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Living with IT: Uses and Interpretations of Computers in the Home and Family Context

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ABSTRACT

Having a computer and Internet connection at home is becoming increasingly common. In order to get a richer and fuller understanding of the impact of IT on life in the information society, the use and interpretations of computers need to be studied also outside the world of work and organizations. The paper reports on how a group of 50 families (183 people) live with information technology in their home. The focus is on the process of making the computer a part of the home and family life, going from the moment the new computer enters the home up until one year has passed. The IT-families field trial in Loviisa, a town in the southeast part of Finland, is used as a source of empirical data. The paper describes how participants start using their computer and Internet connection for leisure, entertainment, games, but also for banking, shopping and communication. The purpose of the paper is to explore what 'IT in the home' means to participants: how they use and interpret the technology in various situations, what kind of physical and mental positions the computer takes on in the home and the minds of family members, and how the technology affects the nature of daily life in the home.

1. INTRODUCTION

In order to get a richer and fuller understanding of the impact of information technology (IT) on life in 'information society', the uses and interpretations of IT need to be studied in a variety of different social contexts. One context that information and communication technology (ICT) is increasingly penetrating is the home. For instance, from 1997 to 1999 the number of PCs in Finnish households increased from 35 to 42 percent and Internet connections from 12 to 22 percent (Statistics Finland 1999). Because IT in the home is a rather new phenomenon, and in order to contrast the much studied effects of computer use in the world of work and organizations, studying IT in the home is both justified and interesting.

How then should studies of IT in the home differ from studies of IT at work and in organizations? Monteiro (1998) suggests that in order to avoid connotations of IT as a tool and the idea of a "competent User mastering her Tool" when studying computers in the home – where IT use can be related to e.g. leisure, relaxation and entertainment—the emphasis should be put more on how people *live* with IT as opposed to how they *use* it in a very functional sense. He also suggests that studying e.g. the *domestication* of new technologies and their *social and historical meanings* would be possible paths to go beyond the purposeful, rational and functional uses of IT. IT in the home should then be seen as a *social phenomenon* and the study of IT in the home accordingly needs a socio-cutural or socio-technical approach, rather than a technical or an economic/rational one.

Habib and Cornford (2001) explored ethnographically the processes of computer domestication in seven British families. They concluded that the process of domestication is complex and their analysis

strengthened the understanding that computer technologies are both interpretatively flexible (e.g. Bijker et al. 1987) and their uses are situated in and therefore dependent on the context in which they are studied (e.g. Orlikowski 1992). In their study Habib and Cornford (2001) recognized that the domestication process included various processes, like developing routines, rituals and ceremonies, putting up rules and norms, and channeling and appropriating magical features that family members ascribed to the computer. They further found that the various domestication processes of the families were directed towards making the unknown computer more familiar in terms of: integrating the 'untamed' computer into the family; making the 'unpredictable and erratic' computer more safe and reliable; making the 'opaque and enigmatic' computer more understandable and comfortable; making the 'hostile and exploitative' computer more intimate and friendly, and making the 'magical' computer more empowering and liberating.

In another, quite extensive study of the home use of Internet for communication and information in 110 households in Pennsylvania, US (see Kraut et al. 1996, 1998, 1999), Kraut et al. (1999) found that the Internet is a new and important entry in the list of mechanisms, like TV, radio and telephone, that work as channels for communication and information into the household. They concluded that as such it may have more important social impact in domains ranging from work, school and family interactions to medical, library and government applications, than the impact it is extensively assumed to have in commercial and economic domains.

The rather young tradition of social study of technology (Bijker et al. 1987, Bijker and Law 1992) provides a good alternative to deterministic, tool-centered, rational approaches to the study of IT.[1] The approach used here maintains that technology is both physically constructed, as an objectified cultural artifact with physical limitations and constraints, and socially constructed through human design, use, interpretation and imagination. In the view taken here technology is dual in that it is both structural and socially constructed (Orlikowski 1992). PCs and Internet technology are viewed as having a high degree of interpretative flexibility, because they can be used for so many varying purposes and therefor can be interpreted in almost anyway the user wants to. IT then, is not seen here as simply functional with a pre-set purpose of use, but is regarded as also being defined by its user according to the way it is being used and interpreted (e.g. Orlikowski 1992). Accordingly, the concept of 'computer' is used here in a non-fixed way as a collective term, including the physical parts of a PC in the home and the infrastructure behind it, as well as the way in which it can be used for various actions and transactions. Because of the duality inherent in technology, i.e. when in use, technology starts structuring its context, it is assumed here that the use of IT will have effects in the home reaching beyond the intended functional ones (Orlikowski 1992).

