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FINDING INFORMATION ON THE WORLD WIDE WEB

ABSTRACT

This is an educational case study trying to show a little bit of how and what children (10 - 12 years old) think about searching for information on the Internet. In the guidelines for primary (and secondary) school it is said among other things that the students should learn how to evaluate facts from different sources. Since Internet came into our schools this has been the subject for many discussions. To what extent are these young children able to search for information on the Internet? Some teachers do not let the children even try and others think that Internet is a fantastic tool to use in training the pupils to evaluate facts.

There have been observations, interviews, less formal talks and analysis of the children's written works in three different schools/classes. The schools/classes were chosen because it was known that the teachers let the students use the Internet for relatively free information search. All the students used AltaVista, MegaCrawler and similar search engines.

The findings are that the children appreciate that Internet is a fast way to find current information and they all want to find "good" information. What "good" is differ from student to student. It can be anything from short texts (in Swedish) to "non-commercials", but they all had the ambition to do a good job and not just take the first hit available. They were also aware of that there could be "lies" on the Internet. If the children are supposed to succeed with this type of work they have to have the opportunity to practice.

We live in a changing society. It is slowly transforming into something other than the industrial society it has been for a long time. Some people call it an information society, as information is becoming an increasingly important part of our existence. We are unceasingly flooded by immense amounts of information. The Internet has become the symbol of information overflow. Even our children are using the Internet, including the World Wide Web, and it is of vital importance to start thinking about how we deal with this phenomenon in the classroom.

The Swedish curriculum prescribes that the students should be able to orient themselves in a complex reality with great information flow and rapid changes. It is also necessary that the students develop their ability to evaluate facts and conditions critically and to realize the consequences of different alternatives (Utbildningsdepartementet 1994, p. 15)¹.

The curriculum does not provide clear directions about what to do at different ages other than the goals of attainment. For the fifth grade,² the curriculum states that the students should be able to

¹ Utbildningsdepartementet = Ministry of education

² In Sweden when students leave the fifth grade, they are usually 12 years old.

- converse about and make personal reflections on questions of philosophy, faith and ethics in relation to everyday situations.
- find and assemble information about society from different sources such as fiction, specialist literature, newspapers, encyclopaedias.

(Grundskolans regelbok, 1995, p. 173 & 179 in Thoursie, 1995)

It is not a matter of course that students are allowed to deal with information retrieval on the World Wide Web in school before the fifth grade. The reasons can vary. Many schools choose to let this flood of information wait until the students are in their teens. Some because they still do not know how to deal with the situation among younger children and others because they do not consider young children able to deal with the information flow. The curriculum leaves it to the schools or to the individual teachers to decide what methods to use to reach the goals described above.

Despite this, there are schools, which let the young students search for information via the World Wide Web. In my dissertation, I intend to understand what this means to these students. To what extent do they examine and evaluate facts? What reflections do they make upon the information they find? What do they think about the consequences of different alternatives? During late fall 1997, I made a pilot study on this theme, and the main question was "What ideas do the students and their teachers have about the contributions of the Internet to schoolwork?" Below I present the result from the study.

Information Retrieval

Information retrieval research has been conducted for over 30 years (Schamber 1991). Research on adults is usually conducted on people with great experience of information retrieval such as researchers and university students. The main goal of research on children searching for information on computers has been to make information retrieval easier by taking advantage of children's natural curiosity, adjusting interfaces, and making search engines less sensitive to misspelling. Most of the research on this area has been conducted with experimental designs using fixed databases and special logs documenting the subjects' search paths.

The results from earlier research on children retrieving information can be summarized as follows: No differences between boys and girls have been found (Hirsh & Borgman 1995; Borgman, Hirsh et al. 1996; Berger 1997). Older children and children with more computer experience have an easier task searching with words than the younger and less experienced, but the differences are great depending on the subject and the interface (Borgman cited in Hirsh & Borgman 1995). Practicing information retrieval is important. It is also important to allow this to take some time and that you may experiment and fail (which is not valid for children only) (Hert, Rosenbaum et al. 1995). Most of the research is concentrated on *how* children search – not *why*.

