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Tove Håpnes & Knut H. Sørensen

COMPETITION AND COLLABORATION
IN MALE SHAPING OF COMPUTING

A study of a Norwegian hacker culture

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Introduction

The perception of knowledge as gendered is at the centre of feminist theory. This has been a critical position, allowing feminists to undermine existing bodies of knowledge as male biased and to argue the need for more women in knowledge-producing institutions. The main bulk of the literature has been concerned either with epistemological issues or the way particular discourses perceive women. However, there is also a growing body of literature concerned with gender and the practice of science. Science is analyzed and critized as the outcome of a masculine way of relating to nature (Keller 1983, Bleier 1986, Harding 1986, Tuana 1989), but also as a hostile environment to women (Rossiter 1982, Zuckerman et. al. 1991).

Feminist studies of technology has partly followed the same pattern (Wajcman 1991). The observation that most designers of technology are men, suggests that technology is shaped accordingly as a carrier of masculine values. However, there are few empirical investigations of these claims and the findings are ambiguous (see e.g. Berg 1992a, Sørensen 1992, Cockburn 1992). The sociology as well as the history and philosophy of technology have largely ignored gender issues, while feminist studies have focused on the uses of technology (see e.g. Olerup et al 1985, Lie et al 1988).

Recent contributions from the social studies of technology do not easily lend themselves to gender-sensitive reinterpretations either. The contingencies of emerging technologies are many, and in some sense, the social shaping of technology is overdetermined. A reanalysis of for example Thomas Hughes' (1983) study of Thomas Edison shaping the emerging system of electricity

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would face great problems in differing between the effect of Edison as a man versus Edison as an American versus Edison as a capitalist versus Edison as a person with particular cognitive characteristics.

However, in our opinion, the most substantive problem arises from the implicit understanding in most of the literature on gender and technology - that gender is the so-to-speak dominant force of the relationship. Masculinity or maleness becomes a pre-given factor that shapes technology, independent of the process of design and development. The task is thus reduced to establish the correlation between the given features of maleness and (some of) the characteristics of the resulting technology.

The approach contrasts with constructivism as it is currently practiced in technology studies (Bijker & Law 1992). This may of course be less of a problem for feminism than for constructivism, but it would be interesting to establish some common ground of research. Also within feminism there is a growing uneasiness with gender categories as pre-given (Haraway 1991). A challenge common to feminist and constructivist studies of technology would be to analyze design and development of technology as simultaneous constructions of gender and technology (see Berg 1992b).

This article is a response to this challenge. Through an analysis of a male, Norwegian hacker culture we want to explore the interrelationship between gender and technology, or to be more precise, between maleness and computing. Is it possible to see the gender identity of hackers as independent of their style of computing, and vice versa?

Feminist studies of technology: Constructivist links and political challenges

Constructivist studies of technology have mainly, but not exclusively, grown out of science studies (Bijker 1992, Woolgar 1992, Sørensen 1993a). At least in Scandinavia, feminist studies of technology have a rather different ancestry, coming out of industrial sociology and labour process theory (see Lie et al 1988). Inquiries into so-called office automation in the late 1970s and early 1980s was a breakthrough for gender and technology as a research issue. The main argument forwarded was that the introduction of new technology usually was to the disadvantagement of women. Their qualifications were neglected, their promotion possibilities decreased, and their work was degraded (West 1982, Game and Pringle 1983, Lie et al 1988)

The emerging discourse on gender and technology focused on three sets of conditions: the sexual division of labour, workplace and union politics, and the patriarchal nature of technological design (Sørensen 1988, see also Wajcman 1991). When women were victimized by technology, this could be explained by a sexual division of labour which marginalized women in relation

to technology. It might also be the outcome of women's marginal position in unions and in workplace politics. Women could also be victimized by technology because it was designed by and for men, shaped by male values, and mediating patriarchal subordiation of women (Hacker 1990).

This discourse was assumed to contribute to the struggles of working women, and it was considered important to prove that technology was gendered, not gender-neutral. The accounts concerned properties of industrial systems and structures of women's subordiation, but they were also anti-determinist in the sense that they emphasized local conditions when accounting for socio-technical changes (Cockburn 1985, Lie et al 1988).

