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FROM "SPICE GIRLS" TO CYBER GIRLS?

The role of educational strategies in the construction of computer-enthusiastic girls in Norway

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1. Introduction: May girls be configured as computer enthusiast?

Studies of computer users have contributed to the construction of the popular image of the computer dedicated, usually called "hackers", as an all-male group with exotic features (see, e.g., Aune 1992, Turkle 1984, 1996, Håpnes 1996, Nissen 1996). They tend to have computers as their main, or even only, life interest, they work extremely long hours and spend nights in front of a screen, and are not particularly interested in "normal" social activities. For such reasons, hackers are interesting to study, and we probably know more about boys' and men's relationship to computers than we do about the way girls and women think and act in relation to these machines.

Even if there has been a sustained interest in women and computing, a dominant concern of these studies has been the assumption that women do not like to use computers. Moreover, female users are seen as not having the same kind of intimate and compelling relationship with the machine sometimes found among men. In fact, women are portrayed as instrumental. They perceive the computer as a tool, rather than as a friend (see, e.g., Rasmussen & Håpnes 1991).

In the last few years, there has been a public concern in Norway to increase girls' interest in computers. Particularly, the multimedia turn with the introduction of the Internet, cd-roms, and e-mail, has meant that information and communication technologies (ICTs) have been heralded as an obligatory condition for future success in the labour market. Since the number of females studying computer science or working in the computer industry has long been low in Norway, there was good reason to worry. Even worse, a couple of years ago the "alarm" was sounded because the amount of women was even decreasing.

It seems reasonable to assume that the interest in computers as a school subject and a potential vocational area is related to computer enthusiasm, although we should not assume that enthusiasm or strong dedication is a prerequisite for engagement with computers. While male hackers are not representative of male computer users, the study of their culture may learn us important lessons about male relationships with computers. Similarly, the existence of female computer enthusiasts could be seen as an indication of a

growing interest in computers among girls. Moreover, the features of their enthusiasm might tell us about what aspects of computers that are interesting to girls as well as providing a basis to analyse in greater detail the gendering of computer fascination. The latter term refers to the possibility of gender differences in terms of styles of using computers as well as the way that different aspects of computer fascination may be understood by the actors themselves in terms of "masculinity" and "femininity" and attributed to male or female practices or cultural expressions. Our main hypothesis is that the current transformation of personal computers into multimedia machines with Internet access makes computers more fascinating to girls and facilitates the development of feminine styles of use.

Norwegian education authorities have been very much concerned with girls' lack of interest in computers,[1] but their strategies have mainly been aimed at a general strengthening of the role of computers in primary and secondary schools. As is argued by Aune and Sørensen (1998), the Norwegian education authorities may be seen as involved in a full-scale experiment to promote ICT skills and competence through schools, even if the policy instruments that are employed, are rather general in nature. The effort to encourage girls to become interested in ICT, multimedia and computers may be interpreted as a part of that experiment, conducted through general encouragement of schools and tearchers to take the problem seriously and also through specific development projects at selected schools.

In this paper, we will examine the effects on this experiment by studying a selected group of girls that in fact were enthusiastic and fascinated by personal computers. In this way, we will provide an in-depth view of some features of this fascination as well as providing information about what kind of initiatives/efforts (if any) that strengthen the girls' interest in the use of ICTs. In particular, to evaluate the national full-scale experiment, we will analyse whether the schools are doing anything that evokes interest among girls, and if so, what? Is the fascination with ICT a result of educational strategies, or is it an outcome of other influences? This will be considered as a possible instance of learning by regulation, to learn from efforts to configure and shape a particular instance of socio-technical relations (Sørensen 1996).

2. Gender and ICT: Differences and differentiations

Computer-use statistics of Norwegian pupils show that boys make the majority among those using computers actively in and outside school (Sjøberg 1985, SSB 1995). We find the same trend in higher education in Norway. The relative share of female master-students at the Department of computer science at University of Oslo in 96/97 was only 6 % (Stuedahl 1997). However, from 1997 the trend seems to have turned and progressively more women start to study computer science.

As already mentioned, much of the research on the use of ICT has focused on hackers. Sherry Turkle, one of the pioneers in the field, argues in *The Second Self* that hackers have fears of relationships with people and therefore have relationships with machines instead (Turkle 1984). The computer becomes a partner that offers a particularly seductive refuge to someone who is having trouble dealing with people. She found that many hackers first sought out such a refuge during early adolescence, when other people, their feelings and demands seemed particularly frightening. They found an escape in the computer and never moved beyond. The hacker culture is held together by mutual tolerance and respect for radical individualism. Turkle (1984) sees the hacker as a personality who is fascinated by the possibilities of control in computer technology. They have a culture of mastery and individualism. Above all, she found that hackers loved the machine for itself. In this study she describes a universal hacker culture.

