ICT AND THE SHAPING OF SOCIETY
EXPLORING HUMAN - ICT RELATIONSHIPS
IN EVERYDAY LIFE

Helsingfors 2005
ICT and the Shaping of Society: Exploring Human - ICT Relationships in Everyday Life

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© Swedish School of Economics and Business Administration & Pernilla Gripenberg

Pernilla Gripenberg
Swedish School of Economics and Business Administration
Department of Management and Organization
P.O. Box 479
00101 Helsinki, Finland

Distributor:

Library
Swedish School of Economics and Business Administration
P.O. Box 479
00101 Helsinki, Finland

Telephone: +358-9-431 33 376, +358-9-431 33 265
Fax: +358-9-431 33 425
E-mail: publ@hanken.fi
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As it probably should be, writing this thesis has been one of the most difficult but also interesting tasks I have done so far. The written part of the work is only a small part of the process of reaching a doctoral degree. Mostly it has been about learning and growing as a human being and about pressing my mental capacity to the limits. In the best case I think learning is about questioning the things we usually take for granted and finding new (hopefully better) ways to see our world. This thesis is my way of sharing what I have learned so far with those who are interested in joining me on the exiting journey into the human-ICT relationship that this thesis is about.

A thesis is never solely the work of the author but building on a collection of thoughts that has developed through time and space throughout history. The first to thank are therefore all the authors referred to in this work, whose thoughts and writings I have used to support my own thoughts and whose ideas I am trying to build upon and extend. Although I rely upon the work of others, I take full responsibility for my text and any errors or misinterpretations that may occur within it.

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support, both financially and academically, that the school provided me with during my years as a GRAMIS student.

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Finally, I want to thank my husband Rabbe and our son Rufus who both came into my life during this rather long process of reaching my degree. Thank you for reminding me that there are other things in life than research and for bearing with me when I was somewhat absent (in either mind or body).

Helsinki, 3 March 2005

Pernilla Gripenberg
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1. ICT AND THE SHAPING OF SOCIETY

Information and communication technology (ICT) is increasingly penetrating all spheres of organizational, individual, working and everyday life in the Western world. ICT is used in all kinds of devices and for all kinds of purposes and, on a personal level; it is hard to imagine a world without mobile phones, ATMs, computer games, CD/DVD-players, e-mail, and so forth. It is no longer common to use a PC, for example, only at work, but it is increasingly common to access one at home, at school, in the library, in a net-café, or in some other public place. As ICTs are increasingly used, the role of ICT as a mediator between people, between people and information and even between people and the natural world is growing in importance. Simultaneously, the role of ICT for shaping and re-forming social life is increasing. Thus, ICT is not only penetrating, but also interacting with (changing and being changed by) various spheres of human life. It is this link between ICT and the social shaping of society that is of main interest in this work.

In this introductory chapter, I first offer an overview of the research process and a brief introduction into the structure of the thesis. In order to position my own thesis and its main arguments within the field, I then introduce the vast research area of the social aspects of ICT, with a focus on the link between ICT and the social shaping of society in which the human-ICT relationship plays an important role. This section also aims at providing the contextual background and motivations for my interest in the human-ICT relationship, on one hand, and for the focus on actors and action in everyday life situations on the other hand. Lastly in this chapter, I describe the aims and purposes of the remainder of this work.

1.1. An intuitive journey into the human-ICT relationship

The research reported here emerged out of a long-term interest in ICT and its potential uses in various parts of society. Furthermore, it has been formed not only by this interest,
but also by an increasing frustration with the hyperbole surrounding this very same matter, raising questions like: why is the information technology often so uncritically promoted in all parts of human life? Why is ICT so often used as the ‘magic bullet’ (Markus & Benjamin 1997), to solve complex political and organizational problems? Why is this unrestrained ‘computerizing’, ‘information technologizing’, or what I term here ‘virtualizing’ of society, going on so often without questioning the underlying reasons for doing so (c.f. Aro 1998, Hintikka 1998), the real needs of humans/citizens (Bjorn-Anderssen 1988, Häyrinen-Alestalo 2001)\(^1\), or the longer term implications of it on society and its various parts (c.f. Stolterman 1995)\(^2\)?

It would be untrue to say that the research process for this research has been linear or neatly structured. I would describe it more as an intuitive journey into the unknown with the interaction between humans and ICT as a guiding star. The journey has further been sprinkled with unexpected events. My research project first started out as a part of a project on computer literacy and it aimed at studying how to increase the level of computer literacy in the workforce. Due to some unexpected events, like lack of funding for the larger project for a second year, restructuring at the university, my professor moving away, and my own discontent with the project formulation, the project was not continued on my part after 1998. However, the research interest in computers, how they were being used, how to learn how to use them, their impact, first on the organization and later also on society and human life in general, remained with me as I continued my research process.

Another major and unexpected event was that I was invited to participate in a unique longitudinal research project, called the IT-Families, for 2 years. That project was also sprinkled with unexpected events, such as a restructuring, where the institute responsible for the project ceased to exist. This, in turn, caused major managerial and economical problems, which of course, also significantly affected the work being done within the project. Figure 1 is an attempt at chronologically describing my research

---

1 For an interesting yet rather controversial article on what humans need and what development is, rejecting completely capitalist values, see Trainer (2000).

2 For an exceptional article comparing extreme technological disasters and their causes see Manion and Evan (2002).
process. The left-hand column shows the approximate timeframe and the coursework done during that period³, in the middle column the different research activities are summarized and, in the right-hand column the outcomes, i.e. reports, of these activities are presented.

A driving force throughout the research process has been my dissatisfaction with how (as will later be described in this chapter) things have been studied and reported on in this area of research. In general my discontent lay with the simplistic manner in which the human-computer relationship has been conceptualized and studied throughout a number of different disciplines. My aim was to find ways to do otherwise. I also increasingly disliked the uncritical way ICT related research often is being conducted and technology promoted in Western societies: in Finland and the US in particular, but in much of the EU too. I wanted to make a difference critically and, if possible, morally. It is, however, easy to criticize without providing alternative ways and these alternatives have been the hardest things to find. Covering a wide research area, stretching from empirical work on ICT implementation and use in specific contexts, to theoretical work on ICT (or rather technology in general) and societal change and finding the best alternatives, is to some extent too large a task to be covered in one thesis. Therefore, this thesis can be seen as a first step in presenting the findings of a research endeavor that is not yet fully completed.

³ Courses in research methodology are not included here.
<table>
<thead>
<tr>
<th>Time frame</th>
<th>Research activities</th>
<th>Reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 1997 – 1998</td>
<td>Literature study on ‘computer literacy in the workforce’ (Data analysis in USA) Literature study on technology adoption and acceptance, user satisfaction, computer playfulness etc.</td>
<td>Conference Paper (Gripenberg, 1998)</td>
</tr>
<tr>
<td></td>
<td>Courses:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Theory of management &amp; organization</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Perspectives on organizations</td>
<td></td>
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<tr>
<td></td>
<td>• New IT enabled organizational forms</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Meaning and culture in organization studies V: Feeling and rationality in org. studies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Information technology and ethics</td>
<td></td>
</tr>
<tr>
<td>1999 – 2000</td>
<td>Literature studies on organizational learning, knowledge management, change, IS/IT and technology implementation, communities of practice and virtual organizations</td>
<td>Book Chapter (essay 1) (Gripenberg, 2004)</td>
</tr>
<tr>
<td></td>
<td>Courses:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Virtual organizations, IT infrastructure and electronic commerce</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Creating knowledge in the new economy</td>
<td></td>
</tr>
<tr>
<td>Oct 1999</td>
<td>Practitioner workshop: transcription, analysis</td>
<td>Conference Paper (Botto et al., 2001)</td>
</tr>
<tr>
<td>Dec 1999 – Mar 2000</td>
<td>Case study at Hanken: Data collection, transcription, analysis</td>
<td>2 Reports (Gripenberg 2001a and b)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Final report (unpublished)</td>
</tr>
<tr>
<td>Spring 2000 – Jan 2002</td>
<td>IT-families project</td>
<td>Conference Article (essay 2) (Gripenberg, 2002)</td>
</tr>
<tr>
<td></td>
<td>Literature study on individual learning, IT in the home context and social study of technology</td>
<td></td>
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<tr>
<td></td>
<td>Longitudinal data collection through interviews, surveys and essays</td>
<td></td>
</tr>
<tr>
<td>2001 – 2002</td>
<td>Literature study on social study of technology (continued), information society, virtual communities, social impacts of ICT etc.</td>
<td>Journal Article (essay 3) (Gripenberg et al. 2004)</td>
</tr>
<tr>
<td>(Jun 2003– Aug 2004 Maternity leave)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003-2005</td>
<td>Writing of thesis manuscript</td>
<td>Doctoral thesis 2005</td>
</tr>
</tbody>
</table>

Figure 1. The Research Process *(shaded reports are part of the thesis)*

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4 This model is adapted from Lindholm (2000: 23)
1.2. Overview of the thesis

The thesis is structured as follows:

Chapter 1 discusses the aims and motivations for the thesis.

Chapter 2 presents the theoretical and conceptual terrain, summarizes the adopted perspective and explicates the research questions.

Chapter 3 presents the methodology and the empirical base for the thesis.

Chapter 4 describes the studies reported on in the four essays, presents their main results and describes how they are related to the thesis as a whole.

Chapter 5 discusses the main research results and contributions of the thesis to the research area plus suggestions for further research.


Essay 4: ‘Supporting IT learning in a community setting: Report on the IT-families project’. Unpublished report to be further developed into a journal article.

1.3. The research area and current agenda

In this section I first briefly present some of the information society discourses that form the context in which the human-ICT relationships studied here occur and to which they contribute. Secondly, I present some of the ICT related research that further contributes to our understanding of the information society on a concrete level and in which several gaps can be identified. Finally, I present the current research agenda and some options for how it could be organized to better fill these gaps.
**Constructing an Information Society with the help of ICT**

The notion of an information society (IS) is commonly used in the effort to capture the web of nuanced societal transformations that can be sensed in today’s Western societies. However, its meaning is rather ambiguous and it includes a large variety of dimensions, elements, and perspectives more broadly captured under the information age device. Variations of these are ‘new economy’ (e.g. Carnoy 2000), ‘network society’ (Castells 2000), ‘virtual society’ (e.g. Agres and Edberg 1998 & Igbaria, 1999), ‘digital economy’, ‘information economy’, ‘knowledge economy’, ‘digital era’ and ‘information era’ that are commonly used by, for example, politicians, journalists, company CEOs and, also, by researchers as tools in a mixed effort to describe the wealth of changes that seem to be occurring. These concepts are not only used to describe and adhere to what is going on at the moment, but also to describe and explain how to adjust to changes of the future. The strong linkages to the development of information and communication technologies and the increase in amount, availability and access to information, as well as how this affects the restructuring of society in terms of production, capital, labor, markets, power and so forth, are uniting themes for the concepts used.

In an effort to exemplify the various discourses in the societal debates on ICT and the information society, Anttiroiko (1998) has distinguished between five, to some extent stereotyped groups, which can aid our understanding of the approaches that define an ‘information society’ and inform the debates (these are only suggestive and not meant to be exhaustive):

<table>
<thead>
<tr>
<th><strong>The visionary information society conception</strong></th>
<th>Approach typically used by scholars and others studying and trying to predict and envision the future. The bottom line is often to convince the ‘audience’ of the subversive effects of new [ICT related] ideas.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The technological information society perspective.</strong></td>
<td>Typical engineering perspective that focuses on ICT and more broadly on the infrastructure of an information society. This perspective often seems narrow in respect to the technological field as a whole, not to mention regarding the societal field as a whole.</td>
</tr>
<tr>
<td><strong>The virtual information society perspective</strong></td>
<td>Typical approach for pioneers in the network debate and for researchers interested in the use of information systems and networks. Ideas like surfing the net, distance work and education, community networks and other micro-level phenomena related to ICT and their development and implementation are seen to be of interest.</td>
</tr>
</tbody>
</table>
The technocratic-bureaucratic information society conception

Typical conception for people working with supranational, national and regional development works. Highlights functionality and broad usefulness of applications of ICT and approaches legitimizing these: tele-democracy, new forms of participation, increased efficiency and flexibility in services and saving costs.

Information society created through the informational mode of development

Typical social science approach that focuses attention on broad societal processes from globalization to regionalization and post-modern thinking and related new development logics and their effects.

<table>
<thead>
<tr>
<th>Table 1 Information society approaches</th>
</tr>
</thead>
</table>
Within the social sciences discourse, Webster (2002), for example, distinguishes between two major schools of thought: those who see the information society as a continuation of pre-established relations, i.e. informatization, and those who proclaim that a new sort of society has emerged from the old. Schienstock et al. (1999), in turn, distinguishes between the following six perspectives on the information society: an information economy, Post-Industrial society, an era of Post-Fordism, an informatized industrial society, a knowledge society and a learning society. In this area, it seems to be agreed that fundamental transformations are occurring in today’s Western societies and that we are at a threshold of something that to its magnitude of impact on human life to some extent may even resemble that of the change from agricultural to industrial society. However, it can also be agreed that “we are still far away from a general theory of information economy or society” (Schienstock et al. 1999, see also Webster 2002).

As my interest is not really in the effects of informatization and its general global effects, but specifically in the use of ICT and its effects on society, I will focus the remainder of this section on some of the other societal discourses more directly involved in the promotion and use of ICT in order to construct an information society. In the following section and in the theoretical section of the thesis, I will then go deeper into the various perspectives for studying ICT in general and in relation to society in particular.

In the effort to understand contemporary (information) society, forces that seem to be driving societal transformations have been identified. Political rhetoric can be seen as one such force. Schienstock et al. (1999) crystallizes four main political arguments that are used to advance the information society in Europe: it would guarantee economic
competitiveness and create new jobs, bring ecological advantages, intensify democracy, and revolutionize our ways of living and working with the help of ICTs.\(^5\) However, with the combination of economic opportunism and human values that the political information society discourse simultaneously tries to accommodate (c.f. Aro 1998); it sometimes resembles more of a utopia (c.f. Häyrinen-Alesta 2001). It is also often used as a threat to accept change, for example, in the ‘coming’ of something that requires you to be prepared for it (Servaes and Burgelman 2000, Häyrinen-Alesta 2001, Knuuttila 2001). In general, I agree with Schienstock et al. (1999) that the particular notion of ‘information society’ could be seen more as a political and less as a theoretical term, used primarily as a political strategic aim or vision. In the political debate the information society could even be compared to an ideology or a form of ‘faith’ (Hintikka 1998:26, also Kling & Iacono, 1994).

The discrepancies between theoretical conceptualizations and the political discourse of the information society do not go without problems. One problem is that the legitimization of political programs, both national and supranational, may suffer from leaning towards populism rather than informed knowledge (Anttiroiko 1998). This has, to some extent, occurred in the policy debates within the EU and its member states.