Male shaping of technology has been deconstructed by applying concepts like *control* and *hierarchy*. Male technology is assumed to reproduce male designers' hierarchical thinking and their aim to control users or Nature (Merchant 1981). There has also been a concern with the destructive aspects of technology, highlighted by designers tendency to use violent metaphors in describing their work (Easley 1981). Keller's (1985) model of gendered science could serve as a different point of departure. With reference to object relation theory male scientists are seen as emphasizing *objectivity* and *autonomy* through their *distance* to their research 'objects'. Also, Keller argues, the meta-discourse of modern science is heavily gendered in its use of metaphors.

The contrast is 'a feeling for the organism' (Keller 1983, 1985), an 'ethics of care' (Gilligan 1982) or more generally, an emphasis on caring as a basis for design and development of technology (see Sørensen 1992). Keller (1985) carefully argues the case of gender-free science (and technology, by implication), but in most instances a 'feminization' of science/design is seen as an important goal.

Some of the problems with such arguments have been outlined by Wajcman (1991). Working with binary oppositions like woman and man easily produces a kind of essentialism or romantism related to biological sex. Moreover, most of the literature on the issue is either normative or speculative. However, there is some evidence that women try to develop or design technology differently from men, but this is the result of a tendency to choose different problemfields rather than solving problems/producing designs that are different (Sørensen 1992).

There are several analytical and methodological challenges here. First, the issue of describing the kind(s) of masculinity displayed in a given context of development or design of technology. This raises problems of reflexivity, but also of reductionism and reification (Morgan 1992). Second, the preconditions to argue the translation of masculinity into the artefact or system that is designed. This raises the problem of identifying certain physical properties of the design as either feminine or masculine, without returning to the more

popular system of polarities of large/small, clean/dirty, heavy/light, etc. (Sørensen and Berg 1987, Sørensen 1992)).

On the other hand, we may approach the problem as being a study of culture. That would imply that our main interest would be to analyze a given group or community to see how it was gendered, e.g. in terms of recruitment, career systems and ideology, and less so in terms how this shapes or does not shape the designs or the work of the group (see Traweek 1988, 1992).

This would allow a broader conceptualization of the interrelationship between gender and science/technology. Male work-cultures are often characterized by competition and conflict, games and an emphasis of mastery (Morgan 1992, see also Wajcman 1991). Physical features of technology like size, noisiness or greasiness may enter the definition of masculinity at the shop floor (Willis 1977), other features could enter in academic settings.

There are different strategies of approaching these problems. The most obvious one would be to look for situations where gender is implicated in controversies about science or technology. Another possibility is by comparing the conditions of male and female researchers, the problems they work with, their methods, their networks, their relation to users, their values, and so on. A third route would be to analyze the socialization of students to identify gendering processes in the university community.

We have chosen to study gender and technology through a group of students who see themselves as computer hackers. They are a strictly male and very marginal community, extreme in their engagement with computers. One of the reasons we became interested in this group, was the conclusions from a study of female computer science students. They used the hackers as a metaphor for all the things they did not like about computer science: the style of work, the infatuation with computers leading to neglect of normal non-study relations, and the concentration on problems with no obvious relation to the outside world (Rasmussen and Håpnes 1991, Håpnes and Rasmussen 1991). Thus, the hackers emerged as a possibly important example of an extremely masculine technological culture. Moreover, the situation of student hackers could be an interesting example of what Turner (1974) calls *liminality*, a transition from an outsider to an insider of computer science. This means that relations are more fluid, easier to change, but also easier to observe than in ordinary situations. Obviously, hackers are not representative of technological research communities, but they may learn us something about them.

On the margins on computer science

In Science and technology studies the concept 'hacker' describes a particular infatuation with computers usually found among young men in a university

environment. An early critical discussion is Weizenbaum (1976). He was very much concerned with the computer bum who is interested in nothing but computers: *'The compulsive programmer is convinced that life is nothing but a program running in an enormous computer, and that therefore every aspect of life can ultimately be explained in programming terms'* (Weizenbaum 1976:126).

Sherry Turkle (1984) approaches them as a sub-culture, describing their way of life, their identity and relationship to computers. She is in particular concerned with the computer's ability to act as a medium of projection and reflection, to be an object to think with: *'A relationship with a computer can influence people's conception of themselves, their jobs, their relationships with other people, and with their ways of thinking about social processes'* (Turkle 1984:168).