As a contrast, Tove Håpnes (1996) found in her study of Norwegian hackers that they did not consider their relationship to their machine to be personal or close. The hackers she studied, had domesticated computers as a tool for work. They developed and shaped a style of work and manners that contained elements of competition as well as collaboration. The culture she described, was individualistic and collective, with elements of competition and collaboration. Play and entertainment went hand in hand with work and utility. Håpnes' hackers talked about winning and mastery, but also about the importance of being artistic and interactive. In comparison with Turkle's MIT hackers, Håpnes found the Norwegian hacker culture less extreme and more heterogeneous. Moreover, it allowed members to model different masculinities through accepting a variety of personal qualities.

Turkle (1984) has also put forward two influential arguments about the gendering of computer use. First, there is the assertion that one may identify two ideal types of programming that she calls hard and soft mastery. Hard mastery is a rational, step-by-step, preplanned programming strategy, while soft mastery is more of an artistic and interactive, trial-and-error type of approach. The former is preferred by males, but not all, while the latter is preferred by females, but not all.

The second argument is that women's relationship to computers is hampered by what Turkle (1988) calls "the fear of the intimate machine". In the computer culture, she argues, it is perceived as natural to have an "intimate relationship" with the computer. However, women feel that intimate relationships are for humans and not for machines, and therefore they turn away from computing. The argument has been contested, for example by Bente Rasmussen and Tove Håpnes (1991). It was the culture around the machine that pushed the girls away not the machine in itself. It was some boys' dominating behaviour around the machine that most of all created the insecurity that the girls felt towards the machine. The girls began to believe that there was something important they did not know, and they began to feel insecure in relation to the boy, the ones that supposedly knew what they did not.

In her recent book, *Life on The Screen. Identity in the Age of the Internet,* Turkle (1996) argues that the culture around computers is being transformed and in some sense trivialised. The previous influence of "hobbyist" PC users who felt that they needed to understand how the machine functioned, is diminishing. The computer culture is, according to Turkle (1996), close to the point where full membership does not require programming skills, but is accorded to people who use software out of a box.

Turkle (1996) argues that the computer culture has changed from a culture of calculation to a culture of simulation. The fascination of computers used to be tied to the seduction of programming. Today, it is, according to Turkle, tied to the seduction of the interface. She claims that the lessons of computing today have little to do with calculation and rules; instead they concern simulation, navigation, and interaction. Turkle (1996:19) also claims that "programming no longer is cut and dried, but it is elusive". It seems like programming knowledge is no longer as important as before. Turkle has found that it is no longer so important to know what is happening beneath the surface of the machine, but to be able to move between easy recognisable icons on the surface.

The social image of the computer is, according to Turkle (1996), far more complex than before. It now evokes both physical isolation and intense interaction with other people. Multimedia personal computers have become the tools we use to write, to design, to play with ideas, shapes and images, to create video sequences and musical effects, to create interactive novels and graphical images. This means that the machines are developing a new set of intellectual and emotional associations. The culture of personal computing now makes room for ways of knowing that are dependent of the "concrete" manipulation of virtual paintbrushes and paints, virtual pens and paper.

Thus, we face a new terrain of computer use and possibly also a new configuration of computer users. This means that we should be careful not to invoke traditional masculine and feminine stereotypes. In fact, since technology and gender are in mutual interaction (Berg 1997, Lie 1998), we have to be open-minded about the nature of fascination with ICTs among girls/women as well as boys/men. On the one hand, however, it seems reasonable to follow Turkle's lead and look for an ICT fascination among girls that is more based on inter-activity and communication than on programming. On the other, the idea of mutual shaping of gender and technology should make us sensitive to the possibility that a fascination with ICTs could be related to a different understanding of femininity. In the following, we will examine these possibilities.

The analysis of computer fascinated girls should be understood on the basis that PCs have become a standard inventory of many households. Today, 39 per cent of the households in Norway have computers.[2] More than one million Norwegians have Internet access.[3] The number of pupils with Internet access at school is growing. At junior high school, the average number of pupils per computer is 11, and more than half of the computers have Internet access.[4]

The aim of the education authorities is to achieve the integration and use of ICT within a variety of subjects at school. In this manner, they also want to make girls more active. In this paper, we will look at what girls fascinated by computers, perceive of the role of computers at school. Does it affect them in any way? Is it a problem for them to get access to computers? How do they characterise their relationship to the computer? Are they afraid of being absorbed? How do the girls find the computer culture?

The multimedia transformation of computers makes us expect a more widespread use. Does this use make computers more attractive to girls? Do the girls become like the boys? Or do they think that boys become more like girls in their relationship to ICTs?

3. Method

This paper uses empirical material from the study 'Communication and information technology—new possibilities for girls?'[5] The total data-material consists of observation and in-depth interviews with 41 girls at the age of 14, 15 and 16 at five Norwegian schools.

In this article I am concentrating only on the girls whom I characterise as computer-fascinated.[6] These informants were chosen according to three criteria. First of all they had to be computer fascinated. This means that they displayed a definite positive attitude towards and a clear interest in the use of computers. Second, they had to have some computing skills. I did not expect them to be experts, but to have greater skills than girls in general at that age. Third, they should use computers on a regular basis. These selection criteria mean of course that the informants are atypical and do not represent Norwegian girls in general.