The aim of the paper is to provide a multifaceted view on life with IT in the home and to deepen our understanding of the relationship between IT and individuals in the home and family context. The purpose is to describe how individuals use and interpret IT in various situations in the home; what kind of physical and mental positions the computer gets in the home and the minds of family members; and how IT affects the nature of daily life in the home. The paper describes how individuals start using their computer and Internet connection for various activities in the home during the first year of possession. The empirical base for the paper is a group of 50 families, consisting of 183 people, who are part of the IT-families project in Loviisa, a town in the southeast part of Finland. The focus, at this point of the research, is not so much on the family as a group and the effects of IT on the dynamics within it and between family members, as it is on the process of making a computer a part of life in the home on the individual level. Findings reported at this stage are preliminary and there are ways to further analyze and explore the data gathered in the project.

[1] E.g. Dahlbom & Mathiassen 1995, Kling 2000, Norman 1993, Orlikowski 1992, Star 1999, Zuboff 1988 and the growing tradition of actor-network theory (ANT) e.g. in Law and Hassard 1999, who all contribute to this fairly new (Aibar, 1996) research tradition, are providing different new ways of designing, studying and understanding technology and its impact on various sides of human affairs both in organizations and elsewhere in society.

2. THE IT_FAMILIES PROJECT: BACKGROUND, PROJECT SETUP AND DATA COLLECTION

The data analyzed here stems from the IT_FAMILIES research project, which is part of a larger development effort aiming at developing business structures and local know-how around IT and its application in the southeast area of Finland. The larger effort was initiated in collaboration between national and local authorities, but it also received European Union funding. The local project was initiated by the town mayor in the town of Loviisa and, as a continuance to previous collaboration projects, is carried out as a joint development and research project between the town and the Swedish School of Economics and BA in Helsinki. The project can be interpreted as a socio-technical system (e.g. Kling 2000), or an actor-network (compare e.g. Callon 1987), including not only the computer technology, with the various licensing agreements for and suppliers of both hardware and software, but also a social infrastructure of technical installers, a help-line and training, as well as funding and local support for the project. Not to mention the receiving families and the researchers involved.[2]

Families were recruited to participate in the project through inserts in local newspapers and radio programs in winter 2000. Applications to enter the project were received from approximately 100 interested families. On the basis of interviews with all interested families, 50 young families of different types (i.e. traditional, single parent, mixed), a total of 183 people, were selected to participate in the project (see Table 1). Participation criteria were that the family did not own or have access to a computer at home and that a research team was allowed access to information regarding for what the family used the computer during the project time. The families for the project were selected, on the first hand, to mirror the language situation in the town: 28 of the families speak Finnish and 22 Swedish. Families with only one of the parents having a stable income were chosen in front of families with two stable incomes. 94 people in the group are parents and 89 are children, of which approximately half were under school age when the project started (in Finland you start school the year you turn seven). When the project started the adults were between 20 and 50 years old and the children between 0 and 18. Different levels of education and social class are represented in the group.

Type of family	Finnish speaking	Swedish speaking	Total (families)	Adults	Children	Total (people)
2 adults, 4 children	1	2	3	6	12	18
2 adults, 3 children	2	3	5	10	15	25
2 adults, 2 children	12	7	19	38	38	76
2 adults, 1 child	8	6	14	28	14	42
2 adults	2	1	3	6	0	6
1 adult, 2 children	1	3	4	4	8	12
1 adult, 1 child	2	0	2	2	2	4
Total	28	22	50	94	89	183

Table 1. Type of families and language representation in the beginning of the project[3]

In April 2000 the participating families received a PC with software (Windows, Works and Word), a printer, an Internet connection (through modem), and an e-mail account for each family member over six years old. In August a tailor-made Microsoft Office-package was installed on their computer. Training and information sessions and technical support, in the form of a telephone help-line and house visits upon request, for a period of two years is provided. A project homepage was set up and launched during Christmas 2000. The project continues until January 2002, after which the family can choose to either buy the computer for a small fee, or return it back to the research team.