Hackers thus become a *deviant* group, a counter-culture defining itself in opposition to 'the dominant modes of computer science'. The culture is partly explained with reference to students' experience at the Massachusetts Institute of Technology (MIT): their insecurity and self-hate is produced by the efforts to be transformed from a 'nobody' to a 'somebody', the expected result of an MIT education.

However, Turkle also sees it as an issue of gender. The hackers are male MIT students, not female. The community is expressing a macho-culture, not by means of physical appearances, but through a highly competitive strive for mastery and control. The hackers subject themselves to increasingly violent tests which make the culture peculiarly unfriendly to women. There is also a flight from relationships with people to relationship with machines, more characteristic of men then of women (Turkle 1984:216).

An intriguing aspect of the hacker culture is how we should characterize their activities. Formally, hackers are (usually) students of computing. This suggests that it is a student culture, a setting where one is trained to achieve computer virtuosity. On the other hand, hackers' uses of computers are by no means just straightforward applications. In fact, some of them design software used by others.

This feature highlights a very important point: The distinction between design and application is by no means as clearcut as usually is assumed in science and technology studies. When people integrate an artefact or a piece of knowledge into their culture, this is not passive consumption, it is an active act of *domestication*. The artefact or the knowledge has to be appropriated, of course, but it also needs to be incorporated and given a place in the practical and symbolic order of the person(s) performing the domestication (see Silverstone et al 1992, Sørensen 1993b).

The aim of our study of Norwegian hackers is thus three-fold. First, to analyze this particular culture to learn about the interaction between gender and

computers. Second, to improve our understanding of how users of an artefact so-to-speak construct the artefact as an ensemble of technical and cultural elements through processes of negotiations with human and non-human actors. Third, to assess the notions of a universal hacker culture, brought about by computers and other media.

Our study of hackers is based on an ethnographic approach in order to get comprehensive and broad information. We used participant observation, though only for a few nights. During this period we discussed our observations with the hackers, both in groups and with individual members. Most of the discussions took part in front of the terminals, because the hackers preferred to illustrate their activities and strategies on a computer to be sure that we understood their explanations. We have also conducted longer interviews with individual members of the group. We think this has given us a good opportunity to grasp their mode of thinking and living in the way they see themselves.

Young men negotiating gender and computers: Being visible as an individual

The sorry image of the computer hacker as a young male workaholic, non-social, and totally emerged in programming is mainly an American one. There are good reasons to expect that the location, for example, in a Norwegian culture would make hacking different or even non-existent. When we approached a group which called themselves 'The Software Workshop', we found a computer-based counter-culture recruited from students from physics, computer science and electronics at the Norwegian Institute of Technology. They did in fact define themselves as 'hackers', emphasizing that this was an international phenomenon which they recognized from books and articles. Moreover, they saw themselves as the 'real hackers' in contrast to the electronical hardware manipulators and the PC-freaks among computer scientists. The 'real hackers' meet at one of the computer labs. Here, they gather in the evenings to work during the night.

The hackers are, biologically speaking, a male group. Their designs are consequently, in a very elementary way, signifying maleness. However, we cannot infer much from this. These males construct computer applications as well as an image of themselves, relative to other students.

The first night when we visited the 'Software workshop', we saw young men sitting in front of computer terminals. The only sounds came from busy fingers typing away on keyboards, interrupted by sudden burst of electronic sounds from computer games. We were almost afraid to disturb them, but it turned out that the hackers were more than willing to talk with us about

themselves and their work. They very much wanted to introduce us to the intricacies of their sub-culture, and to guide us through the world inside their machines. And we tried to follow them.

The hackers emphasized that they saw themselves as one of the best computer clubs in Norway. They worked with large and ambitious programming systems, and their knowledge provided a basis for making sub-programmes and smaller systems on order from companies and clients. Their self image was as an alternative computer culture. They wanted to be different from 'the rule-based mainstream computer culture'. To emphasize the differences, they saw it as very important to be 'visible', as a group as well as individuals. Also within their own sub-culture, it was essential to communicate their individuality. Difference could be symbolized by their dress or haircut, or communicated through particular interests or personality traits. For example, we met the only 'religious' hacker, the 'fastest programmer' and even the only 'normal' hacker.