Until 1995, in order to keep up with the Japanese and American competition, the European debate around the IS seems to have taken the technological/capitalist perspective and focused mainly on technological and infrastructure challenges and the regulatory economic environment surrounding the communications area in particular (including both television and telecommunications). In their brief historical overview of the EU IS policy, Servaes and Burgelman (2000) conclude that the EU way to build the IS has been politically pushing, as much as possible, the wiring of the EU and the building of its highways, at the same time as leaving it, as much as possible, to the private sector to implement. Because the telecommunication liberalization has been an important and integral part of the EU information systems policy, in their summary,

Servaes and Burgelman also question “whether [European] IS policies have not just functioned as the sugar around a policy of telecommunication liberalisation” (Ibid).

As the liberalization of telecommunications developed satisfactorily, from the point of view of the Commission, other issues, such as the democratization of ICT, became the focus of attention. Later, educational policies and lifelong learning and the combination of information technology related policies with other policy areas also became the focus of attention (ibid.). The extensive uses of ICT to achieve these disparate goals are constantly present in the background of European IS policy.

Despite the ambiguity and contradictions in the discourse of what an information society is or can be, most Western nation states have policies and concrete plans for how to enter and be part of the information society vision. Such plans typically include aims to become a leading country in terms of Internet connectivity, in being wired and connected, in being at the forefront of the IT revolution, in supporting globalization and so forth. The official rhetoric urging an acceptance that an information society exists or will exist has grown so strong that arguments for why and how it is actually coming are rarely required (c.f. Knuuttila, 2001). The information society has, to some extent, become a taken-for-granted fact (Knuuttila 2001, Webster 2002) not only in the political discourse but, in some cases, in academia as well (for one example see Igbaria 1999, for a critical discussion see Häyrinen-Alestalo 2001), where, if we analyze more closely the underlying assumptions are often characterized by technological and economical determinism (c.f. Aro 1998).

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6 EU document (as in Servaes and Burgelman, 2000): ‘The Social and Labour Market Dimension of the IS – People First – the Next Steps’.
Other forces that have been identified as driving the transformation towards an information society are, global competition (Schienstock et al. 1999, Agres et al. 1998, Igbaria 1999), changing consumer demands and deregulation (Schienstock et al. 1999), even enlightened populations (Agres et al. 1998, Igbaria 1999) and, of course, the continuous development of ICT (Schienstock et al. 1999, Agres et al. 1998, Igbaria 1999). Whether or not ICT is the main driving force of societal transformation is debatable, but ICTs are often given a major role (Schienstock et al. 1999) often as the enabling force (e.g. Agres et al. 1998).

In the EU, the information society has become a forceful discourse in which it has been possible on a EU policy level to integrate many disparate, and even to some extent contradicting, European ambitions: from competition policy over competitiveness to maintaining cultural diversity and subsidiarity (Servaes and Burgelman 2000). As such, information society visions can be regarded as attempts to replace former ideologies in reformulating welfare ideologies and answer questions like ‘what are we going to live on and produce?’ and ‘how are we going to conduct our lives?’ in a broader sense (Henten and Kristensen, 2000). Because of its initial technological and infrastructure building focus, questions that have dominated the information society policy discussions have dealt considerably with the consuming function of the information society. According to Kaitatzi-Whitlock (Servaes and Burgelman 2000), this has happened, firstly, in the astonishing quantities of information of all kinds that can be produced and consumed on-line and, secondly, around the variety, level and speed of services that can be performed and consumed on-line.

In conclusion, it can be argued that the information society is not a ‘thing’ that can be easily described or understood as much as it is a complex ‘process of constructing a thing’ in which various groups from society take part. It can further be argued that with the strong focus on ICT related development, in conjunction with elements of capitalism like competition and consumption, less attention has been given to the social and cultural consequences of the European information society such as the ways in which the information society and the ICTs employed to reach it, affects agency (empowering
or disempowering) and the development of new cultural and social spaces even public spheres (c.f. Kellner 2000). Less attention has also been given to how these citizens/users of ICT/‘objects’ of information society policies, take part in the construction of the information society and how they perceive the often contradicting motives for jumping onto the information society bandwagon. Most importantly, is perhaps the fact that research has not been very successful in critically informing the political information society discourse on the aforementioned points, but has, to some extent, jumped on the very same bandwagon. This will be outlined in a little more detail in the next two sections.

**ICT related research**

During the late 1990’s and early 21st century, both popular and academic interest in the areas of various information society phenomena related to ICTs and, in particular, to the Internet and Intranets, practically exploded. Examples of such interest areas, or ‘computerization movements’ (Kling and Iacono, 1994) are virtual communities and organizations, e-commerce and e-business, knowledge management, tele- or distant working, virtual schools, and e-learning. Other ICT phenomena that have also generated a lot of interest are ‘cyberspace’, mobile computing, wearable computers, mobile phones, and even intelligent clothes and intelligent homes. As research areas these relatively dispersed areas have in common that the ICT related phenomena, in general, have been studied separately from other areas of life activities, i.e. ICT has been the starting point and it has been studied and developed separately instead of in a manner complementary to other human activities in the same realm.7

Contrary to the political/economical information society discourse presented in the previous section, the aforementioned research areas could be said to represent the discourses taking visionary, technological and virtual perspectives on information society phenomena. In these research areas, developing ICT has been, to a large extent, an end in itself, often accepting fundamentally the existence of a ‘perfect technology’ and thus disregarding the question of for whom, or of what end should technology be a

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7 However, recent studies show that the situation is slowly changing (c.f. Selwyn, 2003, Lehtonen, 2003, Leung and Lee, 2005, Davie et al. 2004, Aoki and Downes 2003, and Peters and Allouch 2005).
means for (c.f. Bjørn-Andersen 1988, Stolterman 1995, Häyrinen-Alestalo 2001), not to mention what consequences it may have for a wider social order. The results of research studies in these quite narrowly based areas thus generally add to the development of better (and more) technology to apply in an increasing number of contexts and not, for example, better learning or better schools\(^8\), a better quality of working life or life in general\(^9\), or a better (information) society for that matter. Developing more effective organizations – in terms of performance and economic pay-off of IT-investment, is the single most extensive exception,\(^10\) however, with ambiguous (c.f. Byrd and Marshall 1997) or even paradoxical results (Kraut et al. 1998, Orlikowski 1992, Robey 1997).

As studies based on a simplified and dichotomized view on the human-ICT relationship abound, the need for social studies of ICT, in general, and outside of work settings, in particular, is increasing. Studies viewing humans as holistic beings co-existing with technology in a multitude of life contexts, ‘ICT as a form of life’, are increasingly needed and called for (Dahlbom 1996, Kling 2000, Monteiro 1998, Schulman 1996, Wise 1997 and Woolgar 2002 to mention just a few). Further, to describe and explain the intertwined human-ICT relationship, keeping technology in the picture (Wise 1997), dialectical theories and concepts that work in a variety of different contexts and settings are needed.

For example, the use of ICT is rarely assessed or studied from the point of view of how it affects users in their everyday life. Attempts have been made to study the impact of ICT on users’ working life (for example, Tolsby 2000, Blom et al. 2001). Attempts to study ICT in the home context are also emerging, but impact studies are rare (for a review see National Science Foundation 2001: 25). A recent special issue of the American Behavioral Scientist (2001) makes its effort to consider the social consequences of adding Internet activity into daily life. In this issue, probably for the first time in its history, The Internet is not seen as something separate from people’s lives, but as an emerging, ongoing activity complementing other life activities,

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\(^8\) For further discussion see, for example, Lynch (1998), Moll (1998) and Nissenbaum & Walker (1998).

especially social and communal activities, thus having a great impact on how people conduct their lives (Haythornthwaite 2001, see also Kraut, Kiesler et al 1998). Research in the area of ICT development and use in a community context is also emerging (Bannon & Griffin 2001, Carroll & Rosson 1996, Ferlander & Timms 2001, Uotinen et al. 2001) yet also here, looking at the impact is rare and the results are somewhat controversial (Kraut, Lundmark et al. 1998, Kraut et al. 2002).

In summary, we still know fairly little about how ICTs affect the way we live, our relationships to each other, our social world, our society and our everyday life. Thus, as is further attempted in this work, probing more in detail into the questions of for who, by whom, to what end and with what consequences are certain ICTs developed, implemented and taken into use, can shed more light on the links between ICT and the shaping of society (Woolgar 2002).

**The current research agenda**

Owing to the fact that there is barely any aspect of modern society that is potentially untouched by the effects of new electronic technologies (Woolgar 2002) there is, however, a problem with this kind of probing. As can be seen in the massive interest in ICT related research, yet with little knowledge about how it affects our lives, we seem to have trouble assembling a credible portrait of the links between computerization and the larger social order (Kling, 1991). This is because of the thousands of settings in which people and organizations ‘computerize’ (Kling, 1991) also making it impossible to cover every topical area or subject with research (Woolgar 2002). Settings vary, for example, in social scale, ecology of social interests and their balance of power, relevant ideologies, technical and economic options and so forth, therefore varying also in the degree to which ICT may restructure major social relationships – interpersonal, intergroup, and institutional (Kling 1991). There does not seem to be a single logic that could explain the social changes because of ICT. Woolgar (2002) suggests that the ambiguity in the understanding of what kind of changes in the social order the use of ICT may produce may be elucidated by alternative ways of organizing the research.

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10 For summaries see Kohli & Sherer (2002) and Tallon et al. (2002).
agenda. He identifies two commonly used organizing principles and offers a third, alternative, way, to which this research tries to contribute.

The first organizing principle is to organize by substantive focus: for example, the impacts of new technology on education, work, medicine, home and the like, or around a particular social and/or political theme, such as, governance and digital democracy, crime and security, cyberspace/digital divide, power and politics, communities, or capitalism. Because the insights may seem wholly unique to the substantive domain under consideration, the drawback of this way of organizing is that the general analytic messages that arise may be lost (Woolgar 2002).

The second principle is to organize through a typology of different kinds of electronic technology, separating discussions of, for example, Internet technologies, mobile phones, video imaging and so on; the drawback being that the notion of technology itself may gain too much weight.

A third, alternative principle, which will be attempted here, is to emphasize the importance of circumstances that surround, sustain and make sense of ‘technology itself’, including the idea that, as technologies are changing, so too are our conceptions of them (Woolgar 2002). Others have also made similar calls for alternative ways both to organize the research agenda in this area and conceptualize the relationship between humans, technology and society (Kling 2000, Robey 1997, Stolterman 1995, Webster 2002)

Furthermore, Woolgar suggests that instead of taking statements such as ‘ICTs are rapidly penetrating all areas of life and are changing radically society’ as given and acceptable rationales for research, we need to ask the questions, ‘penetrating whose life?’, ‘changes for which people?’, and ‘by whom and which groups and agencies have these technologies been regarded as the impetus for radical changes?’ (Woolgar, 2002). Similarly, regarding the information society research Webster states that instead of accepting ex post facto reasoning that because there is more information (measured, for example, in bits or the economic value of information) we have an information society
Webster goes on to remark that, “we surely should examine the meaning and quality of the information. What sort of information has increased? Who has generated what kind of information, for what purposes and with what consequences?” (Webster 2002:26)

Woolgar also finds that new technologies are often related in an unproblematic way to general overarching macro-level trends, which gives rather little clue as to how these technologies are actually used and experienced in everyday practice (Woolgar 2002:6). Instead, he states:

we need to disaggregate the phenomenon, to focus much more on the bottom-up experiences, on the nitty-gritty of actually making the damn modem work. We need to ask critically whether, to what extent, and how such everyday experiences relate, for example, to shifting patterns of employment, to the development of wider social networks, and to global society. (Woolgar 2002:7)

These are the kind of questions that this thesis is attempting to cover.

1.4. The purpose and contribution of the thesis

The aim of this work is to increase our understanding of how our conceptions of an information society are constructed and reflected through our use and interpretation of ICT in specific everyday life situations. The work is thus focusing on ICT in everyday life, an area still largely neglected in empirical research on the information society, in particular, as the area where the information society would be constructed and interpreted.11 This interest further boils down to an empirical focus on the relationship between humans and ICT in various everyday life contexts. The purpose is to demonstrate how our increasing ICT use in various everyday contexts is constructing, transforming and shaping our understanding of an information society, through continuously changing our understanding of the contexts within it.

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11 For a much welcomed exception, see Heiskanen and Hearn (2004).
The relationship between ICT and social transformation is here studied through studying the relationship between humans and ICT within three specific contextual empirical settings:

- the office setting (Essay 1)
- the home setting (Essays 2 and 4)
- the regional community setting (Essays 3 and 4)

With ICT I refer, in particular in the empirical sense, for the most part to what could be called ‘office technology’: PCs equipped with common office applications, Internet connection, e-mail, and access to a printer, even a network (particularly in the office environment). However, the conceptual framework developed in this thesis should be applicable also to other types of ICTs and I, therefore, refrain from making a more precise definition, rather leaving it slightly open. There are also other reasons for openness in the definition that will become clear as the work unfolds.

The office setting was first selected because of my initial interest in organization research. The home setting was added because of the obvious lack of ICT related studies in this area and to mirror the balance of people’s everyday life that naturally consists of both work and home life. The community setting was then chosen as a third setting as it serves as a context for the home, and thus also serves as a link between private spheres and the surrounding society. Furthermore, there is not much research conducted in this area, although it is an emerging area. (c.f. Bannon and Griffin 2001, Carroll and Rosson 1996).

The thesis makes its contribution to the growing research area on the social aspects of ICT and computerization, also called ‘social informatics’ (c.f. Kling 2000). It started out critically questioning the rather hyped up view – which in recent times has calmed down considerably – on ICT and the information society that prevailed at the very end of the last millennium and that, in part, affected the way the research questions were posed and how the research was conducted. The thesis contributes both empirically and theoretically to the discussion within social sciences concerning the dual role of

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12 “the interdisciplinary study of the design, uses, and consequences of information technologies that takes into account their interaction with institutional and cultural contexts” (Kling 2000).
technology in society: how ICT is formed by society and simultaneously forms society. In the empirical study of everyday life contexts, ranging from the private sphere of the home, through to the context of work and towards the context of community, the study provides a nuanced and multifaceted view on human life in contemporary society. It deepens our understanding of how the everyday use of ICT is, for its part, structuring human action and interaction and constructing an information society throughout all levels of society. The thesis is unique in that it empirically studies the relationship between humans and ICT in several different social settings, thus trying to provide a broad, yet specific picture of the relationship between ICT and social transformation.
2. EXPLORING THE HUMAN-ICT RELATIONSHIP THROUGH THEORY

The human-ICT relationship has been studied in a number of different ways, using various perspectives with roots in different paradigms. This chapter is an effort to present how the ICT-relationship has been studied in various schools of thought. The way this chapter is structured is that I first briefly present how the human-ICT relationship has been conceptualized in the two main schools of thought that underlie most of the research in this area and how these two schools differ from each other. They are usually referred to as the technological determinist and the social constructivist views, where the main distinction is that humans are viewed either as passive receivers or active co-constructors of ICT.