The training and information program during the project has been extensive and directed towards the whole family. Training has been provided in evenings with groups of 10 to 15 families at a time. Training sessions lasted around two hours at a time. Themes of training sessions during the first

[2] The whole complex sociotechnical system or network of actors and actants that were involved in the project both prior to its actual start and throughout will be described separately in the future, but will not be further considered here.
[3] One family has divorced and several babies have been born in the participating families since the beginning of the project.

months of the project (spring 2000) included Windows 98, Internet and e-mail with Outlook Express. In addition two information events were arranged, where local banks and the local telephone company respectively presented bank and phone services and the use of Internet. Further, a family night was held with instructions on how to use the Paint application for children, information about viruses, and information on the research conducted in the project. From fall 2000 to spring 2001 themes of learning events included: educational games for children, word processing, publications, spreadsheets and presentation graphics. On top of this, during spring 2001, participants had the opportunity to take the national Computer Driving License® exam[4].

Throughout the project all individual members of the participating families over six years old have been sharing information on their computer use with the research team. In addition to the background interviews with the families, data has been gathered individually from all participants both through electronic questionnaires and in the form of written essays. Smaller children have been interviewed separately (Öhberg 2001). The data that this report is covering was gathered between spring 2000 and spring 2001 trough two questionnaires and three essays.

The first questionnaire covered a range of aspects regarding individual usage patterns and spontaneous ways of using the computer and Internet at home and with other members of the family.[5] The second questionnaire was based on results from the first one and focused on five main areas that had come up: surfing the world wide web; e-mailing and communicating over the Internet; playing games; shopping; and banking over the Internet. See table 2 for general themes and types of questions asked in the questionnaires. Because the research was explorative, the questions in the questionnaires were to a large part open ended, but also scales, as well as priority rankings of items and the option to check several alternatives that applied in a given situation, were used. Participants answered the first questionnaire during summer 2000: four months after their family had received the computer. The second questionnaire was answered four months later: around Christmas the same year.

Theme (and questionnaire)	**Type of questions**
Usage patterns• (1 & 2)	when, where, how long, with whom, for what do you use computer
Perceptions about computer and use (1)	what is a computer, what is good and bad with it, what is fun and irritating with it, has it been useful or enjoyable, in what way
Perceptions about computer and the family (1)	what do you do with others in front of the computer, do you have access to computer at home when you want to, do you quarrel about the computer, has the computer changed the family, do you have rules regarding its use
Surfing the Internet (2)	what do you do when you surf, which are your favorite www-addresses, what do you use Internet for, what is Internet, what is best and worst with Internet
E-mail and communication patterns (2)	have you been in contact to others through Internet, how often, where, how often do you use e-mail, have you gotten to know anyone over Internet, what is e-mail
Banking (2)	have you used bank services, for what, what is best and worst with banking over Internet
Shopping (2)	would you buy something over the Internet, what would it be like, have you bought something, what, for how much, where, why, what is best and worst with buying over the Internet
Games (2)	what do you think about computer games, are they better than other games, which are your favorite games, why, with whom do you play

• Data is based on the participants' own recollection of their use of the computer.

Table 2. Themes and type of questions in the two questionnaires.

As the lack of resources and distance to the project location did not permit more in-depth following or interviewing of each and every participant in the families in the project, essays were used as an alternative way to take part in their stories about them and their computer. The essays were collected so as to get richer data than could be gathered trough the questionnaires. The first essay, written in

[4] A national exam for proving computer literacy in terms of being able to use a PC, including word processing, using spreadsheets, graphics applications and Internet.
[5] Learning patterns were also covered in this questionnaire, but training and learning aspects of the project will be reported more thoroughly elsewhere after the project is completed in spring 2002.

June 2000, was about the first meeting with the computer when it was delivered to the home of the participating families. The second essay, written in fall 2000, was about the family and their computer. The third essay, written in spring 2001, was about participants' perceptions about various aspects of the information society. This essay was collected only from adult participants. The questions in the questionnaires and the themes in the stories to some extent overlapped. It is also possible that what was written in the essays in some sense mirrored what had been asked in the questionnaires. The overlapping of essays and questionnaires should provide a fuller description of participants' perceptions and interpretations than only monitoring their use through questionnaires.