The term 'normal' usually signifies those on the outside, the people who are not immersed in computers like they are. This is a way in which the hackers may turn on its head their common experience of being classified as special or 'un-normal' because they spend so much time and efforts with computers:

> 'A lot of others think that this community distinguishes itself in a
> negative way. They see us as exhibitionists. But we are not. It is
> more that we want to gain distinction because we are clever. I
> want people to know who I am, not to disappear in the mass'.

They confirm this specialness through communicating that being fascinated by computers means to be different. This is why you may stand out within the sub-culture by being described as 'normal'. As a group they communicate their common culture through a particular style of living. They prefer to work in the evenings and at night, and they use a sub-cultural language shaped by their digital activities. It is also important for them to make it clear that they dislike the university system. The best thing about the university is the opportunity to work with powerful computers. They get access to good work stations, large amounts of computer power, good systems and software. They describe themselves not as good students, but as clever computer users.

We would like to know how hackers construct their masculinity in terms of their work with computers, their internal relations, and their relations to other groups. The way that technical and cultural elements, including gender, are negotiated into the construction of networks, may be observed through the interaction among the hackers and the machines. We want to show that the masculinity of hackers is not a simple reflection of a general masculine culture or the computer. It is a product of the efforts to construct networks of men and machines.

How come that individuality is such an important characteristic of the identity of the hackers, and thus of their construction of masculinity? To understand this, we have to look closer at how they relate to and negotiate with computers. We have chosen to focus on their style of working with the machine, and how they interpret the machine and their own identity in terms of the interaction with the machine. Most of the hackers have been interested in computers since they were 10-12 years of age. Quite early they began to feel special. The story Fred told is typical:

> '*In my class, we were a couple of kids that got hooked on computers. It made a difference at that time, to be a computer freak or not. Many people does not understand how it is because they are not interested themselves. What we did, appeared to be dull to quite a lot, and thus they assumed that we were dull also*'.

Before they started with computers, many had played a lot with mechanical or electronical sets. They had disassembled radios and watches to see what was on the inside and how they could be reassembled and developed. In this way, they had developed a taste for tampering with machines. The computer offered new possibilities to integrate new elements, either by developing the computer or through the making of software. Programming became a main activity. In the hackers' accounts, comics and science fiction also stimulated their interest in computers. Here, they met with figures and heroes able to invent machines that could do the most fantastic things. This was the raw material of dreams and a source of new ideas to be tried out on their computers.

Their strategy of learning is to tamper, to try and fail, and to read about ideas and possibilities in computer magazines and manuals. Programming and a taste for science fiction are important elements in their accounts of themselves. *The Hitchhikers Guide to the Galaxy* is required reading to those wanting to join the culture. They see it as an extremely funny book. In general, science fiction is relaxing and entertaining, an escape from reality, but also an opportunity to fantasize and think creatively.

Games are a third source of inspiration, to play computer games for many hours in a row, often several playing together. Usually, the computer games display general characteristics of boys' games. It is the activity, the action, which is important, roles are distributed and exchanged, and there is an element of competition. Some win, some loose, and the action offers challenges, speed and excitement. All this is found in computer games too.

They continue to play computer games also as members of the 'Software workshop'. Simple games are recreation or models from which to make their own games with more advanced niceties and possibilities. However, to be a real hacker, games cannot be your main activity. Only Multi-user Dungeon -

MUD - is constructed as 'real fun', and consequently as a proper hacker activity. Playing MUD may go on for months because of the challenges the game seems to offer in terms of gaining skills and resources. The game is played by the user of computer networks. Thus, several people may play simultaneously with or against each other. Participants may come from different countries. One exciting possibility offered is the ability to spy on the other players, if you have learnt the trick. You may also communicate with the other players, leave messages or obstructions, and thus 'bug' the rest. What counts as an extra sophistication is that you do not know the identity of the other players. You construct your own identity in the game. The ultimate aim is to become a wizard by scoring huge amounts of points. This is evidence that you are a master of the game.