Secondly, to give some overview of the vast research area, I will present some examples on how the human-ICT relationship has been conceptualized in the area of organizational research, where the lion’s share of research has been done. Also here, the underlying conceptualization of the human-ICT relationship is usually either determinist or constructivist.

Thirdly, there are some approaches emerging in this area that I find interesting, because they provide alternatives that hopefully are able to bridge the gap between the two seemingly incompatible perspectives on the human-ICT relationship. Furthermore, they try to embrace some of the dialectical nature of the intertwined and co-evolving human-ICT relationship. I have chosen here to call these perspectives socio-technical, as they are trying to see the human-ICT relationship in more dynamic ways than previous perspectives. They explicitly try to conceptualize in new ways the human – ICT relationship, either avoiding being determinist or constructivist or trying to take the best from both sides. Additionally, these theories are focusing on action and interaction between humans and ICT. The focus of the third part of this chapter will remain on these theories.
Lastly, I will summarize my own perspective into what is called here the socio-technical interaction perspective that underlies my research. On the basis of this perspective I will also explicate the specific research questions that have been dealt with in the separate essays.

2.1. From a dichotomised to an intertwined relationship

Determinist and constructivist conceptualizations

A problem with ICT-related research, contributing to the difficulty of understanding its effects in society, is the tension between two seemingly opposing conceptualizations of the human-ICT relationship, which to varying degrees have underpinned research in this area. In the more technology driven (technological determinist) view, humans, or ICT users, have been conceptualized as the passive receivers of technology and technology has been seen as an objective force with the purpose of determining behavior. In this perspective, developing technology has been in focus, and impact studies, assuming the existence of a causal logic between ICT implementation and human behavior, have been common. In its extreme form, it has further assumed that technology has an internal logic and that its development is independent of those who design, produce and use it, i.e. technology is viewed as an objective force and it can be developed to perfection. This view is also called the ‘black box’- view of technology. Another variation of the determinist view is that of economic determinism or managerialism, assuming that ICT can increase productivity, economic returns, and managerial control. Furthermore, the determinist view has assumed that organizational and societal transformation is predictable because it is directly linked to technology applying a causal logic. These perspectives are the traditional ones and they still dominate much technology related research in a large variety of subject areas and covering research into a huge range of different types of technologies.

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13 Such a point of view is, for example, reflected in human-computer interaction research into much used constructs like ‘user resistance’ (c.f. Hirschheim & Newman 1988), ‘technology adoption’ (c.f. Chau & Tam 1997, Lassila & Brancheau 1999) and ‘acceptance’ (c.f. Chau 1996, Straub et al. 1995, Gefen & Straub 1997, Igbaria et al. 1997), where users are seen as passive receivers of technology.
The constructivist approach has emerged mainly in opposition to determinism and often takes an ‘emancipatory’ or critical stance in opposition to capitalist and managerialist views of the relationship between humans and ICT. It is also an answer to the historical development of ICT, which has undergone such major changes that new approaches are continuously called for. In this conceptualization, humans have often been given an active role as co-constructors of technology and reality at large. ICT users are not only passive users or instruments of capital, but active, social, political, learning, communicating, interactive beings and technology should serve to release their potential and increase their quality of life. Studies using this approach usually have wished to uncover how humans are subordinated to technology, or they have emphasized the need for developing technology that liberates humans and are truly human centered. ICT is often seen as a process or activity and it is viewed as the outcome of strategic choices and social action. This view has further assumed that organizational and societal change, caused by ICT, is unpredictable, because change is the result of a complex web of actions and interactions between people, including a variety of contradicting forces. The constructivist approach has been applied in an increasing number of studies for the past twenty years. Variations can also here be found in the breadth to which studies are critical or mainly descriptive or interpretive.

Examples of human-ICT research representing the two paradigms

When reviewing literature concerning the relationship between humans and ICT in, for example, organization and information systems literature, the underlying perspectives are not always as clear-cut and obvious as they were presented above, they are nevertheless often detectable. Schienstock et al. (1999) summarized various perspectives on ICTs in organization research using different metaphors (see Table 2). Using the above distinctions, when looking at the functions and aims of these metaphors, one could roughly determine that determinism is underlying the first three (tool, automation technology and control instrument) and constructivism the last (process), whereas organization, technology and medium are more ambiguous and could be either/or.

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14 For one brief historical overview, see Dahlbom (1996).
15 For a more thorough discussion of human-ICT related research in organization and IS literature, see essay 1.
### Table 2. Perspectives on ICTs (Schienstock et al. 1999)

To give an example from the ‘computerization’ literature, Kling (1994) recognizes five common and important societal discourses used to describe the nature of computerization, the character of computer use and the social changes that result from computerization. The first two are the *technological utopian* and *dystopian* views, both underpinned by a technological determinist view that technology shapes society, the first in a positive way and the second in a negative way. The two social constructivist discourses he recognizes as the *social realist* and the *social theory* perspectives. The first is using empirical means and methods such as journalism, ethnography and critical inquiries to examine how computerization is actually perceived and practiced, and the other developing or testing concepts and theories that transcend specific situations. The fifth discourse he identifies as *analytic reductionism*, working with tightly defined conceptual frameworks where the human-ICT relationship is reduced to a few key concepts.

To briefly present the critique within which the constructivist approaches have emerged, the relationship between ICT and organizational and societal transformation in the determinist perspectives are seen as too simplistic. For example, Kraut et al. (1989) and a recent review of research on the impact of IT on organizations conclude (Robey, 1994) mentions: reinforcement politics (Danziger et al. 1982), web models (Kling & Scacchi 1982, Kling 1987, Kling 1992), structuration theory (Orlikowski 1991 and 1992, Poole & DeSanctis 1990, DeSanctis & Poole 1994), post-structuralist theories (Poster 1991), social control theories (Perroll 1988) and language action theory (Winograd 1988) all of which will not be further reviewed here.

<table>
<thead>
<tr>
<th>metaphor</th>
<th>function</th>
<th>Aim</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. tool</td>
<td>support work process</td>
<td>increase quality, speed up work process, cope with increased complexity</td>
</tr>
<tr>
<td>2. automation technology</td>
<td>elimination of human labor</td>
<td>cost cutting</td>
</tr>
<tr>
<td>3. control instrument</td>
<td>monitoring and steering work process</td>
<td>adjustment to changes, avoiding defects</td>
</tr>
<tr>
<td>4. organization technology</td>
<td>co-ordination of work processes</td>
<td>transparency, organizational flexibility</td>
</tr>
<tr>
<td>5. medium</td>
<td>setting up of technical connections for communication</td>
<td>quick and intensive exchange of information and knowledge</td>
</tr>
<tr>
<td>6. process</td>
<td>improve information system</td>
<td>continuous learning</td>
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</tbody>
</table>
that the only consistent finding is that the impact of IT in organizations is inconsistent. Thus, they wish to abandon deterministic assumptions about technology as being a driving force of change, enabler of more efficient organizational design, or other ideas reinforcing the causal logic linking IT with organizational change (Robey, 1997) or positive performance (Byrd and Marshall, 1997). Robey (1997) offers four theories from the social constructivist perspective that could be better used to explain organizational transformation using a ‘logic of contradiction’, where forces promoting change are contradicted by opposing forces favoring persistence. According to Robey, these theories better accept the possibility of the paradoxical consequences of technology in organizations and elsewhere in society: political theory, organizational culture, institutional theory and organizational learning (see Table 3). These theories are presented to exemplify the ongoing debate, but will not be further discussed or used in my work.

<table>
<thead>
<tr>
<th>Theories using a logic of determination</th>
<th>Organizational outcomes are determined by causal forces, or imperatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technological imperative</td>
<td>IT directly accounts for changes in organizational form.</td>
</tr>
<tr>
<td>Managerial rationalism</td>
<td>Managerial intentions for changes in organizational form are enabled by IT.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Theories using a logic of contradiction</th>
<th>Forces promoting change are contradicted by opposing forces favoring persistence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Political theory</td>
<td>Using IT as a resource, groups with incompatible opposing interests engage in political activity, from which organizational changes emerge.</td>
</tr>
<tr>
<td>Organizational culture</td>
<td>Cultural persistence opposes cultural change; information technologies are produced and interpreted as cultural artifacts that may symbolize a variety of values, beliefs, and assumptions.</td>
</tr>
<tr>
<td>Institutional theory</td>
<td>Institutionalized patterns and practices sustain an organization’s legitimacy and are unlikely to change. IT may be adapted to institutional practices or used to reform them.</td>
</tr>
<tr>
<td>Organizational learning</td>
<td>Existing organizational memory cannot be obliterated by IT, although technology may be used to support organizational learning.</td>
</tr>
</tbody>
</table>

Table 3. Summary of theories used to explain organizational transformation (Source: Robey, 1997:217)

Within the information society debate, Webster (2002) also opposes the determinist perspective. For example, he opposes quantitative measures of ICT use or penetration or
number of bits or signs, as accounting for qualitative changes from an industrial capitalist society into a society that would be of a markedly different form – namely an information society. He clearly opposes the more dominant societal discourses, viewing ICTs as the major enabling and driving force towards the information society and the studies measuring the information society in terms of the penetration of ICT and other technologies into society (e.g. Ricci 2000, Rai and Lal 2000).

**Humans and technology intertwined**

When I was reviewing ICT related literature and the debates around technological determinism and social constructivism, or whether technology determines society or the other way around, I was left with the feeling that this cannot cover it all. My thoughts were that the human-ICT relationship is viewed too simplistically and that there had to be more adequate ways to first describe and then explain the relationship. Dahlbom (1996) gave words to my thoughts and described the human-ICT relationship in the most fascinating way that came to form the basis of my own perspective on the human-ICT relationship.

One of the reasons for the tensions in this research area might be that our language and way of talking of technology forces us to see the human-ICT relationship as a dichotomy and not as something inseparably intertwined: we say people and technology, people using technology, the consequences of technology on society, society shaping technology (Dahlbom 1996). As ICTs are infiltrating more areas in life than the world of organizations and work contexts the whole way of thinking of technology and people (society) as separate, a dichotomy, may be inadequate. Modern information and communication technologies tend to disappear and, thus, be difficult to conceptualize: to be an efficient medium means to intrude less and less on the communication taking place (Wise 1997). As Dahlbom notes when he states that, ICTs have “radically changed the world we live in, the artifacts of daily use, the activities we engage in, the ways we do work and find pleasure, the ways we interact and find isolation” (Dahlbom 1996).

17 For further discussions and examples, see for example, Blom et al. 2001, Suominen 2000, and Uusitalo 2000.
As technology comes in all its varying forms, people and technology have become intertwined (Dahlbom 1996, Wise 1997). Wise (1997) talks about a new technological assemblage, which is increasingly pervasive and appears at the interface of ourselves and the rest of the social world. Technology could be perceived of as a form of life, an artificial world where technology in its many different forms is shaping our world and our lives, the conditions of our everyday existence and us, and where you cannot understand one without understanding the other (Dahlbom 1996). Because much of the literature in this research area has been based on seemingly inadequate presuppositions regarding the distinctions between technology and the social, the way of thinking of an intertwined human-ICT relationship requires approaches and conceptualizations that can embrace some of the complexity and duality involved in the relationship – keeping technology in the picture (Wise 1997) – and, that work in a variety of different contexts and settings.

2.2. Dialectic approaches to the human-ICT relationship

As I was searching for more adequate theories for viewing the human-ICT relationship as intertwined, I first ran into Wanda Orlikowski, who was then later followed by a number of others. Orlikowski (1992) recognizes a perspective she calls: technology as a trigger of structural change model, where technology is seen as an intervention in the relationship between people and organizational structure. Orlikowski’s model can be related to Kallinko’s theory of organized complexity, where technology, formal role systems and rules and regulations constitutes the organization through complex selections and monitoring of choices. Kling (2000) in turn promotes what he calls social informatics, which is similar to what Dahlbom (1996) describes as the new informatics – also sometimes referred to as the Scandinavian approach (to information systems design) (c.f. Dahlbom and Mathiassen 1995). Meyrowitz and Wise, in turn, seek alternatives in exploring social space and notions of social roles (Meyrowitz 1985) and various forms of agency (Wise 1997). I have chosen here to identify these perspectives as belonging to the socio-technical school of thought, as they are trying to see the human-ICT relationship in more dynamic ways than the purely determinist or purely
constructivist perspectives. However, some of these theories differ extensively from each other.

In the socio-technical systems perspective (STS), first introduced in the 1950’s, technology is seen in a multifaceted way as physical objects and artifacts, as activities or processes that makes or moulds something, and as the know-how of how to do this (c.f. Bijker et al. 1987). The STS approach opened up a new direction for the study of technology in organizations, focusing on understanding the relationship between people, technology and organizations, on the one hand, and the quality of work for individuals, on the other hand (Griffith and Dougherty 2001). The newer socio-technical perspectives go beyond the traditional views of technological determinism, industrial efficiency and rational/functional ways of thinking, stressing in various degrees the role of the social in technology implementation, use and design, simultaneously maintaining a dynamic view also on technology. Kling (2000) suggests that viewing ICTs as socio-technical systems in practice draws attention to various elements, which would be left out of a purely technical (or purely social) analysis. Such elements are, for example, people in various roles and relationships with each other and with other system elements, support resources (training, support, help), information structures (content and content providers, rules/norms regulations, including access authorizations and control), and a network’s content for various constituencies (including who is authorized to change the content and how that matters).

In Table 4, I have collected a list of various conceptualizations and theories on the human-ICT relationship as I identified them in the literature. In the remainder of this section, I present some main ideas of the socio-technical theories, their similarities and differences and the concepts that I have found most useful for a better understanding of the dialectics of the human-ICT relationship and for overarching some of the previous difficulties in this research area.

18 The Socio-Technical Systems approach has its roots in UK labor research and also in Scandinavia emancipation through the work of labor unions and good labor relations have a strong position in society, thus most probably influencing the emergence of a participative and user-centered approach to technology also in Scandinavia.
<table>
<thead>
<tr>
<th>Determinist</th>
<th>Constructivist</th>
<th>Socio-technical</th>
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</thead>
<tbody>
<tr>
<td>Robey, 1997</td>
<td>• Technological determinist</td>
<td>• Political theory</td>
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<td></td>
<td>• Managerial rationalism</td>
<td>• Organizational culture</td>
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<td></td>
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<td>• Institutional theory</td>
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<tr>
<td></td>
<td></td>
<td>• Organizational learning</td>
</tr>
<tr>
<td>Kling, 1994, 2000</td>
<td>• Analytical reductionism</td>
<td>• Social realism</td>
</tr>
<tr>
<td></td>
<td>• Technology utopian and dystopian discourse</td>
<td>• Social theory</td>
</tr>
<tr>
<td>Orlikowski, 1992</td>
<td>• Technological imperative</td>
<td>• Social informatics</td>
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<tr>
<td>Bijker et al., 1987, Bijker and Law, 1992</td>
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<tr>
<td>Latour, 1987, Callon, 1987,</td>
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<tr>
<td>Dahlbom, 1996</td>
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<tr>
<td>Dahlbom and Mathiassen, 1995,</td>
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<td>Garrety and Badham 2000</td>
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<td>Wise, 1997</td>
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<td>Kallinikos, 1998</td>
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<tr>
<td>for review see e.g. Bertelsen and Bodker, 2000</td>
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<tr>
<td>Winograd, 1988</td>
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<tr>
<td>Meyrowitz, 1985</td>
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<td>Schulman, 1996</td>
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<td>Webster, 2002</td>
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</table>

Table 4. Conceptualizations and theories of the human-ICT relationship
(*will not be further reviewed here)
Complex interaction between humans, ICT and social contexts

While perspectives like actor network theory (ANT, Callon 1987) and the social construction of technology (SCOT, Pinch and Bijker 1987) have successfully gone beyond organizational boundaries and studied technology elsewhere in society, the structurational model of technology (Orlikowski 1992) was developed to better understand the complex relationship between the social (people), the technical (information technology), and the institutional (organizations). From the moment I first came across this model, it has provided me with a more comprehensive way for understanding the complex interaction between technology, actors, and institutions. In particular, it served very well as an initial tool for understanding the complexity in the social processes driving ICT use and implementation.