In an effort to better understand the relationship between individuals and IT in the home environment, the description in what follows is structured using the social construction of technology approach. Using both qualitative and quantitative data as support, a description of participants' immediate uses and their interpretations of the new computer is provided. The analysis then goes further and looks into the various physical and mental positions the participants give to the computer. In the discussion the duality between participants' interpretations and the structural features of the computer in the home is explored. In subsequent work it is possible to deeper analyze the data presented here, and subsequently gathered data, from various perspectives, e.g. gender, generation, or the family as a unit. It is also possible to go deeper into subject matter, like learning or interacting in the various groups.

3. THE COMPUTER BECOMES PART OF EVERYDAY ACTIVITIES IN THE HOME

Through describing how participants started using the computer and Internet at home and how the use changed over time, this section explores how the computer becomes a part of the everyday activities in the home, i.e. how participants socially construct and interpret the computer within the context of the home.

The new computer is used both as a toy and a tool

During the first four months participants used the computer mainly for looking up information on the Internet ('surfing'), for writing (both for work, studies and pure enjoyment), for playing games and for paying bills. Drawing, making invitation cards and being creative in an artistic way with the computer were also popular activities. During this time e-mail did not yet raise that much interest among the majority of the participants. Since e-mailing is interactive, this may be partly because participants did not have anyone to send e-mails to.

During the first period most participants found surfing the Internet and playing games to be the most fun. The option to be able to pay bills directly from home made life easier for the adults, whereas down loading Internet pages and finding the right information on the Internet was seen as most time consuming by almost everyone. This was in part due to slow modems, which also indicate a discrepancy between home user needs and exclusive web page designs. After eight months the number of uses for the computer had expanded among the participants: the computer was now used also for counting, for picture processing, for writing and receiving e-mail and electronic postcards and for chatting. This change in participants' interpretations and understanding of how the computer could be used indicates that a form continuous reconstruction and reinterpretation of the new computer occurred as time passed.

Most of the respondents to the first questionnaire reported that they used a computer also outside home: at work, at a friend's house, at the library or at school. More than half of them used a computer at work. Most spent time in front of a computer at least once a week. A quarter used a computer every day, 14% several times a day, and only 15% used a computer less than once a week. The time spent in front of the home computer was usually less than one hour at a time. This indicates that computer use in the home context of the fifty families still was minor compared to, for example the context of work. In light of these results dangers like computer addiction seem marginal.

40% of those who answered the second questionnaire (after eight months) still used half or more than half of their time by the computer for surfing the Internet. Seven percent used almost all their computer time surfing the Internet. However, the perception of surfing as a fun activity in itself had now changed into a more concrete searching for specific information. In this respect reinterpretation of the Internet went from toy-like interpretations towards tool-like interpretations. A quarter of the respondents used half or more than half of their computer time for playing games. Eight percent used almost all their computer time for games. These participants obviously interpreted the computer as a toy mainly to be used for entertainment in the form of games.

Their Internet connection participants used mainly to pay bills, to receive and write e-mail, to look up information in relation to their own or the family's hobbies and spare time activities, to compare prices and products, to buy things, or to look up information in relation to work, studies or school. Among other things participants looked up information about cars, travelling, sports, cooking, astrology, construction and renovation. In addition they looked for and downloaded free software and games or played the lotto. Clearly, participants soon realized that they could achieve what they saw as personal benefits from using the Internet for a variety of informational tasks, e.g. in terms of saving time, being able to explore information that would otherwise be difficult or even impossible to find – most of it for free –or as aid for other types of domestic errands that otherwise takes time and effort.

Internet at home was mainly used for other activities than to find work related information and thus maintained its character as an information channel for activities related to leisure or domestic tasks. Almost 70% of the respondents to the second questionnaire used Internet at home more for spare time and leisure activities than for work. 14% used the Internet from home more for work and 11% thought that they used Internet from home fifty/fifty for work and pleasure. Six percent used Internet solely for paying bills. Two percent did not use Internet at all, the reason being that they didn't have time or they didn't feel a need to use it. Other reasons reported were lack of knowledge of how to find information, lack of interest, or a disbelief that the kind of information they wanted could be found or existed on the Internet. Those who knew how to look up information used a combination of methods: almost 80% used www-addresses they had seen in ads in mass media, 75% used search engines, and 65% used addresses given to them by friends and acquaintances. The fact that ads and media played the most important role perhaps confirms the interpretation that it is rather difficult to find information on the Internet, but more importantly that other media are important channels for first hand information giving directions of where to find more. In other words, media was an important source of providing meaningful interpretations to participants and thus an important actor in the social construction of the Internet. Search engines are still the second most important means to find information, which means that they provide an important functional service within the Internet. The popularity of the third method indicates that it became common between participants and their friends and acquaintances to talk about the Internet and sharing knowledge and experiences about how to find one's way around within it, i.e. also friends influenced the reinterpretation process.