In this paper, I will describe and analyse the girls' relations to computers, how they become computer-users, and how they use computers in their everyday life. The argument is structured in three parts. The first part compares the girls perceptions of themselves with some general expectations and myths about "computer-girls" as having an untraditional, "male" interest. In the second part, I will look at computer-fascination. What aspects of computers are attractive to the girls? In the third part, I analyse the girls' use of computers and their computer-related activities.

In the conclusion, I will return to the question in the title of this paper, do the girls become "cyber girls"? This will be related to the issue of the efficiency of the strategies of education authorities. Have they succeeded in configuring new groups of computer users? What kind of processes of social learning are involved?

4. Computer-girls or tomboys?

If educational strategies to create computer fascination among girls should be effective, this would most probably be because the strategies interact with other qualities in the girls' environment or characteristics of the girls themselves. Thus, it is important to assess if there are some common features of computer fascinated girls that would make them more open to the efforts of schools. Also, they might display qualities that would marginalise them and imply that computer fascination can be achieved only with considerable individual costs.

Previous research and the images provided by mass media cause some general expectations about "computer-girls". First, they are assumed to be "*tomboys*", to be more masculine than most other girls. If this were the case, computer fascination would certainly be relegated to margins of normal social life. However, this seems not to be a relevant description. None of the girls appear as tomboys. Neither their interests nor the way they look and dress is in line with such a characteristic. In fact, they appear as normal teenage girls with an interest in fashion, music, make up and boys.

Second, such girls are expected to do well or at least have an interest in mathematics. Previous research indicates a strong connection between math skills and being interested in computers. This would also limit the potential of computer fascination. However, the data do not support this. When the girls talked about a favourite school subject, or their best school subject, there were no similarities among them. Some liked math and science, others language and social science. There was no clear relationship between their computer fascination and favourite school subjects besides the fact that all the girls were high performers. Half of them were among the best in their class, and the others declared themselves to be above average. Consequently, it might be the case that computing is just another "subject" that these girls are good at. Comparing with our data about non-fascinated girls, many of them were high performers as well (Håpnes & Rasmussen 1997). So it is not as simple as that.

It is known that female engineering students tend to have parents with higher education (Rasmussen og Kvande 1991). Therefore, one could expect that computer fascination among girls would have a similar explanation. However, the parents of the computer fascinated girls had very different educational background and jobs, ranging from a cleaning lady to an engineer.

What is important to notice, though, is the fact that, compared with the other girls in the larger study, the computer fascinated girls were different in their educational and vocational ambition. The less computer fascinated girls want jobs where they can help other people (Håpnes & Rasmussen 1997). The computer fascinated girls would also like to work with people, but this is not as important or central. Instead they want exciting, challenging and well-paid jobs. One of them even thought she wanted to become a carrier-woman without husband and children.

Finally, there is the image of the *computer-nerd* as an unsocial, unsuccessful person. Again, this does not match very well with my informants. In fact, all the girls were very social and spent much time with friends. I also observed them in relation to classmates and saw that they tended to be among the *popular* rather than the *unpopular*. Since the girls were all social, popular and accepted as girls, this might be important to their willingness to expose themselves as computer-girls. Non-nerdishness might thus be a condition of computer fascination among girls.

Thus, my informants were not a homogeneous group and did not fit with any stereotypes of computer users. This gives an optimistic basis for believing that educational strategies might be quite efficient due to the rather limited number of clear constraints or conditions of computer fascination. However, there were some other interesting similarities. First, it is interesting to notice that none of the computer fascinated girls have elder brothers. We know from the larger study that many girls seemed to suffer from the fact that their brothers tended to occupy the machine at home. Most of my informants were the eldest child. Only two of them had elder sisters, but they were not interested in computing. Thus, they did not have to fight with someone else for time in front of the computer.

The second similarity is that most of the girls got in touch with computers at an early age. Not all of them had a computer at home, but all of them remembered using a computer at their parents' workplace or at a friend's house, if they did not have one themselves. I do not mean to say that girls have to start using a computer at an early age to become interested, but early use might be one of the reasons why my informants did not seem to host a fear of the machine. Instead, they appear to feel very comfortable using computers, since they had domesticated the computer into their everyday life at an early age.

Today, all the girls, except one, have access to a computer at home. The girl that does not have a computer at home uses her uncle's machine on a regular basis. Only one of them has a computer that is exclusively hers. The others have machines that the whole family share, but most of the girls were the main users of the family machines:

> Mostly it's me. But sometimes my father does some work on it and my
> brother plays the boring card games. (Trude)

Although the girls used the machines at home a lot, they were not the ones to decide what machine to buy. Most of them said that their parents made the decision to buy a computer, and it was always the father who made the final decision of which brand to buy. The girls explained this by saying he was the most competent person in the family. Since some of the girls actually have computer skills comparable to that of their fathers', it is interesting to see that the girls do not at all influence the act of buying the home computer and that none of them complain about this.