Orlikowski’s (1992) model explains how technology is both socially constructed—a product of human action—and organizationally institutionalized—shaping the human actions by which it was first produced (see Figure 2). The model is a meta-theory that moves across different levels, yet without being abstract to the point of being difficult to relate to real life experiences and examples. On the contrary, it explains why the use of technology has power to change, for example, an organization well beyond what was preliminary argued for (for example efficiency and enhanced production) when implementing or encouraging an increased use of ICT. It also explains why it is difficult to predict the longer-term effects of technology introduction, and also why these effects change and later institutionalize patterns of human behavior. In other words, the model embraces the technologization process both at a micro and a macro level and explains how these levels are connected.19

19 Orlikowski’s (1992) and Orlikowski and Robey’s (1991) work as well as Giddens’ original work on structuration has been used as a base for a growing body of research. This research is concerned with developing and discussing the empirical applicability of the theories (c.f. DeSanctis and Poole 1994, Griffith 1999) especially in the field of IS development and research (Rose 1999, Pozzebon and Pinsonneault 2001, Rose and Scheepers 2001, Johnston 2001). This area of research will not further be discussed here.
Figure 2. The Structurational Model of Technology (Source: Orlikowski, 1992:410)

One could of course question why there are no arrows going from institutional properties to technology and from human agents to institutional properties, as institutional properties may open up options for technological development and human agents, of course, influence institutional properties through their actions. I believe, however, that these areas were somewhat outside of the focus of Orlikowski’s attention, because she was particularly interested in integrating technology into the actor-structure relationship of Giddens’ structuration theory and not into institutionalization or structuration per se.

One could relate Kalliniko’s (1998) theory of organized complexity to the above model in order to understand how technology intervenes in the process of social construction and institutionalization. His theory is concerned with social and cultural means for accomplishing patterns and predictable relations. An organizational architecture of constraints, by which elements are connected to each other (for example, rules and regulations), and that defines an organized complexity, emerges at the crossroads of the three constituencies. Complexity involves the institutionalizing of a set of selections regarding system defining elements (such as work roles in an organization) and the
development of the architecture of constraints. In his view, technology differs from the other two in that it attempts to detach intention from human beings and to entrust it to material artifacts, thus constituting, augmenting and patterning human interaction. Kallinikos defines tools and machines as assemblies of selected and reified possibilities, which are acted out by following the logic of their operative code. As the operational domain of technology – through increased information technology use – is expanding, the role of technology for determining how a certain task is to be performed is also expanding and changing; i.e. the relative significance of the three major constituents of organized complexity are redefined. However, this does not imply that technology shapes behavior in a deterministic fashion, because it still provides a horizon of open possibilities (Kallinikos 1998).

The various socio-technical perspectives on the impact of technology for organizational and societal change have in common a dialectic view that technology has a varying degree of interpretive flexibility, whereby the continuous use and interpretation of technology actually changes it (Bijker et al. 1987, Orlikowski 1992). This notion is clearly distinct from the more traditional, process view of technology implementation, where technology is viewed as being relatively static after having been implemented, for example, in the organization. This is also different from the purely constructivist view criticized by, among others, Wise (1997), in that there is a certain degree of interpretive flexibility in technology, i.e. it is not infinite. In other words, a certain technology has a number of inherent paths of development and use and to the degree that various paths can be chosen, the same technology has an inherent degree of flexibility in its future interpretations by and meanings to its users and developers.

Hanseth and Monteiro (1998) complement the notion of interpretive flexibility through the ANT notion of inscription. They find to be problematic Orlikowski’s (1992) point that “[t]he greater the spatial and temporal distance between the construction of a technology and its application, the greater the likelihood that the technology will be interpreted and used with little flexibility.” Hanseth and Monteiro (1998) counterpoint her in stating that, “According to ANT, however, the interpretive flexibility of a technology may increase as the distance between designers and users increases.” This is
because the closer the design of a technology (in this case organizational information systems) is to its users, the stronger and more inflexible programs of actions can be *inscribed* into the technology and the more the technology imposes its inscribed program of action on its user (Hanseth and Monteiro 1998). Regarding the content, flexibility and strength of inscriptions Hanseth and Monteiro (1998) state:

Inscriptions are given a concrete content because they represent interests inscribed into material. The flexibility of inscriptions vary, some structure the pattern of use strongly, others weakly. The strength of inscriptions, whether they must be followed or can be avoided, depends on the irreversibility of the actor-network they are inscribed into.

This, in turn, could be compared to Kallinikos’ idea of entrusting intention into artifacts.

The socio-technical perspectives have in common a focus on the *interaction* between humans, ICT and social contexts (Orlikowski 1992; Bijker et al. 1987; Bijker and Law 1992). This *interaction is on-going* and *action* is a key element. One theoretical base for this lies in structuration theory (Giddens 1984). In structuration theory, social activity is viewed as being both enabled and constrained by social structure. Human interaction draws on social structure, and in turn action continually changes or reproduces social structure (Hayes and Walsham 2000: 51). Thus, there is a dynamic relationship between the context in which a technological system is embedded, and the actors who act and interact within it. Orlikowski (1992) calls this the *duality of technology*, which means that technology is created and changed by human action as well as being used by humans to produce other action; i.e. it is *both* physically *and* socially constructed and constrained. Furthermore, once technology is physically constructed and then socially constructed to a certain degree, there is usually a general agreement on a current interpretation of what the technology is and how it is to be used – a temporary closure has been reached (Bijker et al. 1987). At this point, the technology tends to become institutionalized and distanced from the humans who constructed it and gave it meaning (Orlikowski 1992) – at least until it is opened up again for reinterpretation. The need for reinterpretation may rise, for example, because of learning or because changes in the surrounding context make a current interpretation problematic or even obsolete.
To capture the processual features of the interactions going on to reach a temporary closure, the symbolic interactionist concept of trajectory could be used. Trajectory in this tradition is 1) the course of any experienced phenomenon as it evolves over time and 2) the actions and interactions contributing to its evolutions (Strauss as cited in Garrety and Badham 2000).

Applying the initial STS perspective on technology as being simultaneously physical object, activity or process, and the know-how of what and how to do, and adding to this that ICT is media also, I view ICTs – particularly in the form of the office PCs studied here, which are developed far away from their users – to have a fairly high degree of interpretive flexibility. I further assume that the processes of social and meaning construction regarding ICT among users continue long after the initial implementation and taking-into-use. I find both the notions of interpretive flexibility and duality of technology, and also the ideas of temporary closure of interpretation and trajectory, helpful in exploring, in a dialectic way, the human-ICT relationship in the socio-technical contexts of everyday life.

**Actors and agency in socio-technical contexts**

In the socio-technical views, technology is constructed in *social contexts*. This is not abstract, but refers to specific matrixes of social relationships that play significant roles in influencing the ways in which people design and use ICT and thus affect the consequences of technology for, for example, work, organizations, or other social relationships (Kling 2000). Kling (2000) uses the concept of socio-technical interaction networks, whereas the SCOT approach uses the term relevant social groups (Bijker et al. 1987), the symbolic interactionist perspective uses the term social worlds (Garrety and Badham 2000), and ANT talks about actor-networks when referring to these matrixes of relations.

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20 This should not be confused with the use of the trajectory-term in economics of technology (Garrety and Badham 2000), nor to how has been conceived in the SCOT tradition (see Bijker et al. 1987 and Bijker and Law 1992).
Wise defines social space as the space created through the interaction of multiple humans over time. Thus, there is never one single social space, but multiple social spaces (1997: xiii). He distinguishes between place and space in that; “place is a practised space, a place with actors, with movements through/in/of places...The movement through space does not actualize all the possibilities of that place” (1997:124-125). It is within this context that the main difference between, for example, actor network theory and the other socio-technical schools lie. Actor-network theory (ANT) abstracts actors in the context to include also non-social actors (such as electrons and catalysts) that interact through networks, creating a coherent actor world (Bijker et al. 1987, Callon 1987), whereas Pinch and Bijker (1987) maintain a distinction between the social and the technical, and, for example, Meyrowitz (1985) only focuses on the social behavior of humans.

In his effort to go beyond the human-technology dualism of modernity, Wise (1997) first explores the notions of agency through the actor-network perspective and then in what he calls the Deleuzian perspective. Agency in ANT follows a symmetry principle between human and non-human actors in a network. The actor-network is not reducible to either network or actor, but questions about technology are asked in relation to empirically describable networks of human and non-human entities (Law 1987, Callon 1987). “Any element which bends space around itself, makes other elements dependent upon itself and translates their own will into a language of its own” is considered an actor in a network (Callon & Latour 1981:286, as cited in Wise 1997). Hanseth and Monteiro (1998) state that it is through the inscribed programs of action that the technology becomes an actor [or more precisely an actant], because it imposes its inscribed program of action on its user. The interest of an actor-network analysis is not solely in the actor, but in its relations with other actors: the actor and the network are two faces of the same phenomenon (Heiskanen, 2004). The symmetry principle is not only applied to non-human (for example, a computer) and human (a user) actors, but to micro (such as users and computers) and macro actors (akin to corporations and institutions) as well. The focus lies in the results and effects of agency in building and maintaining the network.
In comparison to the concept of the actant in actor-network theory, the symbolic interactionist perspective argues for using the concept of *boundary objects*. Boundary objects are, according to Star and Griesemer (Garrety and Badham 2000): “objects which both inhabit several intersecting social worlds and satisfy the informational requirements of each of them. [They] are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites.”

The critique against ANT, both in terms of the symmetry principle (c.f. Collins and Yearly 1992, Wise 1997), and the maintaining of existing power structures (Star 1991, Wise 1997, Winner 1993), is related more to the limitations of studies influenced by ANT than to its potential as a general research method. In fact its usefulness is widely recognized (c.f. Star 1991, Wise 1997) and it has opened up a whole new way of analyzing technology (c.f. Star 1991). In response to the critique against symmetry, Callon and Latour (1992, as cited in Heiskanen 2004) assert that the intention is not to *prove* symmetry between humans and non-humans, but instead, to use ANT as a methodological heuristic tool and to ask how and why *asymmetries* are established.

In the Deleuzian perspective (Wise, 1997), effects in social space are achieved through corporeal and incorporeal agency. Corporeal agency is the ability to achieve effects through physical contact and incorporeal agency without corporeal means, i.e. through words, meanings and signs. Wise (1997) calls these Technology and Language respectively and it is the relationship between the two that is important for understanding the ways technology and social space intertwine, interact and are mutually constitutive. Agency always involves both technology and language, and they are the two fundamental characteristics of human beings (Deleuze and Guattari 1987, as cited in Wise 1997); their use in a particular relation constitutes human beings (Wise 1997:59). It is the shift in the balance between language and technology (tool and symbol) that alters the formation of human social space; human existence is marked by language and technology in a particular relation (Wise 1997: 52, 59). “To eliminate either technology or language entirely would lead us out of human space.” (Wise
In short, to Wise, social space is composed of the stratification of technology and language (Heiskanen, 2004).

In the social informatics school of thought, social agency derives from *social access* to technology. Social access refers to the *necessary know-how* in using technologies in ways that enhance professional practices and social life, including, for example, a mix of professional knowledge, economic resources and technical skills (Kling 2000). Social access is opposed to technological access, usually meaning only physical access or the availability of suitable hardware and appropriate software for a given activity. Social access is accompanied with the notion of *social resources or social infrastructure* that supports the use of a technical infrastructure (Kling 2000) and is equally important for both developing technical systems as it is for analyzing them. Such resources are, for example, technical installers, trainers, and consultants. Together, of course, the technical and social resources build up the socio-technical system.

I suggest that various perspectives on actors (social or non-social) – and their relationships to each other, and agency in socio-technical contexts or networks are helpful in the effort to better understand the dialectics and sources of complexity in the human-ICT relationship.

**Electronic media shifting spatial, temporal and social organization**

Notions of time and space in socio-technical contexts have also been explored (c.f. Castells 2000, Giddens 1990, Meyrowitz 1985, Moores 1999) and can explain some of the emerging complexity in the human-ICT relationship. Giddens, for example, considers that examining the recombination of time and space, the separation of time from place and space from place is crucial to understand the dynamism of modern times (Heiskanen, 2004:16). The stretching of social relations across time and space, a process Giddens calls time-space distanciation, is characteristic of modernity. Different electronic media have contributed significantly to the shifts in spatial and temporal organization of social life, dislocating space from place (Moores 1999). This dislocation, gives us opportunities for instant access to distant or virtual locations,
which in turn affect how we, for example, experience presence and absence, familiarity and estrangement, i.e. the cultural experience of modernity (Moores 1999).

In Meyrowitz’s (1985) view, the biggest social changes, in relation to electronic media, stems from its undermining of the relationship between social place and physical space. This undermining has occurred as electronic media (in particular TV) has served as an instrument of demystification of previously separated experiences. By revealing previously ‘backstage’ behavior, for example, the image and prestige of political leaders have been demystified, as have adults to children and men and women to each other (Meyrowitz 1985). Meyrowitz’s (1985) theory is one of the few notable attempts at overcoming the barrier of the traditional division in media studies between studying ‘mass’ and ‘interpersonal’ communication separately, and at simultaneously grouping technologies and forms of communication into a single domain of investigation (Moores 1999). The basic argument of his theory is summarized when he states that:

many of the traditionally perceived differences among people of different social “groups,” different stages of socialization, and different levels of authority were supported by the division of people into very different experiential worlds. ... Such distinctions in situations were supported by the diffusion of literacy and printed materials, which tended to divide people into very different informational worlds based on their different levels of reading skill and on training and interest in different “literatures.” These distinctions were also supported by the isolation of different people in different places, which led to different social identities based on the specific and limited experiences available in given locations. By bringing many different types of people into the same “place,” electronic media have fostered a blurring of many formerly distinct social roles. Electronic media affect us, then, not primarily through their content, but by changing the “situational geography” of social life. (1985:5-6)

His theory has profound consequences for how and why ICT or electronic media actually can be seen as drivers of social change, not at all in a technology determinist fashion, rather in a truly social one. It is through affecting the social roles of affiliation (group identity), transition (socialization), and authority (hierarchy), that electronic media affect social behavior, because new media moves or removes boundaries between social situations. Meyrowitz’s theory is a very useful tool for understanding in detail both why and how ICT as media (and other media as well) changes our social reality,
i.e. society, social interactions and relations by shifting social boundaries between people or groups of people.