The computer becomes a bank, a shop, and a place for social interaction

In more detail we analyzed participants behavior in relation to using the Internet connection for banking, shopping and interacting. In this case banking over the Internet definitely expressed the most stable change in family members' behavior that could be ascribed to the new computer.

90% of all the adults that answered the second questionnaire had used some form of bank service through the Internet. Almost all had paid bills, but only a few had used other forms of services like asking for advice or trading with stock. The attitude towards banking through Internet was very positive and the benefits were described like this: you don't need to queue, you don't need to go back and forth to the bank, you don't need to stick to opening hours, it is easy to pay bills and keep track of transactions, and it is generally timesaving to take care of bank errands electronically. Those very few who still went to the bank in person, reported that they had not had the time or interest to figure out how Internet banking worked, they preferred personal service, or they did not trust the security of

Internet banking. In sum, handling the most trivial forms of banking errands, like paying bills, over the Internet, the vast majority of the adult participants quickly translated into a meaningful and beneficial way of acting, i.e. they quickly turned their home computer into a bank.

Having had the computer at home for eight months, a third of the participants had bought something over the Internet. The sum spent on shopping varied from 130-1200FIM (22-202EUR). Half of the purchases exceeded a sum of 500FIM (84EUR). A third of those who had bought something over the Internet had done so more than once. The products that were bought by the participants were mainly clothes, books, hair- and skincare products, products for home decoration, extra equipment for the car, toys, tools, fishing equipment, gifts and Christmas presents. These products where almost without exception bought from well known chains or department stores, of which most have a history of catalogue selling. Also local stores had been used, but no one had yet ventured on a shopping trip to a foreign country or a company that exists only on the Internet. Participants reported that the main reason to shop over the Internet was that they felt that they reached a broader supply of goods than the local stores could provide, but a few had tried out of pure curiosity. The positive aspects of shopping through the Internet were described like this: it was easy, it gave the opportunity to compare prices and products in the peace and quiet of one's home, one didn't have to go anywhere, and one could escape crowded shops. The respondents found the negative aspects to be: that one could not feel or see the product, which naturally made it difficult to evaluate the quality, and that both money transactions and unknown companies could be insecure. However, 70% of all respondents thought that buying something over the Internet was, or would be, both quick and easy, and some even thought that it was too easy. In sum, participants found it quite easy to translate the home computer into a shop, but this was not without reservation. There needed to exist a physical shop or at least a well known name to associate the 'virtual' shop with. The way the participants used the shopping options that Internet provides clearly indicate that trust and reliability is still important criteria for doing business and these are commonly associated with something that is familiar from before. Also over the Internet, then, a good name and reputation seem important for building up trust among customers.

After eight months, when the first enthusiasm of surfing the Internet had calmed down, also e-mail and other type of communication over the Internet had awoken the interest of many of the participants. Yet, at this point 30% reported that they had not been in contact with anyone over the Internet and less than ten percent had sent or received e-mail on a daily basis. A small number of people reported that they had made acquaintance with someone over the Internet: four through chatting, three through e-mail that had come or gone to the wrong address, one through a web-page in relation to a hobby, and one through a dating service. Mostly it seemed that the respondents received or sent e-mail less than a couple of times a week. When communicating through e-mail, the other part was most usually somewhere else in Finland and second most commonly in the same town. In other words, other forms of communication, like telephone or meeting people in person, maintained their positions as the more common ways of interaction between friends and relatives. As e-mail is less personal than a phone call this may not be so surprising, especially when thinking of these interactions as social, instead of e.g. business, work related, or other more formal types of interactions. If needing comparison, e-mail could be compared to serving the function of something in between a letter and a postcard, yet with some characteristics of an informal phone call.