> My father suddenly came home one day with a new computer. We
> did not even know about it. He is probably the best qualified to

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assess what machine is best. It might have been him and my mother that picked it out. (Inger)

We could interpret this lack of influence as an indication that the computer fascinated girls are not recognised as really skilled by their parents, and that such recognition is not very important to them. In some sense, their interest in computers and skills in using them are not displayed publicly in a very visible manner. In fact, none of the girls read any kind of computer magazines, and they rarely talked with friends about computers.

So far, there seems to be few "structural" prerequisites to become a computer fascinated girl besides the possibility of accessing a computer. Nor is the fascination related to marginalising social or cultural features. Thus, there should be considerable room for schools to cater an interest in ICTs also among girls. At the same time, it seems that most of the reasons of acquiring such interest are related to non-school aspects. Thus, it is important to look further into the actual activities that these girls use computers to perform. Are they created by school-like interests, or do they grow out of leisure preoccupations?

5. Dimensions of computer fascination

To assess the impact of education policy, we need to look at the location of computer use as well as what computers are used for. If school is of any importance, it should be an arena as well as a cause of use. My informants said that they used the computer at school as well as at home. The place of most frequent use and how often they used it, varied among the girls. They also used the computer differently, both concerning tasks and frequency of use. Thus, school as well as home are important localities.

Table 1 gives an overview of the way the girls used computers. The girls apply the Internet for several purposes. The table distinguishes between surfing, searching and chatting. *Surfing* is when they for instance look at the home pages of pop- or movie stars like Spice Girls. This in contrast to *searching*, where they are more focused upon collecting information to be used in schoolwork or in connection with a hobby. *Chatting* refers to their use of chat-lines. I have not differentiated between different chat-lines. A striking feature of Table 1 is the variation. No application is used frequently by all, while very few options are reported as non-used. Compared with the girls in the larger study, the fascinated girls stand out by their varied use.

Table 1. Frequency of use of different computer applications among the seven computer fascinated girls. *

	Cecilie	Jorunn	Silje	Ingunn	Trude	Inger	Hedda
Word-processor	+++	+++	++	++	++	++	+++
Computer-games	+++	+++	++	++	++	+	+++
Cd-rom	+	++	++	+	++	++	+++
Surfing	+	++	+++	++	++	++	++
Searching	+	+	++	++	++	++	+++
E-mail	+++	+++	-	-	-	-	++
Chatting	-	-	++	++	++	+	+++

* '+++' means frequent use, '++' means medium use, '+' means little use and '-' means no use.

The table also indicates that schoolwork as well as leisure interests are important aspects of computer fascination. Word processing is used substantially by all of them, and there is considerable activity with searching. This suggests that school strategies have had some influence upon the development of computer fascination.

However, all my informants were introduced to computers early in their childhood, between the age of four and ten. I mentioned earlier that this might have been a reason for the girls computer fascination, but when comparing with the data from the larger study, there were non-fascinated girls that were introduced to computers at an early age as well. My informants are special through their consistent and constant interest in and fascination of computers.

The girls' first computer-experience was playing computer-games. Studies of male dedicated computer-users (hackers) have found that computer-games are one of the most important inroads to boys that become hackers (see, e.g., Befring 1995). Boys start playing computer-games at an early age. In this way, they acquire some skills and an interest in computing. In the longer run, this may help to cater a growing interest and fascination and dedication. Even though my informants said they had liked to play computer-games and found them amusing, they did not become fascinated in the same way as some boys tend to do. They kept on playing, but games never became a major interest. Instead the girls began to use other programs, like painting and writing.

None of them did really remember how they had acquired their computing skills, but none of them had learned their basic skills at school or through any form of organised training. If they could not work things out on their own, they asked their parents for help or used a trial-and-error strategy. Here, they seem to have a lot in common with other PC users (Sørensen, Aune and Hatling 1998).

Half of the girls had computer-interested fathers who had thought their daughters how to use the computer. These fathers had acquired computing skills through education or work. Only one of the girls said that she had asked her mother. She usually needed help with the word processing program, and her mother knew a lot about this.

Two of the girls had parents with very little computing skills, so there was nobody to ask for help. Silje described her learning process in the following

manner:

> *I worked it out myself. It was actually quite simple, it's just like an ordinary typewriter. I learned it quickly. And there was a demo on it.*

Trude told a similar story:

> *Nobody at home knows more than I do anyway, so at home there is nobody I can ask for help. So I just try out different things until I get through.*

These girls used the trial-and-error strategy in most cases. Silje had also used a demonstration program on the computer. She even read manuals when the trial-and-error strategy failed. The trial-and-error strategy was common and a lot used among all my informants. I will come back to this later.

We see that the home is the dominant location for the acquisition of computer skills among the computer fascinated girls. Their skills and positive attitudes were obtained before they started to use computers in class. Still, most of the girls have had some computer training at school. All of them were positive to make use of computers in class and wished that the technology were integrated in as many subjects as possible.

There is one important exception to the above pattern of skills acquisition. Since Internett is a new medium, the some of the girls was first introduced to it at school. Their parents did in many cases not know it any better than their children. All of my informants claimed that they were as good as, or even better than, their parents in using Internet. Often, they said, their parents, usually the father, needed to ask their daughter how to manage. In this respect, the girls were the home expert. This is likely to have given them a high degree of self-confidence.