Contrary to Meyrowitz, Webster (2002) finds that increased access to theoretical knowledge, in particular, has an impact on how our social order is constructed. Therefore, as ICTs are one of the main tools for increasing access to information, the relationship between humans and information should also be explored. Schulman for example, defines information like this:

In the common sense view of information as an entity, all things that exist in the physical world are potential sources of information. As such, information has the properties of the physical world and exists regardless of our perception of it. In other words, information is something independent of humans. It is inanimate, incapable of acting or exhibiting agency (1996:368),

He further adds that the dimension of meaning of information exists only in the relationship between humans and information, and thus belongs to the category of the human world and not the category of the physical world (Schulman 1996:368):

When the human agent enters the scene and reads the information a fundamental change takes place. In the relationship between human agent and information something new is created that we usually call meaning. Information does not contain meaning per se. Meaning is brought about in the relationship between the reader and the information being read (Ibid.).

In Webster’s conceptualization of the information society (2002), he maintains that on an everyday level, the prime concern in exchanging or receiving information is its meaning and value. However, using Schulman’s (1996) distinction between information and meaning, we cannot examine the meaning and quality of information other than by examining it in concrete relationships with human agents. This is why it is important to study, in everyday life, the meaning people give both to their relationship with ICT and to the information they receive through it.

In summary, I find it useful to use these various ways of looking at actors and forms of agency, the ideas of the duality of technology and interpretive flexibility, the stretching
of time and space, the shifting boundaries between social situations, and the idea of the meaning of ICT and information, as tools for analyzing the dialectic nature of socio-technical contexts in everyday ICT use. They all add to the understanding of how humans and technology intertwine, in that they shed light on different aspects of the dialectical human-ICT relationship and the various actors and type of agency that actors display. They also add depth to the structurational model of technology (as described earlier in this chapter).

2.3. A socio-technical interaction perspective on the human-ICT relationship

In this section I summarize the socio-technical interaction perspective that underpins my empirical research. The perspective supports the idea that developing, implementing, taking-into-use, using, interpreting and re-interpreting ICT is a continuous process (Robert and Grabowski 1996), regardless of whether it occurs within an organization or another social context. This process, as with all artifacts (seen as phenomena, not manifestations of phenomena), eventually subtly, yet fundamentally, changes the way we think, act and interact with each other in various contexts, because it helps, hinders or prescribes organizational and individual action and influences our perception of reality to a point where it even shapes beliefs, norms and cultural values.

Furthermore, I remain open to the possibility of social transformations facilitated by ICT, yet skeptical to technological utopian, determinist, or dystopian claims. In my understanding, whether in research or in other forums of debate, underlying any development, implementation or assessment of technology in all areas of human life, there lies a set of values and interests of various social, political and organizational agents (c.f. Bijker & Law 1992). I do not view ICT as a force of change in its own right, because, whether made explicit or not, developing, implementing and assessing technology ultimately has a political and social character. This does not mean that ICTs do not potentially have a transformative effect on society – especially through their medial functions – nor does it mean that transformations have to be revolutionary.

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21 Even researchers, who can be included among the agents, act according to underlying values and interests (for example, Boland 2002, Bromely 2002, Ihde 2002).
(Kling 1991), but instead, can be subtle and contextual. Technological development can be seen as a nondetermined, multidirectional flux that involves a constant negotiation among and between groups shaping technology, i.e. there is no one best way, rather social groups define the problems of technological development (Bijker et al. 1987).

The position taken here is also one embracing the idea of an on-going interaction between humans and technology where action is a key element. Furthermore, technology is not seen here as objective, nor ‘perfect’ in the sense that it could be evaluated objectively regardless of its relation to the humans with which it interacts (see further, Manion & Evan 2002) nor in simplistic economic terms (c.f. Bjørn-Anderssen 1988, Orlikowski 1992, Sauer & Yetton 1997, Truex et al. 1999, Atkins & Dawson 2001). Rather, it is assumed here that to have impact ICT first has to be used by humans. For humans to use technology they have to find it a meaningful activity in some way or the other. For finding the use of technology meaningful they have to interpret it, which is done according to their frame of reference. A frame of reference consists of a person’s values and beliefs, which are formed through background knowledge and experience, personality and other dimensions related to the human psyche, as well as his or her social, historical, cultural, political and technological context; i.e. interacting with and through technology is contextual. In turn, this means that the frame of reference of each individual technology user will ultimately determine how he or she interprets technology, if and how he or she will use a given technology, and which technology he or she will use and which not. The interpretation and use of technology of one user will, however, have an impact on the frame of reference of other users by affecting, through learning, knowledge sharing, imitation, reinterpretation, negotiation and competition, the social and technical context where the use of technology is occurring.

In short, the socio-technical interaction perspective developed here takes a dynamic rather than passive view on the humans who are affected by increased ICT implementation and use in all spheres of life, but it also tries to see how these humans, through their own actions, sustain and increase this use in different contexts.
2.4. Research questions

In support of the overall purpose, to shed more light on the links between ICT and the shaping of society, the empirical research task here is to probe into the questions of for who, by whom, to what end and with what consequences are certain ICTs developed, implemented and taken into use in various everyday life contexts.

The empirical studies conducted in the three empirical settings (home, office, and regional community) focus on the following research questions:

RQ1: Because ICT cannot be seen as a force of social change in its own right, the first question is:

What kind of actors and other forces are driving increased ICT use and development in the various socio-technical contexts of everyday life and how do these actors and forces work? (Essays 1, 2, 3 and 4)

RQ2: Because the increased use of ICT in all areas of life cannot be explained in ‘economic rational’ or ‘technology determined’ ways, the second question is:

a) How do humans accept, domesticate and integrate ICT into the different contexts of everyday life? (Essays 1 and 2 in particular)

Because very little is known about the ways in which ICT affects our everyday life in terms of, for example, social relations, interactions and meanings, the second question continues:

b) What kind of consequences and meanings for everyday life can be recognized from this integration? (Essays 1, 2, 3 and 4)
3. RESEARCH APPROACH AND METHODS

This chapter first presents the general research approach applied in the thesis. It then goes on to describe in more detail the particular methods used for gathering data in the projects that make up the empirical base of this thesis.

3.1. Interpretive and hermeneutic research approach

To a large extent, my views on reality and knowledge creation, especially in regard to the phenomenon under study (the relationship between humans and ICT), have been outlined and positioned in relation to methodological perspectives and previous research in the Introductory chapter and in the Theoretical section of the thesis (Chapters 1 and 2). These views form the base in my choosing the phenomena to study and the methods applied to study them. The purpose in this chapter is to explicate the research projects and methods further and to pinpoint the research approach to make it easier for the reader to position the work within the epistemologies\(^\text{22}\) and research paradigms\(^\text{23}\) that underlie all scientific research.

The close interest in and attention to the very specific relationship between humans and ICT, with a focus on actors, action, negotiation, interpretation and meaning of ICT in everyday life contexts, that characterizes and ties together this otherwise broad work, emphasizes the interpretive nature of this work. Although no specific method connects together the broad research material, the mode of analysis as a close, interpretive and, to some extent, critical reading of text, in terms of interviews, observations and other material, and the subtle, on-going dialogue both between theory and empirical material and between researcher and subjects, clearly indicates the character of this work as:

\(^{22}\) For further discussion on epistemologies underlying business studies, see (including entrepreneurial studies in particular and social science in general) for example, Kovalainen (2000). For an overview of modern movements in European philosophy, see Kearney (1994)

\(^{23}\) For discussions of research paradigms in organizational studies, see Burrell & Morgan (1979) and Deetz (1996), and from a perspective of qualitative research, see especially Morgan & Smircich (1980) and Myers (1997).
Interpretive:

in the sense that “[Information Systems] research can be classified as interpretive if it is assumed that our knowledge of reality is gained only through social constructions such as language, consciousness, shared meanings, documents, tools and other artifacts. Interpretive research does not predefine dependent and independent variables, but focuses on the complexity of human sense making as the situation emerges (Kaplan and Maxwell 1994); it attempts to understand phenomena through the meanings that people assign to them (Boland 1985, 1991; Deetz 1996; Orlikowski and Baroudi 1991). Interpretive methods of research in IS are “aimed at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context” (Walsham 1993, pp. 4-5).” (Klein and Myers 1999)

Critical:

to the extent that the task has been “one of social critique, whereby the restrictive and alienating conditions of the status quo are brought to light. Critical research seeks to be emancipatory in that it aims to help eliminate the causes of unwarranted alienation and domination and thereby enhance the opportunities for realizing human potential (Alvesson and Wilmott 1992b; Hirschheim and Klein 1994). To make this possible, critical theorists assume that people can consciously act to change their social and economic conditions. They do, however, recognize that human ability to improve their conditions is constrained by various forms of social, cultural and political domination as well as natural laws and resource limitations.” (Klein and Myers 1999)

Hermeneutic:

in the sense that it applies the idea of the hermeneutic circle by which “we come to understand a complex whole from preconceptions about the meanings of its parts and their interrelationship” (Klein and Myers 1999). Human understanding is reached by iterating between the interdependent meanings of the parts and the whole that they form, where the ‘parts’ and the ‘whole’ should be broadly and liberally interpreted (ibid.).

There is the question of whether or not the critical and interpretive approaches may clash if applied within the same research project. I agree that to some extent they might if not explicitly kept apart, for example, in the writing of a research report. Critical research pays most explicit and direct attention to matters of agency and to moral and ethical issues, whereas interpretive studies aim at showing how realities are socially produced and maintained through norms, rites, rituals, and daily activities (Deetz 1996). It is not impossible, however, to find hybrids of the two discourses, where one is
explicit and the other only subtle and implicit, perhaps without the researcher even being aware of the implicit one.\textsuperscript{24} In this work I, therefore, wish to emphasize that the main approach is interpretive, but I want to make the reader aware of my own underlying inclinations that I have found often to be of a ‘society critical’ nature. It is not only research data that I, to some extent, treat critically but, in the effort to avoid uncritical use of existing theory, also the reading of theory and previous research reports has included, from my part, a constant questioning of underlying assumptions and seeking of alternative theories and explanations. Thus, I think it is fair towards the reader to make the critical undertone explicit where justified, so that my claims are correctly interpreted. Accordingly, as the approaches in the different research projects, described in the next section, vary in the degree to which they are more or less interpretive or critical in nature, I have made the differences between them explicit (see next section: Table 5: mode of analysis).

3.2. Overview of the research projects and methods

The research method should be chosen to fit the phenomenon one is studying and as the best possible way to answer the research questions. Because the aim of this research was to understand a complex phenomenon through studying different settings, I used a number of different research methods in the studies that are further presented in the four essays. Approaches that I have used are a case study, mainly based on interviews; a longitudinal study, using different methods for gathering data, and a comparative study, using four longitudinal studies for comparison (see overview in Table 5).

The empirical materials for the essays I collected in three different research projects. The first project considered the computerized dimension of office work where, as a means of data gathering, I used people from some client organizations for a pilot group interview (workshop) and my business school (Hanken) as a case study. The second project is called the IT-families project, which was a regional development project aiming at increasing ICT-knowledge and use in a local area. The study was a

\textsuperscript{24} For example, Kling (1994) finds that, with closer scrutiny, Zuboff’s (1984) social realist (interpretive) work displays an anti-utopian (critical) undertone.
longitudinal study of 50 families, who received a personal computer for their use in the home and training for a period of two years (ending in spring 2002). Their computer use and the changes in their conceptions of the computer, the internet and the information society, was continuously followed up through surveys, written essays from the family members, meetings, and interviews. A third study was also made in the comparison of the IT-families project with three other EU-funded development projects all with a similar character of longitudinal action research studies.

<table>
<thead>
<tr>
<th>Research project:</th>
<th>Case Hanken</th>
<th>IT-families</th>
<th>Rural area development</th>
</tr>
</thead>
</table>
| **Method:**       | Pilot workshop + interpretive case study:  
• close to grounded theory approach  
• ethnographic stance  
• critical undertone | Longitudinal field study:  
• a type of action research approach  
• ethnographic stance | 4 Longitudinal field studies:  
• a type of critical, comparative approach  
• four longitudinal action research studies |
| **Type of data:** | Qualitative:  
• group interview  
• interviews  
• documents/meetings  
• observations | Qualitative and quantitative:  
• interviews  
• essays  
• surveys, observations etc. | Qualitative & quantitative:  
• data from four longitudinal case studies  
• meta-data on the cases |
| **Mode of analysis:** | Interpretive/explorative/inductive | Descriptive/interpretive (mainly)/critical (to some extent) | Descriptive/comparative/critical |
| **Reported in:** | Essay 1 | Essay 2 and 4 | Essay 3 |

Table 5. Overview of my research projects and methods

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25 The distinctions regarding methods and modes of analysis that are used here are mainly adapted from Myers (1997) and Klein and Myers (1999).
3.3. Pilot workshop and case study: Hanken

Based on Orlikowski’s (1992) structurational model of technology (described previously) and Kallinikos’ (1998) theory of organized complexity, I drew a process model of ICT impact in the organization, or what I called ‘organizational virtualization’ (Figure 3). To gain more pre-understanding, I then used the model as a basis for discussion in a workshop with six ICT users in September 1999. At this point, my research interest was on the impact of ICT introduction for changing (or ‘virtualizing’) the organization. However, it became evident when analyzing the pilot study that what we really discussed during the workshop was what impact ICT introduction had on office work in general and for the individual participants in particular.

![Figure 3. The impact of ICT introduction and use in an organizational setting](image)

The left-hand side of the model illustrates Orlikowski’s (1992) structurational model of technology. The mid-part of the model breaks down what occurs within the organization (the gray ovals symbolizing the organization), based on Kallinikos’ (1998) theory of organized complexity, where functions, formal role systems and technologies are the three major constituencies of formal organization. The last oval (left-hand side) contains the changed organizational situation, because of technology introduction and use, which we know relatively little about empirically. The framework contained a time dimension
going from left to right, i.e. from new technology introduction to, through learning and re-interpretation, resulting, in time, in new qualitative understandings of how the organization works. The triangular relationship between agents, technology and institutional properties of the environment and the organization is maintained throughout the model i.e. from left to right. The dotted arrow going back from right to left, symbolizes that a new understanding of technology equals the introduction of new technology into the organization and, thus, reflects the iterative and ongoing character of the virtualization process. The framework gave an overview and provided insight – both to me and to the workshop participants – into relationships that only partly can be reached through empirical investigation.