Four and eight months after the computer had been installed in the houses of the IT-families, changes not only in participants' uses but also in their perceptions of the computer was obvious: in use 'the computer' changed. From the slightly threatening, large, gray and square boxes with lots of cable in all colors the computer continuously received a wider set of meaning and interpretations by the participants. They both used and described the computer in new ways: from 'tool' to 'toy', from 'information bank' to 'technical gadget', from 'information and entertainment channel' to an 'all-family-luxury-package'. When asked (after four months) what they thought a computer was, participants did not at all only focus on physical aspects of the computer nor on the functional aspects of the software installed on it. Instead, they saw the computer, for instance, as a medium for information and communication, a device for fun and entertainment, something that could keep one

company and was a good way to relax, or as a tool for goal oriented action. In addition some participants also noted much wider aspects, seeing the computer as a source of infinite learning, a source of worry about where the world is headed and as an attempt to make a copy of human beings. Even though participants' perceptions of both the computer and the Internet were generally positive throughout, the more they were exposed to the computer and the Internet at home, the more aware they also seemed to become about the weaknesses of their IT. Most of the participants encountered situations where they realized that the complicated and sensitive technology in the computer and related devices are not always so dependable, but for the most part still fixable. Through this, the computer lost some of its 'magical' features and became an appliance like any other in the home.

4. THE COMPUTER TAKES ON DIFFERENT POSITIONS IN THE HOME AND FAMILY LIFE

The following section explores both the physical and mental positions and space that the computer takes on in the home and in the minds of the participants, i.e. how IT structures the home and the everyday life of the participants.

The computer enters the home

In the first essay, participants often very richly described the situation when the computer was first delivered to the home. An interesting observation that many remarked upon was that the boxes containing the computer, including its various parts like the CPU, the screen, a printer, a modem, etc. seemed to both outnumber and be much bigger than the participants had expected. Another quite common theme was about how participants felt anxious, worried and inadequate when all the different parts where unpacked: lots and lots of gray parts, meters and meters of cable, and a whole library of different manuals appeared from the boxes. Questions like: 'how are we going to fit everything in', 'where are we going to put all this' and 'how are we going to fit all the parts together', raced through the minds of the parents in the participating families. At this point the computer did not at all live up to the expectations: expectations that were compared to 'waiting for a new family member' or to promises made to the kids about being able to play games with the computer as soon as it arrives.

The next step was for the family to decide where in the home to put the whole collection of gray boxes called a computer. Someone's TV-room had to make way and, to a father's bitterness, became a computer room instead. A mother squeezed it in on a desk behind the sofa – for a single parent with two children and 50 m^2 to live on it was a real sacrifice to find a place for the computer. Someone put it on a desk in the bedroom, someone in a corridor, someone in a child's room. One family started building a desk only after the computer was delivered. In sum, a whole range of organizing activity rose from the situation, like making new and moving around old furniture and discussing among family members what would be the optimal place for the computer in the home. These negotiations were one of the first instances when participants' interpretations of what the purpose of the computer is and what it is supposed to be used for in the home surfaced. The final result depended on the combination of how the family ended up seeing where the computer could best fit everybody's needs and where in the home they could sacrifice the space needed. Then, the whole ensemble of parts was to be fitted together and hopefully gotten to work. Luckily, some less technically oriented participants noted, the men who delivered the computer where experts and managed just fine to put all the pieces together, in some cases with some help from the teenaged kids in the family.

When everything was put together, the third moment of truth came along. An almost devout atmosphere prevailed when the whole family gathered around the computer for the first time: would it work when switched on? In some cases the computer did not work. After all the arrangements, the expectations, the anxiety and the worry, the disappointment between family members was severe if the computer did not work. Luckily, the project provided a help-line for the participants to call when encountering problems, and if the problem could not be solved over the phone a house call was made to fix it, to change faulty parts, or to otherwise help out in problem situations. If everything did not

work as it should, participants also employed the help of friends or relatives in order to save the day when the computer arrived.

It was only after all these first obstacles were overcome that the participants could start to play around with the computer. Then the anxiety soon disappeared and a sense of victory arrived when participants realized that clicking the mouse, opening windows and menus, and typing on the keyboard was not that difficult after all. Of course, these computers were delivered with operating systems and some software applications already installed, which may not always be the case. In one family, with the help from 'a more knowledgeable friend' even two 'incomprehensible games' and a game of solitaire was found, as promised to the two little boys in the family. Many of the participants thought it was easier than anticipated to use the computer and the provided software. Throughout, the expert help and the information and training provided through the project seemed to add a feeling of security and a means to get out of tricky situations with the computer. Seen through the stories of the participants, ad slogans like 'one click away' and 'the world at your fingertips' seem almost farfetched and also indicate that hardware design is quite far behind compared to software design.