Children and computers

In Sweden, many students associate computers with games and amusement. It is possible that the computer will induce another behavior than what is usual in school. The expectations on easy activities are great (Jonsson 1997). The computer invites to act and, according to Jonsson, a lot of time in front of the screen is spent changing typeface and moving pictures. The strategy seems to be

trying and see what happens. On the Internet, the searching itself is more important than the subject searched for. Jonsson refers to teachers in saying this, and he stresses the importance of helping students to formulate questions and to question sources. He also poses the question if there is any meaning at all in searching for information on the World Wide Web in relation to the goals of the curriculum, before the student is 15 years old.

Computers affect children very differently at different ages. Turkle (1984) describes three stages in children's relationship to computers. Small children are interested in whether the machine is able to think or not. From the age of seven/eight, the children are more interested in controlling the world around it than thinking about what it consists of. Teenagers deal with the question of identity, and the relation to the computer changes once more. The computer again becomes a medium of philosophizing, not upon the machine but upon the self.

Methods and sample

This study can be described as a didactic case study. Several methods have been used to collect data: observations, chat, conversations, interviews, analyses of written texts among other things. The study aimed at giving a picture of what was happening right there, right then. My intention was to find a school, where they encouraged the students to use the World Wide Web as a tool in their search for knowledge. I quite easily found three schools that were willing to let me come and do my study.

All three schools were elementary schools. Two of them were situated in very small cities, and the third in the countryside. The students' access to Internet computers varied. What the three schools had in common was that the teachers were enthusiastic in letting the students use the World Wide Web and they all encouraged the children to use Internet computers after school. School A had Internet computers even for the youngest children. School B had a special group of students – one from each class in grade 4 – 6. These students were trained in Internet skills and were supposed to support teachers and other students. The class at school C was in contact with a class in USA through email. The exchange was supposed to result in a book about USA and Sweden respectively.

The first visit

I will try to give a picture of the World Wide Web classroom with the help of glimpses from my field notes³, which I have reflected on. At school A I began with a visit to the youngest students.

The doors are open between the classrooms while I am there. In the lower classes, the students work with "work of your own". There are two Internet computers in each classroom...In the second grade...three girls...(are going to) send an email to Spice Girls. From the beginning, the teachers had in mind that the youngest students were just to learn how to handle the computers through working with spelling and drawing programs. The work with the Internet was supposed to start in grade 4. All the computers in the school are connected to the Internet through a network and each class has their own

³ The field notes are the notes I did on my visits. The notes have been read and commented on by the teachers. Students that were interviewed have read and commented on their own interview transcriptions.

email address. Some girls in grade 2 came up with the idea to write to Spice Girls and the teacher encouraged it. As they did not know enough English, they had some help from older students translating the letters. Two groups of girls wrote a letter each and now it was time for one of the groups to write the text into the email program. The teacher had not used the email program very much herself so in the beginning it was "trial-and-error". All the girls were sure they were going to receive an answer.

It was clear that the teachers' permitting attitude and the openness to the students' suggestions was the reason why the girls could send their email. The younger children at this school had not thought very much about the Internet otherwise. In the fifth grade, it was easier to get an answer to the question what is good with the Internet and the World Wide Web. Several students were very enthusiastic and answered that you get information very quickly and that you have answers quickly if you use email. "It is Great!" The students used the Internet every day in different ways. The teacher told me that the students' own searching for information had high priority.

Grade 5 is working with different countries. Each student begins with writing down what they want to know about the chosen country. Then they write down a plan for their work. Right now, many of the students are working with the Nordic countries. Close to the school an Icelandic family lives. Many of the students chose to visit them and make interviews about Iceland. The World Wide Web is also a popular place to search for information. The teacher has to approve the students' plans. If the plan does not contain for example information retrieval from books or encyclopaedias, the teacher discusses an addition.