I then further explored in a case study (Case Hanken), the pre-understanding that I had gained from the model and the discussion in the workshop. Empirical data can, to a certain extent, reflect upon institutional properties, although they are to some extent difficult to detect. For example, using systems breakdowns as opportunities for data gathering gives some direction on the institutional properties of the system. The optimal way for me to study this kind of process would have been to follow through the process longitudinally within an organization from a ‘time 1’ to a ‘time 4’. This was, however, not possible for me to do in practice, so the empirical part of the study I based on a ‘time 4’ study with respondents having to go back in their memory and recall ‘times 1-3’. In practice, because of the circularity of the process, the different ‘times’ may also be difficult to distinguish from each other because they are overlapping and a ‘time 4’ is always simultaneously a new ‘time 1’, i.e. it is at the same time a reason for as it is a result of ICT introduction. The ‘times’ may also be occurring simultaneously, for example, in different parts of an organization and, furthermore, they may occur so slowly that they would be difficult to detect even over a longer period of time.

My main method of data gathering in the case study was interviewing ICT professionals from the IT department and ICT users in various different positions in the school. Interviews were conducted in January-February 2000. Also participating in meetings, observation and informal conversations added to the material. Because of a server change in the business school, I also had the opportunity to take advantage of the idea to
use systems breakdowns to detect institutionalization of ICT use. The five semi-structured interviews with ICT users in the business school and the pilot workshop/group interview provided me with the main set of data that I analyze in essay 1. The method of analysis of this material could be characterized as interpretive, explorative and inductive. The other material that I gathered served more as background information for myself than for deeper analysis, but, of course, this material influenced how I as a researcher saw and interpreted the interview material. A more detailed description of the method for this study can be found in essay 1.

Inspired by the grounded theory approach (originally developed in Glaser and Strauss, 1967) the model in Figure 4 was drawn out of the analysis of the workshop and case material. As this model was never included in the essay where the material is otherwise presented, I decided to include it here, as it did form an important pre-understanding of the actors and forces that are driving increased ICT use at various levels in society and, thus, could be seen as one of the results of this thesis. The model reflects the various roles as user or driver of ICT use that both individuals and organizations can have depending on the context and situation. For example, a user of ICT in an organization can be a peer or a pioneer in another context. An organization also has different roles as either user or driver of ICT use, depending on in which relationship this is considered. Another element in the model is the role of ‘heritage’ that is inherent in the task to be performed, in the individual (in terms of, for example, culture, experience and education), and in the organization (for example, in terms of information and communication structures). Furthermore, national and international decisions regarding infrastructure, standards and policies affect the way ICT is further used both at an individual and an organizational level. The notion of technoculture was used in the model to show that there are cultural inclinations towards, for example, admiring technology and people and organizations that are knowledgeable and that seem to be at the forefront of ICT use and development, which seem to be a driver of increased ICT use.
To a certain extent this study formed the basis for the thesis and assisted me in developing my first arguments for the rest of the essays. The results of the study provided a base for going beyond the office context and entering into more untouched areas of ICT use, such as the home and community settings. For example, as seen in the above model, actors that influenced both individual and organizational ICT use sometimes came from the contexts outside of work. It seemed to some extent impossible to study ICT use in the vacuum of one context, because on the individual level people are actors in and influenced by many contexts simultaneously. These insights also formed my argument for writing the thesis in essay form, focusing on various different contexts and aspects, instead of a monograph trying to encompass ‘the whole world’. With this approach it is obvious that this thesis does not provide a complete and detailed picture of the whole, but it does provide several interrelated specific pictures of a whole that may even be impossible to grasp in its totality.
3.4. IT-families project

Following the results from the case study, in the IT-families project, I moved away from the work context and into the private sphere of the home to see how ICT affects life in other settings than those which are purely work related. The reasons for such a shift being that there seemed to be a gap in the literature and research in this area and because I was given the opportunity to take part in a longitudinal field project including 50 families that I could study for a period of two years.

The IT-families project consisted of 50 families, a total of 183 people recruited through adverts in local newspapers and radio programs, who received a PC with software, printer, Internet connection (through modem), and e-mail for each family member over six years old. Participants could keep the equipment throughout the two year-long project, as long as we could study them, and what they did with the computer. After the project, participants could buy the computer for a small fee. The project started with planning and fundraising in 1999. In January 2000, participants were recruited and the last contact with the families was the collection of a concluding essay in February 2002. My involvement in the project started sometime in March 2000 after the families had been interviewed and selected, but before they had received their computers and the project, in that sense, had officially started. The project design was thus given to me from the start, whereas the research part of the project, including designing and conducting the study (questionnaire design and design of essay assignments and the like) and reporting on it, became my responsibility in the group. As an aid there, was an internally developed electronic tool for data gathering and I had a team of staff that were involved in the project.

Data was gathered mainly through electronic means: questionnaires and essay assignments were distributed to 92 adults and 42 children, a total of 134 persons. The data in this thesis does not cover children under six years old. Electronic data gathering has a specific advantage in that transcription (essays) and data entry (surveys) is automatic. However, a lot more pre-work was needed from my part, particularly with surveys where coding and databases had to be built up and perfected before the
questionnaire was distributed. A further problem that slowed down the process of distributing questionnaires and essay assignments was that there were two language groups in the project: Finnish and Swedish speaking Finns were both represented. Subsequently, each question, set of answers and assignment texts, plus cover letters and other instructional texts, had to be perfectly translated, so that the answers to questionnaires of both groups could be merged in the same database and analyzed as one set of data. A professional translator first translated questions and alternative answers and other texts and then I double-checked her translations. Data gathered from the project can be seen in Table 6.

<table>
<thead>
<tr>
<th>Time of data collection</th>
<th>Type of data collected</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb 2000</td>
<td>Initial structured interviews with one representative from each family</td>
<td>50</td>
</tr>
<tr>
<td>Jun 2000</td>
<td>Essays on the first meeting with the computer when it arrived in the house</td>
<td>96</td>
</tr>
<tr>
<td>Aug 2000</td>
<td>Questionnaire answers on usage and learning patterns and initial use of the computer</td>
<td>94</td>
</tr>
<tr>
<td>Oct 2000</td>
<td>Essays on the family and their computer</td>
<td>80</td>
</tr>
<tr>
<td>Jan 2001</td>
<td>Questionnaire answers on surfing the Internet, playing games, shopping, e-mailing and banking with the computer</td>
<td>90</td>
</tr>
<tr>
<td>April 2001</td>
<td>Structured essays around 5 questions regarding the information society</td>
<td>36</td>
</tr>
<tr>
<td>Aug 2001</td>
<td>Questionnaire answers on usage and learning patterns, evaluation of the project and one’s own learning, of the teaching, of the technical support and of the project in general</td>
<td>74</td>
</tr>
<tr>
<td>Feb 2002</td>
<td>Essays with concluding remarks on the project</td>
<td>20</td>
</tr>
</tbody>
</table>

Table 6. Data gathered from the IT-families project

26 Smaller children were interviewed separately, see Öhberg 2001.
27 I am bilingual, but translating between the two very different languages proved to be too difficult and time consuming for me to do on my own.
More detailed descriptions of this project can be found in essays 2, 3 and 4 and on data gathering and methods in essays 3 and 4. 28

3.5. IT-families project in comparison to three other rural area development projects

The comparative study was a joint effort between five researchers, with four different EU-funded development projects, the IT-Families project being one of them. In February 2001, the five of us coincidentally met at a working conference for doctoral students where the organizers had placed us in the same group to outline a possible joint paper on virtual community. Each of us was in charge of a project (one acted as a coordinator on behalf of the conference) and provided data and descriptions of our own projects into the research process. After years of co-authoring over e-mail and meeting in conferences, myself and one of the other authors finally published an article in The Information Society (Gripenberg et al. 2004, Essay 3 in this thesis). Following the results gained from the pilot workshop and Hanken case study, one of my contributions to the article was the idea of viewing the projects in terms of macro-actors driving a European information society through increasing ICT use in rural areas. With its European and political perspective, this study opened up a seemingly untouched area of research.

Meta-data on the IT-Families project that was used in this study I gathered throughout the period of my involvement, as a natural part of participating in the project. Meta-data concerned, for example, the project aims, number and demographics of participants, technology that was to be applied, sources of funding, important actors for driving and initiating the project, and planning, coordinating and executing all the activities around the project that were not part of active data gathering. Interviews and discussions with colleagues and other people that were involved in the project and documents, like funding applications and meeting minutes, were used as sources of data. More details on these and the other projects can be found in essay 3.

28 All assignments, questionnaires, cover letters, instructions and so forth for all the separate sets of data gathered in this longitudinal study as well as a schema of all activities in the project can be obtained upon request from me in either Finnish or Swedish. (They have not been translated into English.)
4. ICT USE IN EVERYDAY LIFE: SUMMARY OF THE EMPIRICAL STUDIES

This chapter shortly presents the main results of the four essays (Appendices 1-4) and their relations to the aims of the thesis. The order of the presentation is based on the ways in which the studies are connected and build upon each other and not on how they were chronologically finished or published.

Essay 1: Virtualizing the office: micro-level impacts and driving forces of increased ICT use
Author: Pernilla Gripenberg
Status: book chapter
Data: Pilot workshop and Hanken case study

Leaning primarily on the structurational model of technology (Orlikowski 1992) and the different agency perspectives when analyzing interview and case material, the first essay explores the human-ICT relationship in the office setting. It looks at how ICT and humans interact on a micro-level in offices and the consequences of this interaction for office work. The essay firstly attempts to identify micro-level actors and other forces driving increased ICT use (‘virtualization’) in the office setting. It makes an attempt at describing how individuals make sense of ICT and the changes it brings about in various aspects of their work tasks and how they perceive their work. The analysis goes further in trying to describe change and the institutionalization of that change as a social learning process occurring through the everyday use and interpretation of ICT, in changing, for example, communication patterns, perceptions of time and place, perceptions of work load, responsibility, and information load.

The main contribution of essay 1 to the thesis lies in the broad description of micro-level forces driving ICT use in the office setting, thus answering research question 1: What kind of actors and other forces are driving increased ICT use and development in various socio-technical contexts of everyday life and how do these actors and forces work. In an effort to summarize the web of forces and processes that both sustain and
drive ICT use at micro- and macro-levels in the office setting, at least the following were included:

- technology enthusiasts of different kinds, not necessarily experts, but anybody who could decrease uncertainty for a user in a given situation
- emotions driving learning, especially the frustration of being unable to solve problems in relation to using ICT and the joy of being able to do so
- habitual use of ICT together with features in technology that makes humans dependent on it, yet leaving them with less control over their tools
- technologically supportive culture, including an admiration for technology and for people who are knowledgeable about technology with an often firm belief that technology will make things easier and better for humans, without having to prove itself
- political and other external forces regarding structural, institutional and economic matters, such as infrastructure, national and international standards, laws and regulations regarding technology and its use
- commercial competition between organizations

Furthermore, regarding how some of these forces work, the results confirmed what has also been found in previous literature:

- that ICT in the office setting was not static but interpretively flexible (e.g. Bijker et al. 1987, Orlikowski 1992),
- that decisions regarding ICT use were not always formal and rational but could be coincidental and influenced from anywhere in the context and (e.g. Burkhardt and Brass 1990, Byrd and Marshall 1997)
- that personal interaction was a key for learning, which gave a central role to those who were more knowledgeable about ICT (Burkhardt and Brass 1990, c.f. also Zuboff 1988).

Other forces on the micro-level that sustained or drove ICT use were recognized as a social learning and construction process oscillating between users, peers and enthusiasts and fuelled by sentiments of personal satisfaction or frustration.

The essay contributes also to answering research question 2, in particular the second part: *How do humans accept, domesticate and integrate ICT into different contexts of everyday life and what kind of consequences and meanings can be recognized out of this*. One area where, to some extent, the unexpectedly large micro-level effects of increased ICT use could be detected was in the structuring of information. Uncertainty about information matters gave rise to a continuous interpreting, re-interpreting and negotiation of how the existing ICT was supposed to be used and why. Issues like
which media to use, where to post messages, when to use e-mail, when to print paper copies, how to sort, file, and store messages, both in e-mail and in Intranets were constantly debated. This concern ranged across levels, from individual decisions on how to sort and store e-mail messages, to how to structure and distribute department information, to how to build up company web pages, data bases, and so on.

Other effects of ICT use that were detected in the data, were changes in communication and interaction patterns between, for example, employees and superiors or teachers and students. How to judge the validity of information and its source was an issue of concern for interviewees that needed both learning and further interpretation and negotiation of useful rules of thumb. The fast pace of e-mail interaction affected, not always positively, both perceptions of time and the ability to concentrate for longer periods of time. The Internet also seemed to have an effect on how time in relation to work and tasks was perceived. The instability of the new technical and socio-technical system seemed to be an unexpectedly large source of insecurity and even lead to the duplication of work.

In sum, the essay shed more light on the links between ICT and the shaping of society in that it described how the ever-changing meanings and new interpretations of what ICT is and for what and how it is supposed to be used, are turning into completely new ways of acting and knowing things in an increasingly ICT supported environment. The changes described in the essay are going beyond an original routine or task that ICT may initially have replaced and, coming closer to a new and different understanding of what work is about and what it is becoming. In short, the changes described are about how ICT use reshapes behavior and about the changes in power, roles, rules and regulations that ICT use gives opportunity for, starting often in the organizational setting, but reflecting into other spheres of society and human life as well.
Essay 2: Living with IT: uses and interpretations of computers in the home and family context

Author: Pernilla Gripenberg
Status: reviewed conference paper
Data: IT-Families project: essay and questionnaire data

Drawing mainly on ANT (c.f. Latour 1987, Callon 1987) and the social construction of technology (Bijker et al. 1987), including the ideas of the duality of technology and an interpretive flexibility for analyzing essay and questionnaire data from the IT-families project, this essay examines the human-ICT relationship in the home context. The focus is specifically on the domestic use and interpretation of ICT. The essay provides a nuanced description of how ICT, in the form of a PC and an Internet connection, enters the home of the participants and then how it is slowly accepted and integrated into their lives. The purpose is to describe the qualitative changes in the nature of home and family life that accompanies a PC and Internet connection when brought into the home. More specifically, the essay describes how participants start using their computer and Internet connection for leisure, entertainment, games, and also for banking, shopping and communication, thus giving technology a variety of new meanings as well as giving these concepts new dimensions (i.e. changing participants’ reality). It further describes how the participants perceived the effects of ICT on their life in the home.

The main contribution of the essay to the thesis lies in the detailed description of how the human-ICT relationship develops in the home over time, thus, for the context of the home, answering research question 2 (a) and (b): How do humans accept, domesticate and integrate ICT into different contexts of everyday life and what kind of consequences and meanings can be recognized from this integration. The results of the essay include a step-by-step description of the first encounter with the new PC:

- how participants first perceived their computer when it arrived at their doorstep in a number of boxes, whose contents had to be fitted in somewhere and a large number of manuals that supposedly had to be read,
- what kind of activities and negotiations between family members occurred in making physical space for the PC and deciding where it would best serve everybody’s interests,
• what happened when everything was fitted in and all parts connected to each other and the family gathered around the computer to switch it on.