The computer becomes part of family life

Having and using a computer involved and evoked a whole range of emotions, both positive and negative. We asked the participants what was the most fun, the most entertaining, the most irritating and the most dull aspects in regard to their computer. Most fun were drawing, surfing the Internet, playing games and learning new things. Most entertaining were that the computer was so many-sided, some information on the Internet could be entertaining, details in various programs could be entertaining. Most irritating and dull was definitely that the Internet was so slow. Other moments of irritation could be found in the slowness of learning and the inadequacy of one's knowledge of how to use the computer, the difficulty in some programs, or that programs did not work at all. Rising phone bills also caused some negative feelings. Seemingly, as elsewhere in society today, the value of 'learning', 'knowing', and 'being able' is highly rated also among the IT-families, which was, of course, inherent in their participation in the project in the first place.

During the first four months the majority of participants actively used the new computer for various activities, with a clear break during peak summer. It was clear that being outdoors, going to the country, and other summer activities were more popular during the holidays than playing around with the computer. It seems that the participants saw the computer more as something related to every day life during school term, work nights, or times of study, or to the type of activities one does when it rains or one does not have better things to do. However, the computer had affected the lives of the family members and had become part of their thoughts, their actions, and their relations to each other. After four months, almost half of the participants found that the family had more fun together since the arrival of the computer in their home. 40% thought that they watched less TV and 30% thought family members had more in common and had come closer to each other because of the computer. However, this was probably not due to the computer in itself, but expressed something about how family members related to common projects in general and not about permanent changes in family structures.

Participants usually sat alone in front of the computer, but especially in the beginning they quite often also sat there with a friend, a sibling, a child or a parent. Together they played games, surfed the Internet, helped each other, practiced the use of the computer, or installed games or software. Based on this, IT did not really seem to increase interaction between family members, but it can not be said to really have decrease it either.

Very seldom, but sometimes, it happened that the computer became a part in a family row. Between husbands and wives a lack of patience with the other's learning pace or ability to grasp new things was given as one reason for quarrel. Who among family members was the one who knew best how to do something with the computer, or that someone sat in front of the computer for too long a time, could also give rise to negative emotions between family members. Parents' regulation of their children's use of the computer was one reason to negative emotion between the children. These instances should

perhaps also be regarded in a more general sense as expressions of how family members normally interact with each other and not as somehow generated by the computer. Participants themselves did not find that the computer actually had changed their internal relationships or roles within the family.

The most common explicit rule set up by parents regarding the use of the computer, was that children had to ask a parent for permission to use the computer, especially for playing games or for surfing the Internet. Another common rule in the families was a time limit for how long children could use the computer at a time. Because surfing the Internet costs by the minute, surfing was usually restricted by time limits. In order for children to also engage in other activities than sitting in front of the computer, time limitations were used. It was clear that some parents were worried about their children's physical health and training in social skills, which they saw could not be trained in front of a computer. 'Children need to play outside as well.' Explicit rules and regulations regarding computer use at home was not seen as necessary in all the families and none saw that any other family member had shown signs of asocial behavior or disturbingly excessive use of the computer.

A recurring theme in the essays that the participants wrote, was the perception of time and the flow of time in relation to the computer. The computer had an ability to make its user lose track of time, i.e. one became so consumed by the computer game, Internet, or something else that one did with the computer, that one didn't perceive how the time passed. In families with small children, the time aspect was more one of lack of time for practicing with the computer or generally do things beyond basic household activities, like cooking and washing. On the other hand in families with older children there seemed to be time for everyone to use the computer at the time of their own wish. A feeling of guilt seemed to bother those participants who felt they had not had time or opportunity to use the computer as much as they wanted or had anticipated that they would when they entered project. A third aspect around the notion of time was that in some cases, for example some of the parents, felt they could save time thanks to the computer. Especially mothers felt they could save time paying bills, do some of the shopping and look up information using the computer and the Internet. The time they saved they used either on themselves or on the family. In this sense the computer did not seem, at least not in the first instance, to change, for example, the division of household tasks between family members, or provide very much help in practical household tasks.

