"To do" gets more attention than "to understand"

Pupils' use of ICT in some Swedish classrooms


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Abstract: The purpose of this paper is to discuss what the use of ICT in education means to teachers and pupils in the Swedish compulsory school. The paper is based on an empirical study of the work with ICT in nine different schools. The study is a part of one of the largest campaigns, 1996-2000, about ICT in school. It points out a current trend towards dissolution of boundaries in terms of room, time and activity.

The introduction of ICT and the directions in the curriculum, which include pupils' activity and responsibility, are supposed to involve changes. The expected changes would include, for example, the role of the teacher, the role of the pupil and the way of working. ICT is looked upon as a means to facilitate these changes.

Introduction

This paper presents some results from a classroom-study carried out in the autumn of 2000. The study is one part of an evaluation of the use of ICT in some selected Swedish schools, supported by the Foundation for Knowledge and Competence. The aim of the study has been to investigate what meaning the use of ICT can have in education, what teachers and pupils do and what is characteristic of this kind of teaching. In the paper we pay attention to two extracts from our field-notes and illuminate phenomena namely: preparation, individualization and co-operation together with dimensions of control and responsibility.

In school-documents there are expectations about different changes connected to the use of ICT, especially about pupils' learning. The intention "to create a good learning environment" is expressed both in official school-documents and by teachers themselves. ICT is looked upon as a means to create this good environment. The computer is expected to be a means contributing to variation and acquisition of knowledge as well as pupils' independency and growing responsibility for their schoolwork. Our earlier evaluations and research, as well as others', show that the use of ICT itself does not lead to improved activity and promotion of pupils' learning. Teachers’ intentions and strategies beside external conditions are more important than ICT in activities constructed by teachers and pupils together. We mainly see ICT as something that can strengthen and accelerate processes that have prompters other than ICT.

1 "Send me an e-mail!" In Swedish: "Maila mig sen!" Lärarintentioner och förändrade gränser för elevers arbete. Linköpings universitet. Institutionen för beteendevetenskap. LiU-PEK-R-226.
2 www.kks.se.
Research strategy

In earlier evaluation-studies our informants have been mainly school politicians, school principals, teachers and, to some extent, pupils. They have described the use of ICT in education. In this study we have chosen to be present in the classrooms to observe and talk to teachers and pupils to gain knowledge about what happens when ICT is used. Instead of focusing on the informants’ statements, the rhetoric level, we have concentrated on their practice.

We have visited nine teachers and their pupils in environments where the conditions, because of the KC-foundation project, should have been suitable for ICT. These teachers have a great deal of experience by using ICT in education and they can be regarded as ICT-enthusiasts. In each school we attended learning-activities on an average of ten to fifteen hours. At the end of each week we interviewed the teachers and some pupils. In this paper we put our focus on extracts from two cases.

ICT in education

In our study a complex activity, difficult to define, occurs, where ICT indeed is a part of that activity but seldom a principal one. Both group-tasks, pupils' accounts and searching for information in other sources than textbooks were in school already before ICT but it has been said that ICT has influenced both ways and forms of working. As demonstrated by both our research group and others, ICT does not in itself lead to changes in any specific directions of work in school.

Preparation

The purpose of ICT in education connected with the aim of giving pupils greater responsibility for their own work means that both the pupils' and the teachers' tasks in some way are changing. The demands directed to pupils include both skills in managing ICT and intellectual challenges. They are, for instance, expected to be able to arrange their time at task, to work by themselves also when the teacher is absent and to have enough knowledge to decide if a text in a foreign language, mostly in English, is relevant for the task or not. Older pupils also have to give meaning to and value reliability of different sources.

The demands are different from earlier ones, and it is sometimes possible to talk about a change of division of work between teacher and pupil. The pupils take over teachers’ arrangement and preparation for teaching. They work with mostly time-consuming searching on the net, often without much of meaningful result concerning subject knowledge. This goes on at the expense of more in-depth work and discussions. One of the teacher’s tasks will be to assist the pupils with ways of searching for materials. That means that the teachers have to have knowledge and skills to handle the equipment. Many teachers do not have this knowledge. Our study also shows that proportionately a great deal of time is devoted to searching, whereas the in-depth work with the collected information is negligible.

Many pupils are skilled ICT-users but, the pupils’ need of broader and deeper ICT-knowledge is also noticed. Some pupils find the demands too high. Sometimes they have not got a fair chance to manage their new role as they are not prepared to work independently on their own, irrespective of using ICT or not. Those who need a clear structure, both in terms of content and working methods, might see the demands on
responsibility and the use of ICT as a limitation of their possibilities to meaningful learning. These pupils might see themselves as failures.