The essay also describes in detail how the perceptions of the computer changed over time from first being perceived more as a toy, towards being used more as a tool for specific tasks. It describes how the number of uses expanded over time going from surfing the Internet, playing games and paying bills to also include doing calculations, picture processing, writing and receiving e-mail, and chatting over the Internet. In addition, the description includes how participants’ interpretations of the computer expand over time, from being gray, square boxes accompanied by a frightening amount of cable and manuals, to being a medium for banking shopping and communicating in ones home.

In describing how the computer becomes part of family life, the essay makes an attempt at exploring the computer as an actor in the family. This exploration analyzes:

• what kind of emotions the computer evokes in the participants
• how, when and with whom did participants use the computer
• what kind of new rules did this new actor give rise to
• how did it change family members relations to each other
• how did it affect the perception of time and space

In sum, the essay showed that having and using a computer at home required both some physical and 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 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. Despite the fact that in some cases children were able to instruct their parents in PC use, the computer did not seem to substantially change the character of family relations (such as giving more power permanently to the children). The new PC could be compared to projects that have been the focus of more attention for some time, like buying a new car or going on a family holiday. From the perspective of how the results link to social changes in society, for example, the change of not leaving ones home to go banking or shopping or meeting friends may have further consequences on the individual’s social life. In addition, when home computing becomes even more
common, it will probably reflect back on how, for example, banking and other business will be structured in the future.

**Essay 3: Entering the European Information Society: 4 rural area development projects**

Authors: Pernilla Gripenberg and Ingjer Skogseid, with the help of Francesco Botto, Andrea Silli and Virpi-Kristiina Tuunainen

Status: journal article

Data: IT-Families plus three other EU-projects

Drawing upon ideas of various actors displaying agency at micro and macro levels in socio-technical contexts (e.g. Bijker et al. 1987), using the IT-families project as a case and comparing it with three other European development projects, this essay explores the link between ICT and the shaping of society from the perspective of rural area development projects. As the surrounding context and political decision-making plays an important role in how ICT is perceived and used in various specific social contexts, this essay uses the four projects in identifying the particular actors and forces driving these projects and how these actors relate to each other. The cases are further used in identifying the actual process of change as well as common issues of concern in the technical, organizational and receiver realms of the projects. The results showed that, although the projects seemed fairly different at first sight, the main actors fell into the same categories and the same type of problems occurred in the projects.

The contribution of the essay to the thesis is that it provides a description of actors and the forces driving ICT use at a macro-level (the EU) in the regional community setting, thus answering research question 1: *What kind of actors and other forces are driving increased ICT use and development in the socio-technical contexts of everyday life and how do these actors and forces work.* The essay provides evidence that, although the content of different ‘virtualizing’ efforts may vary, the actors and driving forces, in particular on a macro-level, may be similar. In these cases they were identified as:

- **political initiators** at EU and national levels,

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29 An earlier version of this article has been published in the electronic proceedings of IRIS24, see Botto et al. 2001
facilitators in the form of a research institution or similar communities concerned by the efforts, and ICT that was being provided.

Such identification is important in that it provides understanding of how increased ICT use is driven on a macro-level. Because various actors have various interests, this essay also shows that the process of change is of a political and social character more than it is determined by the technology that is being used and implemented.

The actual change process could be identified in the four projects as consisting of four dimensions:

- An opportunity provided by different EU funds
- A motivation to initiate a project in a particular area, like a perceived need to ‘go virtual’, increase ICT knowledge, to take on the e-economy challenge etc.
- A transformation e.g. from real community to virtual community, from separate communities to network of communities, from no community to virtual community etc.
- A goal of a network structure to be reached through increased ICT use

When analyzing issues of concern in the four cases it was recognized that the critical issues often arise in the relation between major actors, mainly as problems resulting from the different expectations between them. For example, expectations about project outcomes varied between initiators and facilitators and the expectations about IT skill level and development varied between facilitators and community members. Moreover, expectations about technology and what it could truly provide varied in all the relations between technology and facilitators, technology and initiators and technology and community, showing that expectations need to be clarified and modified constantly during the process. In other words, technology was socially constructed and continuously re-constructed during the project.

The essay also gives answer to part two of research question two: How do humans accept, domesticate and integrate ICT into different contexts of everyday life – and what kind of consequences and meanings can be recognized from this integration – by analyzing what kind of consequence the ICT implementation had for the communities involved when it came to acting in an ICT supported environment. An important finding
was that it seemed to take a lot of time to get acclimatized to such an environment because of several obstacles that require a lot of individual effort and willingness to learn from the participants. Obstacles that were identified were:

- difficulty in trusting people one has never met
- finding a common language to communicate in
- understanding features in the technology
- lacking shared culture to increase understanding between people

To overcome these obstacles, participants needed to sense that there were real benefits in using the new space and that it was worth the effort to learn how to use the ICT, or the project would be likely to fail. Another reason for failure was that a virtual space needs a certain kind of critical mass so that participants meet someone when entering – otherwise it soon becomes an empty, non-used space.

In sum, the essay shed light on the links between macro-level actors and increased ICT use in the light of EU development projects for developing regional communities towards a European information society. It increased the understanding of forces driving increased ICT use in communities that can be considered rural and somewhat outside mainstream technologization and thus, according to some macro-actors, in need of outside intervention. One of the conclusions drawn was that, perhaps, more effort could be put into considering the real needs at the level of involved communities to define what kind of needs and expectations they have, instead of pushing solutions from above to problems that, possibly, not are perceived as problems at all by the participants.

Essay 4: The IT-families: Supporting IT learning in a community setting

Author: Pernilla Gripenberg
Status: working paper to be further developed
Data: IT-families

Using the IT-families project as a case of learning ICT use the fourth essay contemplates on what kind of skills are perceived to be important in a contemporary information society and the changing technological environment and, further, on how learning these could be developed and supported at a community level. However,
because the content of skills and knowledge needed in an information society varies through time, the focus is more on how to learn than on what to learn. This essay differs somewhat from the others in that here, the researcher takes on an active role as an actor that sets out, not only to study, but to change a situation. Thus, this essay draws on some of the knowledge gained in this thesis and uses the ideas of socio-technical contexts and agency as tools for increasing ICT use among participants. The essay first presents the historical arguments for studying computer related skills and then argues for a choice of a social constructivist and experienced based learning/teaching approach as well as an action oriented research approach when setting up the longitudinal field trial. The aim of the project was to find models for developing IT-related skills that could also be used at a community level elsewhere.

The contribution of the essay to the overall aim of the thesis lies in the studying of a major action to increase ICT use in a community setting. This essay contributes to research question 1: What kind of actors and other forces are driving increased ICT use and development in various socio-technical contexts of everyday life and how do these actors and forces work? Because the researcher actively takes on the role of an actor that sets out to make an impact on ICT use among the participants, the contribution is more focusing on how forces of change in a community setting work and how they affect the skill level of individual participants.

The project set out to build a model for developing ICT related skills and to test this model on the 50 families that had entered the project. The results show that the model was indeed successful and that the participants had developed enough skill and knowledge to be able to continue the learning path on their own. The model stressed the existence of various equally effective paths to learning from which participants could choose. The program was extensive and directed towards the whole family, including training sessions, information events, family nights, technical support through a helpline and house calls, as well as a project homepage.

The contents of the program stressed that there are different kinds of knowledge and skills that are needed in order to be able to succeed in the information society. Such
knowledge was divided here into three main categories based upon previous research and data from the project:

- **technical knowledge and skills**, including understanding how to install the computer and its various parts and how to use these, how to protect and take care of the computer, how to install and manage programs, understanding of accessory appliances, their compatibility and installation
- **applied knowledge and skills**, including what kind of applications and programs exist on the market, how can they be used and what functions do they have, how can their use be combined, how can accessory appliances be used and their use combined with different programs
- **general knowledge**, including understanding benefits and drawbacks of ICT, understanding effects of ICT on ones own and ones children’s life, understanding of required premises for ICT to function on a societal level, understanding of general effects of ICT on a societal level.

To conclude, the results show that different forces in the everyday context influence different types of knowledge. Therefore, learning computer related skills is best supported using a combination of techniques that, in turn, support different dimensions of the skills and knowledge needed to succeed in the information society.

Applied knowledge was best supported through:

- in-course instruction
- practising and experimenting independently and in cooperation with someone else
- self-directed learning through following others and reading

Technical knowledge was best supported through:

- technical support (help-line and home visits)
- practising and experimenting independently and in cooperation with someone else
- self-directed learning through following others and reading

General knowledge was best supported through:

- interacting with environment
- in-course instruction
- practising and experimenting independently and in cooperation with someone else
Furthermore, having a network or support group among family and friends provides a good opportunity to find solutions to IT related problems in the immediate environment. Directing the program towards the whole family ensured this kind of support.
5. DISMANTLING THE MYTH OF TECHNOLOGICAL IMPERATIVE

This chapter starts with an effort to summarize the findings of the thesis and map the areas covered by the different studies in relation to the research area. The chapter goes on to discuss the strengths and limitations of the approaches in the thesis. Finally, the chapter offers some concluding remarks and suggestions for future research directions.

5.1. Summarizing the findings

The purpose of the thesis was to give a broad, yet specific picture of the human-ICT relationship in various socio-technical contexts in everyday life. The studies reported on in the essays moved on different levels ranging from micro- to macro-level and covered somewhat different aspects of the research questions. In Figure 4, I have tried to map the studies into a matrix to show what areas were covered by this research (c.f. also Figure 1 in the introduction to the thesis). As can be seen from the matrix, the areas covered by the studies presented in the four essays are by no means exhaustive nor are both research questions covered extensively in each of the studies, however, there are numerous other settings that could and should be studied as well.

The aim of the thesis is to increase our understanding of the relationship between ICT and the social shaping of society. In probing into the questions of for who, by whom, to what end, and with what consequences is ICT developed, implemented and taken into use in various socio-technical contexts, the results of the thesis indicate that the forces driving societal change in relation to ICT use are complex. As can be seen throughout this work, forces driving ICT use are a mixture of political, economical and social interests as well as also being psychological traits of users and features within the ICTs employed, moving both within and across micro- and macro-levels of society. That ICT and technology in general is often used rhetorically as the inevitable force of change only conceals the various interests that are inevitably underlying increased ICT use.
Therefore, it is all the more important to further study the interests of the forces driving ICT use in various contexts and at various levels of analysis.

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<th>ICT Integration &amp; Consequences</th>
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<td>Collective</td>
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<td>Human-ICT in national development projects (essay 3)</td>
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<td>Macro-level</td>
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</table>

**Figure 5. The level of analysis and research focus in the studies**

The empirical studies of socio-technical contexts of everyday life provide a multifaceted view of life in a contemporary [information] society. To deepen our understanding of how an everyday use of ICT is structuring human action and interaction and constructing an information society, the findings suggest that it is possible – and desirable – to study the human-ICT relationship using theories than can embrace the dialectic nature of the human-ICT relationship and bridge the determinist-constructivist division. Concepts derived from such dialectic theories that were successfully used here to further our understanding of the consequences of ICT use were:

- the ideas of interpretive flexibility and duality of technology
- various forms of actors (human and non-human) and agency
- the stretching of time and space
- the shifting boundaries between social situations
- the idea of meaning of ICT and information
- viewing humans as holistic beings co-existing and co-evolving with technology

The thesis further showed that emphasizing the circumstances that surround, sustain and make sense of ‘technology itself’ (Woolgar 2002) gives a holistic understanding of how
ICTs are integrated and subtly affect the way we live, our relationships to each other, our social world, our society and our everyday lives. Studying socio-technical contexts of everyday life gives us a better understanding of how the information society is subtly constructed, not only through everyday ICT use, but also through the continuous social construction of this use that permeates society at various levels. Only in this way can we come to understand how we can develop truly ‘better’ ICT, i.e. ICTs that make peoples’ everyday lives better and not better technology per se.

In an attempt at generalizing the findings of the separate studies and relating them to previous studies and theory, the findings suggest that:

- In becoming part of the network of people and things that structure our lives, ICT use considerably affects both the way humans think, act and interact with each other and with ICT in various socio-technical contexts, and thus changing our social reality and how we conduct our everyday lives.
- The way ICT affect our lives is not always solely positive but can mean that office personnel, for example, are more dependent and have less control over their own work, and that people’s spare time is more physically restricted to the walls of ones home, wherein one is deprived of many previously natural sources of unmediated social interaction.

Further, the findings confirm that:

- ICTs, in particular in the form of office technology mainly studied here, indeed exhibit a high degree of interpretive flexibility and duality in the various contexts, and thus continue to be changed by their context long after implementation and taking-into-use (as well as reflecting these changes back into the surrounding context).
- It is possible to successfully study the human-ICT relationship in dialectic ways balancing between the constructivist and determinist extremes.
- There are indeed various social, economical, political, technical and even psychological forces driving increased ICT use at various different levels in various socio-technical contexts in society.

The main finding of the thesis can be summarized as:

- By oscillating between empirical and theoretical investigations and balancing between determinist and constructivist conceptualisations, it was possible to build up a dialectical framework that can be used in studying socio-technical contexts in society. This framework helped giving clear glimpses of how societal change is embedded in complex social processes surrounding everyday ICT use. For example, interacting with and through ICT changed perceptions of time and
space, social roles, and the ways to communicate, which at some point in time emerges as societal change, in terms of, for example, new ways of acting and knowing things.

5.2. Strengths and limitations

The close interest in and attention to the very specific relationship between humans and ICT, focusing on actors, action, negotiation, interpretation and meaning of ICT in everyday life contexts, emphasized the interpretive nature of the thesis. As interpretive field research of a hermeneutic nature has emerged as one important approach in information systems research, Klein and Myers (1999) suggest a set of seven general interdependent principles for evaluating such research. These principles can also be applied as an aid in the conduct and reporting of such research (ibid.) and thus to reflect upon the strengths and limitations of the research reported on in this work. The principles, which draw on key ideas in anthropology, phenomenology and hermeneutics30, are:

1. The fundamental principle of the hermeneutic circle: all human understanding is achieved by iterating between considering the interdependent meaning of the parts and the whole that they form (fundamental to all other principles).

On a general level this principle can be seen in the thesis in the way the research tried to understand a complex whole of how the everyday use of ICT subtly brings about changes in how society may be perceived, and again changes how ICT may be used and so forth.