Judging from conversations I had with the students and from what I saw of their behavior, it seemed like the picture the teacher gave of the classroom work was correct. Searching for information on the Internet had become a part of the students' every-day life– a positive part. My impression was that the teachers encouraged the students to search for knowledge within the limits of the subject taught at the moment. The students did it with great joy and were proud of their findings.

At this school rules and prohibitions did not surround the use of the Internet. No "driver's licenses" for computers were used. The teachers trusted the students' own responsibility. The curriculum (Utbildningsdepartementet 1994) prescribes that teaching should be pursued in democratic forms and prepare the students to actively participate in society. It is common life at this school that the students are responsible for their own learning.

After a time at this school I began to feel more at home and I started to ask the students how they chose among all the information they found. Some boys in the sixth grade were working on a site with many links on it. I asked one of the boys what links he chose. "Things that can be good to have". He told me that the site was to be read both by adults and by children. Some of the links he had chosen were links to different companies, for example newspapers. He knew they were commercial. I tried to initiate a discussion about the suitability of having commercial sites as links, but it never came to a discussion. He did not seem to understand what I was trying to say.

The second visit

The students had a very positive attitude towards the Internet. In school B, too, they emphasized that the Internet was fast and contained a lot of information.

Grade 6 is working with searching and assembling information about countries all over the world. They need to find certain facts and then put them together in a neat booklet. They can use their geography books, encyclopaedias, and the Internet. They are also allowed to find other channels for their information retrieval. A boy has sent a fax to a relative in Australia and received information that way. Most of them have searched for information on the Internet. Mostly they have used the CIA World Fact Book, where they have fetched maps and flags. A boy wrote the name of his country in the search engine Mega Crawler. He got information about different football teams in the country. He did not reflect upon whom had written the texts. A girl found information about Tamagochies the same way. She did not know who had written the text either, but she had noticed, she told me, that some of the texts were commercial. The text she had chosen was, according to her, a non-commercial text, and a good one.

I also came to meet Johanna, a girl in the fifth grade, who was booked for Internet surfing after school.

Johanna tells me that she learnt to use computers and the Internet from Lena, who is a member of the special Internet group at this school. Johanna does not have a computer at home, so she books computer time at school or at the municipal library. She has her own email address at Hotmail and sends email to a boy, who she met in a chat on the Internet. She also tells me that she has many ordinary pen pals and the difference between email and snail mail is that you do not write that much in an email.

Johanna finds a search engine. The reason why she chooses this engine is that she thinks it provides good information. She enters different kinds of turtles in the engine. She tells me that she has three small turtles at home. When I ask her why she searches the net, she answers that she finds things she did not know before. She reads many books, but they do not contain everything.

To summarize what students say about the kind of information they choose it can be described in one word – good. The boys, who worked with links to their site at school A, choose links that were good to have. The girl, who was looking for information about Tamagochies, chose a good site. Johanna chose a certain search engine because she thought she could find good information. The students did not accept just any information.

I do not think we have to fear that our children see all the information that comes through the Internet as good, but the question is: what is good in their eyes? What do they choose?

Children and commercials is an area where a little more research has been conducted. One of the questions is if children can distinguish at all between commercials on television and other programs. Researchers have not come to a

consensus in this matter. Some studies mean that children can separate commercials from other programs at the age of three to four. Others say that it is not until they are six to eight years old that most children are able to do this. Nevertheless, all studies agree that when a child is about ten years old this ability is fully developed (Bjurström 1994).

To be able to distinguish commercials from other programs does not necessarily mean that you understand the purpose of the commercial. This is the second question. Not until an individual has understood the purpose of it, they are concerned with its reliability (Dorr, 1986 and Young, 1990 cited in Bjurström 1994). The consensus in this matter has parallels to the first question regarding ages. In some studies, it is said that 5-year-old children can develop this ability. The majority of the studies point to the fact that most of the children have developed a basic understanding of the purpose of the commercials. In some studies, researchers tried to separate different degrees of understanding. They found that a child has to be about twelve years old before it can fully develop an understanding of the purpose of the commercials (Bjurström 1994). In his report, Bjurström emphasizes that there is a lack of a more theoretical understanding of how children gradually develop an insight into the purpose of the commercials.