Thus, the effect of the education authorities' strategies seems to be mixed. Generally, the strategies are not important to the fascinated girls' basic skills and interest. All of them started to learn about computers at home and in an unorganised manner. Some say they have learned some new skills at school, but the main impression is that their main learning strategy is to keep on finding out things on their own, using the trial-and-error strategy.

This is somewhat surprising, given the widespread belief that women (and by inference, girls) are afraid of computers because it is an advanced machine that they do not understand. At one of the schools we met a teacher who claimed that *"They are hiding their hands behind their backs because they are afraid to press the keys"*.

When interviewing the girls, we found that this was not true since the trial-and-error strategy was common. The girls are not afraid of pushing buttons. They know so much about computers that they do not fear that a disaster might happen, if they push the wrong button. However, we know from the larger study that many non-fascinated girls are afraid of pushing buttons because they fear that they might delete something. Some of them have learned this fear from the teacher. But this is not something the fascinated girls fear:

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*It's not that easy to delete something. And if you delete something,
it's possible to have it back. It's always saved somewhere on the
disc.* (Trude)

They have discovered that machines give many warnings before deleting, so they
did not see accidental destruction to be a problem. It is of course important that
teachers and parents give children this sense of security. But the problem is that
they themselves often lack sufficient computer skills to invoke such confidence.

All my informants have the idea that computers are supposed to be
something anybody can handle, and they do not find them difficult to use:

*Not very difficult. It depends, sometimes when I come across
something new that I haven't done before and nobody has explained
it properly, it may happen that I get into minor trouble. But
basically it should be a thing everybody can handle [...] that's
what's meant when it's called a personal computer.* (Ingunn)

When interviewing the fascinated girls, I was focused on possible gender
differences in the use of ICTs. The girls admitted that they more frequently
associated boys than girls with computers, but still they claimed that everybody
could learn to use computers. It all came to whether or not you had an interest in
learning to use it. They had noticed gender differences themselves, but they had
difficulty in explaining why it was so. Some of them thought attitudes were
changing, and that more and more girls would be paying attention to computers.

As previously mentioned, my informants were selected because of their
computing skills. However, to my surprise, the girls did not think of themselves
as clever users of ICTs. This might just be an outcome of traditional Norwegian
female behaviour, "not to brag about oneself", but none of the girls hesitated to
tell me that they were high performers at school. When asked to compare their
skills with girls at the same age, some of them did admit they might know a bit
more:

*I manage to do what I'm supposed to [...] It depends upon who I
compare myself with. Four or five girls in my class are clever
computer users and that's me and some of the others. That's
because we have a computer at home, while they* (the other girls)
can only use it at school. (Jorunn)

It became clear that the girls, when asked if they were clever computer-users,
immediately compared themselves with some of the boys they knew. As the girls
saw it, these boys knew something they did not. They still believed that there was
a kind of secret, exclusive knowledge that boys seemed to have. The computer-
fascinated boys talked about things like "Ram, Rom and Megahertz", words that
did not give meaning to the girls.

None of my informants complained about boys pushing them away from
computers, as Rasmussen and Håpnes (1991) found among female computer
science students. Nor did they fear having an intimate relationship with the
machine as Turkle (1988) found. For example, the girls used the computer as a
diary and told the computer their secrets. Some of the girls also said they saw the

computer as one friend among many friends. They had not turned to the computer because they found it difficult relating to other humans. Still, there was something around computers that made the girls feel uncomfortable. They experienced a computer-culture of boys talking a technical language that the girls neither knew nor understood.

When they were asked about their basis of seeing someone as clever computer users, the girls mentioned the ability to be a fast writer and to find the right information:

> *It means that you can find things fast and that you, when thinking a*
> *bit, can dig up something new, or do something new without*
> *someone else explaining what to do. And to explore things without*
> *having fear of deleting or doing something wrong.* (Ingunn)

Programming has long been considered the most important skill of computing and the aspect that could seduce users to become dedicated (Turkle 1996). Among my informants, this was an unknown skill. They did not know what it was, and nobody mentioned it as a skill. Despite this, we know that half the girls had designed their personal homepages. To do this, they need to know a kind of programming.[7] But the word "programming" means nothing to them.

This fact makes it even harder to understand why the girls do not see themselves as clever computer users. The skills they claim necessary for being good at using a computer, are skills they all possess.

As previously argued, we may see the computer as transformed from a machine of calculation to a machine of communication and information. Clearly, it is the latter qualities that interest the fascinated girls, in line with the argument of Turkle. Nevertheless, when we analyse the issue more closely, there are communalities as well as variation in what the girls find attractive about computers. First and foremost, all of them found the computer fascinating because there were so many possibilities. They liked the fact that there always came something new, something they did not know. Internet with all its different areas of applications was clearly fascinating.

We should also note that the girls had little interest in penetrating beyond the surface level of the interface between themselves and the machine. This is in line with the new computational aesthetics that Turkle (1996:30-32) describes. The machine's inner body was not of any interest. The girls actually very strongly said this was one part they did not want to know anything about.