Competition and control, excitement and fun

When games are the object of negotiations around the machine, we find a competitive style. There is competition either between the hacker and the game software, or between the hacker and other players. The important thing is to gain control through understanding the system and being able to manipulate it to win. Competition may also be a part of the internal activities of the subculture. Who makes the most brilliant othello-game? In their accounts, this is seen as play, not work. It is considered to be fun, and to stimulate creativity.

At the same time, they compete about endurance. For how many hours in a row are they able to do programming. In this area, we find personal as well as community records. John told us about Georg:

'I nearly thought he had disappeared, but no - he came back, pale
and sallow, and told that he had made a new record. He had been
programming for 42 hours in a row, then he went into his room
and slept for 17 hours.'

The word 'asceticism' is mentioned as a central element in such perseverance. You do not give up until the problem is solved. Thus, they may work very long hours at the computers. They forget about time and eating. In their accounts, this is not only a matter of excitement. It is resulting from a determination to succeed. The trick is to be enduring and patient. However, forgetting about time does create practical problems. To help out, Erik designed a program that produced a warning message on the screen in the late afternoon: 'The shops are closing in ten minutes'.

Programming is a main task, but to master programming is not a goal in itself. It is a precondition of designing software products. One of the hackers put it like this:

*'If you want to build a whole house, it is not enough only to learn
how you hit the nails'.*

To design a product may be everything from developing a whole software
package for drawing to make a small function to be put in a programme or a
system. The hackers are into very different kinds of problems. Some may be
interested in graphics, some in fractals, and some in how you combine pictures
with movement and sound.

The fascination with machines and programming is explained as a result
of the possibilities offered to them by the computer. The interesting part is not
to find out how things have been made, but how it is possible to design them:

*'You have a problem or an idea, let's see if we are able to run it
or solve it through the machine'.*

They are motivated by the excitement and fun. The joy of working is in the
process itself. John describes his fascination in these terms:

*'With computers you don't think the same things over again. There
is always variation, always new possibilities emerging. That is the
exciting thing about computers, the lack of repetition. Computers
are variation.'*

Many hackers describe their style of working with computers as experimenta-
tion, searching for solutions, coaxing and trying and then see what it looks like.
They much prefer trial-and-error than well-structured methods out of manuals
or existing software. They explain their preference by pointing out that they
dislike to be controlled. It is better to try it out directly with the machine, or
asking others in the community.

They perceive themselves as creative computer users, in contrast to
standardized computer professionals. The style of work and their understanding
of themselves is expressed through the way in which they define computers and
computer systems. PCs are 'disgusting', IBM computers are 'wicked',
Macintoshes are in fact 'snobbish', and they hate programming languages like
Pascal and Cobol. Such programming languages represent uniformed and rule-
regulated systems. They are replete with 'barriers' that block their wish for
individuality and artistry, or - as they put themselves:' *We depend on freedom
from 'walls' when we do programming'.* They want the structure to be in their
mind, not in the software. Success should depend on abilities, their capacity to
think logically and abstractly.

Their favourites are the programming language C and machine code.
They say that this gives them greater freedom to construct their own
approaches, to find 'brilliant' solutions. PCs are considered as tailormade to a
uniform use. They have a lot of 'strange' characteristics. In the hackers'
accounts, they have no consistent design, only a lot of parts clashed together.
Thus, they do not like them. They are the machine of others, they are outside
their culture. Macintoshes are snobby because they look brilliant in terms of

design and graphics, but they are considered to be slow and full of structures and barriers. Macintoshes are associated with architects, marketing people, and women.

Even if the joy is in the work process itself, they tell that it feels glorious to be the one who masters the machine, the one that is able to control it and the processes that are being run. One of the hackers put it this way:

> *'In relation to the machine, I am the boss, and it feels grand to win over the machine'.*

To win means to be able to control, to be able to solve the problem that initiated the work. They see the relation to the computer as neither personal nor close, like the MIT hackers do in Sherry Turkle's account of them:

> *'Most of us look at the computer as a thing, to be manipulated. People, on the other hand, exist for cooperation. What is fascinating to us is the **potential** in the machine. You may nearly put anything into it'.*

The hackers are using concepts like manipulating, control and winning over the machines. They are characteristic of the approach to computers that Turkle (1984) calls 'hard mastery', described as a typical of boys. At the same time, our hackers say that it is important to have an artistic approach, to be creative, to try things out, to see what fits, elements similar to Turkle's 'soft mastery', more typical among girls using computers.