I decided to make interviews with some students. The starting point of my questions concerned what is good and bad about the information you find on the World Wide Web?

The third visit

The students I chose to interview were all members of the Internet group at school B. They were chosen because they all had some extra experience from searching information on the World Wide Web. Their function as supporters in their classes was regarded as positive, as they all have had the opportunity to reflect upon the work with the World Wide Web in another way than their classmates.

When I asked what was good or bad on the World Wide Web, their answers mostly concerned the medium as such:

The World Wide Web has all the news and it is easier to find information than in books. Most things about the Web are good. It is bad if it is in English...Email is good to use when you want to write and ask things. It is much faster than ordinary letters. It is easier and you do not need any stamps.

The Web is good because there are so many things to have fun with. What is bad is when it does not work and it takes a long time.

Everything is on the Web and you find things faster than in books. What is good with Internet is that it is just easy to find facts.

You can find many things on the Web. If you want to make a cake and you do not know how to do, you can just search for "cakes" and see if you find a recipe.

The good thing with Internet is that there are so many things and pictures...Email is good to use if you want to ask about different things. It is fast.

What is good and bad can be interpreted in different ways. Anyway, I got some answers concerning the content:

On the Web, there are a lot of things that are not in papers or magazines. That is good.

Good things are things you did not know before. Bad things are documents where there is just text.

You can find a lot of things that you cannot find in the books here at school. Probably most of what you find on the Web is printed in books somewhere, but not in the books on this school. The things that are not in books are bad things like bomb recipes and porno.

More than one of the interviewees talked about bomb recipes, and later I understood that this subject had been discussed on the meetings of the group. I also asked the students if it is possible to know if what comes up on the screen is "true", i.e. if you can rely on the information to give a true picture of life. Whether my question was correct or not can be discussed. The question about if there is any truth or not is deeply philosophical. I chose this concept, as my experience is that children in our society use it. I counted on the concept to carry a mutual meaning, and another reason was that I could not find another way to an approach.

In the Internet group we have talked about sites written by for instance political parties where information can be distorted and not give a fair picture of the subject. That is bad, too. Commercials are often not good, because you just say that things are good and the information is distorted.

Commercials are no good – it is just there. You can watch commercials sometimes.

There are lies on the Web. Johan gives the example that if you want to find information about Sweden you shouldn't look in the USA, because they don't know much about Sweden over there.

They have learnt on the group meetings how you can see where different information comes from. From the addresses you can sometimes suspect that what is said may not be true. If you doubt, you can ask an adult or think by yourself. If it says that something happened in the Middle Ages and it also says that it happened 1995, you understand that it is wrong.

If you want to know if the facts are likely to be true, you can check the county codes. You can also compare it to books.

It is quite clear that these students are aware of the fact that the information you get via the World Wide Web is not neutral. Some of their answers sounded like imitations of what their teachers had said, but other answers seemed like processed knowledge put into a context. I interpret the ability to construct one's own examples, like the one concerning the medieval ages, as an understanding of some of the context. Examples like that can of course be imitations of something

someone else has said earlier, but the way this student sounded indicated that it was individual thoughts.

To realize coherence is a work that the learners have to do by themselves. Ekholm (1992) describes this as a detective's work, trying to reveal regularities in what you have experienced. To do this you need time, as coherence does not show up until the person who develops knowledge has handled the knowledge area for a longer period (p.11).

The fourth visit

In school C, the students in grade 5 were working with their exchange with an American school. A boy willingly answers my questions. When I ask him about good and bad information on the World Wide Web, his reply is similar to the one the students in the Internet group in school B gave. He too, thinks that English texts are bad. He laughs at me when I ask if everything is true. He knows very well that it is not.

