. The social studies teachers say that they have to watch the TV news. The pupils’ questions are becoming more “sprawling”. At the same time the teachers feel more professional, since they have yet another tool to use. They claim that all the walls of the classroom are used and that more suggestions from the pupils can actually be used in the teaching. In this way the teachers get closer to the pupils’ culture. The pupils seem similarly happy to be able to instruct a teacher who is “a little slow on the uptake”. It is all more fun and modern. It is something new, says the home economics teacher.

In different ways, therefore, a picture is emerging of how teachers are in a sense losing control of both subject content (classification) and teaching practice (framing) as well as showing how these two entities are mutually related to each other.

6. Discussion

To begin with, one can observe that the use of media and ICT in education still seems to occur to a relatively limited extent, which is in line with the results in both Hemmey et al. (2003) and Skolverket (2003). Even if the use of media and ICT still seems on the whole to be at a relatively low level, the study indicate that the teachers, with a few exceptions, are very favourably disposed to using media and ICT in their teaching. Give us the tools and we will use them is what they seem to think. This is a challenge to the notion that teachers in the forms 7–9, i.e. subject teachers, should be less inclined to use media and ICT in their teaching (Sutherland et al., 2004).

As described above, subject areas differ from the others with respect to how much media and ICT are used in their teaching. In line with Goodson and Mangan (1995), Selwyn (1999) and Sutherland et al. (2004), it is evident that media and ICT are embedded to different extents in the various school subjects. Social studies subjects, for example, are strongly embedded in media and ICT. One explanation of this is, as mentioned above, that two social studies teachers were included in a project, which enabled daily use and development of media and ICT.

Another explanation given is that teachers have been forced to adapt to a situation where pupils have increased difficulty with reading and understanding written documents. Teachers have therefore been compelled to adopt new forms of mediation in order to communicate subject content, since in comparison with say the subject of Swedish, the written culture is not a particularly important part of the subject. By definition social studies also has a weak classification, since it consists of four distinctive subjects. Thus some parts of the subject of social studies, e.g. social studies and geography, are more closely related to the new digital technology than others for example, history and religion.

Swedish is also embedded in media and ICT to a relatively great extent. It is evident for example in the subject of Swedish that narratives and narration belong to the sacred, that which on no condition can be removed from the teaching. When it really comes to the crunch, it is the story in the printed book and the story written by hand on paper that matter. CD books developed through various technologies and films are accepted as complements and as something necessary. This does not imply, however, that they are conceived as having the same high quality as printed books. One of the teachers of Swedish thinks explicitly that the interpretations, which I understood to mean the interpretations of literature, are “different” when using a sound book or watching a screen version of a book.

It is also obvious that the subject of music, as well as that of art, has a positive relationship to the new technology. Both teachers emphasise that this has to do with the special character of these subjects and their relation to youth cultures and media. The music teacher thinks that she “is right in the middle of the youth culture” together with her pupils. Similarly, the art teacher thinks that “this is our world”. Like Dale et al. (2004) one can underline how influences from below, encompassing young people’s culture outside school, seem to be brought into the educational discourse of these two subjects with particular ease. The sacred in music is the practice and composition of music, and in both art and handicraft it is the making of artefacts.

In the foreign languages it is the communication and the ability to speak the language that represents the sacred. In that case media and ICT contribute to the communicative skills, the basis of language teaching, being able to develop.

As described above, the science teachers, however, are more hesitant, which is in line with Sutherland et al. (2004), who think that science teachers work in a cultural context that counteracts the use of ICT in the teaching. Sutherland et al. (2004) are also of the opinion that mathematics teachers are willing to incorporate ICT in their teaching, which however receives no support in this study, as shown above. Jedeskog (2005) thinks, however, that teachers, except for Swedish, of both mathematics and science subjects accept media and ICT more easily than other groups of teachers. Sutherland et al. (2004) also state that mother tongue and foreign language teachers have developed productive ways of integrating ICT in their teaching.