Competition and collaboration

While their approach to computers have competitive features - to win over the machine and internal competition - their knowledge about computers and their products are available to all members of the hacker culture. To help each other and to use each others products make them become more able and to reach further in their inventiveness:

> *'As a group, we are more powerful than as individuals. For example, the drawing programme that Erik designed, there is a lot of me in it too. Things he have taken from what I know and have made. (...) From this point of view, cooperation is more characteristic of our group than competition. The computer field is in fact too large for competition. But of course, there are elements of competition in the group, for example we did have this Othello-programme contest. But we have come to see that to progress, we have to learn from each other'.*

They dislike internal secrets related to computers, and they are ardent adversaries of the practice of the mainstream culture of copy protection and copyright. This is reflected in the collaborative features of their approach to

computers. You do not just contest the machine to be able to master it. You have to learn to understand the logic of hardware and software too. There is a process of domestication going on between man and machine, a process which demands collaboration of the two parties. In this way, the hackers manage a dual relationship to the machine, to activities and approaches, and to each other. They have a style of work and a way of interacting which is simultaneously competition and collaboration.

Still, even if there are many common features in their style of work, the hackers also emphasize distinguishing individual stylistic elements. This is related to their keenness to achieve visibility as persons. They manage and communicate their individuality through the tasks on which they are working, and through their style of interaction with the machine:

'We work rather differently, too. Some just sit down, work on a programme and tumble with the bits and pieces until they arrive at a solution. My approach is characterized more by the way I look at the whole problem, analyze it to simplify it as much as possible, and then I start running things on the machine'.

The hacker culture provides more than an opportunity to interact with machines. When they are tired of programming or need a break, they often see a movie together or drop by a pizzabar to eat and talk about movies, science fiction books and computers. According to the hackers, new members are offered a community and a group of friends. While each persons individuality should be provided for, they see it as very important to take care of the community. The sub-culture should be congenial, and the members should be open toward each other. They protect each others in particular through a caring based on tolerance and solidarity.

The combination of competition and collaboration, of individualism and caring, may be typical of male middle-class groups, inside or outside of science and technology. What we see here is probably a useful corrective to the picture of male scientists as being dominantly competitive and individualist. Without some collaboration and caring, a group or a community would find it difficult to exist. Even in settings of competitiveness and individualism, there may be an undercurrent of collaboration and caring which is important to the work performed.

Men, women and machines

The hackers have not thought much about why they are a purely male resort. To them, it is a mystery that no women are interested in computers the way they are. Nevertheless, they have learnt that computer hacking is something women and girls want to keep at arms length:

'The first thing you learn as a computer boy is: Never talk to girls about computers! They get this kind of desperate expression. I believe they think it's too complicated, they cannot stand to listen to it. All of us belonging to this hacker community have learnt that. When girls don't understand what we say, they loose interest. I don't understand it.'

Consequently, the hackers have defined women as being on the outside. However, that does not imply a point of view that women are generally different from men:

'In the Software workshop community, we are a minority also among men. So some women doesn't need to be that different from some other men'.

As a group, women are associated among other things to Macintosh machines. That is of course outside the interest sphere of hackers, but they tell us that through working with Macintoshes, they believe more girls could learn to become more interested in computers. Macintoshes are perceived as simpler to use (far simpler than the SUN workstations and terminals which the hackers employ themselves). That is because they are well-structured and rulebased. Moreover, Macintoshes are seen as related to activities like the *application* of graphical programmes, to the designing of text and use of graphics, things which are defined in their culture as feminine. Their own work with graphics is not defined as application. They *design* graphics.

The hackers do not understand the absence of women, but it does not bother them much either. They do not believe that they 'frighten' away women. Some has visited the workshop, not as computer users, but as girlfriends. The hackers may relate to girls outside the hacker community, but as one of them said, they do not consider it important to 'chase or look for women either'. Here, there are some differences among hackers. Some have girlfriends, some emphasize that they have no relation to women or things outside the hacker culture. It is the life at the software workshop and the enthusiastic interest in computers that are their common denominator.