It is accepted as common knowledge, at least in Norway, that women use the computer if they find it useful. In this respect, they are instrumental. The computer is just a tool and they do not use it unless they deem it helpful. Consequently, we should expect the fascinated girls to argue in a similar way about their use of computers. In the larger study, some girls accounted in this manner. My informants spent time in front of the screen and wanted to learn more because it was fun, not because it was useful. Even though they of course saw that computing was a smart thing to know, their fascination for computers came from their excitement about all the things they did not know and the

pleasure they got from playing with it. They regarded the computer as an advanced toy that also happened to be a useful tool (see also Gansmo 1998).

The small number of informants in this study does not allow for general and precise conclusions about the conditions of becoming a computer fascinated girl in Norway. However, there are some observations that are remarkable. First, all the girls were introduced to the computer at an early age through playing computer-games. Second, they all had good access to a computer during their childhood. They never needed to fight with elder brothers or others to get access. They have been allowed to play with it, and nobody has ever demanded that they should learn formally how to use it. The girls have regarded the computer as a toy they could have fun with.

Since the computers were introduced early as a "natural" element in the home, the girls developed a confident relationship with the computer. The computer was never anything fearsome that they wanted to keep at a distance, but a "toy" they wanted to and were allowed to explore. The elements of (1) early introduction, (2) using the computer for fun and (3) good access, have given the girls an environment conductive to the development of fascination.

The role of the school appears to be more limited. However, it provides some impetus to keep up interest because school work may imply an interesting use of computers. Also, school may teach them some new skills or at least introduce them to new challenges. In particular, this possibility is related to the use of Internet. However, to better understand the anatomy of girls' fascination with computers, we need to look at their everyday use in even greater detail.

6. Hooked on the net?

All of my informants knew how to use word processing, the Internet and some games. To what degree they use computers and for what purpose, vary. One of the girls, Ingunn, gives the following account of how she employs the machine:

First of all, I use it for playing, but recently I have been drawing quite a bit with it. And I have written essays. Lately I have found a lot of information on the Internet and chatted a bit. And I have started touch-typing. I haven't got very far yet, but at least I have started. And I have played CDs on it, and used it quite a bit more than I had thought I would, found photos and picked up posters.

Ingunn is making wide use of the computer (see also table 1), and her account is neither instrumental nor expressive, but rather constructed in a playful sense. We heard teachers say how important it was to give the girls an impression of how *useful* it would be for them to learn to use a computer, but this may impose limitation rather than encouragement.

The fact that many boys frequently play computer-games has been a standard explanation of their dedication. An educational strategy that presupposes that girls do not want to have fun, may be a serious mistake. This is not to suggest

that computers are not also used for "serious" purposes. Such instrumentality is also evident from, e.g., Hedda's account:

> *I use the computer a lot for schoolwork. I write things with it, things I'm going to hand in. And I usually load down photos from the Internet and cd-roms and put those in the text. I use the computer a lot to do such things. I do not use it a lot for games, I don't do that. And I'm on the Internet, 'cause we have Internet at home, on chatting programs. So I use the computer a lot.*

It is often said that girls do not like to play computer games. This is supposed to be for boys. Playing games was, as mentioned above, the girls first computing experience.

> *The first time I used a computer I played games at a girlfriend's house.*(Trude)

Today none of the informants spent much time playing games, but only one of them said she did not play games at all. The others said they played, but they were easily bored by playing the same game frequently. This might be the reason why game-playing is limited.

> Also, some of the girls said they could not find interesting games:
>
> *Yes [I play], but it is difficult to find games that seem interesting.[...] I have played Super Mario and games like that, but that's just funny games. I prefer playing games where I have to think, not fighting games.*(Silje)

It might look as if there is a mismatch between the games offered and the kind of games that girls find attractive. Girls do like to play games, but there are very few games made for girls. However, some had found games that they liked:

> *Yes, I play once in a while, but I'm not fond of those small games, games where you only go around eating strawberries or such things. I don't find that funny. I think it's funny using games that last longer, where you are supposed to find different things and get points when you do. Then you have sort of a goal.* (Hedda)

Still, games are not the activity that keeps up computer fascination among the girls. All my informants apply the computer as a writing tool. They use it for schoolwork. Some Norwegian schools allow homework to be done by computer, some do not. But even if the school does not allow word processed papers, the girls may still use the computer to write drafts. They apply spelling control to correct mistakes, and then they copy it out nicely by hand. However, schoolwork is hardly the only objective:

> *I have a computer in my room at home. If something special happens during the day I write it down. I write a lot on my computer. I practice writing. And I also spend some time drawing pictures in Paint Brush. But most of all I write, write poems and things like that.* (Cecilie)

It is interesting that girls use computers to write their diaries, since this indicates that they feel comfortable telling the machine their inner thoughts.

One of the skills that the girls seem to give the highest appreciation, is the ability to write quickly. In fact, many of them practice to become fast writers. This is clearly not because they plan to become secretaries. The quote from Cecilie above show how the computer has become a way to "textualise" her life, in the sense that she uses it to surround herself with different types of texts. This may not mean that her relationship with the computer is intimate, but perhaps that she enjoys the freedom of computer-based word processing to shape and reshape written expressions.