Two cases - analysis and discussion

In our description and analyses, we have used a theoretical model which emanates from four different situations of teaching (with ICT). Our starting-point is two axes: teacher (ICT)-directed/learner-centred task and teacher (ICT)-directed/learner-centred way of working. The four fields express different degrees of teachers’ (ICT’s) and pupils' influence and control. It has been possible, at least to some extent, to put in our empirical findings, even if the fields may overlap each other, especially field 2 and 4, (we will return to this). When we apply our empirical findings to this model (see below) some interesting patterns become obvious. One being that in practice field 2 and 4 seem to overlap each other. Det ska vara 2 och 4!

Teacher directed task

<table>
<thead>
<tr>
<th>1.</th>
<th>2.</th>
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<tr>
<td>&quot;Work with this in this way!&quot;</td>
<td>&quot;Work with this in any way!&quot;</td>
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Teacher directed way of working

<table>
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<th>3.</th>
<th>4.</th>
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<tbody>
<tr>
<td>&quot;Do what you want but work like this!&quot;</td>
<td>&quot;Do what you want in any way!&quot;</td>
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</tbody>
</table>

Learner-centred way of working

Learner-centred task

Both tasks and working methods can to a certain extent be ordered either by the teacher, the pupil or the computer, but of course steering and control can vary both in proportion and over time. In the figure the teacher’s/computer’s steering is most evident in field 1, while the pupil in field 4 has the whole responsibility, both in terms of content and the way of working.

Keywords in the curriculum are pupils’ influence and responsibility. If these are to be effected successfully they will also influence the teacher’s control over the pupils’
learning process. The teacher will have to let the pupils control their own learning to a much greater extent than at present.

Just in some cases during our visits, what is called, pedagogical software was used; the computer asks and the pupil answers, field 1. We have understood that teachers’ goal is to leave field 1 and to go in the direction of the other fields and many teachers already have. The goal to strive towards will be field 4. Such an intention is supported by the intentions in curriculum about the active, responsible pupil support. This will raise issues about the relationships between the fields but also about their influence on pupils’ possibilities to learn. A behaviourist perspective on learning is characteristic of field 1. As teaching connected to field 1 is rare in our study the field is neglected in this paper. Furthermore, our findings make it possible to handle field 2 and 4 as one field since the pupil’s task is seldom totally free. Hence, the following text is related to the use of ICT in field 2 and 3. The others are just briefly discussed.

Work with this in any way - a visit to an upper secondary school

Most of the observed teaching is related to field 2. The contents of the tasks is decided by the teacher but the pupils may choose working methods, supported or not by ICT, as well as mostly where or when to work.

In a class with third year pupils in social studies, upper secondary school, each pupil has a laptop of his own. For almost three months their task in the subject Swedish has been to work in groups with ”authors of the twentieth century”. They are expected to search for information and facts, in any way, and write about a selected author and to read pure literature. During this lesson some pupils are reading pure literature, some are collecting facts about an author and some are writing at the computer. Notes from a lesson:

I (the observer/researcher) am strolling about the classroom. It is rather narrow. The classroom is small and the class consists of 24 pupils. One girl is busy with hot-mail. Now and then two girls are chatting. Three are listening to music in their headsets. The pace of work is quite slow and peaceful. The pupils seem to be busy with a lot of activities at the computers. They are at the same time working with school-tasks, sending e-mails, choosing new music from their MP3-files, looking at a homepage and they are chatting. When I get nearer, they very rapidly (and skillfully!) change to the school-task.

Most of their collected material seems to be copied from books in the library. Sometimes I notice two pupils discussing an introduction to their work (the groups seem to consist of two pupils) but mostly they are working individually.

The ways of working vary. The pupils collect facts both from the school-library and from the Internet. They work, at least sometimes, with the prescribed task. The pupils have "a lot of plates spinning at once" and their parallel activities show the computer as a tool for working, as well as a tool for entertainment. The findings also raise issues about the role of the computer as a tool of distraction in pupils' learning and how such a statement influences pupils’ ability to do their schoolwork with discipline.

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The teacher’s task will, for instance, be to serve and send the pupils links and websites by e-mail. It is not possible to talk to the pupils in a normal way because they wear headsets to listen to music when they work. The silent communication that may exist between teachers and pupils with e-mail, sending schoolwork or more informal talks, will not be evident to the observer.

Besides the three basic skills, reading, writing and arithmetic, the use of ICT has intensified the demands for something that, in the project (KK-foundation) preliminary has been called “a fourth basic skill”, handling the information that is overwhelming us. But one large contemporary problem is that in school practice the ambition of attaining a fourth basic skill not seems to reach beyond a rather simplistic use of different software.