That English texts should be a criterion for bad sites is not valid for everyone in the class. One of the teachers tells me this. Many of the students have such a command of the English language that they do not react on what language the site is written in. The contact with the USA makes the students learn English in a natural way.

Each student has at least one email pal in the USA class. Some students sit together when they write their letters and they do not seem to have any problems with the English language. The teachers control all letters before they are sent. The letters are quite short, just a few sentences, and contains information about their interests and families.

Comment from one of the teachers: "The letters are very short to begin with. As the replies arrive and the students get to know each other more, the letters become longer and have more substance."

The only information they actively take in about the USA is the one they get through email from the American class. The collaboration has just begun and the teachers count on a deeper knowledge to develop. When the students answer questions from the American class, they usually use their own experience. A group of girls though, got a question about the Swedish royal family. They do not think they know enough about the subject so they search the Web and find a picture of the king, the queen, and their children. They do not have time to do anything about it, because it is time for lunch by the time they get there. They copy the web address and turn the computer off.

As it is Christmas soon, the students are going to write about Swedish Christmas traditions. One group has written about Advent and Lucia. They are also going to write about the food we eat at Christmas. They have already found a recipe on gingerbread in English on the Web. They copied this into a letter. A girl is now going to look for a recipe of "Jansson's temptation"⁴ in English. One of the teachers gives her good help. He found it himself earlier and knows where to look.

⁴ Jansson's temptation is a kind of potato gratin with anchovy.

The last visit summarized what I had seen earlier. In this class email and information retrieval on the Web was used in a fruitful combination. So far, they are in the beginning, but well on the way.

The questions from the students in the USA stimulate the Swedish students to reflect upon what things are like in Sweden. Their own learning about the USA emanate from their own questions, which was already recommended in our former curriculum (Skolöverstyrelsen 1980). The local government where this school is situated has an IT project plan in which it is written, under the heading *Strategy*, "A fundamental idea is to stimulate the own responsibility for the development of competence – students as well as teachers." With this kind of work it is possible.

Concluding analysis

As this study is just a pilot study and is using a small sample, it would be too ambitious to claim that the picture presented represent all schools in Sweden. Anyway, I think it can provide some insights into what it can be like. This is a picture of what happened in some Swedish schools in the late fall of 1997. The schools were chosen from one criterion only; that they were using Internet and the World Wide Web as a working tool.

All the students I spoke to did seem to have a true ambition to do a good job. The information they found on the Web was must be good. From their experience, they made a judgement of what they found. Objections to students younger than teenagers using the World Wide Web in a meaningful search for information are based on the assumption that these students don't have enough knowledge to judge the relevance of what they see on the screen (e.g. Jonsson 1997). Reality may look like this, and believing that the students should be able to judge the relevance of texts without any previous knowledge is naïve. It is a whole different matter to have the ability to learn to judge relevance. The students in the study clearly showed that they had acquired hints from the teachers on how to judge different documents.

When I saw the younger children (7 – 9 years) searching the Internet, and by the computer on the whole, I could see that they, to a higher extent than the older, spent a lot of time clicking and moving around pictures as Jonsson (1997) describes it. They spent more time testing what could be done with the machine. According to Turkle (1984) children in these ages begin to direct their interest towards controlling the world which includes the computer. The older and more experienced students master the technology and know how to use the computer more specifically. The students at school C did not always use the Internet for information retrieval. They knew the most important facts were already written in their schoolbooks.

Developing a more directed behavior does not necessarily have to do with age. It can also depend on the experience one has of the medium. The youngest students I saw were beginners. In traffic research, it is common to talk about beginners (driving a car) as having a greater cognitive stress than experienced drivers have, as there are many new moments to handle at the same time. This demands great cognitive capacity. Experienced drivers have certain moments automated and the cognitive capacity can be concentrated on co-operating with other drivers and pedestrians (Gregersen 1991). It should be possible to transfer this reasoning to computer use and we can find an explanation to why the less

experienced students do not direct their searching in the same way as the others. They are occupied with finding out the capacity of the medium. If certain moments are to be automated, a prerequisite is that the students can practice on their own and do it often. Experimenting and testing limits must be allowed. In all the visited schools in this study, the students were encouraged to use the Internet both in school and after the school day. In all three schools, there were students by the computers until the teachers left in the afternoon. This was not the intention from the beginning, but developed logically from the way they worked.