The positions that the computer acquired in (or was given by) the participating families and individual members, showed that having and using a computer at home required both some physical and some mental rearranging: the computer needed space, and it seeped into the thoughts of the participants and affected the way they did and saw things in the home and in their everyday life. Through interaction with the computer, it became part of the network of people and things that structured both the home and the life of individual family members. Yet, in this rather brief analysis, on the family level the computer did not really seem to change in any substantial ways already established family structures and patterns of behavior during the first year. On this level acquiring a computer and starting to use it in the family cold be compared to projects that are the focus of attention for a certain period of time and in which all family members can to some extent be included, like buying a new car or going on a holiday. At the family level a computer can be compared to the kind of projects where the enthusiasm usually wares off and the object of the project becomes part of the ordinary after a while.

The dual relationship between individuals and IT

In the essays some adults express their concern that computers at home may decrease social contact between humans and may result in people, especially children, being even less physically active than they already are. However, when the parents had reinterpreted the computer into being a bank in their own living room, almost none wished to physically go to the bank anymore, thus excluding both the physical action and the social encounter with a real person that a visit to the bank would have provided them. In this example IT first became a medium of action (parents could pay bills from their living room) and then it influenced the behavior of the parents (they started using only their own 'living room bank' and did not go to the physical bank anymore). Through social construction this will again

have further consequences: e.g. parents will influence friends and relatives that it is a good idea to have a computer at home, because you can use it to pay bills with from your living room. Slowly and simultaneously then, banking over the Internet becomes the norm and the nature of banks changes too: they let go of most of their personnel in service encounters and perhaps increase the people who work with technical applications of bank services over the Internet (this direction of change is clearly visible in Finland, where this process has been going on for the past ten years). As the process continues, the concerns of the parents might prove to be right, but not only as they feared, because children don't play outside anymore, but e.g. because they themselves quit going outside the house to run errands, which may prove to partly cause the option of going outside the house to run errands to slowly disappear.

Of course, the process described in this example is circular and not at all solely 'to blame' on the parents in that before the parents could change their behavior there had to already exist a technology for paying bills over the Internet. The example shows both how ICT is turned into a gateway from the home to the outside world and how this has consequences reaching also outside the home – and vice versa. This is an example of the duality that is inherent in technology.

5. CONCLUSIONS

Computers, their use, and the meanings people give to them in the context of the home were here examined through a social construction of technology approach. The purpose of the paper has been to describe the qualitative changes in the nature of home and family life that may accompany a computer and Internet access when brought into the home. The IT-families project was used as a source of empirical data and examples. The changes have been described from the first moments when the computer arrived at the house and afterwards when the computer was made a natural part of life in the home.

The description in this paper might be compared to previous research regarding, for example, the introduction of telephones, radio and TV into people's homes. Because of the interpretative flexibility and the dual features of technology, when extensively introduced into people's homes, these three media channels have had wide consequences on society. So will also computers have. On the other hand, also because of these dual features, both TV, radio and telephone has become so mundane that we hardly ever reflect upon their meanings for our daily life. This will in time happen to computers as well.

In society the process of change related to the use of technology is complex, dual, and somewhat difficult to grasp. But, if we are to understand were the use of ICT will take us, it is necessary to try to see the subtle ways in which the simple, everyday use of this technology brings about a dual change process that has consequences outside the context in which it is being used. In the families the computer was already in the very beginning being interpreted and reinterpreted with every new type of use –and the meanings of that – that the participants ascribed to the computer. These uses and meanings were situated and varied somewhat between families and between family members. Yet, as the process of social construction of IT continues, it reaches out to the level of society, becoming an integral part of it and changing it at the same time. Through this process the interpretations of technology also reaches various points of 'closure' (Bijker et al. 1987), meaning that some interpretations become more or less fixed and accepted in society, like the idea to use IT for paying bills gained general acceptance among adult participants. These (temporary) closures in the meanings of technology are the ones that has the most power to affect the structure of society, yet at the point of closure the technology disappears into the background and becomes mundane and difficult to critically examine or question.

For further research, this kind of step by step analysis of change, reaching out from explorations of various situated, everyday contexts, could be a way to reflect over and question societal changes that are emerging with the increasing and rather uncritical use of ICT in various contexts in society. This would be useful both for policy makers, IT designers, researchers and users of IT.

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