Writing may be important, but when we asked the girls what they preferred to do with their machines, they all referred to Internet! To many of them, computers were actually synonymous with Internet. As said before the girls use the Internet for fun as well as serious work. Internet is new and. They meet a totally unknown world, a world that seems endless.

> *It's the whole thing. It's in a way a totally different world. You can meet a lot of people living in totally different places and in totally different parts of the world. It's great fun.* (Cecilie)

During our first period of observation at one of the schools, we were shocked to learn what they actually were doing. We watched six girls surfing on the net to find photos of pop or movie stars, or to find the lyrics from Backstreet Boys' latest CD. To begin with, it seemed like a waste to give girls multimedia machines to do such things. The computer became just as a substitute for pop magazines. But after having thought about it for a while, and followed the girls during a couple of months, it became very clear that this was just the way to do it. Let the girls play and have fun :-)

> *The first thing we looked up was some pop groups and handsome boys in Hollywood [...] To print out such photos I find amusing.* (Silje)

About half of the girls had designed their personal homepages. All of them had done this at school, and it was one of the first things they did on the Internet. Today, none of them were satisfied with their homepage, so they were making plans for future changes. They wanted to update the information concerning their interests, and they wanted to make it more fancy, with a variety of colours and links.

After having used the Internet only for pleasure, the girls started to use it to collect information they could use in schoolwork. This also includes using cd-roms. Inger explained the reason for using multimedia to collect information in this manner:

> *The fact is that you can get information from the whole world. You are spared from having to look up in an encyclopaedia and rush around to find different things. They pop up directly. If you just write something in, it comes forth.*

Internet became a substitute for the library. It was faster and more easily

accessible. When they wrote essays or did a project, the girls downloaded photos and information from the net or cd-roms

Chatting was discovered relatively late in their Internet career. Some had tried e-mail, but they were not so fond of that. Chatting on the net was the very best. Or, as Hedda put it:

I find it really funny using those chat programs. Such chatting
programs make you sit on the Internet for hours, making you feel as
if you haven't spent any time at all. Time passes really fast.

What the girls find fascinating about chatting is that they can talk freely and easily with people they do not know. It is a new kind of communication where they can at the same time appear in person as well as anonymously. They want to get in touch with people, and some of them prefer boys, at their own age. It is not common among girls to invent a new personality, but sometimes they "cheat" a bit:

It depends, if I talk with a boy aged 22 or so, then I do not write
that I'm 15. That's not very smart. So I write that I'm about 16-17
years old. But I do not pretend being someone other than myself.
(Hedda)

When they chat, they all use nicknames. They do not know why they do so, but that is just the way it is.

I don't know why. That's really no point 'cause everybody reveals
his or her name anyway. (Silje)

None of the girls admit having experienced disagreeable things on the net, but they are all a bit sceptic. They know that they cannot trust that people are telling the truth. They say they do not think that they would dare to meet them face to face. Some of them have friends that have found pen pals through a chat line, but only Hedda had met somebody she met on the net face to face:

Once I had an e-mail friend. He said that he lived in another city
and that he was 17 years old. We were supposed to meet outside the
supermarket, 'cause he was coming to my town. And then it all
appeared to be two boys in my class that had been playing around
with me all the time. "Very funny".

Hedda has been more careful since. The girls are all at a difficult age. As a teenager, it is hard to find out who you are and what you want to be. You try to discover your identity as a girl and as a person. They experienced much pressure, and having to match the ideals can be hard at times. Therefore, the chat programs function as "free spots" for the girls. Nobody can see them, and they are judged by what they write, not how they look. Moreover, the programs give them a very good opportunity to get to know boys, which is one of the main interests during these years. Taking these facts into consideration, it is no wonder that girls love chatting.

In comparison, it is interesting to note that Hendrik Storstein Spilker (1998) in his study of the Norwegian cd-rom , "JenteROM" (Girls' ROM), found that it was designed with three elements that where supposed to attract young

females. First, there was a diary part that invited the girls to come forward electronically with their inner thoughts. Second, the cd-rom contained links to information about trends, sports, body, health, music, environment, cooking and IT. The information was presented in words and pictures, and occasionally accompanied by sound and video clips. Third, the cd-rom tried to be useful by providing information about, as well as giving access to, Internet. We do not know if this cd-rom was successful among girls, but from what we now know about girls' interests in computing, there seems to be a good match.

7. From "spice girls" to cyber girls? Dimensions of social learning

This paper has given an account of some features of young teenage girls labelled as computer enthusiasts. To begin with, one should note that they appear to be quite different from the stereotype of the male hacker. They are by and large like most other teenage girls in terms of the way they conduct their social life, and their relationship to computers is just enthusiastic, not dedicated. They have an active and varied use of ICTs. This make them stand out as different from other girls, but not in any radical manner. They do not construct any sub-culture, in the sense that male hackers do (Håpnes 1996).