It was not possible in our study, only a week in length, to follow the work-process in specific topics or in an interdisciplinary theme from the very beginning to the end. But our observations expose the fact, that the pupils mainly use their time at school searching for and collecting information. The notes about elaborating and evaluating activities with the ambition of working with "the fourth basic skill" are hardly noticeable.

One reason to this is that these pupils have computers of their own they do not have to leave the classroom to go to the computer-lab. In this example most of the pupils and the teacher stay in the classroom the whole lesson. The possibilities to discuss questions, ideas and thoughts are there, but the collective work in the class seldom exists.

Educational research shows that collective work or teamwork is seen as essential in learning. Learning is about handling acquired knowledge but it is also about breaking the new against the old and transferring it to new contexts. This work takes place in dialogue with others, in school together with classmates and teachers.

Do what you want, but work like this - Peter’s Power Point demonstration

The second case is related to field 3 that includes exercises especially intended to practise the ability to use ICT. The contents of the tasks seem to be of no interest, neither for the working pupils nor for the teacher. The work is managed when the information is found and when the presentation with support of ICT is accomplished.

Peter, class 6, presents his work about London that has lasted two/three hours a week for four weeks. He has searched for information on Internet and makes his presentation supported by Power Point. Notes from the lesson:

Some of the classmates are gathered at the computer and the presentation starts. A boy is pointing at the screen wondering what the island west of the UK is called (Ireland), but Peter does not know. The presentation consists of five pictures of London accompanied by some lines of text and lastly a photo of three football-players.

Peter is managing the presentation adjusting to his classmates' reading-speed. When everyone is ready with one picture, he goes on with the next one. At the end of the presentation the audience has to answer some questions. Peter wants to know the

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name of the capital of England, the number of inhabitants, the area and the name of one of the football-players.
His classmates answer the questions very quickly and praise the nice-looking presentation. The pupils' study of London is over.

Peter has the demanded knowledge to search for information and to use Power Point. That was his task. He is a clever ICT-user but he lacks what at least earlier was looked upon as relevant knowledge according to content and spelling. He could not answer the question about Ireland and his short written presentation contains many spelling mistakes. Peter’s presentation raises questions about the aim of the task, which were discussed in the interview with Peter’s teacher at the end of the week. He focuses on the process, not the product. He stresses the importance of searching and presenting, the skill, and ignores, at least in this case, the contents, facts and understanding. Peter’s knowledge differs from what traditionally is considered as school-knowledge. It would be a serious mistake to believe that this new knowledge, i.e. handling computers and producing professional presentations, could replace pupils' knowledge about the contents in education.

**Individualization and co-operation**

In spite of shifting responsibility from the teacher to the pupils, the teacher still has the main responsibility for activities going on. Teachers continually encourage the pupils "to do something". Our findings show that "to do", for instance to search, is stressed and that an individualized way of working dominates. There is no time to work with syntheses and entities. "To do" gets more attention than "to understand" or, in other words there are obvious risks that you do not fulfil the latter and that issues about learning will stay in the background. These circumstances combined with individual tasks and with the absence of textbooks, which often offer a comprehensive picture and a general view, can mean that content, earlier seen as important, is neglected. At the same time pupils do not attain "the fourth basic skill" (not even to use the technology).

Intentions to create a good learning environment supported by ICT include teachers’ ambition to vary and to individualize teaching. A way to interpret the meaning of individualization is to underline the fact that tasks will be adjusted to each pupil’s ability. Anyhow, tasks and ways of working are seldom differentiated in that way. All pupils are mostly expected to work with the same or very similar tasks in the same way. That means that individualization to a great extent is the same as isolation. Possibilities to learn through discussions, to work with experiences and to create understanding will be reduced to a minimum. Another consequence might be that pupils get their own, individual knowledge and that the common, general knowledge, that would be created in co-operation and discussions between pupils and teachers, will be marginal.

In a socio-cultural perspective on learning, the participation in social activities and the use of artefacts, here ICT, are regarded as important. The use of ICT in our study is mostly individual in spite of prescribed pair- or group-work. Certainly, dialogues, more with classmates than with the teacher, exist. But if they are talking about the contents on the screen it is not possible to decide. However, our field-notes reveal that the conversation between teacher and pupil mostly deals with search-alternatives more than with the contents. One conclusion would be that the interaction with classmates and

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with the teacher is replaced by the computer and the individual work. However, it is naive to believe that the computer, other than in exceptional cases, for instance searching for facts, could replace the teacher.