On a more personal level, this principle can be recognized in the research process: how I started out questioning the relevance of my first research project on ‘computer literacy in the work force’— later abandoning it altogether only to return to it as I had gone a full circle. In many ways my understanding grew in a circular way, and the detours made me come back and see things I already thought I understood in a different light. The circular development of my understanding is not as visible in this report as it perhaps could have been. This was partly because it is written in a context where the positivist

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30 For further discussion, see Klein and Myers (1999), for an excellent overview and further resources of qualitative research in information systems, see also www.isworld.org
writing tradition first was more visible to me. For me, this meant that presenting the end results was more important than presenting the process of how I came to pose the research questions in the first place and how they continuously developed throughout. Secondly, I was not at first aware of the hermeneutic circle, but I continuously felt that I was going around a problem that somehow seemed to escape me. I thought I was constantly changing my research subject, whereas in fact I was continuously exploring the human-ICT relationship and how it had been studied in various contexts and within different paradigms. It was only when I was close to the end that I really grasped and could put into words what exactly I had been striving for.

In the projects themselves, the hermeneutic circle is best applied in the IT families project, where new questionnaires and essays were to some extent based on replies from respondents to earlier assignments. In the Hanken case in particular, and at some point also in the IT-families project, it would be interesting to return again and, in a sense, complete a new circle of increased understanding. If it would have been possible within the time constraints of this work, it could, of course, also have benefited the results of the thesis.

2. The principle of contextualization: requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged.

Throughout, the thesis aims at, if not critically reflecting, at least making explicit the background of the different research settings as well as my own context as a researcher and of the research process.

3. The principle of interaction between the researcher and the subjects: requires critical reflection on how the research materials (or “data”) were socially constructed through the interaction between the researchers and the participants.

In the careful accounting of the research methodology in the IT-families project, this principle is more explicitly reflected to than in the Hanken case and pilot workshop. In the pilot workshop, however, such a social construction of a shared understanding between researchers and subjects was in fact the whole point of the workshop. In the Hanken case, it was clear many times that the way I posed the interview questions made
the subjects think in certain ways that they had not done before, and thus a more explicit discussion of this principle could have benefited the first essay.

4. *The principle of abstraction and generalization*: requires relating the idiographic details revealed by the data interpretation through the application of principles 1 and 2 to theoretical, general concepts that describe the nature of human understanding and social action.

Klein and Myers (1999) concluded that it is perhaps so that this is a leading principle of interpretive field studies of a hermeneutic nature. This is so because understanding new ‘data’ requires pre-understanding. Also, this thesis relies heavily on theory and pre-understanding and the theoretical and conceptual foundation is extensive, yet developed in oscillation with the empirical work. However, theoretical pre-assumptions could perhaps have been more clearly presented in the essays, so findings could have been better related to theory in the separate essays.

5. *The principle of dialogical reasoning*: requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings (“the story which the data tell”) with subsequent cycles of revision.

In the introduction and methodological sections, I have tried as explicitly as possible to make my own presumptions, and how they have developed throughout, visible. Going further back into my own history and how my own understanding of ICT has developed throughout this research process, two things could further be added, relating also to the principle of contextualization. I grew up with a father and cousin/best friend who could be called ‘techno-freaks’ and I both admired and was very much influenced by them. They kept me up to date with the latest in computer technologies and I came to learn a lot about and appreciate this, at that time (1980’s and 90’s), new and truly exiting technology through them. This appreciation was one of the initial driving forces of the research conducted here, but today, after several revisions throughout the research process, I am considerably less enthusiastic and increasingly critical towards the way we so often fail to see ICT as an integrated part of everyday life. Yet, having written a whole thesis about it, I myself still tend to fall into this trap every so often – it is difficult to view humans and technology as truly intertwined.
6. **The principle of multiple interpretations:** requires sensitivity to possible differences in interpretation among the participants as are typically expressed in multiple narratives or stories of the same sequence of events under study. Similar to multiple witness accounts even if all tell it as they saw it.

This principle is perhaps most visible in the comparison of the IT-families and the other European development projects, as the purpose was to identify the various actors and their expectations of the various projects. It was also applied in the essay regarding the Hanken case and more subtly in the essay on living with computers in one's home. Making use of this principle could certainly benefit essay 4 in the future.

7. **The principle of suspicion:** requires sensitivity to possible ‘biases’ and systematic ‘distortions’ in the narratives collected from the participants.

The last principle can, to some extent, be said to permeate the whole thesis in that both theories and previous work, as well as the data collected, was continuously questioned for relevance and underlying interests and assumptions.

In sum, the strengths of the interpretive approach used here lies in that instead of predefining dependent and independent variables it tried to encompass something of the complexity of human sense-making as the human-ICT relationship emerged in the various contexts. Furthermore, instead of measuring how and what humans do with ICT, it tried to understand the human-ICT relationship through the meanings that people assigned to this relationship. Thirdly, instead of taking a pre-set and static view of technology, it tried to understand the context of technology and the processes through which it is influenced by and influences the surrounding context. To the extent that the thesis took a critical stance, the most important contribution lies in the dismantling of the myth of technology being the driving force of society.

A limitation of this work could be found in the way the material used here seems somewhat scattered and does not seem to cover a consistent whole or totality of a research problem. The reasons for this can, to some extent, be found in the coincidental nature of the research process. However, lending from the idea of the hermeneutic circle, we can come to understand the whole by iterating between studying
interdependent parts and the whole that they form. Not having covered all possible interdependent parts, I believe it is still possible to say something about a whole that they form. In addition, I do not think I would have reached the level of understanding I have done during this rather long journey into the human-ICT relationship by using any other approach than the kind of explorative approach that was employed in this work.

Another limitation in the effort to provide a framework for the study of such a broad phenomenon as the human-ICT relationship and its links to societal change is, of course, the disadvantage of under-representing or even leaving out perspectives that may have been of importance in the analysis. What I have tried to do is to cover the perspectives I have found most central in contributing to the emerging field of social informatics and to find commonalities in perspectives not previously compared and combined to the extent I have done here. Moreover, much ICT-related research is not reviewed here as I have concentrated on the literature that is of relevance for the empirical studies, i.e. computerization in the home, office and regional community settings. Even so, I am aware that literature reviews in the essays could have been more extensive, in particular in essay 1. This limitation is due to the fact that I have focused on three different areas, instead of one, which would have generated more overlap and had made the reviewing process easier.

5.3. Conclusions, reflections and suggestions for further research

While this research was conducted over a period of over seven years, many things have happened in the research area during the writing of the various parts of this thesis and it is thus difficult to provide a crystal clear model of the results. On the other hand the emerging nature of the work has contributed to the flexibility in the empirical work and to the possibility to integrate different discussions into the theoretical framework. The thesis is not only a theoretical discussion, but should also be seen in light of the empirical work that supports it and vice versa. This hermeneutic approach, thus, to some extent constrains the theoretical framework, excluding perspectives that are not reflected in the empirical work, nonetheless, it does further elaborate on the perspectives as they were used in the empirical parts.
Two conclusions can be drawn from this thesis. First, that there is a whole empirical area, of which this thesis covered only a small part, in which the human-ICT relationship should be explored further and in more detail, using dialectical socio-technical perspectives. Second, further work is also needed to elaborate on the theoretical framework, which only made one attempt at combining and integrating some of the most promising perspectives in the research area, but there are certainly other concepts and theories that could be integrated.

Using dialectical theories and empirical investigations for probing further into the questions for who, by whom, to what end, and with what consequences are certain ICTs developed, implemented and taken into use in different socio-technical contexts will give us a much better understanding of where our relationship with technology is going. In other words, probing further into the aforementioned questions will increase our understanding of how technology structures our social world and how we affect this structuring through our own choices and ways of using – or not using – ICTs in various contexts. This, in turn, will hopefully give us the possibility to recognize options in the development of the human-ICT relationship and a better sense of how our choices affect the nature of society, i.e. whether, and to what extent, an extensively ICT-supported information society is, in the long run, a desired form of society. More importantly, however, to better inform public, societal, and political debates we need to raise the societal awareness that the information society is a joint project of societal design (Stolterman and Schuler, 2000) and not only a commercial project or something that goes on above peoples heads, i.e. under the ‘inevitable’ force of technological progress. In order to raise such awareness more interdisciplinary efforts could also be beneficial, for example, between sociologists, technologists and philosophers of technology and society.

For a more specific agenda for future empirical research, my first suggestion is to explicate more firmly the ‘myth’ of technology being such a driving force behind societal change and to study more carefully who and what the forces are that sustain this myth on various levels of analysis and how they work in other contexts than those covered here. For example, more macro-level research is needed to highlight and
understand the forces that are driving increased ICT use in the network of companies and institutions that benefit [economically] the most from ICT use. 31 Such examples of these are producers, vendors and marketers of technology, but researchers too should not be forgotten. Technology emanates from a wide range of specific constituencies (Woolgar 2002, compare also to Kling’s and Iacono’s 1994 ‘computerization movements’) common to market driven, capitalist societies and the following areas are ones that should be studied further:

- supply-side electronic industries and suppliers of electronic goods in general
- advertisers who emphasize the beneficial effects
- media accounts that tend both to dramatize and polarize potential outcomes
- commentators and analysts (some social scientists included) who wish to draw attention to specific kinds of impact
- the legion of experts and consultants who offer certainty in the midst of uncertainty
- participants in policy debates and policy processes, not least politicians and various government agencies

These could be studied using agency perspectives in order to understand how they drive increased ICT use in everyday life situations. Also, the contexts and networks of the large amount of very technologically driven ICT research should be studied more carefully and the consequences of this research examined and debated more critically in society. Attempts at forecasting future trends, for example, of mobile phone Internet (Funk 2005) or at visioning the future of, for example, ambient intelligence in the home (Friedewald et al. 2005), should be used, not only as predictions of a future that we need to accept as it comes, but as basis for critical societal discussions of whether they picture a future that we want, and whether they should be actively supported or actively worked against or re-worked into something else, for example, through democratic processes or new legislation.

The decision processes of technology development and implementation nationally, internationally and individually should also be studied further. Decisions regarding ICT development and use could be examined further; for example, in terms of national and

31 For example of research emerging in this area, looking specifically at the telecommunications industry see Cheng et al. 2003 and on the drivers of wireless broadband see Rao and Parikh 2003.
international regulations,\textsuperscript{32} standards, political strategies and polices,\textsuperscript{33} and in terms of consumer decisions to buy or not buy or to use or not use certain ICTs in home, work and other contexts. The consequence of consumer decisions and the reciprocal nature of technology adoption and domestication processes in various contexts and with different forms of ICTs should be studied empirically in more detail. Although consumers may not be aware of it, it is within these processes that individual users, through their choices affect, for example, the success or failure of certain technologies, and therefore also affect the future of the human-ICT relationship.\textsuperscript{34} To raise awareness among consumers that individual ICT choices do have further consequences than one may perhaps perceive of, more effective societal dissemination of research in this area is, in my opinion, needed.

My second suggestion for the empirical work would go in the direction of the effects of ICTs (in a very broad sense), as media and the effects of shifting boundaries in social situations (c.f. Meyrowitz 1985 and Wise 1997) and the increase in access to theoretical information (c.f. Webster 1995). In combination, Webster’s and Meyrowitz ideas make a powerful framework of the effects of electronic media on social relations and how we conduct our lives. It also becomes obvious that the medial effects of ICT on society are both largely underestimated and understudied. With what is going on in technology development and the convergence of different ICTs that has been going on for a while, like digital TV, various forms of mobile technologies, like camera-phones and palmtops, not to mention the rapid growth of the Internet, this research area is exploding with material and unanswered questions. How the shifting boundaries between social situations and the increased access to all kinds of information further affect our lives in various social contexts should be considered in more detail. A particular focus on the relationship between various ICTs and quality of life could also be further explored.

\textsuperscript{32} See, for example, Kielbowicz 2002 in special issue on regulating the Internet.
\textsuperscript{33} See, for example, Axford and Huggins 2003 in special issue on political sociology and local governance of the Internet.
\textsuperscript{34} For promising examples of research emerging in this area see Lehtonen 2003 and Selwyn 2003, see also De Marez and Verleye 2004.
Research around the aforementioned themes is emerging and should be used for further reference. For example: studies on mobile phone use among young people (Aoki and Downes 2003 and Davie et al. 2004); Internet use in relation to quality of life (Leung and Lee 2005), how people growing up with Internet differ from previous generations and why Internet is perceived as seductive by these people (Leung 2003) and can engage people in flow experiences (Pace 2004); and the use of mobile communication devices to support work and communication outside traditional work settings (Peters and Allouch 2005 and Schrott and Glückler 2004).

For developing the theoretical framework for studying the dialectical human-ICT relationship and on how technology, humans and society inter-link there are at least two options. First, continuing to work with and integrate the various socio-technical perspectives introduced in the theoretical part will provide more fine-grained concepts that can be used empirically to understand the links between ICTs and society on an even more detailed level. For example, language action theory and activity theory that were not specifically discussed here could be incorporated into the framework and compared with the perspectives presented here. Furthermore, Meyrowitz’s ideas of how electronic media affects behavior through affiliation, transition and authority could, for example, be better integrated into the framework and further used for empirical exploration.

Secondly, adding other perspectives that were left out might give new insights into these relationships. For one example Kellner (2000), represents an interesting option from philosophy in his development of a critical theory of technology. His concept of technocapitalism and how the restructuring of capital (c.f. also Castells, 1989) is producing a new social configuration that he terms the infotainment society is particularly interesting, in that it could be contrasted with the previous information society concept. In the research area covered here this concept could open up new avenues for illustrating how ICT blurs the boundaries between previously distinct contexts. As a concept, infotainment society points to the merger of information and media industries and to the significance of new technologies of information,
entertainment and social reproduction that we can see happening today. ‘Infotainment society’ suggests that the information society is no longer about the restructuring of such things as production, capital or labor in terms of information with the help of ICT, but rather a merger of spheres of life that have been previously at least analytically distinct.

Another convergence of concepts that could open up new avenues for studying socio-technical contexts is *glocalization*, pointing to the shifting boundaries of time and space in which ICTs are both used and produced and that, of course, further shape both the design of the ICTs and the contexts in which they are being used. Of particular interest could be the changes in our perceptions and interpretations of locality that extensive use of phenomena like the Internet, both for information seeking, sharing and communicating, may result in. This concept may also be useful in exploring further the sorts of new cultural and social spheres and public spaces that are enabled and emerging because of ICTs (e.g. Kellner 2000).

Lastly, I would like to make a call for integrating more critical writings on the philosophy and sociology of technology into the framework for understanding the role of ICT in society – something that I was not able to do here – and to raise more public awareness of the effects of ICT use in society through these writings.

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35 According Roland Robertson, the term glocalization describes the “tempering effects of local conditions on global pressures”. At a 1997 conference on Globalization and Indigenous Culture, Robertson said that glocalization “means the simultaneity --- the co-presence --- of both universalizing and particularizing tendencies.” (http://searchcio.techtarget.com/sDefinition/0,sid19_gci826478,00.html) (See further Prof. Robertson’s home page at http://www.abdn.ac.uk/sociology/staff/rolandR.php)

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APPENDICES


**Essay IV:** Gripenberg, P. ‘Supporting IT learning in a community setting: Report on the IT-families project’. Unpublished report to be further developed into a journal article.