They know little too about how women interpret and evaluate computers and computer science, for example what female computer science students at the same university see as interesting and what they would like to do. They do not know that these women call them 'key-pressers', a concept used to signify people whose only great interest in life is to do programming for the sake of programming. To the female students, the hacker figure signifies all the fears and horrors of computer science. They construct their femininity in relation to computers through defining hacking as bad and constructing their own approach to computer science antithetical to what they see as a monstrous love of computers for their own sake.

Male computing and computing males

The most striking feature of the hacker culture we have analyzed, is its many ambiguities. It is competitive, but also collaborative. It is directed toward control and manipulation of the machine, but also artistic and interactive. It is considered playful, but also useful. The hackers play games, but also design products. They strive to achieve individual visibility and recognition as well as community.

What emerges is a more complex male culture of computing than could be imagined from the literature. We find hierarchy, competition, distance and control, but also more 'feminine' characteristics. This is the result of the way computers and masculinity are allowed to interact in the rather freewheeling hacker culture. Computers as well as masculinity are constructed as sufficiently flexible to allow these contradictions. The computer and computer science in the hackers interpretation of it, seem to encourage modification of traditional masculine values like being competitive and in control. On the other hand, the construction of approaches to the computers draws upon these traditional values. Contradictions in the constructed masculinities are also found in the uses of computers. The approaches are neither hierarchical, competitive, and manipulative nor interactive, collaborative and network-like. They are both.

It is interesting to compare the male hackers' accounts with those of the female computer science students at the same university. They perceive the hackers as too obsessed with computers, too emerged in abstract technicalities, and not sufficiently engaged in the solution of practical problems (Håpnes and Rasmussen 1991, Rasmussen and Håpnes 1991). The hackers see the women (and most other male computer science students) as main-stream, caught by structures and rules.

This is a gendered controversy above all about how to work with computers. There may be disagreements in terms of the quality of software, the relative importance of e.g. userfriendliness to elegance, but they are not so pronounced. The Norwegian hackers are not that absorbed in the abstract, 'erotic' (Hacker 1989) qualities of computers. They are also interested in computer applications, although their definition of usefulness seems to differ from that of the female students. What emerges is not a dualism of male and female, because we may observe at least two different male cultures of computing - probably several. Still, the cultures are gendered in a thorough and important way.

The complexity of the hacker culture is also evidence of the flexibility of computers as a cultural medium. The hackers have developed what we will call *a strategy of domestication* in their relationship with computers. They incorporate them by tampering, by trial and error, combined with the use of written resources like computer journals and manuals. They try to develop and

14

maintain creativity by playing games and reading science fiction. Also, in their use of computers, the hackers emphasize qualities like understanding and control to achieve a kind of freedom in their problem-solving. Still, the outcome in terms of style of work is different. Even a similar strategy of domestication does not produce only one way of using computers.

The same phenomenon may be observed on the symbolic level. The hackers use their style of computing to distinguish themselves, not only from the non-hackers but also from the rest of the community. However, a style of computing may not be sufficient, so many also use dress, hair-cut, and personal style to make sure that their individuality come across. What comes out of the process of domesticating computers is a web of artifacts and styles, of machines and identities. The persons change, as does computing. The tampering novice seems to acquire new skills, but also to learn the value of community and collaboration in experimenting with and improving upon computer software. The skills and his style of work becomes part of the gender identity of the hacker, while this identity seem to influence the way he operates within the field of gendered polarities like hierarchy versus equality, competition versus collaboration, and control versus creativity. The result is contingent on the construction of masculinities, but not determined by them.

The domestication strategy of the Norwegian hackers is obviously influenced by the international discourse about hackers. This discourse is a resource from which they get cultural models. Some of the common characteristics, like working at night, may be accounted for by a common situation as marginal users of a limited resource - computers. Others, like the interest in science fiction, is probably an indication that this literature manage to address issues generally appealing to boys and young males interested in 'modern' technology. Compared to Turkle's description of American MIT hackers, however, the Norwegian hackers appear as less extreme and more 'feminine'. This may be due to differences of interpretation, but it could also be argued that it reflects some dissimilarities of American and Norwegian cultures.

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