The dominating forms of knowledge are facts and skills, more than understanding. Teachers refer to lack of time. They have not got the time they want for deeper discussions, neither with individuals nor with groups. The field-notes show that discussions in the whole class, with just some exceptions, are rare, which means that pupils’ possibilities to ask and work up with questions of their own are negligible. There is a risk that pupils’ “zone of proximal development”\(^{11}\) for learning will be reduced, but also their possibilities to create their own understanding of the world around, with support by facts and skills.\(^{12}\)

One finding highlights the dissolution of boundaries, for instance in relation to the classroom. Pupils who have a computer of their own at home prefer to do schoolwork where and when they want, e. g. at home during weekends and evenings but also during schooldays. The main reason is that at home they can work in peace and quiet. If school cannot offer a good learning environment to pupils who have these possibilities, they can leave school and study at home. They say that they work harder and concentrate more at home. Again, it is possible to establish that the individual work at home will influence the possibilities for collective discussions and learning. Also, the individual tasks might focus too much on facts and at too low a cognitive level, as the conditions to get understanding demand dialogue and exchanging of beliefs and ideas.\(^{13}\)

Another finding says that the communication between teacher and pupils is changed from oral in the classroom to written, supported by ICT. This shifting raises the requirements on pupils’ ability of reading and writing. It might lead to making pupils with difficulties with reading and writing silent, but might also reduce the possibilities of learning which are to be found in the borderland between speech and writing. According to Säljö (2000) it is impossible to use a lot of the possibilities of ICT if you are not able to express yourself in written words at a fairly advanced level.

**Control and responsibility**

As boundaries relating to room and time are changed, to some extent depending on ICT, teachers’ and pupils’ work are influenced. Teachers do not have the same possibilities as earlier, when all of them were in the classroom, to follow and to control pupils’ work. At the same time, pupils’ own responsibility for a well-done piece of work will increase.

When issues about control and responsibility are brought to the fore, some difficulties will occur. Not all teachers are willing to hand over a growing responsibility to the pupils, neither according to the use of ICT nor learning. Teachers want to know how pupils use the computer and also what they learn. Our observations and interviews evidently point out a lack of confidence from the teachers as to pupils’ ability to be responsible for their own work and learning as described in the curriculum. Third years pupils in the upper secondary school, for instance, are not allowed to be in the computer-lab without a teacher, but they are in the same time expected to work independently taking responsibility for their own learning. However, there are teachers,

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\(^{11}\) Vygotsky, 1986.


\(^{13}\) Carlgren, 1998.
who in gradual stages, let go of their control, letting pupils to exercise influence over their education and increase their responsibility at a slow and adjusted rate.

Again it is necessary to emphasize that pupils’ preparedness varies with regard to taking over responsibility both for learning and handling the software. Pupils’ different ability for taking responsibility means that some of them take the possibility to work on their own. They manage to achieve expected results. Others do not meet the demands. They do not understand the aim and the meaning of the education and they can be regarded as failures. The changed role of the pupil does not seem to be good for them.14 When giving pupils increased responsibility using an independent way of working, irrespective of using ICT or not, a shifting of influence and power is attained from the teacher to the pupils.15 The changed sharing of power corresponds with outlines in the curriculum regarding participating and responsible pupils.

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Final remarks

In this paper attention is focused on two extracts of cases. In the first one, pupils themselves choose the way of working to perform a piece of work decided by the teacher. In the second one “do want you want but work like this” is prescribed, a specific way of working means with ICT. The two examples raise issues about pupils' activities and conditions to learn, irrespective of using ICT or not.

A proportionately large amount of time in school is used searching for information, mainly on the Internet, which means that time for elaborating this information, individually or collectively, will be reduced. The most frequent way of working is individual work, also when pair- or group-work is prescribed by the teacher. The main individual work takes place at the expense of collective discussions which might give pupils possibilities to confirm and develop their conceptions and opinions.

Pupils’ ability for taking responsibility for their own work varies. Some pupils work successfully on their own, preferring to work at home. Others do not understand the aim either of the task or of the way of working. Their time at school appears to be meaningless and they are at risk of being failures. However, with a more conscious and individual supervision, a sort of acclimatization, more pupils might be successful. The possibility of becoming successful without more instructions than ”do what you want in social subjects!” will for a lot of pupils be extremely small.

The findings highlight some changes that are important for pupils’ conditions to learn. A common intention, both in school-documents and with the nine interviewed teachers, is ”to create a good learning environment”. The importance of ICT is more stressed in the documents than with the teachers. The learning environment we met is changing all the time. The issue of whether changes will lead to “a good learning environment” for all pupils is handed over to more focused studies in the future.

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