The most obvious inference to make from the study is the importance of the multimedia transformation of computers. While the traditional stand-alone personal computer has a limited attraction, the addition of Internet creates a very different situation. Internet suddenly offers possibilities of playful activities that the girls perceive as fun. The freedom of creative writing offered by word processing is also important, but it is Internet that is the backbone of the enthusiasm.

As mentioned in the introduction of this article there has been an effort in Norwegian system of education to increase computer skills and interest in computing. These efforts have been directed towards girls as well as boys, but girls have been given a particular focus. Judging from the accounts of the computer fascinated girls, they appreciate the efforts, but are not affected by them in any major way. The source of their enthusiasm is located in the home, rather than at school. This may appear as surprising, given the fact that these girls have a rather varied social background, but it is probably related to the fact that we are looking at a group of girls who generally does well in school.

The activities of the education authorities may be interpreted as acts of regulation of computers, with two specific aims. One is to configure Norwegian pupils as skilled and motivated users of computers. The other is to reconfigure the gendering of computer use by changing the meaning of gender as well as gender-related differences in the way the technology becomes applied. To achieve this goal, they have in theory set up a learning network of indirect relations, where researchers and statisticians are surveying such developments in

schools as well as in the home. However, there seems to be no efforts to create direct loops of learning.

Maybe the most striking feature of the situation is the modest role of the education system, compared to the importance of the home as a learning locality and of the cultural industry as a provider of incentives as well as occasions for learning. If we take the accounts of the computer fascinated girls seriously, they indicate a very important shift between public education and a private mixture of edutainment and infotainment, a wielding of education, information and entertainment with which schools may find it increasingly difficult to compete.

From this point of view, the relatively successful reconfiguration of the gendering of computers we believe may be observed in Norway, is only marginally brought about through the education system. The most important factor is in the development of multimedia, in particular in the form of Internet. This has in a very profound manner changed the meaning of computers and made them far more attractive to girls. One should be more careful to suggest that the construction of girlhood has changed, since even the computer fascinated girls emphasise their gender normality. Nevertheless, there seems to be under way a change in the gender distribution of computer skills that may be more consequential.

Thus, we may be moving in a direction where the system of education has to compete openly and more briskly with other means of getting educated than in any previous historic period. It is not safe to assume that increased engagement in computers is the best way for the education system to regain its previous position.

As I see it, it is important to get girls interested in and fascinated by computers. To obtain this goal, we have to exploit the attraction of playful activities. Girls should be given the chance to learn what a fantastic toy the computer is by letting them explore it. In this way, they may get to know the computer as a "playfriend" and get interested in keeping on playing with it. As with human friends this friend can grow with you, so there is no need to put the toy away as you get older. In this respect, and with reference to the concept of social learning, it is important to notice that the girls analysed in this paper acquired their computer skills mainly through learning by doing. This may also be a paradox to the education authorities.

The title of the paper asks if young females are moving from being "Spice Girls" towards becoming Cyber Girls. This was meant to describe their career on Internet. The girls start as "Spice Girls", surfing for photos of handsome boys in Hollywood. Next they went on to searching for information, and they ended up chatting with others on the net. A "Cyber Girl", as I have thought, lives one life on the net. I do not mean that they live withdrawn from *real life*, but that they also live in the virtual world of multimedia. In this life they might have another identity that differs from the one they have in real life. My girls are still not adequate Cyber Girls, but I believe they move in this direction.

Notes

[1] See "IT i norsk utdanning. Årsplan 1998" (IT in Norwegian education. Plan for the year of 1998), Ministry of Education, Research, and Church Affairs, http://odin.dep.no/kuf/publ/1998/itplan.html#49.

[2] Numbers refered in the Norwegian computer-magazine *Komputer for alle*, 6/1998:34.

[3] The information is drawn from an article at Alex skole, a part of the Norwegian newspaper Aftenposten's hompage on the 15th of August 1997 under the title *"Læring i cyberspace"*. The article was written by Morten Søby, phd-student at the Pedagogical research institute at the University of Oslo.The adress of the page was: http://www.aftenposten.no/alex/skole/d17592.html.

[4] IT i skolen 1997 - SSBs tilstandsundersøkelse. ODIN, Kirke-, utdannings- og forskningsdepartementet (KUF). http://odin.dep. no/kuf/proj/it/ssb.html. SSbs Notater 97/42.

[5] The project was managed by Bente Rasmussen at NTNU (Norwegian University of Science and Technology) and Tove Håpnes, research scientist at SINTEF-IFIM. The datas were collected by Kjersti Kvaløy, Helen Jøsok Gansmo and myself, all students of sociology at NTNU. A report with the results has been published (Håpnes & Rasmussen 1997).

[6] This article is based on my master-thesis in Sociology. In my master thesis I concentrated on the girls that where fascinated with the computer (Nordli 1998). After criteria described in this article I "picked" out in-dept interviews with seven of the girls.

[7] There is a problem in defining what should be considered using and what should be considered programming. If you use e.g. Excel and you record macros, that might be perceived as "using" but when you look at those macros and change some things by hand, in fact you are "programming". It is similar with the design of homepages. You can create them with several programmes without actually writing codes, but in fact you are actually programming.

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