How important are the teaching methods? All three schools aimed at the teacher being a mentor, helping the students to find answers to their questions. On some occasions though, I saw teachers standing behind the students' backs, telling them what to search for even when the students could have managed themselves. With the best of intentions teachers want to help students finding the "right" answer, making learning as effective as possible. In Sweden this is an heritage from our curriculum of 1962 (Kungliga-Skolöverstyrelsen 1962) when the leading star was to make the students learn as much as possible in as short a time as possible. The curriculum of 1980 instead accentuated that

One can not learn to collaborate if one does not practice collaboration, one can not learn how to outline an assessment and present it clearly, if the working methods do not demand this. One never learns to be responsible for mutual well being if no one gives you the responsibility and sets the demands. (Skolöverstyrelsen 1980 p. 48)

If this is transferred to the area of evaluating facts and conditions critically on the World Wide Web, the conclusion has to be that the students must search freely. If they are expected to learn to choose among different alternatives on the Web, they have to use it. In our latest curriculum, this is not opposed, but it is not proclaimed either. Students searching freely do not mean that the teacher is passive and just point at the computers. Dewey emphasizes that if you give up one idea you do not necessarily have to accept its opposite. Teaching methods which has their basis in the students' experience also demand careful planning (Dewey 1938).

The schoolteachers in the study wanted their students to have access to the Internet. They believed in their students' ability to learn to evaluate information. I believe I could discern that in the students' answers.

Conclusions

Did I get any answers to my questions? Yes, according to the students, the Internet makes the information retrieval process faster. There is also more information than in the books and it is more current. Many students emphasize that working with the Internet and the World Wide Web is fun, which is important. If students do not consider school to be exciting, fun and meaningful, it will be devastating to their desire and ability to gain knowledge (Utbildningsdepartementet 1997)⁵. This study shows that the students have a

⁵ Utbildningsdepartementet = Ministry of Education

potential for learning to make distinctions between different kinds of information.

What do the teachers think about what the Internet can add to the school? With only this study as a basis, it is more difficult to find an answer to that question, as no deeper interviews with the teachers were performed. Yet, I have posed the question how the use of the Internet and the World Wide Web is consistent with different perspectives on knowledge, students, and teachers. These areas are all linked together and difficult to separate. Whether you consider gaining knowledge as memorizing or understanding, the information on the Web can be valuable. Only the methods will differ. What does make a difference to whether the Web is interesting or not, is the perspective on children's cognitive development. This is what determines if information retrieval on the World Wide Web is meaningful in relation to the goals of the curriculum. Searching freely may not be meaningful if you are of the opinion that a teacher's task is to serve the students knowledge in small doses. For this, the Internet and the World Wide Web are too unstructured for the young students. On the contrary, if you think that students construct their own knowledge with the help of a guiding teacher, who is there to create challenging situations, the Internet can be a fantastic tool even for very young students. As I see it, the Swedish school will have problems fulfilling their goals if we wait too long letting the students work with examining and evaluating critically. So, why not use the Internet then?

The consequence of examining and evaluating critically means taking a standpoint for what is good. As a *personal* standpoint is to be supported in school (Utbildningsdepartementet 1994), what is good can be very individual. There are restrictions in the curriculum. As a base for all work in school there must be a certain set of values. The teacher has the responsibility to keep the work within these limits. I have not touched upon this in the article, but it is not insignificant.

When computers enter the schools, some schools also change methods, and it can be difficult to distinguish the role of the computer. What I have seen is that the computer works as a catalyst. Instead of computers renewing methods, they give teachers the motivation to discuss pedagogical matters.

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