The study also shows that some school subjects seem to have a very contradictory relationship to media and ICT. To the teachers of physical education health and woodwork and metal work, in particular, media and ICT are a kind of “Trojan horse” (Olson, 2000), that is in conflict with traditionally deeply embedded “subject grammar”. What these subjects have in common is that the practical is seen as sacred, and that the teachers in different ways identify themselves as practical. A discernible fear is of becoming too theoretical and hence not only less practical but also too much like other subjects. If this were to happen, they say, the pupils’ positive attitude to their...
subject and its 'oasis' character might also disappear. In the long term, this might also threaten their status as school subjects. This suggests that school subjects and their framing are related to and gain their legitimacy from each other, i.e. through their “otherness”.

The study also shows that the incorporation of media and ICT in teaching can lead to educational change in contrast to, for example, Cuban et al.’s (2001) claim, that very little actually changes in teaching following the integration of media and ICT. Hennessy et al. (2005) also argue that there is limited support for the view that technology has revolutionised teaching and learning. However, even if the word revolutionised is strong and not defined in an educational context, the present relatively small study, suggests that media technology functions as a “fulcrum”, i.e. as a kind of turning point, regarded as a result of a process or a reorientation of the educational practice, rather than a sudden insight.

This study suggests that where media and ICT are incorporated into the teaching context, different content is introduced that has not been filtered through the recontextualisation apparatus and that, to an increasingly extent, communicates perspectives that are closer to pupils' lifeworld. School subjects' classifications are both challenged and weakened at the same time as the teachers are losing their influence over the framing of different school subjects.

Taking a power perspective, teachers held the advantage based on the textbook and the framing it provided through education and professional experience. Teacher’s thus decided and knew in advance the content and the forms of the organisation of their teaching. However, content of teaching more frequently comes from outside the recontextualised discourse, associated with a technology that pupils are often more proficient in than their teachers. This means that teachers will be less able to prepare subject matter, not least because content might also offer ideological perspectives other than those traditionally presented by the textbook. In all these respects the traditional hierarchies of schools face challenge. Pupils and teachers are also likely to be more equal, according to the teachers, in the sense that pupils will be able to help teachers with the technology and thus create a more mutually beneficial relationship.

Jедеског’s (2005) consideration that subjects adopting ICT suffer a loss of authority is correct in the sense that the relations between pupils and teachers may become less hierarchal. It is also true in the sense that the teachers will be expected to put their prestige on the shelf, i.e. that they cannot count on having the best knowledge in all contexts. Rather, pupils, too, can be allowed to use their knowledge to help other pupils. But it does not seem to involve any loss of authority for the individual teacher. The teachers emphasise rather that it is a matter of a different relationship, i.e. a relationship based on a different kind of respect than the one they have been used to. The consensus of the teachers is that it is leading to something positive and different.

In response to Kerr’s (2005) uncertainty whether the use the use of information technology really results in the pupils learning more effectively, this study shows that the pupils seem at least to learn with greater enthusiasm and also that they seem to be prepared to spend more strength and energy when media and ICT are involved. Nearly all the teachers, also those who are more doubtful and critical in this connection, emphasise that the pupils work more, are more careful, etc., when media and ICT are used in the teaching, and are generally more active and responsible. The passivity ascribed to the use of media and ICT by for example the handicraft teachers seem to find no support among the other teachers.

To summarize: When media and ICT are introduced into the teaching, the traditional textbooks lose their role in the teaching. Not only do they seem to be dated from the point of view of content, but the pupils also seem to have obvious difficulties in approaching textbooks and written texts. Instead they search for knowledge on the Internet. At the same time another recontextualisation agent, the teacher, loses control over the communication in the classroom and hence of the framing, too. On several levels and for different reasons the regulative discourse is challenged in this way (Bernstein, 1996/2000).

7. Conclusion

The educational discourse, as well as the classification of school subjects and the framing of the teaching, is being exposed in different ways to challenges when media and ICT are incorporated into the teaching. As a consequence, the teaching of the different subjects will less and less be governed by the agents of the contextualisation apparatus, i.e. disciplining textbooks and teachers’ perspectives. As somebody said, the teaching will be more “sprawling”, since more perspectives and above all the pupils will be allowed a say. The world appears in this way as more complex. This entails that there will be more dialogue in the discourse and that several different perspectives will be taken into consideration. Reflection will hence be given scope in the educational context. It is also discernible that the present, i.e. what might be called reality, is in various ways making it felt to an increasing extent in educational activities. For this reason it is also becoming more difficult in different ways to govern the content of the teaching. In all these ways the different school subjects’ classification and framing are both being challenged.

I have pointed out above the contradictory condition that is manifested in the teachers' partially positive and partially negative attitude to new technology. Drawing on Durkheim's concepts of 'the sacred' and 'the profane' it appears in this study that the sacred in schools is often associated with the physical and practical, not only in subjects such as physical education, health, woodwork and metalwork but also in the science subjects. In the science subjects practical laboratory work represents “the sacred” and manual contact with the biological, physical or chemical material is important. Practical aspects are also emphasised in home economics, handicraft and physical education. For the subject of Swedish, writing on paper with a pen and/or reading in a book may be experienced as practical and concrete, and thereby also deemed sacred, although the pen and book were, after all, also technologies that were once new.

The remaining question is why the teachers at this school and most likely at other equivalent schools in Sweden and in many other countries do not use media and ICT in their teaching to a greater extent. They seem to be of the unanimous opinion that school work becomes qualitatively better in many respects with the incorporation of media and ICT; and that pupils achieve better results and work with greater focus and commitment at the same time as teachers' and pupils' relations are considered to have changed for the better. Perhaps this is due to teachers' desire to maintain their authority or to the unequal status of different school subjects. A subject whose value and usefulness are questioned in school contexts, like Sloyd, shows little interest in change or to integrate media and ICT. Subjects that are highly valued, e.g. science subjects, also indicate little interest in change and hence in integrating media and ICT. What constitutes a school subject and how its different parts relate to one another is also likely to be significant. Where a subject is closely dependent on textbooks, such as for science, and the parts presented in a particular order, will clearly affect how media and ICT are integrated. In such a context social studies subjects seem more open and less hierarchal and therefore also more likely to incorporate media and ICT.
The study also clearly indicates the reasons for different attitudes depending on subject classification and framing, and subject relations to each other. Boundary lines need to be upheld in order for subjects to be legitimated and conceived of as important by pupils, teachers and not least education politicians. Adaptation needs to be made to changes already taking place, such as the deterioration of pupils’ ability to assimilate written text. Some subjects such as music and art have benefited due to their location in the heart of youth culture and the significant contribution of pupils’ lifeworld. There are of course also differences between individual teachers in the same subject as well as differences perhaps due to gender, as we shall see below.

The positive attitude to ICT that Kerr (2005), for example, identifies in society at large appears to be more contradictory for schools. There might even be a kind of technophobia embedded in educational discourse. Is this due to nostalgia for an older society and culture that has survived in various subject paradigms of schooling? From this perspective, technology might itself represent the profane, i.e. that which is prescribed for the school subjects.

Finally, an interesting observation from this study is that female teachers in the specifically practical subjects of textile craft and home economics, display a generally more positive attitude towards media and ICT than their male colleagues in woodwork, metal work, physical education and health. We know that ICT has a largely male-dominated history in Swedish schools and in a sense has handed down specific “gender regimes” that Connell (1987) identifies. At the same time it cannot be unambiguously stated that access to and use of media technology is gender related (Livingstone, 2002). The question is rather about if and how transformations of gender take place in the school subjects and in relation to ICT (Skärēus, 2007). This is an important issue to take further in a future, more extensive study of the relationship between the school subjects’ paradigms, teaching practice and media and ICT.

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